

6<sup>th</sup>  
Edition



How to Prepare for  
**DATA  
INTERPRETATION**

**CAT**  
for

Common Admission Test  
& other Management Examinations

Arun Sharma

Mc  
Graw  
Hill

**6<sup>th</sup>**

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DATA  
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EDITION

# How to Prepare for DATA INTERPRETATION

# CAT

## Common Admission Test & other Management Examinations

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### **Data Interpretation for the CAT, 6e**

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*To  
my wife  
Meenakshi,  
and my grandparents  
(Late) Mr. R. N. Sharma  
and  
(Late) Mrs. Girish Kumari Singh*

# Preface to the Sixth Edition

The importance of **Data Interpretation** to clear CAT and other MBA examinations can never be undermined. Right through the last decade of CAT, in spite of several changes to the exam pattern as the test evolved from its paper pen format to the online format, the importance of DI has, if anything, increased rather than decreased.

The current pattern of CAT has Data Interpretation and Logical Reasoning as one of its three sections containing a total of 32 questions out of the total 100 questions in the exam. These 32 questions are typically divided between DI (16 questions divided into 4 sets of 4 questions each) and Logical Reasoning (16 questions divided into 4 sets of) questions. While this has been the pattern of the DI-LR section of the CAT, the latest papers – especially the ones after 2017 have started to become increasingly more difficult. Thus, while the earlier CAT papers required you to solve 20–22 questions (all correct) to score a 98+ percentile in this section, the latest papers (2017 onwards) you would need to solve only 14-16 questions in order to achieve the same percentile. This is just an indication of the increased level of difficulty of the sets in the Data Interpretation and Logical Reasoning section of the CAT – and naturally would and should drastically change the process you adopt for preparation of this all important section of the exam.

In the current difficulty level of this exam, you require to do just 4 sets out of 8 in order to get in the 95–98 percentile. If you are able to attempt 5+ sets and 20–22 questions (all correct) out of 34, you would get a very high 99+ percentile (even going as high as 99.7+ percentile at 22 attempts). In fact, if you can go all the way to 6 to 6 and a half sets with 24–25 attempts with a maximum of 1 error, you would get a 100 percentile.

In this context, you would undermine the importance of DI prep at your own peril – and my advise to you is not fall into the trap that most aspirants fall into – viz: Not giving enough importance to Data Interpretation during

your preparation journey.

There is another huge risk of not working on DI thoroughly and adopting the strategy that you would clear this section based only on your Logical Reasoning solving:

The evidence of the latest CAT papers shows us that out of the 8 sets being asked in the DI–LR section, 4 sets would be extremely tough (Level of Difficulty 3), 2–3 sets would be of a tough level (level of Difficulty 2) while only 1 to 2 sets would be normal difficulty levels. Imagine a test, in which these two normal sets fall under Data Interpretation and you have not really prepared your DI- as you adopted the strategy of doing more LR. What you would lose out on in such a scenario would be the opportunity to score the easy marks in the section by doing the DI and would be forced to go to the tougher LR questions, in order to get your attempts in the section. Naturally, you would be losing out hugely to your competitors, in such a scenario.

Hence, my advise again would be to make sure that you treat both these subjects DI and LR with intensity and do everything in your power to maximise your skill levels for them.

This then leads us to the question about how should you prepare your Data Interpretation, keeping in mind the increasing difficulty level of the exam? Let me try to answer that for you.

Unlike theory-oriented subjects, where you can feasibly define a portion and start studying the theory to understand the subject, Data Interpretation as a subject is an ‘experientially learnt subject’—a subject learnt through experience. Your approach while studying DI should always be to identify Data situations and the typical specific solving skills that a particular DI question requires. Once identified, the DI situation and the specific thought process involved in that situation should then become part of your ‘must have skills’.

Data Interpretation traditionally has been a section that has been dominated by your ability to understand graphs, charts, tables and caselets presenting information about various variables in the form of numerical values of certain variables. Variables would be either given or derived from the variables that were given (for instance, if you were given Revenues and Costs for a company over 5 years, then you could derive the profit or loss for the company over the five years as a derived variable). Traditionally, the

questions would ask you questions about the variables (either given or derived variables) and would essentially involve a little logic and mostly calculations and observations. However, if you were to look at the DI sets asked in the CAT over the past 3–4 years you would realise that the traditional kinds of Data Interpretation questions have mostly disappeared. These have been replaced by question sets that have been heavy on logic, analysis and reasoning – with calculations and the skills required to solve the traditional Data Interpretation questions almost not being tested. These questions require a completely different approach and completely different skills from what has been traditionally tested in DI. In my training sessions with my students, I have realised that the resources required and the approach required to prepare for the section has to change. The old approaches to DI preparation would leave you completely unprepared under the changed scenario – since Traditional DI and Logical DI are almost like two different subjects.

Naturally, given this change, I have observed that aspirants and students across the country have been finding it difficult to find appropriate resources for this section. Over the years, the first five editions of this book have been used by lacs of aspirants to successfully prepare for CAT and MBA and even for aptitude exams like Banking etc. However, given the changes that I have described above, I realised that the pedagogy and the structure of this book have to undergo a major change.

It is in this context, that I have divided the book – into three major sections:

**Section I: Traditional Data Interpretation**

**Section II: Logical Data Interpretation**

**Section III: Data Interpretation from the Archives (XAT, IIFT, CAT)**

As you can see, this is perhaps the first book that gives you the opportunity to prepare separately for traditional DI and for Logical DI. So let us have a look at the structure of this book and how and why this book is the one valuable resource you must have with you during your CAT and other exam preparation journey.

While doing this, I have retained the original strength this book had. This book has always been structured and written in such a way that you get an experience of all the possible situations, interpretation and calculation tasks

that DI questions throw up. The endeavour in the book is to make sure that when you are solving the DI questions in any test, you have already ‘experienced and done’ what the question asks you to do—be it for CAT, XAT, IIFT, CMAT, Bank PO or any other exam having a DI component. In other words you are prepared for any eventuality that a DI question might throw up for you.

## **Section I: Traditional Data Interpretation:**

This section provides you with a comprehensive view and the study resources and the questions required in order to prepare for the traditional data interpretation questions. While CAT has been moving away from traditional DI, other exams like XAT, NMAT, SNAP, MAT, CMAT as well as Banking and other competitive exams still are rooted in traditional DI. Hence, this section retains its' importance for your DI preparation journey.

So how does this section help you master your Traditional Data Interpretation?

1. After a description and some basic starting exercises of the basic modes of data representation, the Section moves into [Part 2: Developing your Calculations](#) – where we take a look at the various kinds of calculations that dominate traditional DI.
2. This is followed by [Part 3: ‘How to think In Traditional Data Interpretation’](#) an invaluable DI study resource. This part provides you with two distinct resources → Under Chapter 1: Intro to Traditional DI and Mathematical Constructs in Traditional DI, help you go through the necessary mathematical understanding required for Traditional DI. [Chapter 2](#) is a hands on, one-on-one training section, where the reader is taken through the step-by-step thinking and solving process that is gone through in a DI set. Original CAT and XAT questions that can be classified under Traditional DI, and provide us with huge learning opportunity have been handpicked and discussed from the thought process point of view in this section. I would expect the reader to make the most out of this resource in order to completely understand what it takes to solve a DI question set, before he/she heads forward towards the next parts that are focused on practice.
3. [Parts 4](#) and [5](#), start you off on your practice journey of Traditional DI, first through [Part 4](#) (DI Exercises without Options) followed by [Part 5: Ten Minute Test Papers](#), where you get to test and work on your speed in Traditional DI.
4. You would finally move to the most important part of the practice in

this section – Mock Test Papers – with 30 Mock Test Papers containing around 16–17 questions each, to be solved in 30 minutes per paper under simulated exam conditions. These mock tests would provide you with excellent exam quality questions on Traditional DI. Your focus while solving these mock tests should be to first solve the test in a strict 30 minute time frame and then check your score with a +3 for every correct answer and a -1 for every wrong answers. Students who can score 99.5+ percentile would be able to score 40+ in these tests and hence your endeavor should be to increase your speed and accuracy while solving these tests. Any questions you are not able to solve during the time limit for the test, you should solve after you finish the test. You have to know each data structure, relationship between variables, calculation structures and challenges. Make sure that you learn from every experience and every challenge you face while solving these questions.

## **Section II: Logical Data Interpretation:**

This section provides you with a comprehensive view and the study resources and the questions required in order to prepare for the crucial Logical Data Interpretation questions, which are a feature of the current CAT papers. Hence, this resource is the most critical study resource of this book – and indeed of any study material or book you might be able to lay your hands on. The section takes you through 3 major Parts that would give you a comprehensive learning experience for Logical DI.

**Part 1** of this section provides you with an invaluable write up on ‘How to think in Logical Data Interpretation’ which takes you through a hand held training experience of how to organise your thoughts while solving a Logical DI set. This section guides you through a series of Logical DI experiences, helping you to understand exactly how the toppers think in Logical DI situations. It will also give you a strong starting point in order to understand what logical DI is all about. You would be expected to go through each of the sets provided in this section – taking each set as a learning experience, first by trying to solve the set yourself without reading the explanations to the same and then try to look through the thought process and try to learn at what points your thinking was inferior to the toppers thinking in the same situation.

**Part 2** of this section is ‘Twelve Minute Tests’ that consists of 30 Twelve Minute Tests which provide you with a challenge to test yourself against a logical DI situation under time pressure of 12 minutes for a set of 4 to 5 questions. The logic of why these are twelve minute tests, is because in the CAT examination these days toppers are solving between 5 to 6 to 7 sets in one hour to score between 99.5 to 100 percentile in the DI and LR section. Hence, in my opinion the key test of how good you are at DI, is to check whether you are able to resolve a Logic based DI set in under 12 minutes. In this part, I would expect you to first solve each of the 30 tests in a 12-minute framework. The first thing you would aim for would be to get through the set in 12 minutes. You would only count your score for questions you were able to solve under 12 minutes. However, once you are through the 12 minutes, if you are not able to resolve the question, you should try to take yourself through a learning experience with every question set. After the 12 minutes

are over, the focus shifts to learning how to take yourself through tough logical DI sets. These would go a long way in developing your belief in solving logical DI.

**Part 3** of the Logical Data Interpretation section, provides you with 30 full Mock Tests Papers consisting of around 16 questions per test. These tests have to be first solved under a strict 30-minutes time frame to check how much you are able to score in DI in 30 minutes. The relevance of these mock tests is that they are a simulation of the DI part of your DI and LR section in the actual CAT, where you would roughly spend around 30 minutes in DI and 30 minutes in LR. Of course, like you did in the previous part, once you are through the test in the time allotted, you should take each set and go through the invaluable learning experience derived out of taking yourself through to the answers of these intricate questions.

**Logical DI**, much like traditional DI, would be repetitive in nature i.e. logic and analysis and the reasoning in the sets would start repeating themselves across various sets and solving situations. Your task as a student is to make sure that you have seen enough Logical DI, so that when you actually go into the CAT, whatever they throw at you – you should be ready to handle, simply because, you've seen it and experienced it earlier. That is the best way to prepare for Logical DI and I am sure this section will create a highly engaging and invigorating learning experience for you that would take you a long way in cracking the CAT.

## **Section III: Data Interpretation from the Archives**

This section contains DI questions from the archives of the XAT (2008 to 2019); IIFT (2007 to 2018) and CAT (2017 and 2018). Needless to say, the question sets in this section are an invaluable resource since they define and help you experience exactly what the examinations you are preparing for would ask you. My advise to you is to take each set as a learning experience focusing your energies on – trying to identify repetitiveness in variable relationships, in calculations, in reasoning and analysis structures (numerical and otherwise), in language structures, in data representations so that you are ready to solve anything the exam throws at you.

To sum up, it would not be inappropriate to state that this book gives you an overall perspective to prepare for the all-important DI part of the DI and LR section of the CAT, while also providing you with an invaluable learning resource but for all MBA entrance exams as well as for other exams based on aptitude and Data Interpretation. In it's latest avatar of the sixth edition, I am confident that this book has become one of the most important resources for cracking Data Interpretation.

Wish you a great learning experience. May Data Interpretation provide you a flight, straight into the IIMs!

**ARUN SHARMA**

# Preface to the First Edition

The CAT has gone online and, in its aftermath, we have embarked on a new journey of preparation for the CAT. After nearly 15 years of being a three-section examination, in 2011, the online CAT moved to the two-section format, with the sections being: **Section 1: Quantitative Aptitude and Data Interpretation**, and **Section 2: Verbal Ability and Logical Reasoning**.

This new change in pattern has greatly increased the strategic importance of Data Interpretation (DI). This is because the DI questions can potentially help aspirants push their sectional score in Quantitative Aptitude and Data Interpretation to new highs.

Besides, during the last few years, with increasing competition for various entrance examinations including the CAT, Data Interpretation has emerged as a key area in qualifying these examinations. Yet, surprisingly, students have very limited resources to prepare for this section in a comprehensive manner.

My experience with training students who are preparing for the CAT and other similar competitive examinations has clearly shown to me the serious lack of a quality resource book for preparation of Data Interpretation. It is for this reason that I have come out with this comprehensive book exclusively focused on Data Interpretation.

Keeping in mind the dynamic nature of the exam and also the latest trends which have shown up in the online version of the CAT, I am pleased to present you this popular book that addresses the needs of online CAT aspirants as well as helps the reader to prepare for any competitive examination where DI is a key part of the questions asked.

***The book is divided into the following parts:***

**Part I: Basic Modes of Data Interpretation**

This part discusses the basic modes of data presentation. The student is expected to attain a level of comfort with the basic modes of data representation (graphs/charts and figures) and should also get acquainted with the kinds of data that are represented in each type of graph/chart/diagram.

The types of data presentation that are discussed here include:

- (a) Tables
- (b) Bar charts
- (c) Pie charts
- (d) Line (X-Y) graphs and
- (e) Caselet-based data

## **Part II: Calculations**

This part focuses on giving you the best available advisory for handling typical DI calculations like additions, subtractions, percentage calculations, ratio calculations and ratio comparisons.

Parts III to VIII comprise sets of questions arranged with a specific purpose. For the questions from these parts, the student is essentially required to work out every question for the skills it intends to test and develop.

## **Part III: DI Exercises (without options)**

This part consists of data interpretation exercises without options. Here, the focus of the student should be on improving his/her understanding of different modes of data presentations as also to get acquainted with the language employed in creating questions on data interpretation. In other words, close attention should be paid on the way questions are framed as also on the kind of calculation and logical mental processing required to solve the question.

## **Part IV: Ten Minute Test Papers**

This part, termed the Ten Minute Test Papers, gives the reader the first feel of solving the questions under a specific time period. The focus here should be on the development of speed, while continuing to work on improving your understanding and exposure to questions.

## **Part V: Full Length Sectional Test Papers**

This part, comprising 23 full length tests, intends to give the student a feel of full length timed tests. The objective of increasing speed and improving accuracy should be the focus while solving this part.

It should also be noted that the questions in this part are tougher than those normally asked in any entrance examination. Therefore, tackling this section with a positive score would definitely strengthen your confidence in solving the data interpretation parts of any examination, including the CAT.

## **Part VI: Model Test Papers**

The questions in this part are a close simulation of the actual questions that have been asked in previous years' CAT examinations. In other words, it tests exactly the same skill set that the CAT has tested over the past decade.

## **Part VII: Questions from Other MBA Entrance Exams (XAT, SNAP, IIFT)**

This part of the book focuses on helping you understand the level and scope of questions that have been asked in other parallel MBA entrance exams which most CAT aspirants take, viz., XAT, SNAP and IIFT. Detailed solutions, unseen short cuts and thought processes have been provided to all the DI questions that have appeared in these exams over the past five years.

## **Part VIII: Challenges in DI**

As is evident from the name, the questions in this part will take you to the next level of exposure and understanding of what can be asked in Data Interpretation. This part and the questions within this part have been built in order to help the reader develop his ability to handle new unknown DI situations along with improving the ability to anticipate and recognize novelties in DI question sets.

## **Part IX: Data Sufficiency**

This part aims to help you develop your problem solving skills in the crucial Data Sufficiency question types—something which has been a constant presence in the CAT and all other exams over the past decade. It has been

designed and written in order to help the reader understand the various option schemes that one might come across in a DS question and also to help him/her develop a process and a flowchart for solving DS questions.

## **Part X: Previous Years' Question Papers (DI Portion): CAT 2003–08**

CAT 2008 was the last CAT paper which is available in the public domain. As such, this part of the book would help you understand what the CAT was in the last five years (in its paper pen avatar). This part would help you (the reader) understand where you stand with respect to your ability to crack the typical CAT type DI questions.

## **Part XI: Sample Papers Based on the Online CAT Pattern (2009 and 2010 Pattern tests 1 and 2) & Part XII: One Sample Paper Based on Online CAT 2011 Pattern**

These parts help you understand the nature of evolution of the CAT exam in its online format—first in the three-section format of 2009 and 2010 (where Data Interpretation and Logical Reasoning was a separate dedicated section) to the two section format of 2011 (where Quantitative Aptitude and Data Interpretation were merged into one section while Verbal Ability and Logical Reasoning was the other section of the test).

Besides, the book also contains an explanatory note on “Online CAT—The DI Perspective” which would help you understand the key differences between the earlier and the current pattern.

The book is now totally in sync with the new trend and pattern of the examination. Ultimately the endeavour is to provide a one-stop solution for CAT and MBA exam aspirants to tackle the Data Interpretation questions in the CAT and other parallel examinations.

My efforts have always been meant to fill the gap in preparation strategy and processes. Through this book, I am confident of giving you, the reader, an invaluable resource for enhancing your DI scores drastically. Contained in this book is the very best advisory for each and every question type. Your job is simple — to ensure that you follow the process contained in this advisory.

## DI: LEAST PREPARED AREA OF THE CAT

Under-preparation for DI is one of the biggest strategic errors that aspirants are prone to make while preparing for the CAT. The reason for the same is not hard to find. Unlike other areas of preparation, DI has no specified “portion” under which you can organise your preparation. This results in systematic neglect of DI preparation. Thus, while there is a definite portion that can be defined for Quantitative Aptitude, and at least some contours of a portion defined for English preparation, students and trainers are at a loss when it comes to defining what to study for DI.

The first thing you should realise is that **the DI questions in the QA & DI section represent a short cut for you to crack this all important section of the CAT—and hence the DI represents a short cut that leads straight into the IIMs** (a kind of a back door entry into the IIMs). I have my reasons for saying so. Basically, if you look at the preparation processes for the four question types that the CAT covers—(a) Quantitative Aptitude; (b) Verbal Ability & Reading Comprehension; and (c) Data Interpretation (DI) & (d) Logical Reasoning (LR)—and compare these processes, you would realise that it is the questions under DI & LR that require the minimum effort and also afford the possibility of minimum turnaround time. For example, if you were aiming at moving from a range of say 50 percentile to 90+ percentile in any of the four question types of the CAT, the DI and the LR question types would be the fastest as well as the ones involving the least effort. Probably, this explains why for the vast majority of CAT aspirants, DI (& indeed LR) remains the least prepared question category. [Note: For more inputs on Logical Reasoning please refer to my book *Logical Reasoning for the CAT* published by Tata McGraw-Hill.]

With this book in your hands, you have already got a head start in your preparation. By preparation, I mean you have to come out of your conventional preparation mode—the way everyone prepares for university examinations—of defining the portion, studying theory, practising questions, and so on.

Instead, what you would need to focus on is to develop an ability to understand what the basic unit of learning is, when it comes to DI. The

following points would give you a better understanding of what it takes in order to crack this section.

# KEY POINTS OF YOUR PREPARATION

## Skill Sets Development Approach

The process of preparation for DI has to be managed in two dimensions—development of certain skill sets and an exposure to certain kinds of problems. You need to distinguish clearly between these two.

(a) By **skill sets development**, I mean that there are certain specific skills that are essentially tested in DI. As a CAT and management aspirant, you first need to identify these skills, and then create a regimen for the development of the same. To further expand this point, suppose one has a simple set of DI containing four questions which are based on percentage changes and ratio calculations. If such a set of questions is given to two lakh CAT aspirants to solve under test conditions, the results would show that even in these four questions, there will be a great variance in the scores across the nation. Not only that, even amongst the people who get everything correct—hence the same scores—there will be huge variance in the time required.

My question to every CAT aspirant is this—why should you allow your competitor to have an advantage over you (either in terms of scores or the time utilised) in simple percentage change and ratio calculation questions? And if this gap does exist, i.e., even if you can solve all these four questions correctly but would take three minutes more than the 99 percentilers, then should you not do whatever it takes to bridge the gap?

(b) By **exposure to problems**, I mean that your preparation objective should be to get to a point where you have solved so many question sets of DI that you should be able to tell yourself, “What else can they now throw at me?” or one showing an even stronger belief in your self, “Give me anything to solve and if it is DI, I can take any bet that I will solve it.”

This two-dimensional approach is to be used in conjunction with a two-pronged approach outlined below.

- (1) Traditional Data Interpretation
- (2) Advanced Reasoning-based Data Interpretation

## Preparation

The first thing I would like to focus on is the skills development approach. The key point here is that Data Interpretation is all about a set of skills, which you would need to execute while solving questions. The key focus of your preparation strategy has to be

- (a) Identify the specific skills Data Interpretation questions test you for—this identification should happen with each question set that you solve, and
- (b) Create a concrete strategy to develop efficiencies in these skills.

***As you are exposed to various types of questions, you may become aware of the following:***

- (i) *You would see repetitions of the same type of tasks across questions:* Tasks such as comparisons of ratios, addition of 2, 3, 4 digit numbers and also numbers with higher number of digits, multiplications of certain levels, sorting of lists according to highest to least or vice versa, visual interpretation of different types of graphs and graphical situations, etc., would appear repetitively as you set about discovering what DI is all about.  
Each of these repetitive tasks that you identify as you go through exposing yourself to DI questions and situations, would represent a critical dimension in your preparation for this section. Your focus should be on improving your methods in doing these tasks and developing core competencies in executing them. Think of the process through which you are approaching the given task and what scope of improvement is possible in order for you to be able to do the same task in a more efficient manner and at a greater speed with fewer errors.
- (ii) *In some cases, you would come across specific situations which are unique to that very problem and would not appear in any other problem that you have seen in DI.* In such cases, my advice is that you should look at exactly what that question is testing you

for and to keep it in mind for future reference/problem solving experiences.

Let me illustrate this by an example:

*Consider the following set of questions that had appeared in the DI section of the CAT 2007 paper. Remember that when you are solving this set, you are playing for 20 marks in CAT 2007. The value of 20 marks in the paper can be understood if you look at it from the view point that it would convert a 70 percentile score to 90+ percentile and an early 90s score to perhaps a 99+ percentile score.*

*We would first ask you to try to solve this question set. Given the nature of this set of questions, it can be safely expected that most aspirants should be able to solve this with ease. Especially those who are scoring over 70 – 80 percentile!!*

*The only thing that would differ would be the time dimension—while a 70 percentiler might take somewhere between 10 – 12 minutes to solve this, a 100 percentiler in DI would be able to attempt these in around 5 – 6 minutes.*

## Directions for Questions 1–4

***Answer the following questions based on the information given below:***

A health-drink company's R&D department is trying to make various diet formulations, which can be used for certain specific purposes. It is considering a choice of 5 alternative ingredients (O, P, Q, R, and S), which can be used in different proportions in the formulations. The table below gives the composition of these ingredients.

The cost per unit of each of these ingredients is O: 150, P: 50, Q: 200, R: 500, S: 100.

| Ingredient | Composition  |         |     |          |
|------------|--------------|---------|-----|----------|
|            | Carbohydrate | Protein | Fat | Minerals |
| O          | 50           | 30      | 10  | 10       |
| P          | 80           | 20      | 0   | 0        |
| Q          | 10           | 30      | 50  | 10       |
| R          | 5            | 50      | 40  | 5        |
| S          | 45           | 50      | 0   | 5        |

1. For a recuperating patient, the doctor recommended a diet containing 10% minerals and at least 30% protein. In how many different ways can

we prepare this diet by mixing at least two ingredients?

- (1) One
- (2) Two
- (3) Three
- (4) Four
- (5) None

**(Estimated time for a 100 percentiler to solve this: 5 – 10 seconds)**

2. Which among the following is the formulation having the lowest cost per unit for a diet having 10% fat and at least 30% protein? The diet has to be formed by mixing two ingredients.

- (1) P and Q
- (2) P and S
- (3) P and R
- (4) Q and S
- (5) R and S

**(Estimated time for a 100 percentiler to solve this: 30 – 40 seconds)**

3. In what proportion P, Q and S should be mixed to make a diet having at least 60% carbohydrate at the lowest per unit cost?

- (1) 2:1:3
- (2) 4:1:2
- (3) 2:1:4
- (4) 3:1:2
- (5) 4:1:1

**(Estimated time for a 100 percentiler to solve this: 30 seconds)**

4. The company is planning to launch a balanced diet required for growth needs of adolescent children. This diet must contain at least 30% each of carbohydrate and protein, no more than 25% fat and at least 5% minerals. Which one of the following combinations of equally mixed ingredients is feasible?

- (1) O and P
- (2) R and S
- (3) P and S
- (4) Q and R

(5) O and S

**(Estimated time for a 100 percentiler to solve this: 30 seconds)**

### **Solution to Q 1: Ans: (1)**

10% mineral is feasible only if we mix O & Q. Any other mix of two ingredients would not give us 10% minerals since one of the ingredients would contain less than 10% and the other would contain at max 10%. The average mineral in the mixture would always be less than 10 in such a case.

### **Solution to Q. 2: Ans: (4)**

P and S are the cheapest ingredients. However, both of them contain no fat and hence, the second option can be ruled out.

Since P is the least cost ingredient, we will try to use P maximum and any other ingredient only to the extent required to meet the constraints. Since P and S is not feasible, the next lowest cost can be generated by mixing P and O. But that is not there in the options. Hence, we try the next cheapest combination possible, viz. P and Q. This too will not be feasible since P and Q can never give us 30% protein.

Hence, Option 1 is ruled out. Option 3 would give us a feasible mix if we use 3 units of P and 1 unit of R. The cost for 4 units of the mixture would be  $50 \times 3 + 500 = 650$  and the average cost would be  $650/4 = 137.5$ . We now need to check the remaining two options to see whether this cost can be beaten and it is apparent that for the fourth option if we take a mix of Q and S in the ratio 4:1, the total cost for 5 units would be 600 and the average cost would be 120. It can be seen that the fifth option will give a higher value. Hence, Q and S is the ideal combination.

### **Solution to Q.3: Ans: (5)**

The objective obviously is to maximise P in the mix. Also, it can be seen that Options 2 and 5 are the only possibilities (as no other option will give you 60% carbohydrates). Between Options 2 and 5, Option 5 will always be cheaper. You do not need to check this.

### **Solution to Q. 4: Ans: (5)**

O and P fail because of proteins, R and S fail because of carbohydrates, P and S fail because of minerals, while Q and R fails because of carbohydrates. Only O and S satisfy all conditions.

By any standard, this set of questions would qualify as pretty simple in the context of the CAT exam. So the key issue we need to consider is that of the time differential between a 100 percentiler in DI and a 60 percentiler in DI. Obviously, a 100 percentiler is faster in reacting and processing the information while solving the question—obviously because his skill sets in doing the same things are better. Perhaps an analogy to this can be taken from the domain of sports. In cricket, anyone can play a bowler bowling at 50 kmph, but it takes a person with special skills to face a fast bowler bowling close to 100 miles per hour.

I would like to end by giving you a brief outline of the skill set required for preparing for DI.

The skill set can be divided into two dimensions:

- (1) *Calculative Skills*: This is a function of your ability to add two-digit numbers, your ability to multiply two-digit numbers, your ability to calculate percentage values and your ability to compare ratios (big and small).
- (2) *Mathematical Knowledge Based Skills*: Number systems based skills (especially important for advanced reasoning based DI), Venn diagrams, Averages and Alligations, Progressions, Percentages and Ratios.

Focus on sharpening your skills in these areas and you should definitely be able to create a percentile jump in your scores.

## **Understanding the Two Segments of DI Preparation**

Looking at it from another point of view—as I have mentioned above—preparations for the DI part of the CAT need to be organised into two basic segments (based on the question types):

### **(1) Traditional Data Interpretation**

This is the conventional DI question based on charts and graphs. The skill sets required to do well in this question type include the following:

- (a) **Your knowledge of some basic areas of quantitative aptitude:**  
Chapters which you need to be thorough with are Ratio & Proportions, Percentages, Progression, Basic Concepts of Numbers, Averages, Alligations.
- (b) **The ability to understand data and identify variables and their relationships**
- (c) **Calculation skills:** You would be well advised to hone your ability to add two-digit numbers, calculate and compare ratios and also develop your ability to approximate calculations involving big numbers.

## **(2) Advanced Reasoning Based Data Interpretation**

Such type of questions first made their appearance in the 2003 exam. These can be typically defined as questions that have some information based on data, forcing the need to make certain logical deductions. Unlike traditional data interpretation questions, in these questions, data is normally presented in a disguised format. So obviously the skill you need to develop for doing well in this question type is to develop your ability to interpret data and discover hidden linkages between the various variables presented.

One sees many aspirants being shaken by this question type and one knows for a fact that more than 80 per cent of the people preparing for CAT are scared of this question type.

To illustrate what I mean, let us take a simple situation.

### ***The Anatomy of An Advanced Reasoning-Based DI Question***

Suppose there is a narrator of a story who tells you that there is a situation wherein there is a bus going from Delhi to Mumbai and it has two stops in between, say at Ahmedabad and Pune. Next, he makes the following statements:

- (a) When the bus left Delhi, there were 80 passengers.
- (b) When the bus left Ahmedabad, there were 83 passengers.
- (c) When the bus arrived at Mumbai, there were 75 passengers in the bus.

What sense can you make out of this information? Suppose someone makes a conclusion that in Ahmedabad there must have been 3 new passengers who got into the bus. Would that thinking be correct?

Obviously, as you, most of you would be shouting out loud in your minds that we cannot conclude that there were 3 new passengers who got into the bus!!

The difference between the number of passengers who left Delhi and the number of passengers who left Ahmedabad must obviously be a function of two distinct variables:

- (i) The number of people who got down from the bus
- (ii) The number of people who got into the bus

Thus, obviously the only thing you can conclude here is that in Ahmedabad, there were three extra people who got in (when compared to the number of passengers who got down from the bus).

Why am I using this article to tell you the obvious? Why am I wasting your time to tell you this?

*Well, consider one of the toughest questions that have happened in the CAT DI sections ever.*

The year is 2089. Beijing, London, New York, and Paris are in contention to host the 2096 Olympics. The eventual winner is determined through several rounds of voting by members of the IOC with each member representing a different city. All the four cities in contention are also represented in IOC.

In any round of voting, the city receiving the lowest number of votes in that round gets eliminated. The survivor after the last round of voting gets to host the event.

- A member is allowed to cast votes for at most two different cities in all rounds of voting combined. (Hence, a member becomes ineligible to cast a vote in a given round if both the cities he/she voted for in earlier rounds are out of contention in that round of voting.) [Note: Interpret this sentence—one way of becoming ineligible to vote is if you voted for a particular city in the first round and that city got eliminated, and if you voted for another city in the second round and that city too got eliminated in that round, then you cannot vote in the third round.] Can you relate this to a passenger getting out of the bus?
- A member is also ineligible to cast vote in a round if the city he represents is in contention in that round of voting. [Note: Do you realise that this is giving us a way of making a member who is ineligible to vote eligible? Also do you see that after every round

starting after the first round itself, exactly one member will become eligible to vote.] Do you see passengers getting into the bus (one passenger at a time)?

- As long as the member is eligible, he/she must vote and vote for only one candidate city in any round of voting.

Now with this information if you are given the information that 83 people voted in the second round and there is missing information about the number of people who voted in the first round, can't you realise that 82 people must have voted in the first round? Obviously! Because from the first round, to the second round, only one new person would be eligible to vote. Also, the rule for making people ineligible to vote is going to come into the picture only in the third round for the first time so the difference between the number of people who voted in the first round must be 1 less than the number who voted in the second round. (1 person gets into the bus!!)

Further if you are told that in the third round 75 people voted. Can you see that 1 person must have entered and 9 people must have dropped out? And those 9 people must have voted for the city eliminated in the first round and they also voted for the city eliminated in the second round.

Isn't it the same logic as given in the bus question: bus leaves from Delhi with an unknown number of passengers, reaches Ahmedabad and when it leaves Ahmedabad there are 83 passengers. It is also known that no one is allowed to get down in Ahmedabad and exactly 1 person entered in Ahmedabad. Further, 1 more person enters in Pune and when the bus leaves Pune, there are 75 passengers in the bus. So, obviously 9 people must have got down in Pune.

The surprising fact is that this question is amongst the toughest questions to have appeared in CAT!! And if people cannot correlate the logic of what they see in their daily lives to what is asked in DI, the CAT can continue to remain a mystery for thousands of aspirants every year.

# CONCLUDING NOTE

I would like to end with an analogy. In life, there are two types of things that you could try to learn.

- (a) **Theory-based Subjects:** Say, for instance, if you are trying to study a subject like physics or mathematics, there is a specific flowchart and plan which can be defined based on the definition of the concrete portion or syllabus.
- (b) **Subjects that are Learnt Experientially:** These have to be learnt through experience, for instance, swimming, driving, etc. Learning Data Interpretation falls into this category.

As DI belongs to the second of the above-mentioned categories, to solve DI questions, create a smart plan and work in a task-oriented fashion. Set concrete tasks and complete them. Remember that as you experience more and more DI situations/questions, your ability to comprehend and solve DI would keep going up if you focus on the repetitive tasks that you keep doing while solving DI questions.

Remember, skills turnaround time in DI is the shortest of the four question types in the CAT. Hence, do not make the error of aiming too low while preparing for this section. You can never know what could be possible!

**All The BEST !**

**ARUN SHARMA**

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**ARUN SHARMA**

# Online CAT: From the DI Perspective

Welcome to the world of online CAT!

The advent of the online version of the Common Admission Test (CAT) in 2009 and beyond brought with it a whole lot of opinions and views about what has changed in the examination and what should be the ideal preparation pattern. Therefore, one objective in this widely read book is to look at the issues that an aspirant needs to consider while preparing for the online CAT. I would like to discuss this issue in the following parts:

## **1. What has changed?**

A comprehensive analysis of what are the critical dimensions of the changes that have taken place in the CAT in its online avatar and what these changes mean for the aspirant, both in respect of positive and negative factors, taking into account the following:

- (a) Changes in the test-taking experience
- (b) Changes in the exam pattern

## **2. What does all this mean for the Preparation Process? How has it changed and how has it remained constant?**

While doing so I have taken the help of a varied experiential sample of test-takers from across India and also my own personal experience of taking (and may I add dominating) the CAT. Given below are some of the implications of the online version of the CAT in the context of the Data Interpretation part of the examination (which this book is all about).

# I. WHAT HAS CHANGED?

## The ‘Experience’ of Taking the Test

### 1. Cleaner and More Efficient

Compared to the paper-and-pen based CAT, the online version is much cleaner as the clarity of questions, their visibility, as well as the overall feel of the question-solving experience is much better. Online CAT exam has improved the efficiency of solving questions of Quantitative Aptitude and English. However, in the context of Data Interpretation, one thing that has definitely changed for worse while taking the test, is the need to get the data from the screen on to the paper—something which is really cumbersome and involves a lot of writing while solving. Naturally, people who are used to solving mentally and through visual interpretations are in a much more advantageous position in the online CAT exam than people dependent on pen and paper.

### 2. Space Management on Table

In the paper-and-pen version of the CAT exam, the aspirant had to typically manage the test paper, admit card, watch, pencils (at least 2), eraser, sharpener along with the answer sheet on the table. To add to his/her woes, the paper-and-pen version of the CAT exam was mostly conducted in schools. Very often the aspirants had to contend with the additional challenge of managing all this paraphernalia on a school boy’s small table. In addition, if the aspirants were made to sit in a classroom meant for juniors (between classes 3 to 6), they really had a challenge.

Most of these problems have disappeared in the new online version of the CAT exam. The fact that computer terminals at most colleges and universities are of standard shape and size provides all the aspirants with same examination environment and equipment. Besides, while writing the online version of the CAT, all you need to manage on the table are the mouse, the key board, a pencil and a sheet of paper for rough work. No watches, erasers,

sharpeners and most importantly no test paper and no answer sheet (which used to be huge space crunchers in the earlier offline version of the CAT) are there to be taken care of.

### **3. Moving Questions in the Test**

Unlike the paper-and-pen version where test-takers could scan the whole question paper in one look, in the online CAT, aspirants have to move one question at a time. This has both its advantages and disadvantages in terms of the overall test-taking experience. The obvious disadvantage that most aspirants face is the fact that since you cannot really see the whole paper in one look, you cannot make a judgement about the balance, the difficulty level or the portion-wise question distribution in the paper. (Although I am referring to the Data Interpretation section here, this is also true for all the sections in the exam).

Ironically, the biggest advantage for the examinee in terms of the online CAT is exactly the same i.e. since you cannot see the paper entirely at one go, the only option while taking the test is to look at the questions one by one.

This turns out to be a huge advantage because of two main reasons mentioned below:

#### **(i) Higher Focus while Solving An Individual Question**

The fact that they cannot know the exact number of questions from various areas and estimate the difficulty level of the paper, leaves aspirants with no choice but to focus on the one question that is visible to them on the screen. This helps them to easily achieve the all-important “tunnel vision” while solving a question. The immediate result of this is that the focus on the “problem at hand” is infinitely more in the online version than in the conventional paper-and-pen format. Thus, ironically, not being able to scan the whole paper at one go turns out to be a blessing in disguise, giving examinees their best chance to solve a question.

The main reason for this is that while solving the question in front of the computer screen, the experience of the previous question is totally blanked out. In the paper-and-pen version, students who had a negative experience while solving a question or two carried that negativity to the next question.

Thus, the specific advantage of the online version was that “forgetting” a bad experience is relatively easier. The moment you navigate away from the question in front of you, it goes out of your mind. So much so, that remembering a question just two questions back is close to impossible. Naturally the “carry over” emotions from a previous negative experience are significantly reduced.

## **(ii) *The Imperative for Faster Navigation (Less Time Wasted on Unsolvable Questions)***

Since the examinees do not see the full question paper right at the beginning, the imperative to move on to the next question is extremely strong. This results in students seeing a higher percentage of the questions in the online test than in the paper-and-pen version.

**Author’s Note:** One of the problems I had noticed in the paper-and-pen version was that most examinees were not able to “see” the entire paper. i.e. the fraction of the paper that they were able to process was a fraction of the entire test paper. As a result they used to miss out on a large number of sitters! So, naturally the tendency was to miss out on sitters and spend more time on the unsolvable questions. A lot of time was wasted in questions that they tried and were unable to solve or even if they solved it, were unable to get it correct.

**The Ticking Clock Advantage:** Part of this time mismanagement also occurred due to the fact that the aspirants did not have the clock ticking on the screen in front of them. Therefore, they naturally lost track of how much time they had spent in attempting to solve a question set. Very often aspirants would end up getting stuck in individual sets for up to 10–12 minutes or even more.

All this changed for the better in the online version of the CAT exam. There is a greater imperative to move to the next question due to the twin facts that you do not see the entire paper as you move from one question to the other, and that the ticking clock is omnipresent in front of your eyes on the screen. As a result, you are aware of the exact amount of time you spend on a particular question set. The net result is that after trying a question set for maybe 2+ minutes in case you did not have a clue about what to do in the

same, you move to the next set. Thus, time management has improved drastically for the examinee in the online CAT exam.

I believe this is one of the main reasons why a lot of students who compared the two versions of the CAT said that the online version is easier as the amount of time spent in questions which they were eventually not able to solve, reduced drastically. Consequently, they got a feeling that they were solving questions all the time as opposed to the paper-and-pen version where aspirants used to have an overall negative experience of the test (as they would end up spending a lot of time in attempting the “unsolvable” questions.)

#### **4. Mark/Unmark and Review Buttons**

A very important feature in the online version is the introduction of the REVIEW button. In the paper-and-pen version, it was extremely difficult to track the number of your attempts and especially so in the context of questions that you were unsure about and/or questions which you wanted to come back to. There was simply no way in which you could keep a track of those and as a result there was effectively “no second chance” at a question.

This too has changed in the online CAT exam. For every question, apart from the facility to answer it, you also have a MARK button, which would give you easy access to the question at the end of the paper. When you have completed the paper (reached the last questions in the paper), you also get access to a review screen that in one visual shows you all the questions you had solved as well as all the questions you had marked with the MARK button. So going back to a specific question in the paper is just a mouse click away.

To sum up, the net effect of the online CAT is a superior test-taking experience — something that gives you a chance to be more in control of your test and thus aim for a higher score assuming that the same set of questions would have been asked in the paper-and-pen version. The only irritant being the DI questions, where the need to do a lot of copying down is extremely time-consuming.

# **What has Changed in Terms of the Examination Pattern?**

Having seen the specific changes that have occurred in terms of the test-taking experience, let us now examine another crucial aspect.

**Changes in Exam Pattern:** Obviously, for the purpose of this book, the analysis will pertain to how the pattern of the examination shifted from a three section exam where the Data Interpretation and Logical Reasoning section was a separate section to a two section examination—where the sections now are: Quantitative Aptitude and Data Interpretation; Verbal Ability and Logical Reasoning.

In order to read a similar analysis with respect to the other question types namely, Verbal Ability/Reading Comprehension, Quantitative Aptitude & Logical Reasoning you can refer to my books on those subjects, also published by McGraw Hill. The major changes in the pattern of the Data Interpretation section can be summarised through the following points:

- 1. The role of DI in the Data Interpretation and Logical Reasoning section of the CAT**
- 2. DI questions on all types of patterns and difficulty levels**

## **1. The role of DI in the Data Interpretation and Logical Reasoning section of the CAT**

The change of the CAT into a three-section format has in my opinion drastically increased the importance of Data Interpretation in the examination (and indeed of logical reasoning—but that issue is discussed in details in my book “Logical Reasoning for CAT” published by McGraw Hill). I have the following logic to support this conclusion:

The DI and LR section of the CAT consists of 32 questions.

It has been seen that the break-up of these 32 questions between questions on Logical Reasoning and Data Interpretation has been typically 16 for DI and 16 for LR. Seen in the context of the number of questions required to be solved correctly in order to score 99+ percentile in this section (as shown by the table below) you should automatically realise the critical importance that

DI has for this examination:

| Total number of questions in the section | Number of questions on Data Interpretation | Total number of questions on Logical Reasoning | Number of Questions to be solved if you are at 100 per cent accuracy for a 99+ percentile score | Number of questions to be solved if you are at 100 per cent accuracy for a 90+ percentile score | Number of questions to be solved if you are at 95 per cent accuracy for a 99+ percentile score | Number of questions to be solved if you are at 95 percent accuracy for a 90+ percentile score |
|--|--|--|---|---|--|---|
| 32                                       | 16   | 16   | 18 to 20  | 20 to 24  | 15 to 17   | 13 to 15  |

An analysis of the above table would tell you that if you create your strength in Data Interpretation, it is feasible and possible to feasibly achieve most of what you need to do in this section by just solving the DI questions.

Consider the following scenarios in each of which you would be able to qualify the DI and LR section with ordinary to moderate skills in LR:

**Scenario 1:** You solve all 16 questions on DI correctly, then to reach a 99 percentile score in the section you would just need to solve another 2 to 4 questions in LR all correct out of the available 16 questions. Naturally, anyone even with ordinary skills in LR can achieve this.

**Scenario 2:** You solve only 10–12 questions on DI correctly, then to reach a 99 percentile score in the section you would just need to solve another 6 to 8 questions in LR all correct out of the available 16 questions. Skills required in LR—Moderate.

**Scenario 3:** You solve all 16 questions on DI with 90% accuracy, then to reach a 99 percentile score in the section you would just need to solve another 6 to 8 questions in LR out of the available 16 questions (with 90 percent accuracy). Skills required in LR—moderate.

**This explains to you, why in the new three-section pattern of the CAT, developing your DI skills becomes even more imperative.**

## 2. DI questions on all types of patterns and difficulty levels

The DI sets typically asked in the first few years of the online CAT exam, have been varying in terms of their difficulty and complexity levels. Data Interpretation sets have varied from being logically simple and straight forward – based only on calculations, to being extremely complex and

logically twisted. Naturally, you would need to prepare your DI skills in order to be able to handle both these dimensions of DI. Thus, during your preparations on DI, your focus should be on:

- a) Developing your skills for solving traditional DI questions – based on calculations of ratios, percentages and averages;
- b) Developing your skills for solving logic based DI questions – where there is an element of twisted logic in the question set that adds to the complexity of the question set.

### **3. Higher Percentage Cutoffs**

In the online version, aspirants wasted less time in questions which they thought was unsolvable and moved on to those they could solve. The result—most students were able to raise their scores in this section significantly.

Consequently, sectional cut offs which used to be in the range of 30% of the net marks rose to around 40 – 45% of the marks. Besides, one thing that clearly stood out was the heavy penalty for errors—as people with 18 attempts and 4 mistakes scored a lower percentile than those with 12 all-correct attempts.

### **4. Emphasis on Solving Tricky and Tough DI Sets**

As already mentioned above, that DI in CAT 2014 onwards has gone back to tough and tricky sets. Hence, the emphasis of preparation has to also include a process for gaining experience and expertise in solving such sets. We would advise you to closely look at ‘Part IV—Training Ground—Mathematical Constructs in DI’ and ‘Part VIII—Challenges in DI’ to master such sets. It would be advisable to have a close look at the past years’ XAT and CAT questions and their solutions provided in Parts VII and X of the book.

## **II. WHAT DOES ALL THIS MEAN FOR THE PREPARATION PROCESS? HOW HAS IT CHANGED AND HOW HAS IT REMAINED CONSTANT?**

Let us look at this aspect in two broad parts:

- I.** What are the changes that need to happen in the preparation processes for the online CAT exam vis-a-vis the preparation process for the traditional paper-and-pen version?
- II.** What are the things and issues that remain constant in the preparation process?

# **I. Preparations Process**

For the first question, the specific things that come to my mind are:

## **1. More Work on Speed of Solving**

Focus on improving your speed of solving while tackling a question. Focus on improving your interpretation speed, your speed in analysing data and your calculation speed.

In calculations, you need to work specifically on:

- (i) mental addition of 2–3 digit numbers,
- (ii) calculation of percentage values of 2/2 digit ratios as well as 3/3 digit ratios, and
- (iii) comparison of ratios.

## **2. Emphasis on Mental Analysis and Visual Solving of Questions**

Reduce your dependence on writing as much as possible. Also, while solving questions in this book, make sure that you solve the questions on a different sheet of paper.

## **3. Focus**

Focus on solving a lot of Reasoning questions to be ready for the increased emphasis on reasoning.

## **4. The Need to Take Computer Based Tests in Order to Be Able to Think on the Computer**

Thinking and solving questions from the computer screen is an experience slightly different to solving a question from a physical book. Thus, students and aspirants are advised to experience this change by going for online solving experience. It is in this context that we have tied up with [www.mindworkzz.com](http://www.mindworkzz.com) to give our readers a feel of the online problem-solving experience.

## **II. Issues That Remain Constant**

However, in spite of these seemingly big external changes, my personal opinion is that the changes are mostly external in nature. The essence of preparation of the DI part of your preparation remains the same in a lot many fundamental ways.

Some of these that come readily to mind are:

### **1. The Need to Develop Mental Structures for the CAT—DI**

Preparation has always been associated with the development of the logical and data analysis based thinking processes and thought structures for specific data analysis/logical situations. The smart CAT aspirant is able to create superior processes for faster handling of the same data analysis/logical/calculation situations which his/her competitors would take a longer time to handle.

The whole battle for DI preparation for MBA exams can be essentially summarised in terms of the quality of pre-formed mental algorithms that you have created for specific situations you are going to face in the exam.

#### ***Some Situations***

Sorting 20 numbers in a table from maximum to minimum, sorting 4 ratios from maximum to minimum, calculating the percentage value of a 3 digit/3 digit ratio correct to 1 or 2 digits after the decimal, understanding the meaning of an indirect logical clue, correlating various types of data and information and recognising and creating the link between various variables, etc. are some of the situations that might come in the examination paper.

In other words, your battle in this all-important section is won if you have, during your preparation process, executed the task that the question in front of you has thrown up.

### **2. The Need for Thoroughness in Your Preparation**

This is again something that does not change.

To sum up, the CAT examination still remains a test of your intelligence

and an aspirant should focus on this aspect. This book provides you with the entire gamut of conceivable thinking situations that you might encounter in Data Interpretation and Logical Reasoning in your attempt at this exam and other MBA entrance exams. Your focus should be on honing your skills in every mental challenge that the questions in this book give you.

**Best wishes in your endeavour!!**

# Contents

*Preface to the Sixth Edition*

*Preface to the First Edition*

*Acknowledgements*

*Online CAT: From the DI Perspective*

## Section I Traditional Data Interpretation

### **PART 1 Basic Modes of Data Representation**

---

#### **1. Data Interpretation—An Overview**

What is Data?

Data Represents Variables

The Need for Capturing Data

Definition of Data Interpretation

Organisation and Presentation of Data

#### **2. Tables**

Introduction

#### **3. Bar Charts**

Simple Bar Chart

Stacked Bar chart

Composite Bar Chart

The Use of Bar Charts to Show Deviations  
Representation of Percentage on a Stacked Bar Chart

#### **4. X-Y Charts**

The Typical Data Shown on an x-y Chart Involves a Time Series

#### **5. Pie Charts**

#### **6. Cases**

Introduction

## **PART 2 Developing Your Calculations**

---

### **1. Additions and Subtractions (As an Extension of Additions)**

Ideas for Adding and Subtracting Well  
Subtractions—Just an Extension of Additions

### **2. Divisions, Percentage Calculations and Ratio Comparisons**

Calculating Decimal Values for Division Questions Using Percentage Calculations  
Percentage Rule for Calculating Percentage Values through Additions  
Ratio Comparisons

## **PART 3 How to think in Traditional Data Interpretation**

---

### **1. Introduction to Traditional DI & Mathematical Constructs in Traditional DI**

What is Traditional Data Interpretation?

### **2. How to think in Traditional Data Interpretation**

## **PART 4 DI Exercises (Without Options)**

---

### **1. DI Exercises (Without Options)**

## **PART 5 Ten Minute Test Papers**

---

### **1. Ten Minute Test Papers: 1–10**

**Answer Key**

**Solutions**

## **PART 6 Mock Test Papers (Based on the Latest CAT Pattern)**

---

**Mock Test Paper 1**

**Mock Test Paper 2**

**Mock Test Paper 3**

**Mock Test Paper 4**

**Mock Test Paper 5**

**Mock Test Paper 6**

**Mock Test Paper 7**

**Mock Test Paper 8**

**Mock Test Paper 9**

**Mock Test Paper 10**

**Mock Test Paper 11**

**Mock Test Paper 12**

**Mock Test Paper 13**

**Mock Test Paper 14**

**Mock Test Paper 15**

**Mock Test Paper 16**

[\*\*Mock Test Paper 17\*\*](#)  
[\*\*Mock Test Paper 18\*\*](#)  
[\*\*Mock Test Paper 19\*\*](#)  
[\*\*Mock Test Paper 20\*\*](#)  
[\*\*Mock Test Paper 21\*\*](#)  
[\*\*Mock Test Paper 22\*\*](#)  
[\*\*Mock Test Paper 23\*\*](#)  
[\*\*Mock Test Paper 24\*\*](#)  
[\*\*Mock Test Paper 25\*\*](#)  
[\*\*Mock Test Paper 26\*\*](#)  
[\*\*Mock Test Paper 27\*\*](#)  
[\*\*Mock Test Paper 28\*\*](#)  
[\*\*Mock Test Paper 29\*\*](#)  
[\*\*Mock Test Paper 30\*\*](#)  
[\*\*Answer Key\*\*](#)  
[\*\*Solutions\*\*](#)

## **Section II   Logical Data Interpretation**

### **PART 1   How to Think in Logical Data Representation**

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- 1. Introduction to Logical Data Interpretation**
- 2. How to Think in Logical Data Interpretation**

### **PART 2   Twelve Minute Tests**

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- 1. Twelve Minute Tests 1–30**

## **Answer Key Solutions**

### **PART 3 Mock Test Papers on Logical Data Interpretation**

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#### **1. Mock Tests on Logical DI**

- Mock Test Paper 1**
- Mock Test Paper 2**
- Mock Test Paper 3**
- Mock Test Paper 4**
- Mock Test Paper 5**
- Mock Test Paper 6**
- Mock Test Paper 7**
- Mock Test Paper 8**
- Mock Test Paper 9**
- Mock Test Paper 10**
- Mock Test Paper 11**
- Mock Test Paper 12**
- Mock Test Paper 13**
- Mock Test Paper 14**
- Mock Test Paper 15**
- Mock Test Paper 16**
- Mock Test Paper 17**
- Mock Test Paper 18**
- Mock Test Paper 19**
- Mock Test Paper 20**
- Mock Test Paper 21**

[\*\*Mock Test Paper 22\*\*](#)

[\*\*Mock Test Paper 23\*\*](#)

[\*\*Mock Test Paper 24\*\*](#)

[\*\*Mock Test Paper 25\*\*](#)

[\*\*Mock Test Paper 26\*\*](#)

[\*\*Mock Test Paper 27\*\*](#)

[\*\*Mock Test Paper 28\*\*](#)

[\*\*Mock Test Paper 29\*\*](#)

[\*\*Mock Test Paper 30\*\*](#)

[\*\*Answer Key\*\*](#)

[\*\*Solutions\*\*](#)

### **Section III Data Interpretation from the Archives**

## **PART 1 XAT Exam Paper**

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**1. XAT 2019**

**2. XAT 2018**

**3. XAT 2017**

**4. XAT 2016**

**5. XAT 2015**

**6. XAT 2014**

**7. XAT 2013**

**8. XAT 2012**

**9. XAT 2011**

**10. XAT 2010**

**11. XAT 2009**

## **12. XAT 2008**

# **PART 2 IIFT Exam Paper**

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### **DI in IIFT: An Introduction**

- 1. IIFT 2018**
- 2. IIFT 2017**
- 3. IIFT 2016**
- 4. IIFT 2015**
- 5. IIFT 2014**
- 6. IIFT 2013**
- 7. IIFT 2012**
- 8. IIFT 2011**
- 9. IIFT 2010**
- 10. IIFT 2009**
- 11. IIFT 2008**
- 12. IIFT 2007**

# **PART 3 CAT Exam Paper**

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- 1. CAT 2018 Slot 1**
- 2. CAT 2018 Slot 2**
- 3. CAT 2017 Slot 1**
- 4. CAT 2017 Slot 2**

**SECTION - I**

**TRADITIONAL DATA**

**INTERPRETATION**

## PART 1

# Basic Modes of Data Representation

### *Chapter 1*

Data Interpretation  
—An Overview

### *Chapter 2*

Tables

### *Chapter 3*

Bar Charts

### *Chapter 4*

X-Y Charts

### *Chapter 5*

Pie Charts

### *Chapter 6*

Cases

### In This Part You will Learn:

- What is Data Interpretation
- Various Types of Data Representations
  - Tables
  - Bar Charts
  - X-Y Charts
  - Pie Charts
  - Cases (Representing Data)

### This Part Contains:

- Individual chapters on each type of Data Representation

- **Exercises and Practice**  
**Questions covering various question types asked in exams**  
**(like CAT, banking and other management and aptitude exams) on each type of Data Representation**

1. Understand each type of data representation carefully



2. Move from chapter to chapter solving exercises therein.  
Solve without time limits—focus on getting everything



3. Concentrate on interpreting:

- (i) The data-variable identification
- (ii) Their interrelationships
- (iii) The language of the questions

# Data Interpretation—An Overview

## OUTLINE

### Learning Objectives

- Get an overview of the various options for data representation.
- Answer the Question, “What Data Interpretation is all About?”

### Chapter Highlights

- What is Data?
- What are Variables (Discrete and Continuous)
- Organisation and Presentation of Data (Tabular, Bar Charts, X-Y Charts, Pie Charts, Reasoning Caselets, and Numerical Data-based cases)
- General Hints for Data Interpretation

Since time immemorial man has indulged himself in various activities for his habitation and survival. Every activity that man indulges in generates information about various factors such as the magnitude, scope, quality and fulfillment of objectives of the particular activity. In fact, this is true no matter what the activity is—Data is generated from each and every activity.

For example, during the movement of a car from Delhi to Lucknow, there is constant data generation in the form of time taken, speed of travel, acceleration and deceleration data, car temperature data, number of revolutions of the wheel, fuel consumption data, cost data, etc. Similarly, data is also generated in the running of a fan, the making of a telephone call, the consuming of food, the running of a business establishment, etc.

Present day society is information oriented. Almost every facet of life uses quantitative data in one form or the other, and often we come across tables, charts and graphs while reading newspapers, magazines, books or watching television. These may pertain to political analyses, cricket, crime rate in the country, weather, the stock exchange, bullion market, foreign trade, travelling, etc.

## **WHAT IS DATA?**

Data is the term used to refer to the raw numbers (facts and figures) which emerge from the occurrence of any event—physical, social, economic, corporate, geographical, individual, and all miscellaneous kinds of events that have the potential to throw out numbers and figures. These numbers and figures however make no sense by themselves unless they are qualified by a series of qualifiers explained as follows.

## Nature of Data

A numerical value by itself represents nothing and describes absolutely nothing. Thus, if we imagine a number, say 37, it means absolutely nothing by itself. The number starts to gain some significance when it is qualified by saying that it is the temperature or weight, etc. However, just by saying that the number represents temperature doesn't complete the description of the number. It has to be further qualified by specific descriptions, that it is the temperature on 7 June 2015 in New Delhi at 2 p.m.

Thus, three facts get attached to the number to describe it more completely:

- (a) It is a number representing temperature.
- (b) It refers to a place called New Delhi.
- (c) It refers to the date of 7 June 2015 and time of 2 p.m.

However, even with these qualifiers, the magnitude of the value is not imaginable. The natural question that will arise in the mind of the interpreter of this data is: "What does a number 37, described as the temperature at 2 p.m. on 7 June 2015 in New Delhi, represent in terms of its magnitude?"

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The unit provides meaning to the data. Data without a unit is meaningless.

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The information provided does not give us an idea about the magnitude of the temperature. We need to further qualify the number by attributing to it a unit.

Thus, if the number is further qualified by the unit 'degree celsius' or °C then it suddenly makes sense to us. The introduction of the unit in fact automatically qualifies it as the temperature.

A unit also makes a number comparable to other values and we can thus make conclusions like  $35^{\circ}\text{C} < 37^{\circ}\text{C}$  and that the temperature in New Delhi on 7 June 2015 is higher than the temperature in Lucknow at the same time on the same date. Further, that if Lucknow had a temperature of  $35^{\circ}\text{C}$  we can say that Delhi had a temperature that was  $2^{\circ}\text{C}$  more than that of Lucknow or even that Delhi had a temperature that was  $(200/35)\%$  higher than that of

Lucknow, and so on.

---

These qualifiers can be seen as kinds of ‘pointers’ to the number and we conclude that for any number to make sense, it should have:

- (a) **A unit which quantifies its magnitude. The unit when attached to the number automatically adds sense to the number.**
  - (b) **A secondary set of qualifiers (pointers) which when associated with the data help us to convert the data into concrete information that helps us in decision making.**
- 

Hence, we have seen that the number 37 makes complete sense when it is qualified as: 37°C was the temperature of New Delhi on 7 June 2005 at 2 p.m. It could equally have been qualified as: ₹ 37 crore was the sales turnover of a company X in the year 2025.

You are encouraged at this point to think of alternative units and associated pointers which would make sense when attached to the number 37 (or for that matter any other number). While doing so, pay attention to how you are required to use a unit along with a few associated pointers to make any sense of a number.

## ■ Some Standard Common Pointers

### Time

The time dimension is an overriding fact of our life and most data is measured in the reference frame of a particular time. Thus, we qualified the temperature of New Delhi by adding a date and a specific time to it.

Even figures related to companies/industries/corporations/organisations/departments have their respective time dimensions specified.

Other situations include movement of a car/train in a specified time duration, production in a factory in a particular time duration, etc. Units used for time are decades, years, quarters, months, weeks, days, hours, seconds, **minutes, days, etc.**

### Place or Geographical Pointers

This is the second most common standard pointer which is used for making sense out of a number. Thus when we talk about economic data we talk about the country, state, area or region.

Other common pointers include: monetary value, temperature, and number of units consumed/sold/produced, etc.

## DATA REPRESENTS VARIABLES

This is another way to look at data and numerical values. A variable is a quantity or an attribute whose value is not fixed/is changeable and can change with a change of some of the underlying factors. Most data (numerical values/series of numbers) represent variables that can change their values.

As an example, we can think of the temperature of a place as a variable. This variable changes with time since the value of the temperature changes with time.

All series of numerical values will represent some variables that will underlie the set of values.

## ■ Types of Variables

Based on the way the value of the variable changes, it can be a discrete variable or a continuous variable.

### Discrete Variables

Variables which have only discrete value change and have “no in-between” values, e.g., continent, country, company, state, city, year, quarter, month, day, region. Change in these variables always occurs in discrete steps. Thus, the year may be either 2009 or 2013. There is nothing like 2009.05 or for that matter 2013.98 when we talk about the year as a variable.

Similarly, the country being mentioned could either be India or Pakistan or US or UK or Germany or any other.

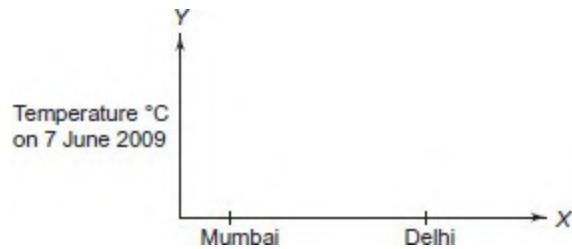
### Continuous Variables

These are variables which change continuously, e.g., sales revenues, unit sales, GDP, population, temperature, speed, etc.

In this context, it can be easily seen that while continuous variables can be easily represented by an unbroken line on the XY plane, discrete variables cannot be shown in such a fashion.

Further, if a continuous variable is taken on one of the axis in the XY plane, then each point on that axis will have a certain value. However, if an axis is used to represent a discrete variable, then not every point of the axis will necessarily represent an instance of the discrete variable. Hence, such an axis will have points which lie in between two values of the discrete variable and which will have no meaning or no value in terms of that discrete variable.

Thus, in [Figure 1.1](#), the X-axis represents a discrete variable and the Y-axis represents a continuous variable.



**Figure 1.1** Discrete and Continuous Variables

Usually, continuous variables are represented by a series of numbers while discrete variables are normally represented by names. One possible case of exception could be the case of the year (time dimension). Here the discrete variable is represented by a number.

## ◆ THE NEED FOR CAPTURING DATA

In today's highly complex world, with more and more pressure on time and other resources like money and machines, improved decision making is critical in all areas of life in order to improve the quality of output from fixed resources. In fact, the definition of a manager's work is to get maximum output out of limited resources through improved decision making.

Data, when put in the correct form and shape, gets transformed into information which feeds this need for improved decision making. The capturing of data allows us to do analysis of the same in order to make improved decisions for improved results. Hence, the capturing of data becomes exceedingly critical.

The criticality of data for improved decision making is all pervasive. It is required in the day-to-day life of an individual as well as in the day-to-day and strategic decision making of a company or a state/country/region.

Hence, as an individual I might be interested in knowing what the extra spoon of ghee in the vegetable does to my weight if my consumption is constant. On the other hand, I might be equally interested in knowing the calories I spend in twenty minutes of jogging versus cycling versus treadmill in order to decide which of these activities I should fix as my standard exercise activity. I might also be interested in knowing which route I should take to my office based on the parameters of time required, fuel consumption, distance and traffic movements. Thus, it is quite likely that I might take a 12 km route to my office rather than a 10 km route to the office since the longer route is less crowded—saving time and fuel.

On a much more macroeconomic scale, the prime minister of a country might want to get information about how to use ₹ 1000 crore which is available with him for the alleviation of poverty. He has to decide between three optional schemes. For making this decision he would need information on the past effectiveness of each of these schemes in meeting the objectives of the investment. Similarly, an advertising manager would need information about the effectiveness of the various advertising media available (such as different channels and newspapers, etc.) and the cost and returns associated with each system. For that matter, the national selection committee for the

Indian cricket team would also be interested in finding out the statistics associated with different opening batsmen in order to judge their ability to face fast bowlers on bouncy pitches. At the same time the weather office predicts weather based on the data available with it.

In today's world, recording data has become so crucial and reporting data has become so widespread that huge amounts of money and efforts are spent on the activity. In fact, in our day-to-day lives, each one of us has been practicing the subject of data interpretation extensively for making our own decisions. Hence, the subject is not new to any of us. What will be new is the various ways in which data can be presented as well as the typical kinds of data associated with different activities. Thus, data created and used to analyse the stock market will be quite different from the data created in the central zone of Indian Railways, or from the data required by the top management of a company or for that matter the top administrative officials of a district, a state. Even within companies, the data created would differ based on the industry of operation. Thus, the data used by the top management in the decision making for a newspaper house will be different from the data used by the top management of a banking group.

As a manager or as a person in a decision making situation in any organisation, you will be required to make critical decisions based on the data reported to you through various channels. Hence your ability to interpret the data and draw out information for improved decision making will go a lot towards the achievement of the organisation's objectives. Hence, all aptitude exams including the CAT, the bank PO exam and all other management entrance exams include Data Interpretation (DI) as a crucial section.

Traditionally, DI has accounted for anything between 20–40 questions in the last ten years of paper-pen format. In the Online CAT, DI has around 10–12 questions and now forms a critical element of the Quantitative Aptitude and Data Interpretation section.



## **DEFINITION OF DATA INTERPRETATION**

The interpretation of data is the process through which inferences are drawn about the data available for analysis. In other words, the process of drawing inferences and conclusions through the interpretation of data is what DI is all about.

## ORGANISATION AND PRESENTATION OF DATA

Normally, data is generated in such volumes and in such great proportions that it becomes impossible to make any useful judgements through the volume of data. Unless organised in a condensed form that will highlight the main characteristics, facilitate comparisons and render it suitable for further processing and interpretation, raw data will have little meaning. Top management people rarely find time to go through the entire details of any report, be it daily production or the sales forecast. An effective presentation of data enables them to draw upon the information with the least effort and time.

One chart table or graph gives at least 10 times more information than one page of words.

There is thus a need to organise the data into meaningful presentations. Data is organised and presented through one of the several forms of presentations available. The most commonly used amongst these are tables, pie charts, bar graphs, the line charts, and so on.

Data can be represented by using any one or more than one of these. Normally data is represented through a graphical representation or a set of graphical representations linked to each other.

Effective presentation of data is broadly classified into the following categories:

1. Tabular presentation
2. Bar charts
3. X-Y charts
4. Pie charts
5. Caselets
6. Miscellaneous charts

We will now go on and analyse each of the types of charts briefly.

## ■ Tabular Presentation

Tabular presentation is the process of presenting data systematically in horizontal rows and vertical columns. This presentation of data makes it easily understandable and usable for further statistical analysis. The heading of each row and column helps the reader understand the data and the units used for the same. The units to be attached to the values within the row/column may either be mentioned in every row or column or might be mentioned commonly at the top/bottom of the table. In such a case there would be a reference to the units, e.g., “All figures in ₹ crore”.

Either the columns or the rows will represent different values of a discrete variable, while the other represents a set of different continuous variables, which may or may not be related to each other.

Normally the rows represent the different values of the discrete variable, while the columns represent the multitude of continuous variables.

### EXAMPLE 1

In [Table 1.1](#) the discrete variable is the year and there are four values of it, viz., 2010, 2011, 2012, and 2013. Each of the columns represent different continuous variables with their own units.

The intersection of a row and a column denotes the value of the continuous variable for that instance of the discrete variable. For example,  $x$  denotes the value of the revenue (in ₹ crore) for the year 2010.

**Table 1.1**

| Year | Revenue<br>(₹ crore) | Costs<br>(₹ crore) | Profit<br>(₹ crore) | Sales<br>(units)<br>('000s) | No. of<br>employees |
|------|----------------------|--------------------|---------------------|-----------------------------|---------------------|
| 2010 | $x$                  |                    |                     |                             |                     |
| 2011 |                      |                    |                     |                             |                     |
| 2012 |                      |                    |                     |                             |                     |
| 2013 |                      |                    |                     |                             |                     |

## EXAMPLE 2

The marks in Physics and Biology of 20 students are as follows:

*Physics:*    20, 21, 20, 21, 21, 24, 22, 22, 23, 20, 23, 22, 21, 22, 20, 24,  
                  24, 22, 23, 20.

*Biology:*    30, 31, 32, 31, 33, 33, 32, 31, 34, 33, 34, 33, 32, 33, 32, 32,  
                  34, 30, 34, 33.

This information can be presented as follows ([Table 1.2](#)):

**Table 1.2**

| Marks in Physics<br>Marks in Biology | 20 | 21 | 22 | 23 | 24 |
|--------------------------------------|----|----|----|----|----|
| 30                                   | 1  |    | 1  |    |    |
| 31                                   |    | 2  | 1  |    |    |
| 32                                   | 2  | 1  | 1  |    | 1  |
| 33                                   | 2  | 1  | 2  |    | 1  |
| 34                                   |    |    |    | 3  | 1  |

## Bar Charts

Bar charts are one of the easiest, graphically attractive and hence most commonly used methods of presenting all types of data. They are especially useful for representing various data series (normally 1–4). The data series comprises the continuous variables while the values of the specific instances at which the value of the data series is measured represents the values of the discrete variables.

Presentation of data as bar charts makes the comparative study of the data very easy. A bar chart consists of a group of bars which are equidistant from each other. The values on the bar charts are read by the measurement of the length or the height of the bars. The width of the bars is largely inessential and is used only for the clarity of the presentation. [Example 3](#) will make the concept of bar charts clear.

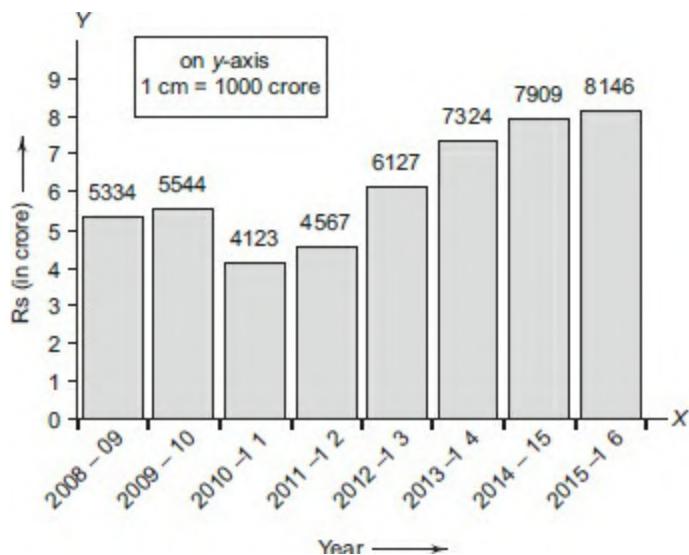
## EXAMPLE 3

The data related to the foreign exchange reserves of India for different years is as follows:

**Table 1.3** Foreign Exchange Reserves of India

| Years   | Rs (Crore) |
|---------|------------|
| 2008–09 | 5,334      |
| 2009–10 | 5,544      |
| 2010–11 | 4,123      |
| 2011–12 | 4,567      |
| 2012–13 | 6,127      |
| 2013–14 | 7,324      |
| 2014–15 | 7,909      |
| 2015–16 | 8,146      |

This data is represented on the following bar diagram ([Figure 1.2](#)).



**Figure 1.2**

## X-Y Charts

As the name suggests, X-Y charts are graphs that are represented on the X-Y plane. In this case we normally have one axis representing one or more continuous variable(s) while the other axis is used to represent a discrete variable. In certain cases (like speed-time graph) both the axes could be used

to represent continuous variables. X-Y charts, also known as line or point diagrams, are two-dimensional diagrams in which any point in the entire plane can be represented by the corresponding values read on the X and Y axes. Normally continuous variables are plotted on either of the two axes, while the other axis is used to represent the discrete variable.

An X-Y chart is a convenient and compact way of representing data series. It is also quite easy to understand. It is often used to denote single or multiple, related or unrelated, continuous variables against a specific set of values of a discrete variable. Such graphs are useful for exhibiting trends and rate of change.

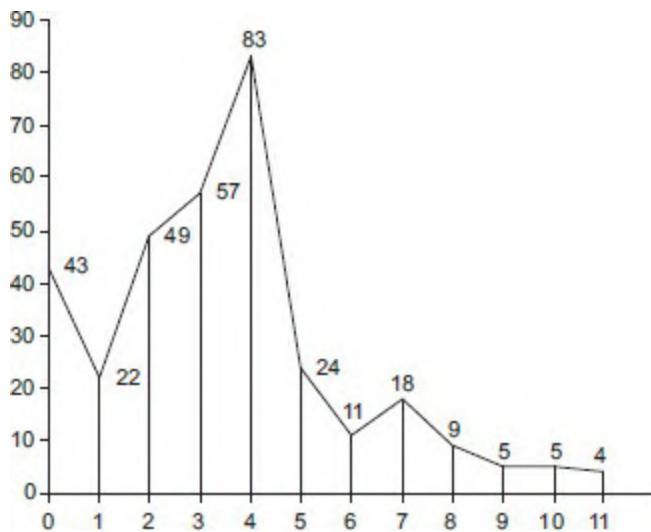
## EXAMPLE 4

The following data ([Table 1.4](#)) shows the number of questions solved by 330 students at Mindworkzz in a test on data interpretation.

**Table 1.4**

| <i>Number of Questions Solved</i> | <i>Number of Students</i> |
|-----------------------------------|---------------------------|
| 0                                 | 43                        |
| 1                                 | 22                        |
| 2                                 | 49                        |
| 3                                 | 57                        |
| 4                                 | 83                        |
| 5                                 | 24                        |
| 6                                 | 11                        |
| 7                                 | 18                        |
| 8                                 | 9                         |
| 9                                 | 5                         |
| 10                                | 5                         |
| 11                                | 4                         |

The data is represented by the following line diagram ([Figure 1.3](#)):



**Figure 1.3**

## Pie Charts

As the name suggests, pie charts are a circular representation of data. The data in question represents the break-up of a whole into its parts. The share of each part in the pie diagram is proportionate to its share of the whole data. The given data is distributed over a total angle of  $360^\circ$ . A pie diagram can also be described as a circular figure which is divided into different sectors or segments, each sector or segment representing in area and angle, the percentage contribution of a certain component to the total.

The following formula is used for the calculation of the angle of a sector of the pie chart:

$$\text{Angle of a sector} = \frac{\text{Value of Sector}}{\text{Total Value}} \times 360^\circ$$

## EXAMPLE 5

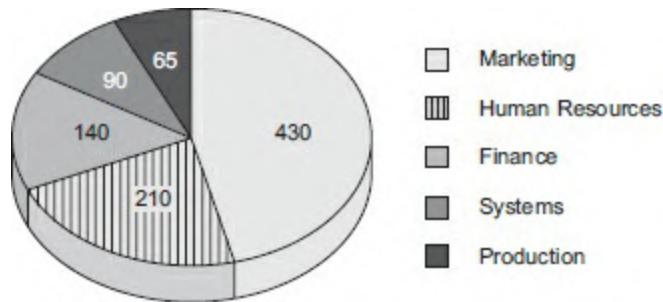
Construct a pie chart based on the following data ([Table 1.5](#)).

**Table 1.5** Number of Students Specialising in Select Subjects

| Specialisation | Number of Students |
|----------------|--------------------|
| Marketing      | 430                |

|                 |     |
|-----------------|-----|
| Human Resources | 210 |
| Finance         | 140 |
| Systems         | 90  |
| Production      | 65  |

**Solution** We need to compute the angle of each sector based on the formula given. This will result in the following diagram ([Figure 1.4](#)).



**Figure 1.4** Number of Students Specialising in Select Subjects

## Caselet Form

In this form of data presentation, the data is given in the form of a paragraph. The student is required to understand the data presented in a paragraph and convert it into a table for solving the questions.

Broadly there are two kinds of caselets:

1. Paragraph based on reasoning.
2. Paragraph based on numerical data.

The following is an example of a caselet based on reasoning.

Let us now look at the use of caselets for representing numerical information. [Example 6](#) is an instance of a caselet based on numerical data.

## EXAMPLE 6

Nath Seeds, an agriculture company divided its operations into five main business areas—fruits, vegetables, medicinal plants, cash crops, and miscellaneous. It recorded the following sales in 2011, 2012, and 2013. In 2011, sales in fruits, vegetables, medicinal plants and miscellaneous were ₹ 6,250,000, ₹ 2,200,000, ₹ 18,80,000 and ₹ 940,000 respectively. Cash crops

accounted for 30 per cent of the total sales during the year.

In 2012, the total sales showed a 10 per cent increase over the previous year. While fruit and vegetables registered 8 per cent and 10 per cent increase over their corresponding figures in 2011, medicinal plants dropped by ₹ 130,000, while cash crops stood at ₹ 5,360,000.

In 2013, though the total sales remained the same as in 2012, fruits fell by ₹ 220,000, vegetables by ₹ 320,000, medicinal plants by ₹ 100,000, and miscellaneous by ₹ 120,000.

In order to make sense of the data presented in the form of a paragraph as above, it is normally advisable to convert it into a table. Something of the following nature will emerge and then the questions based on the caselet can be solved by just reading the values from the table ([Table 1.6](#)).

---

**Table 1.6** Sales Figures for Nath Seed Company

|                  | 2011       | 2012       | 2013       |
|------------------|------------|------------|------------|
| Fruits           | 6,25,0000  | 6,75,0000  | 6,53,0000  |
| Vegetables       | 2,200,000  | 2,420,000  | 2,100,000  |
| Medicinal plants | 1,880,000  | 1,750,000  | 1,650,000  |
| Cash crops       | 4,830,000  | 5,360,000  | 6,120,000  |
| Miscellaneous    | 9,40,000   | 1,430,000  | 1,310,000  |
| Total            | 16,100,000 | 17,710,000 | 17,710,000 |

### General Hints for Data Interpretation

Data interpretation questions are based on information given in tables, graphs or diagrams. These questions test the ability of the solver to interpret the information presented and to select the appropriate data for answering a question.

1. Read the data very carefully. Even the minutest word must not be overlooked since many a times even a single word/group of words could become critical.
2. If there are more than one graphs/charts/tables, understand the relationship between them clearly before you proceed to solve the questions asked.
3. Answer only the questions asked. Do not answer/calculate things

which have not been asked for.

4. Be careful to use proper units and beware of charts and tables with non-uniform units.
5. Every Data Interpretation question will present you with Variables - some given explicitly, others implicitly (or in a hidden fashion). The primary objective in a DI question is to identify the variables given in the data and work out the relationship between the variables. Questions on DI sets would either involve the given or the hidden variables.

As we now move to look at each of these types of data presentations individually, it must be mentioned here that data generation and presentation is so vast a field that it is almost impossible to divide the individual types of tables/graphs/charts into their subtypes. However, an effort has been made here to do so—the objective being to initiate the students into each of the types of data presentations. The student is expected to not just limit himself/herself to the tables and graphs that are part of this book but is expected to go much beyond and constantly be on the look-out for more and more data presentations in magazines, books, journals or even in statistical compilations.

# 2 Tables

## OUTLINE

### Learning Objectives

- Get a first hand view of how data is presented through its organisation in the form of tables.
- Get an understanding of typical data which can be represented through tables.
- Get a first hand feel of the typical question types that are asked on tables.

### Chapter Highlights

- Introduction to tables
- Practice exercise on tables containing simulated examination level questions

## INTRODUCTION

The dictionary meaning of a table is—"a chart of facts and figures shown in horizontal rows and vertical columns." Tables are one of the most versatile methods of systematic presentation of quantitative data. In the context of the qualification of variables as either continuous or discrete variables, tables give the opportunity to present the maximum number of continuous variables with respect to a set of values for one discrete variable. Indeed, the amount of data that can be presented on a table is much higher than that which can be presented on any type of graph or chart. In fact, the data that can be represented on any type of chart (pie/bar/x-y) can also be represented on a table.

The reason for the versatility of a table over the standard charts is because if we want to present any additional information on a table, it is just a matter of adding one more column/row and describing the continuous variable to be shown in the heading of the column/row.

Normally, the discrete variable/s used in a table are:

- (a) Geographical or location based (city, state, country, etc.)
- (b) Time period in terms of months, quarters or years
- (c) Individual or company name based.
- (d) Miscellaneous classifications.

The first three are the most commonly used.

The following exercise will help you to clearly understand tables and the kinds of questions that might be created on tables.

---

### EXERCISE

---

**Directions for Questions 1 to 6:** The following data ([Table 2.1](#)) shows the comparative data for state-wise literacy and population growth. Study the data carefully and answer the questions:

---

**Table 2.1** State-wise Literacy and Population Growth

| State            | Percentage increase in                |  |   |
|------------------|---------------------------------------|--|---|
|                  | Total Literacy<br>(From 2005 to 2015) | Female Literacy<br>(From 2005 to 2015) | Change in % Population Growth Rate<br>(From 2005 to 2015) |
| Andhra Pradesh   | 25.17                                 | 23.32                                  | + 0.09  |
| Bihar            | 22.34                                 | 19.48                                  | - 0.04  |
| Gujarat          | 27.21                                 | 26.20                                  | - 0.53  |
| Haryana          | 29.19                                 | 28.67                                  | - 0.11  |
| Himachal Pradesh | 31.06                                 | 31.00                                  | - 0.24  |
| Karnataka        | 27.52                                 | 26.63                                  | - 0.47  |
| Kerala           | 30.17                                 | 31.20                                  | - 0.43  |
| Madhya Pradesh   | 25.58                                 | 22.86                                  | + 0.13  |
| Maharashtra      | 25.87                                 | 25.92                                  | + 0.10  |
| Manipur          | 29.61                                 | 29.68                                  | - 0.25  |

1. Which of the following states shows a higher percentage increase in female literacy than the percentage increase in total literacy?
  - (i) Maharashtra
  - (ii) Himachal Pradesh
  - (iii) Kerala
  - (iv) Karnataka
  - (a) (i) only
  - (b) (i), (ii) and (iv)
  - (c) (i) and (iii)
  - (d) All of the above
2. For the state showing the minimum percentage increase in total literacy, the numerical ratio of the percentage increase in total literacy to the change in percentage population growth rate is nearly (take absolute values only)
  - (a) 508.5
  - (b) 558.5
  - (c) 598.5
  - (d) None of these
3. The ratio of the percentage increase in female literacy to the percentage increase in total literacy is maximum for which state?
  - (a) Kerala
  - (b) Maharashtra

- (c) Manipur
  - (d) Madhya Pradesh
4. The ratio of the overall simple average of the percentage increase in female literacy to the simple average percentage increase in female literacy of those states where the percentage increase is more than the overall average is:
- (a) 0.972
  - (b) 0.818
  - (c) 0.89
  - (d) 0.146
5. The ratio of the simple overall average of the percentage increase in female literacy to the simple overall average of the percentage increase in total literacy is approximately equal to:
- (a) 0.894
  - (b) 0.968
  - (c) 1.033
  - (d) None of these
6. Which state exhibits the highest total literacy?
- (a) Himachal Pradesh
  - (b) Kerala
  - (c) Manipur
  - (d) Cannot be determined

**Directions for Questions 7 to 12:** The following table ([Table 2.2](#)) shows the courier charges (in ₹) for sending a 1 kg parcel from one city to another. Study the table carefully and answer the questions that follow:

---

**Table 2.2** Courier Charges for Sending Parcels

| Cities    | Allahabad | Mumbai | Kolkata | Delhi | Lucknow |
|-----------|-----------|--------|---------|-------|---------|
| Allahabad | —         | 10     | 5       | 15    | 10      |
| Mumbai    | 10        | —      | 7       | 25    | 20      |
| Kolkata   | 5         | 7      | —       | 20    | 15      |
| Delhi     | 15        | 25     | 20      | —     | 10      |
| Lucknow   | 10        | 20     | 15      | 10    | —       |

7. Among the following, the charges will be the least for sending a parcel from
  - (a) Allahabad to Lucknow
  - (b) Mumbai to Delhi
  - (c) Lucknow to Delhi
  - (d) Kolkata to Mumbai
8. For sending parcel from Kolkata, the least charges will be for:
  - (a) Allahabad
  - (b) Mumbai
  - (c) Delhi
  - (d) Lucknow
9. For which one of the following couriers will the charges be different from the other three?
  - (a) Mumbai to Allahabad
  - (b) Allahabad to Lucknow
  - (c) Delhi to Lucknow
  - (d) Delhi to Mumbai
10. If the cost per kg is assumed to be directly proportional to the distance between the cities, then it can be inferred that Mumbai is farthest from:
  - (a) Allahabad
  - (b) Kolkata
  - (c) Delhi
  - (d) Lucknow
11. The cost of sending a parcel from Mumbai to Allahabad and then from Allahabad to Lucknow varies from the cost of directly sending a parcel from Mumbai to Lucknow by:
  - (a) ₹ 10
  - (b) ₹ 5

- (c) No Variance  
 (d)  $\approx 20$
- 12.** Which of the following routes of sending a 1 kg parcel, will have no extra cost even if the parcel had been sent directly from the origin Allahabad city to the destination city?
- (a) Mumbai-Allahabad-Delhi  
 (b) Mumbai-Allahabad-Lucknow  
 (c) Kolkata-Allahabad-Lucknow  
 (d) All of these

**Directions for Questions 13 to 17:** Study Table 2.3 and answer the given questions.

**Table 2.3** Employees Working in Various Departments of Hoola Boola Moola, Inc.

| Years | Departments (Number of Employees) |           |           |          |          |
|-------|-----------------------------------|-----------|-----------|----------|----------|
|       | Production                        | Marketing | Corporate | Accounts | Research |
| 2007  | 150                               | 25        | 50        | 45       | 75       |
| 2008  | 225                               | 40        | 45        | 62       | 70       |
| 2009  | 450                               | 65        | 30        | 90       | 73       |
| 2010  | 470                               | 73        | 32        | 105      | 70       |
| 2011  | 500                               | 80        | 35        | 132      | 74       |
| 2012  | 505                               | 75        | 36        | 130      | 75       |

- 13.** In which year did the total number of employees reach (approximately) twice the total number of employees that the factory had in the year 2007?
- (a) 2008  
 (b) 2009  
 (c) 2010  
 (d) 2011
- 14.** In which department did the number of employees (approximately) remain the same during the years 2007 and 2012?
- (a) Production  
 (b) Corporate  
 (c) Research

- (d) None of these
15. In how many years was the number of employees working in the production department more than 50% of the total employees?
- 2
  - 3
  - 4
  - 5
16. In which year/s did each department have a larger number of employees than it had in the immediately preceding year?
- 2010
  - 2012
  - 2009
  - 2011
17. Which department had less than 10% of the employees through all the years shown in the table?
- Marketing
  - Corporate
  - Accounts
  - None of these

**Table 2.4** Production of Three Types of Plastic Materials in the Island of Hoola Boola Moola.

| Months    | Production of plastic materials       |         |   |         |  |         |
|-----------|---------------------------------------|---------|---|---------|--|---------|
|           | Polypropylene<br>(in thousand tonnes) |         | Polyethylene Production<br>(in thousand tonnes) |         | Nylon Filament Yarn<br>Production (in thousand tonnes) |         |
|           | 2011–12                               | 2012–13 | 2011–12   | 2012–13 | 2011–12  | 2012–13 |
| March     | 17.6                                  | 20.8    | 104   | 40      | 3150   | 2900    |
| April     | 16.4                                  | 20.6    | 100   | 88      | 3050   | 2850    |
| May       | 16.0                                  | 21.4    | 80  | 96      | 3000   | 2900    |
| June      | 15.4                                  | 19.2    | 88  | 80      | 2520   | 2800    |
| July      | 16.0                                  | 19.2    | 90  | 84      | 2600   | 2700    |
| August    | 16.6                                  | 21.4    | 94  | 80      | 2650   | 2750    |
| September | 16.4                                  | 20.8    | 98  | 84      | 2500   | 2650    |
| October   | 17.8                                  | 23.0    | 100   | 80      | 2200   | 3000    |
| November  | 16.4                                  | 22.6    | 104   | 92      | 2000   | 2950    |
| December  | 17.6                                  | 21.8    | 108   | 88      | 2250   | 3000    |
| January   | 20.0                                  | 20.0    | 96  | 100     | 2750   | 2350    |
| February  | 19.8                                  | 17.8    | 20  | 96      | 2600   | 2250    |
| March     | 21.0                                  | —       | 40  | 96      | 2900   | —       |

**Directions for Questions 18 to 22:** Study *Table 2.4* and answer the following questions.

18. In 2011–12, the ratio of the difference between the maximum and the minimum production of polyethylene, to the difference between the maximum and minimum production of Polypropylene, is nearly
- (a) 14
  - (b) 15
  - (c) 16
  - (d) 18
19. The ratio of the maximum production of polyethylene in 2012–13 to the minimum production of polyethylene in 2011–12 is:
- (a) 4.8
  - (b) 5
  - (c) 5.4
  - (d) 4.2
20. The maximum number of times the production in 2011–12 equals the production in 2012–13 (for the same month) is for which products?
- (a) Polypropylene
  - (b) Polyethylene
  - (c) Nylon Filament Yarn
  - (d) None of these
21. For polypropylene, the production in 2011–12 is greater than the production in 2012–13, (for the corresponding month) for how many months:
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
22. The difference between the minimum production of polypropylene in 2012 – 13 and the minimum production of polypropylene in 2011–12 is how many times the difference in July’s production of polyethylene (of the two years)?
- (a) 3 times

- (b) 2 times
- (c) equal
- (d) 0.4 times

**Directions for Questions 23 to 26:** Study *Table 2.5* and answer the questions given below.

**Table 2.5** Age-wise Brand Ownership of Television Sets

| Brand    | <1 year old | 1–2 years old | 2–5 years old | More than 5 years old |
|----------|-------------|---------------|---------------|-----------------------|
| LG       | 15%         | 45%           | 40%           |                       |
| Samsung  | 5%          | 15%           | 25%           | 55%                   |
| BPL      | 10%         | 10%           | 10%           | 70%                   |
| Videocon | 25%         | 55%           | 20%           |                       |
| Sony     | 15%         | 50%           | 20%           | 15%                   |

- 23. If 1,00,000 TVs were sold last year, how many LG sets were sold?
  - (a) 10,000
  - (b) 12,500
  - (c) 15,000
  - (d) Cannot be determined
- 24. If the total BPL sets sold to date are 500,000, how many are more than one year old?
  - (a) 500,000
  - (b) 450,000
  - (c) 50,000
  - (d) Cannot be determined
- 25. Can we say that Samsung has lost market share?
  - (a) Yes
  - (b) No
- 26. When did Videocon capture the maximum market?
  - (a) Last year
  - (b) 2 years ago
  - (c) 5 years ago
  - (d) Cannot be determined

**Directions for Questions 27 to 29:** Assume that these are the only brands of TVs that were sold and to date the numbers sold are as provided by **Table 2.6**. Answer Questions 27–29 based on the information provided.

27. How many sets were sold over five years back?
- (a) 60 lakh
  - (b) 65.5 lakh
  - (c) 70 lakh
  - (d) Cannot be determined
28. Which TV had the highest sales in the previous year?
- (a) BPL
  - (b) Sony
  - (c) Videocon
  - (d) LG

---

**Table 2.6** Data Relating to Television Sales

| <i>Brand</i> | <i>Units sold</i> |
|--------------|-------------------|
| LG           | 2,000,000         |
| Samsung      | 7,000,000         |
| BPL          | 3,000,000         |
| Videocon     | 5,000,000         |
| Sony         | 4,000,000         |

29. If 50% of all TVs which are more than five years old are now defective, how many TV sets are not defective? (Assume that there are no other defectives in any other category.)
- (a) 177.75 lakh
  - (b) 180 lakh
  - (c) 145.5 lakh
  - (d) Cannot be determined

**Directions for Questions 30 to 34:** Read the table (Table 2.7) and answer the questions that follow:

**Table 2.7** Distribution of Students at Harvard University According to Professional Courses

| S.No. | Course              | FACULTY     |      |                 |      |
|-------|---------------------|-------------|------|-----------------|------|
|       |                     | Engineering |      | Non-Engineering |      |
|       |                     | Girls       | Boys | Girls           | Boys |
| 1.    | Business Management | 25          | 45   | 25              | 65   |
| 2.    | Computers           | 23          | 186  | 20              | 32   |
| 3.    | Finance             | 25          | 120  | 12              | 58   |
| 4.    | Others              | 12          | 100  | 3               | 5    |

30. If 60% of the boys and 70% of the girls are successful in the courses taken by them, then what is the combined pass percentage? (approximately)
  - (a) 67.2
  - (b) 63.1
  - (c) 62
  - (d) 68.5
31. In which course is the percentage of girls (among the total number of students) higher than the percentage of girls in any other course?
  - (a) Business Management
  - (b) Computers
  - (c) Finance
  - (d) Others
32. By what percentage is the number of students doing Computers more than the number of students doing Business Management?
  - (a) 67.2
  - (b) 63.1
  - (c) 62
  - (d) 68.5
33. The percentage of girl engineers doing Business Management are:

- (a) 11.2
  - (b) 12.2
  - (c) 15
  - (d) None of these
34. Taking all the courses together, by what percentage do the number of boys exceed the number of girls?
- (a) 521.4%
  - (b) 421.4%
  - (c) 321.4%
  - (d) None of these

**Directions for Questions 35 to 40:** Study *Table 2.8* and answer the questions following that.

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**Table 2.8** Age-wise Population Distribution of a State

| <i>Age Group</i> | <i>Percentage</i> |
|------------------|-------------------|
| Up to 15         | 30.00             |
| Up to 25         | 47.75             |
| Up to 35         | 65.00             |
| Up to 45         | 79.50             |
| Up to 55         | 93.75             |
| Up to 65         | 98.87             |
| Up to 110        | 100.00            |

35. Which one of the age groups listed below accounts for the maximum population in the state?
- (a) 0–15
  - (b) 15–35
  - (c) 26–45
  - (d) 46+

- Out of every 400,000 people, the number of persons below 25 years is
36. (approximately):
- (a) 181,000
  - (b) 191,000
  - (c) 194,000
  - (d) None of these
37. If it is known that there are 40 million people upto 35 years of age, then how many million people (approximately) are in the age group of 56–65?
- (a) 4.2 million
  - (b) 3.8 million
  - (c) 3.15 million
  - (d) Cannot be determined
38. If there are 20 million people in the age group of 56 and above, what is the difference (approximately) between the total number of people in the age group of 16–25 and 46–55?
- (a) 10.2 million
  - (b) 11.2 million
  - (c) 12.2 million
  - (d) Cannot be determined
39. If the difference between the number of people in the age groups of 46–55 and 26–35 is 3.9 million, then the total population (approximately) of the state is:
- (a) 120 million
  - (b) 130 million
  - (c) 390 million
  - (d) None of these
40. What is the ratio of the number of people between 15 to 35 and the number of people above 35?
- (a) 2:1
  - (b) 65:35
  - (c) 1:1
  - (d) None of these
-

## ANSWER KEY

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1. (c)
2. (b)
3. (a)
4. (c)
5. (b)
6. (d)
7. (d)
8. (a)
9. (d)
10. (c)
11. (c)
12. (d)
13. (b)
14. (c)
15. (d)
16. (d)
17. (a)
18. (c)
19. (b)
20. (a)
21. (a)
22. (d)
23. (d)
24. (b)
25. (b)
26. (d)
27. (b)
28. (c)
29. (a)
30. (c)

- 31. (a)
  - 32. (b)
  - 33. (d)
  - 34. (c)
  - 35. (b)
  - 36. (b)
  - 37. (c)
  - 38. (b)
  - 39. (b)
  - 40. (c)
- 

## SOLUTIONS

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1. Maharashtra and Kerala show the required property.
2. The minimum percentage increase in total literacy is for the state of Bihar. For this state, the numerical ratio between the numerical values of the percentage change in total literacy to change in percentage population growth rate is  $22.38/0.04 = 2238/4 = 558.5$ .
3. You would need to check only those states, where female literacy has grown by more than total literacy. The three states where this occurs are Kerala, Maharashtra and Manipur. The respective ratios for these states are:  $31.20/30.17$ ;  $25.92/25.87$ ;  $29.68/29.61$ . In this case the comparison of the ratios can be done, by simply looking at the highest difference between the numerator and the denominator. The highest difference is 1.03 for Kerala and in comparison the difference for the other states 0.05 and 0.07 for Maharashtra and Manipur are much smaller. [Note, this process of comparison could be used whenever the denominators of the ratios being compared are in the same range. You would need to be careful to use this process in case the denominators are widely different].
4. In this question, you would first need to find out the average of the second column.  $264.76/10 = 26.476$ . Then, the states where the percentage increase in female literacy is greater than 26.476% are Haryana, Himachal Pradesh, Karnataka, Kerala and Manipur. Keeping

an eye on the options at this stage can help you reduce the calculations. For instance, if the option (a) 0.972 were to be correct, the average percentage change in female literacy of these 5 states would have to turn out to be just about 3–4% more than 26.476. This is because, if the required ratio is 0.972, it means that if the value of average of these 5 states was 1, then the average of all the states would be 0.972.  $0.972 \rightarrow 1$  is approximately a 3-4% increase. This gives us a roughly calculated target value of around 27.2. If option (c) 0.89 were to be correct, then the average percentage change in female literacy of these 5 states would have to turn out to be just about 11–12% more than 26.476. This gives us a roughly calculated target value of around 29.3. Taking a look at the five values of the percentage increase in female literacy, we can see that the average of 28.67, 31.00, 26.63, 31.20 and 29.68 is much higher than 27.2 and is likely to be around 29+. Clearly, option (c) is the only feasible option that matches the required value.

5. We have already calculated the total of the female literacy column as 264.76 in the previous question. The approximate total of the total literacy column is turning out to be 274.  $264.76/274$  gives us a ratio of around 0.96.
6. We do not have any information to tell us the figures of the absolute value of the total literacy in the table. The table is only giving us the percentage changes in the total literacy over the decade 2005 to 2015. Hence, we cannot determine this answer.
7. Kolkata to Mumbai costs ₹ 7 only while the other three cost ₹ 10, ₹ 25 and ₹ 10 respectively.
8. Kolkata to Allahabad will involve the least cost.
9. The cost of sending a parcel from Mumbai to Allahabad, from Allahabad to Lucknow and from Delhi to Lucknow are the same at ₹ 10 each, while the cost of sending a parcel from Delhi to Mumbai is ₹ 25 (different from the other three costs).
10. Mumbai is farthest from Delhi as it involves the greatest cost, and cost is proportional to distance.
11. The cost of sending a parcel from Mumbai to Lucknow via Allahabad is ₹  $(10+10) = ₹ 20$ . The cost of sending a parcel from Mumbai to Lucknow directly is also ₹ 20. Hence there is no variance in the cost.

12. It can be seen that there is no variance of cost in either of these three cases.
13. Total of 2007 is 345 while in 2009 it crosses 690.
14. The number of employees in research is 75 for the years 2007 and 2012.
15. The value of the number of employees in production is greater than half the total number of employees in the company for every year after 2008. Hence, option (d) is correct.
16. Visual inspection gives 2011 as the correct answer.
17. If we look at the first years' numbers, we will get that the total number of employees in 2007 are 345. 10% of this being 34.5, marketing is the only department that can satisfy the below 10% for all years' condition. Checking the percentages for number of employees in marketing as a percentage of the total number of employees between 2008 to 2012, we get that the percentage of marketing employees is below 10% for each of these years. Hence, option (a) is correct.
18. Maximum production of polyethylene in 2012 is 108 while the minimum is 20. The difference between maximum and minimum is thus  $108 - 20 = 88$ . Similarly, for polypropylene, the difference is  $21 - 15.4 = 5.6$ . The required ratio would thus be  $88/5.6 \approx 16$  (which is the closest value).
19. Maximum in 2012-13 for polyethylene = 100, minimum for polyethylene in 2011-12 is 20. Required ratio =  $100/20= 5$ .
20. Looking across the two years for each product in each month, you can see that this equality is achieved only for polypropylene in January.
21. This is again to be visually checked. 2011–12 is greater than 2012–13 for polypropylene only in 1 month viz. February.
22. Minimum polypropylene is 2012-13 = 17.8. Minimum polypropylene is 2011-12= 15.4. Difference is 2.4. Difference in July production for polyethylene is  $90 - 84 = 6$ . Required ratio =  $2.4/6 = 0.4$
23. The table provides for brand wise figures with respect to the age of the TVs for each brand. Thus, of all the LG TVs in operation, 15% TVs are 1 year old, 45% are between 1–2 years old and 40% are between 2–5 years old. Thus, we do not have the information about the market

shares of the 100000 TVs sold last year and we cannot determine how many LG sets were sold last year, just by knowing how many TVs were sold last year.

24. Following the logic of the above solution we can see that 10% of the total sets of BPL are 1 year old. Thus, the remaining 90% (=450000) would be above 1 year old.
25. We cannot say anything about market shares. Hence, No.
26. Again, we cannot make a judgment about market shares. Hence, option (d) has to be marked.
27. We would need to use the information of [Tables 2.5](#) and [2.6](#) together here. We get, 55% of Samsung + 70% of BPL + 15% of Sony = 55% of 7000000 + 70% of 3000000 + 15% of 4000000 = (38.5 + 21+ 6) lac = 65.5 lacs.
28. Videocon sold 25% of its 5000000 sets last year. This figure is higher than the numbers sold for any other brand in the tables. Hence, Videocon is the correct answer.
29. Total TV sets = 210000000 = 21 million. Defective TV sets =  $0.5 \times 6.5$  million = 3.25 million. TV sets that are not defective = Total - Defective =  $21 - 3.25 = 17.75$  million = 177.75 lac.
30. Take the weighted average. It can be seen that the approximate ratio of boys to girls is 4:1. Hence, using alligation, the answer will be



**Note:** (This Technique is explained in detail in my book QA for CAT)

31. The number of girls in Business Management is 50, while the number of boys is 110. That gives us 2.2 boys per girl. For the other courses, this ratio is higher than 2.2. For example for computers, we have 218 boys to 43 girls – roughly 5 boys per girl and so on. Note that, the ratio of boys to girls would be a proxy calculation for the percentage of girls studying a course. The lower the number of boys per girl, the higher would be the percentage of girls in the course.
32. Number of students in computers = 261. Number of students doing Business Management = 160. Thus, the number of students doing

computers is greater than the number of students doing business management by  $101/160 = 63.1\%$ .

33.  $25/85 = 5/17 = 30\%$  (approx). Hence none of these.
34. Total number of boys = 611. Total number of girls = 145. The number of boys is greater than the number of girls by  $321.4\%$ .
35. Visual Interpretation of the age groups given, 15 – 25 has  $35\%(65 - 30)$ , which is the max.

**Note for interpretation of the table** The table shows the cumulative percentage of people upto a certain age. Thus, it can be interpreted that 30% of the people belong to the under 15 age group, while 47.75% of the people are from the age group up to 25. Hence, the percentage of people between 15 – 25 will be  $47.75 - 30 = 17.75\%$ . Use this logic to solve questions 35–40.

36. 47.75% of 400,000
37. 65% corresponds to 40 million and correspondingly 5.12% corresponds to 3.15 million. ( $5.12 = 98.87 - 93.75$ )
38. 6.25% people belong to the age group 56 and above, and this corresponds to 20 million, then 3.5% (difference between the respective age groups referred to) = 11.2 million.
39. 3% is 3.9 million, hence 100% will be 130 million.
40. 35% of the population is between 15 – 35 and 35% is above 35. Hence the answer is 1:1.

**PREPARATION TIP:** Calculations in Data Interpretation tend to get repetitive in nature after you have solved your first 50 to 100 sets of Data Interpretation questions. Hence, your attitude with every calculation you come across has to be to master it, and try to discover superior processes in order to do the same calculation, so that the next time you face it you should be able to compete with the best minds.

Throughout this book at various points in the solutions we have illustrated the best processes to do the calculations, and I would expect you to make sure that you understand and inculcate those calculations into your thought processes, so that the next time you face the same calculation, you are ready.

# 3 Bar Charts

## OUTLINE

### Learning Objectives

- Get a first hand view of how data is presented through its organisation in the form of bar charts.
- Get an understanding of typical data which can be represented through bar charts. Also understand the concept of time series.
- Get a first hand feel of the typical question types that are asked on the basis of bar charts.
- Different Bar Charts covered include Simple Bar Charts, Composite Bar Charts, Deviation Bar Charts, Stacked Bar Charts, Percentage Representation on a stacked bar chart, etc.

### Chapter Highlights

- Introduction to bar charts
- Practice exercise on bar charts containing simulated examination questions

In the chapter on tables, we discussed them as a convenient and versatile tool for presenting data. We saw their flexibility and versatility for presenting data. Besides, we also got an exposure to the kind of questions that can be created on a table.

However, it must be pointed out here that the visual impact created by tables is considerably lower than that which is created by graphs and charts. Charts and graphs give a bird's eye-view of the numerical data to be presented. Hence, they become easy to understand and facilitate comparisons.

They have been used extensively since time immemorial, as due to their visual impact they save a lot of time and effort.

In the current chapter we will concentrate on Bar Charts as a device of presenting data.

Bar diagrams (or bar charts) are one of the oldest and most commonly used diagrams for presenting data. A bar chart consists of bars, each of which is a thick box. The value of the reading of the bar is determined by the height of the bar.

### **Points noteworthy with respect to bar charts:**

- Bar diagrams are visual aids for presenting statistical data. Very often in bar charts, different colours, shades, dots, dashes, etc. are used in the bars to distinguish between different continuous variables being represented. There will always be an explanatory index indicating the meanings of the different colours, shades and markings.
- Each bar diagram has a title (which is displayed either at the top or at the bottom of the diagram) indicating the subject matter depicted in the diagram. Besides, at times, there may be footnotes at the bottom of the diagram to explain facts that are not covered in the title. The student is advised to be very careful about reading these footnotes and not to overlook these facts while interpreting bar diagrams.
- One axis (normally the x-axis) of every bar diagram will represent a discrete variable while the other axis represents the scale for one or more continuous variables.

We now move onto the different kinds of bar charts and the kinds of data that can be represented on a bar chart:

## SIMPLE BAR CHART

The simple bar chart is the ‘simplest’ bar chart which has one continuous variable charted along with one discrete variable. [Figure 3.1](#) shows an example.



**Figure 3.1** Simple Bar Chart

The following kinds of data can be represented on a simple bar chart:

| <i>Discrete Variable</i> | <i>Continuous Variable</i>                  |
|--------------------------|---|
| Years                    | Sales (in ₹) trend of a single company      |
| Years                    | Sales (in units) trend of a single company  |
| Years                    | Profit trend of a single company            |
| Years                    | Profit per unit trend of a single company   |
| Years                    | No. of employees trend of a single company  |
| Years                    | Population trend of a single country        |
| Company names            | Sales of each company for a particular year |

### Task for Student

Doubtlessly there will be varied types of data that can be represented on a simple bar chart. You are required to add to the list given and try

to visualise simple bar charts for your own set of combinations of one discrete and one continuous variable.

---

## ◆ STACKED BAR CHART

The length of a bar, on a bar chart, normally represents the magnitude of a single continuous variable. However, in certain cases it might be feasible and in fact required to break up the magnitude of the main continuous variable into its component parts. When this sort of representation is used, the chart formed is called a stacked bar chart.

Different shades, colours, etc. are used to distinguish the various components and an index is given along with the chart to explain these differences. [Figure 3.2](#) gives an example.

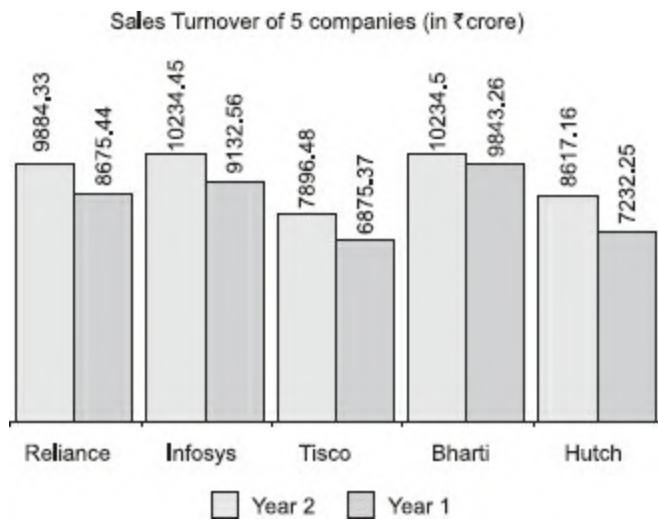


**Figure 3.2** Stacked Bar Chart

## COMPOSITE BAR CHART

One of the primary limitations of the simple bar chart is that it can only be used to display a single continuous variable. Similarly, although a stacked/component bar chart can display multiple continuous variables, it can only do so if all the continuous variables add up to a single continuous variable. In other words, it can only display one continuous variable and its constituent parts.

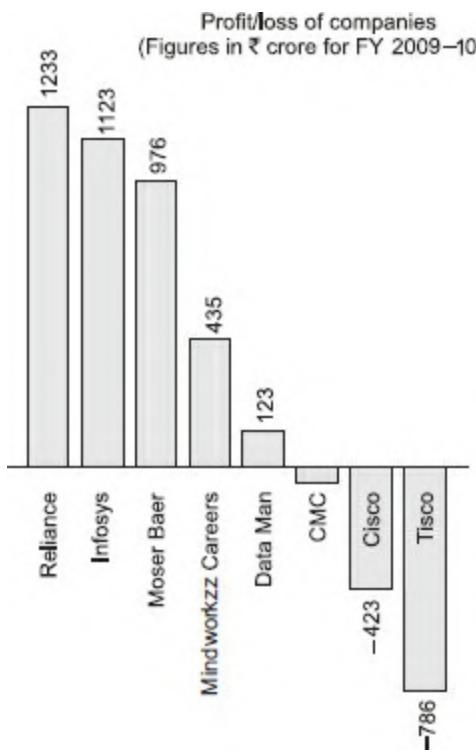
However, if two or more sets of continuous variables are to be shown on the same bar chart, we use what is called a composite bar chart. [Figure 3.3](#) will make it clear.



**Figure 3.3** Composite Bar Chart

## THE USE OF BAR CHARTS TO SHOW DEVIATIONS

Deviation bars are useful for graphic presentation of continuous variables which can have both positive and negative values, i.e., surplus or deficit, net profit or loss, net of imports and exports. In general, continuous variables which have both positive and negative values are best represented on bar charts.



**Figure 3.4** Representing Deviation through Bar Charts

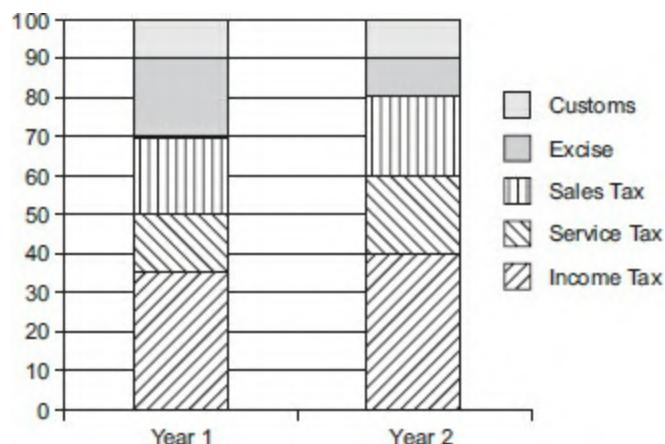
A base line is created and positive values (such as profit, surplus), etc., are represented by bars above the base line while negative deviations (loss or deficit) are represented by bars below the base line. [Figure 3.4](#) will make it clear.

## ◆ REPRESENTATION OF PERCENTAGE ON A STACKED BAR CHART

Sometimes stacked bars can also be used to represent the break-up of some continuous variable. [Figure 3.5](#) will make it clear.

Such a use of bar charts is quite convenient for comparing two or more sets of data.

[Figure 3.5](#) shows the break-up of the various sources of revenues for the Government of India over a two-year period.



**Figure 3.5** Representing Percentage on a Stacked Bar Chart

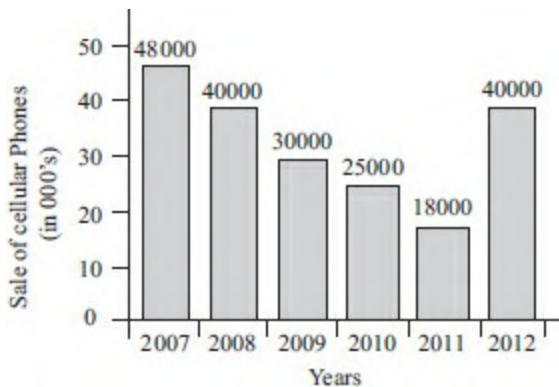
We now move on to give you a feel of the kinds of questions that can be created on bar graphs.

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### EXERCISE

---

**Directions for Questions 1 to 4:** Study the following bar chart ([Figure 3.6](#)) to answer the questions.



**Figure 3.6** Sale of Cellular Phones

1. The percentage increase in sales from 2011 to 2012 was
  - (a) 115%
  - (b) 128%
  - (c) 122%
  - (d) 118%
2. The sum of sales of cellular phones in the years 2009 and 2011 is equal to that in
  - (a) 2007
  - (b) 2008
  - (c) 2010
  - (d) 2012
3. The two years between which the rate of change of cellular phones is minimum are:
  - (a) 2007 and 2008
  - (b) 2009 and 2010
  - (c) Both 1 & 2
  - (d) 2011 and 2012.
4. The difference in the sales of cellular phones for the years 2007 and 2009 is
  - (a) 500 units
  - (b) 1,000 units
  - (c) 5,000 units
  - (d) 18,000 units

**Directions for Questions 5 to 9:** The following bar chart ([Figure 3.7](#)) shows the trends of foreign direct investment (FDI) into India from all over the world.



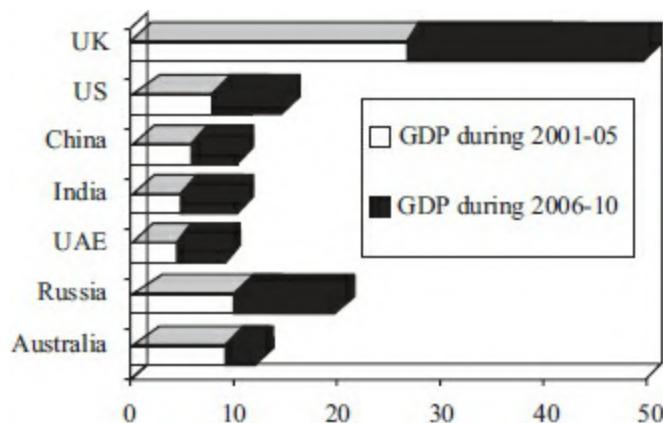
**Figure 3.7** Trends of FDI in India

5. What was India's total FDI for the period shown in the figure?
  - (a) 93.82
  - (b) 93.22
  - (c) 93.19
  - (d) None of these
6. What was the absolute difference in the FDI to India in between 2011 & 2012?
  - (a) 7.29
  - (b) 7.13
  - (c) 8.13
  - (d) None of these
7. What was the ratio of investment in 2012 over the investment in 2007?
  - (a) 5.50
  - (b) 5.36
  - (c) 5.64
  - (d) 5.75
8. Which year exhibited the highest growth in FDI in India over the period shown?
  - (a) 2008
  - (b) 2009

- (c) 2010  
(d) 2011
9. If India's FDI from OPEC countries was proportionately the same in 2007 and 2012 as the total FDI from all over the world and if the FDI in 2007 from the OPEC countries was Euro 2 million, what was the amount of FDI from the OPEC countries in 2012?
- (a) 11  
(b) 10.72  
(c) 11.28  
(d) 11.5

**Directions for Questions 10 to 13:** The following bar chart ([Figure 3.8](#)) represents the GDP of different countries during the half decades 2001–05 and 2006–10. All figures are in ₹ billion.

Study the chart carefully and answer the questions given.



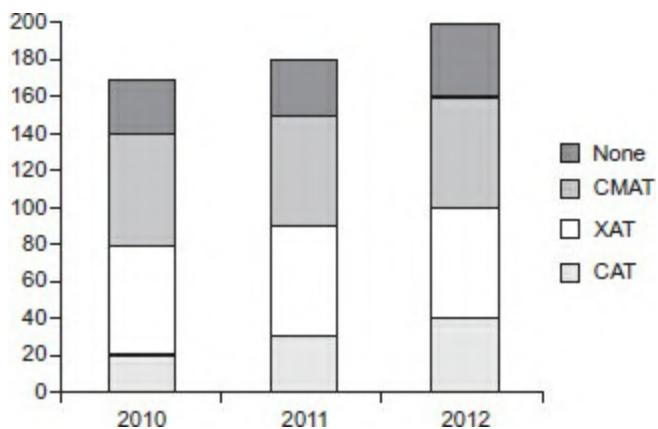
**Figure 3.8** GDP of Select Countries

10. Which of the countries listed below accounts for the highest GDP during the half decade 2001 to 2005?
- (a) Russia  
(b) China  
(c) India  
(d) UAE
11. Which of the countries listed below accounts for the maximum GDP

during the half decade 2006 to 2010?

- (a) UAE
  - (b) US
  - (c) India
  - (d) China
12. Out of every ₹ 10,000 spent during the decade 2001–10, approximately how much was the GDP of Russia during the half decade 2001–05?
- (a) ₹ 700
  - (b) ₹ 1,400
  - (c) ₹ 2,800
  - (d) None of these
13. The GDP of UAE is what fraction of the GDP of the UK for the decade (approximately)?
- (a)  $1/4^{\text{th}}$
  - (b)  $1/5^{\text{th}}$
  - (c)  $1/6^{\text{th}}$
  - (d) Data inadequate

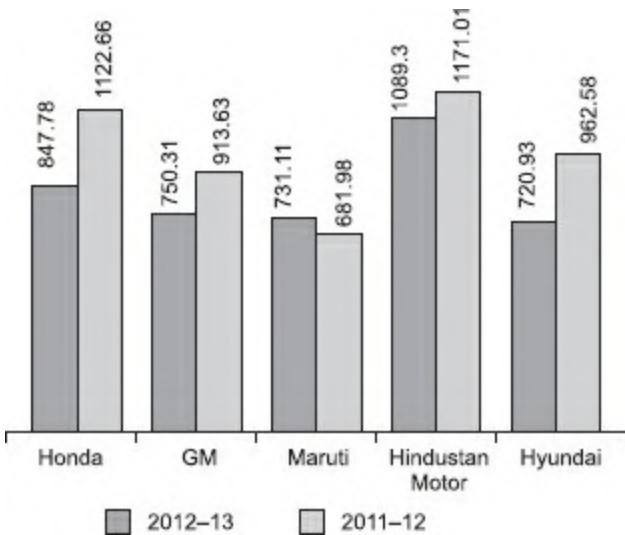
**Directions for Questions 14 to 17:** The following chart ([Figure 3.9](#)) represents the number of students of Mindworkzz at its Lucknow centre who passed the CAT exam or the XAT exam or the CMAT exam or none of these exams. (Assume that there are no students who passed more than one exam.)



**Figure 3.9** Number of Students who Qualified CAT/XAT/CMAT Exams

14. What was the percentage of students who cleared CAT in 2010?
- (a) 19.56%
  - (b) 12.65%
  - (c) 14.28%
  - (d) 11.76%
15. What was the percentage of students who succeeded in at least one of the three exams in 2010?
- (a) 82.4%
  - (b) 82.8%
  - (c) 82.35%
  - (d) 83.3%
16. Which year showed the best result in MBA entrance exams for the institute (in terms of percentage of students who cleared)?
- (a) 2010
  - (b) 2011
  - (c) 2012
  - (d) Cannot be determined
17. What is the percentage increase in the number of students in 2012 over 2010?
- (a) 30%
  - (b) 17.64%
  - (c) 117.6%
  - (d) 85%

**Directions for Questions 18 to 22:** Study the following bar chart ([Figure 3.10](#)) carefully and answer the questions given.



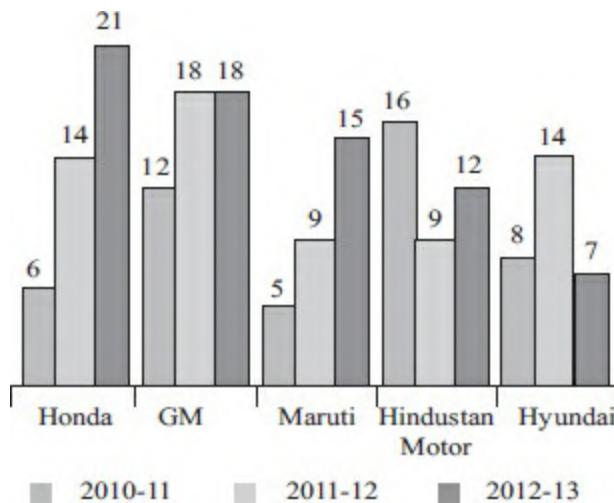
**Figure 3.10** Sales Turnover of 5 companies (in ₹ crore)

18. What is the approximate difference between the average sales turnover of all the companies put together between the years 2011–12 and 2012–13?
  - (a) 133.45
  - (b) 142.48
  - (c) 117.6
  - (d) None of these
19. What should have been the sales turnover of GM in 2012–13 to have shown an excess of the same quantum over 2011–12 as shown by the sales turnover of Maruti?
  - (a) 953.76
  - (b) 963.76
  - (c) 952.76
  - (d) 962.76
20. Which of the companies shows the maximum percentage difference in sales turnover between the two years?
  - (a) Honda
  - (b) GM
  - (c) Hyundai
  - (d) Maruti
21. What is the percentage change in the overall sales turnover of the five

companies together between 2011–12 to 2012–13?

- (a) 17.21%
  - (b) 14.68%
  - (c) 12.67%
  - (d) 21.24%
22. What is the absolute change in the overall sales turnover of the five companies together between 2011–12 to 2012–13?
- (a) 712.43
  - (b) 142.48
  - (c) 683.53
  - (d) None of these

**Directions for Questions 23 to 25:** The following chart (*Figure 3.11*) shows the production of cars in thousands.



**Figure 3.11** Production of Cars for 2010—13 period from Select Manufacturers

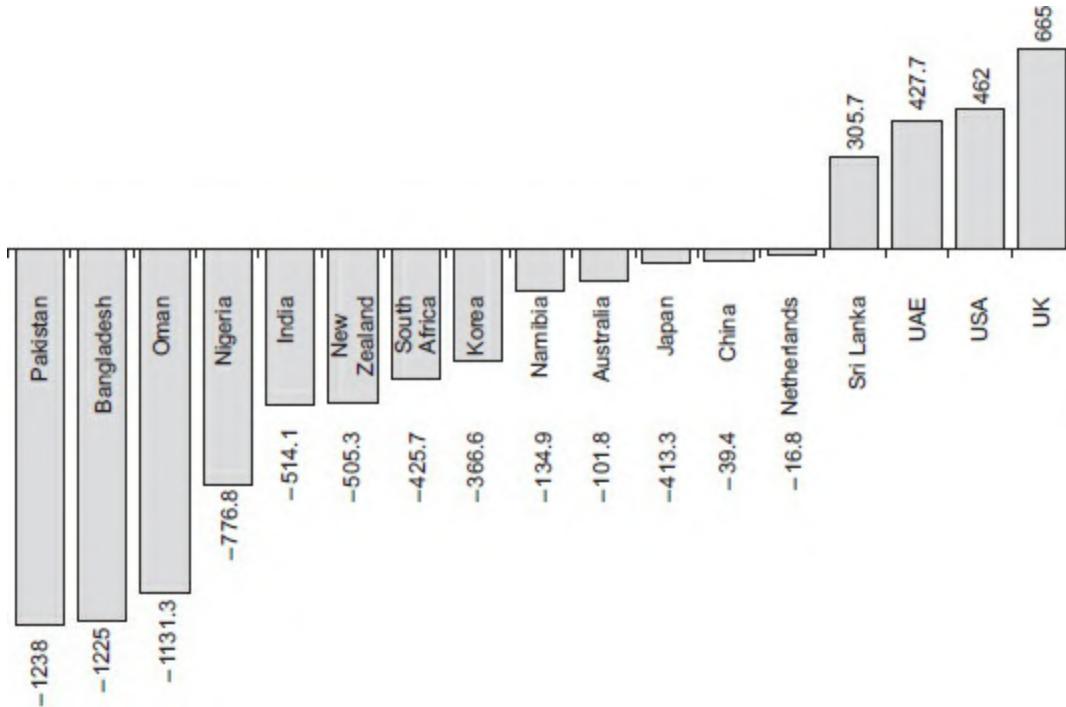
23. The ratio of Hindustan Motors' production in 2011–12 to Honda's production in 2010–11 is:
- (a) 0.66
  - (b) 1.5
  - (c) 2
  - (d) None of these

24. For how many companies has there been no decrease in production in any year from the previous year?
- (a) One
  - (b) Two
  - (c) Three
  - (d) Four
25. How many companies have shown production below their average production in 2010–11, but have showed above average production in 2011–12?
- (a) One
  - (b) Two
  - (c) Three
  - (d) Four

**Directions for Questions 26 to 30:** The total of the first three deficit countries (in ₹ crore) = 3594.3. The total of the next five deficit countries (in ₹ crore) = 2588.5. The total of the last five deficit countries (in ₹ crore) = 334.2. The total of the four surplus countries (in ₹ crore) = 1860.4.

26. The state whose surplus is nearly equal to the average of the four surplus countries is
- (a) Sri Lanka
  - (b) UAE
  - (c) USA
  - (d) UK
27. The ratio of the deficit of the first five deficit countries to the overall deficit of all the deficit countries is nearly equal to:
- (a) 0.72
  - (b) 0.75
  - (c) 0.80
  - (d) 0.85
28. The average of the total deficit of the middle five deficit countries is closest to the deficit of which country?
- (a) Korea

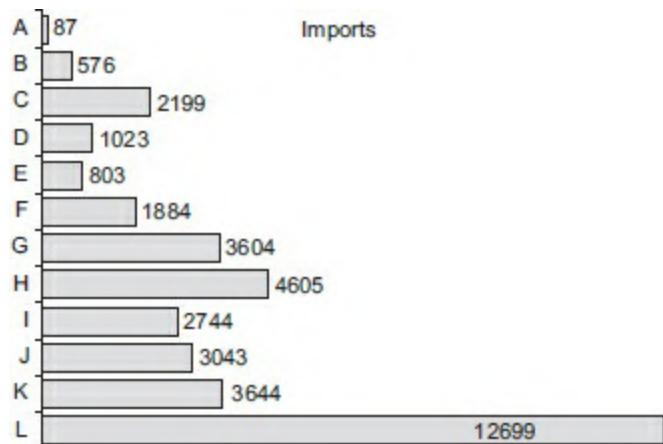
- (b) South Africa
- (c) UAE
- (d) None of these



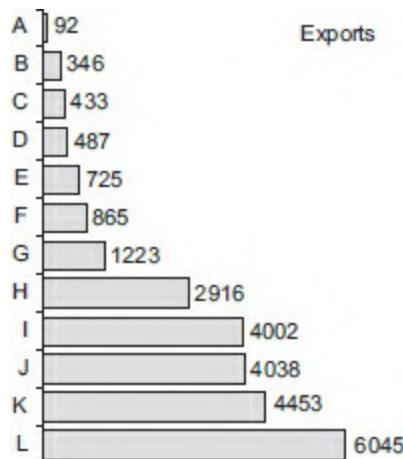
**Figure 3.12** Cumulative Trade Deficit/Surplus of Countries for the Year 2012—13 (All figures in ₹ crore)

29. The net total deficit/surplus is equal to:
  - (a) 4656.6 surplus
  - (b) 4656.6 deficit
  - (c) 3836.5 deficit
  - (d) None of these
30. The ratio between the difference between the highest and the lowest of the surplus countries to the difference between Bangladesh and Oman is:
  - (a) 3.44
  - (b) 2.96
  - (c) 4.5
  - (d) 3.83

**Directions for Questions 31 to 35:** Study the following bar charts (Figures 3.13 (A) and 3.13) (B) before answering the questions.



**Figure 3.13 (A)** Foreign Trade (Imports) by Countries for the Year 2008—09



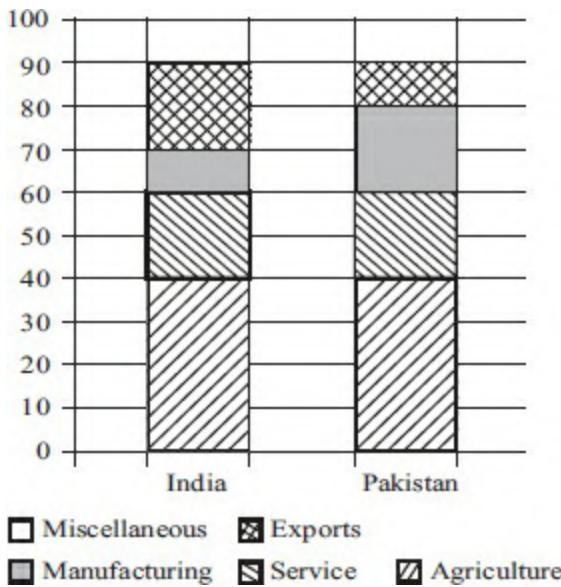
**Figure 3.13 (B)** Foreign Trade (Exports) by Countries for the Year 2008—09

31. How many countries exhibited a trade surplus?
  - (a) 5
  - (b) 4
  - (c) 3
  - (d) 6
32. The highest trade deficit was shown by which country?
  - (a) C

- (b) G
  - (c) H
  - (d) L
33. The ratio of Exports to Imports was highest for which country?
- (a) A
  - (b) I
  - (c) J
  - (d) K
34. The total trade deficit/surplus for all the countries put together was:
- (a) 11286 surplus
  - (b) 11286 deficit
  - (c) 10286 deficit
  - (d) None of these
35. The ratio of the maximum exports to the minimum imports was closest to:
- (a) 64
  - (b) 69
  - (c) 74
  - (d) 79

**Directions for Questions 36 to 40:** The following bar chart ([Figure 3.14](#)) shows the composition of the GDP of two countries (India and Pakistan).

36. What fraction of India's GDP is accounted for by Services?
- (a) 6/33
  - (b) 1/5<sup>th</sup>
  - (c) 2/3<sup>rd</sup>
  - (d) None of the above



**Figure 3.14** Composition of GDP of Two Countries

37. If the total GDP of Pakistan is ₹10,000 crore, then the GDP accounted for by Manufacturing is:
  - (a) ₹200 crore
  - (b) ₹600 crore
  - (c) ₹2,000 crore
  - (d) ₹6,000 crore
38. If the total GDP of India is ₹30,000 crores, then the GDP accounted for by Agriculture, Services and Miscellaneous is:
  - (a) ₹18,500 crore
  - (b) ₹18,000 crore
  - (c) ₹21,000 crore
  - (d) ₹15,000 crore
39. Which country accounts for higher earning out of Services and Miscellaneous together?
  - (a) India
  - (b) Pakistan
  - (c) Both spend equal amounts
  - (d) Cannot be determined
40. If the total GDP is the same for both the countries, then what percentage is Pakistan's income through agriculture over India's

income through services?

- (a) 100%
  - (b) 200%
  - (c) 133.33%
  - (d) None of these
- 

## ANSWER KEY

---

- 1. (c)
- 2. (a)
- 3. (c)
- 4. (d)
- 5. (a)
- 6. (b)
- 7. (a)
- 8. (d)
- 9. (a)
- 10. (a)
- 11. (b)
- 12. (d)
- 13. (b)
- 14. (d)
- 15. (c)
- 16. (b)
- 17. (b)
- 18. (b)
- 19. (d)
- 20. (c)
- 21. (b)
- 22. (a)
- 23. (b)
- 24. (c)

- 25. (b)
  - 26. (c)
  - 27. (b)
  - 28. (a)
  - 29. (b)
  - 30. (d)
  - 31. (b)
  - 32. (d)
  - 33. (b)
  - 34. (b)
  - 35. (b)
  - 36. (b)
  - 37. (c)
  - 38. (c)
  - 39. (d)
  - 40. (a)
- 

## SOLUTIONS

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1. The change in the sales from 2011 to 2012 is from 18000 to 40000. While calculating the percentage sales, you can ignore the thousands in these figures and get the answer simply by doing the calculation of  $\frac{40-18}{18} \times 100 = 122.22\% = 122\%$  approximately.
2. The sum of sales in the two years is  $30,000 + 18,000 = 48,000$ , which is the sales value for 2007.
3. The lowest rate of change is 16.66% and is exhibited by both 1 and 2.
4. The required answer is got by  $48,000 - 30,000 = 18,000$ .
5. Total FDI investment in the figure shown is  $= 5.7 + 10.15 + 12.16 + 10.22 + 24.23 + 31.36 = 93.82$  bn
6. The difference in investments over 2011–12 was \$ 7.13 bn.
7. The 2012 figure of investment as a factor of 2007 investment  $= 31.36/5.70 = 5.5$  (approximately)
8. It can be seen that the FDI in 2011 more than doubles over that of

2010. No other year is close to this rate of growth.

9. (a). Let  $x$  be the FDI in 2012.

Then:  $\frac{2}{5.7} = \frac{x}{31.36}$

10. Visually clear that Russia is the answer.
11. Visually clear that US is the highest amongst the given options.
12. Russia will account for 10 out of 125, i.e., 8% of the total, i.e., 800 out of 10,000 (approximate values based on visual interpretation).
13.  $10/50 = 20\% = 1/5^{\text{th}}$
14. The total students in 2010 can be seen to be 170 out of which 20 students have cleared the CAT. It converts to a percentage of  $\frac{20}{170} \times 100 = 11.76\%$ .
15. Out of a total of 170 students, 140 students have cleared either the CAT, XAT or CMAT. The required percentage would be  $\frac{140}{170} \times 100 = 82.35\%$ .
16. Compare the respective pass percentages for the three years.  $\frac{140}{170} < \frac{150}{180}$  and  $\frac{150}{180} > \frac{160}{200}$
17.  $\frac{30 \times 100}{170} = 17.64$  (approximately)
18. On the surface this looks like a very calculation intensive question. You would need to find the totals of the two years and then find the difference between the two and then divide it by 5 to get the difference in the average sales. Instead of this, a shorter process would be to look at the absolute differences between the sales values for each brand (using + sign for an increase in sales, and a - sign for a decrease in sales). This would give us (ignoring the decimals in the calculations):  $-275 - 163 + 50 - 82 - 242 = -712$ . Hence the difference in the averages would be  $-712/5 = -142.4$ . Note here that since the question asks about the difference, you can drop the negative sign while checking the options. **Difference between two numbers is always a positive value.** The closest answer is option (b).

**Note:** In this case since there is none of these as one of the four options, you might need to finally account for the differences in the decimals too to see whether you would get the actual answer – this

check would make you absolutely sure about the answer. When you do so, you can see that the decimals account for:  $+0.12 - .32 - .87 +0.29 + 0.35 = -0.43$ . The average comes out as  $-0.43/5 = -0.08$ .

Hence, the adjusted answer would be  $-142.4 - 0.08 = -142.48$ , which means the difference is 142.48.

However, even if you do not do this last calculation exactly, you would need to be very very unlucky to get an incorrect answer in this case – even with the presence of the ‘none of these’ option in the set of options.

19. GM should have increased its sales turnover by ₹ 49.13 crore. Hence, the answer is:  $913.63 + 49.13 = 962.76$
20. Hyundai with a difference of 242 on 962 (ignoring the decimal values) is exhibiting a percentage change of slightly more than 25% ( $1/4^{\text{th}}$ ). The only company that comes close is Honda, which has a difference of 275 on 1122, which is slightly less than  $1/4^{\text{th}}$  or 25%. Hence, Hyundai is the correct answer here.
21. Before solving this question, you might want to check out the degree of accuracy you would want to use in this case. Since, the percentages given in the options are at distances of 2-3% from each other, you can realize that you would not need quite exact calculations in this question. Since you have already calculated the difference between the sums of the two years in Question 18 (came out to be 712, remember), you can just work out the total for 2011-12 to calculate the percentage change. The total of 2011-12 (ignoring the decimals and the last digit) is  $960 + 1170 + 680 + 910 + 1120 = 4840$ . [Note: do this addition as:  $900 + 1100 + 600 + 900 + 1100 + 60 + 70 + 80 + 10 + 20 = 4840$ .] The required percentage change we get is  $712/4840 = 14.6\%$ . Option (b) is the closest and the only feasible option.
22. We have already calculated this to be 712.43. Option (a) is correct.
23. The required ratio is  $9/6 = 1.5$ .
24. By visual inspection we can say that Honda, GM and Maruti have not shown a decrease.
25. Average sales of company:

$$\text{Honda} = \frac{6+14+21}{3} = 13.66$$

$$\text{GM} = \frac{12+18+18}{3} = 16$$

$$\text{Maruti} = \frac{5+9+15}{3} = 9.66$$

$$\text{Hindustan Motors} = \frac{16+9+12}{3} = 12.33$$

$$\text{Hyundai} = \frac{8+14+7}{3} = 9.66$$

Honda, GM and Hyundai satisfy the criteria.

26. Solve this using the assumed average approach explained in the section ‘Training ground’ in **Part IV** of this book. If you assume 462 (US’s value) to be the average, you would get a deviation of  $-157 - 35 + 203 \rightarrow$  giving you a net deviation of only +11. Thus, the value of US is the closest to the average.

**Note:** if you were to assume 427 (UAE’s value as the average), the deviation would increase as it would be given by:  $-122 + 35 + 238 = +151$  which is clearly much larger than the deviation we get by assuming the US’s value as the average. Hence, US’s value is the closest to the average surplus of the four countries.

Of course, you could also solve this using the actual calculation of the average. Thus, the average surplus is given by  $\frac{1860.4}{4} = 465.1$ .

27. The deficit of the first 5 deficit countries is  $3594.3 + 776.8 + 514.1 = 3500 + 700 + 500 + 94 + 76 + 14 + 0.3 + 0.8 + 0.1 = 4885.1$ . The deficit of all the 13 countries is  $3594.3 + 2588.5 + 334.2 = 3500 + 2500 + 300 + 94 + 88 + 34 + 0.3 + 0.5 + 0.2 = 6517$ .

The ratio of  $4885.1/6517$  can be seen to be close to  $3/4$ . In order to see whether this value is below  $\frac{3}{4}$  or more, we can look for a number thrice of whose value would give us 4885.1. Approximately, this number is 1628 (three times  $1628 = 4884$ ). If we add 1628 or thereabouts to 4885, we get a value of 6513 to 6514. Since the actual denominator is greater than 6514, we can clearly deduce that  $4885.1/6517$  is a ratio just smaller than  $\frac{3}{4}$ . The next step would be to decide whether this value below  $\frac{3}{4}$  is going to be so far below that we would need to change our answer to 0.72 from 0.75. If you consider

the difference from 6514 to 6517, you can clearly see that there is a very minute difference (in terms of percentage this difference is about 0.05%). However, if you look at the difference between 0.75 to 0.72 in terms of percentage, you clearly see that this difference in terms of percentage is quite large comparatively ( $0.03/0.75 = 3/75 = 4\%$ ).

Hence, we reject 0.72 as the correct answer and stick to 0.75.

28. The middle five deficit countries are India, New Zealand, South Africa, Korea and Namibia. Their average deficit is  $1946.6/5=389.32$ . Korea's deficit is closest to this value.
29. The total deficit of the 13 countries we already know as 6517 (from our calculations of Question 27. The total surplus of the 4 countries is 1860.4 (from our calculations of Question 26). The required answer would be  $6517 - 1860.4 = 4656.6$  deficit. Option (b) is correct.
30. The required answer will be equal to  $360/94 = 3.83$  (approximately)
31. Out of a total of 12 countries, 8 showed a deficit while 4 showed a surplus.
32. Visually it is clear that L has the highest trade deficit.
33. I has a ratio of  $4002/2744 = 1.45$ , which is the highest.
34. Sum of exports–sum of imports = deficit (11286).
35.  $6045/87 = 69$  (approximately)
36. Services accounts for 20%, i.e.,  $1/5^{\text{th}}$  of the GDP of India.
37.  $20\% \text{ of } 10000 = 2000$
38.  $(40+20+10)\% \text{ of } 30,000 = ₹ 21,000$  crore.
39. Although the percentage on Services and Miscellaneous put together is equal for both the countries, we cannot comment on this since we have no data about the respective GDPs.
40. Since the GDP is same, the answer will be got by  $(40-20)/20 = 100\%$ .

# 4

# X-Y Charts

## OUTLINE

### Learning Objectives

- Get a first hand view of how data is presented through its organisation in the form of X-Y charts.
- Get an understanding of the typical data which can be represented through X-Y charts. Also understand the concept of time series as it applies to X-Y Charts.
- Get a first hand feel of what are the typical question types that are asked on the basis of X-Y charts.

### Chapter Highlights

- Introduction to X-Y charts
- Practice exercise on X-Y charts containing simulated examination questions
- Link between X-Y Charts and Time Series data

In [Chapter 3](#), we studied bar charts or bar diagrams as a mode of data presentation. In this chapter, we shall concentrate on  $x$ - $y$  graphs as a mode of data presentation. While bar charts are useful for visual presentation of categorical and geographical data, data related to time-series and frequency distribution is best represented through  $x$ - $y$  or line graphs. This representation is widely used by newspapers, television, government reports, magazines and research papers.

Besides,  $x$ - $y$  graphs are also very useful for determining trends, rate of change and for illustrating comparisons with respect to some time series.

## ◆ THE TYPICAL DATA SHOWN ON AN X-Y CHART INVOLVES A TIME SERIES

A time series is an arrangement of data on the basis of time, i.e., in chronological order. The time period may be a year, quarter, month, week, days, hours, etc. Time series are extremely essential for the measurement of economic and business performance. Hence, most data relating to economics and business are in the form of time series. In time-series data, time (the independent variable) is seen as a discrete variable while the continuous variable being measured defines the other dependent variable.

Thus we have continuous variables like the population of a country, GDP of a country, data on exports and imports in an economy, data of production, sales, profit, etc., of a company and so forth which are measured against time.

Normally time is taken along the  $x$ -axis and the dependent continuous variable is taken along the  $y$ -axis.

As you go through the exercise below you will see examples of various presentations of data, possible through  $x$ - $y$  charts. These are listed below for your quick reference. As you go through the exercise, familiarise yourself with the following representations.

### Examples of Various Types of Data Presentation Possible through X-Y Charts.

- 1. Single Dependent (Continuous) Variable Graph:** These graphs show changes in a single variable over a certain period of time.
- 2. More than One Dependent (Continuous) Variable Graph:** In this type of graph, two or more lines are drawn to represent two or more dependent variables.
- 3. Graphs with Two Scales:** When two continuous variables having different units of measurement have to be shown on the same graph, we use two scales on the graph.
- 4. Range Graph:** For some specific types of data (such as temperatures, run rates, etc.), it is essential to depict the range of the variation of the variable over a period of time. This is depicted using

a range graph, which shows the deviation between different values of the variable under consideration.

5. **Band Graph:** Like a stacked bar chart, the band graph is a line graph used to display the total value of a continuous variable broken up into its different components for each period.
6. **Speed Time Graph:** This is a special case of an x-y chart where the respective axes show the speed of a moving body against time.

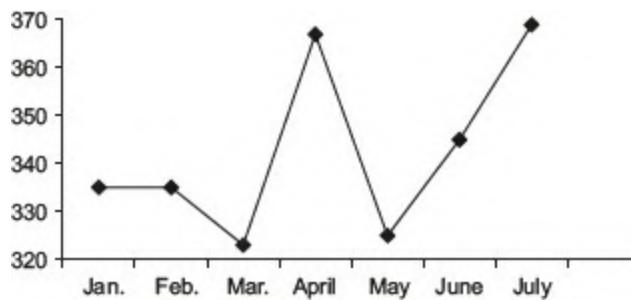
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## EXERCISE

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**Directions for Questions 1 to 5:** Refer to the graph ([Figure 4.1](#)) and answer the questions given below.

1. Which month showed the highest absolute difference in the Consumer Price Index (CPI) over the previous month?
  - (a) March
  - (b) April
  - (c) May
  - (d) July
2. Which month showed the highest percentage difference in the CPI over the previous month?
  - (a) March
  - (b) April
  - (c) May
  - (d) July



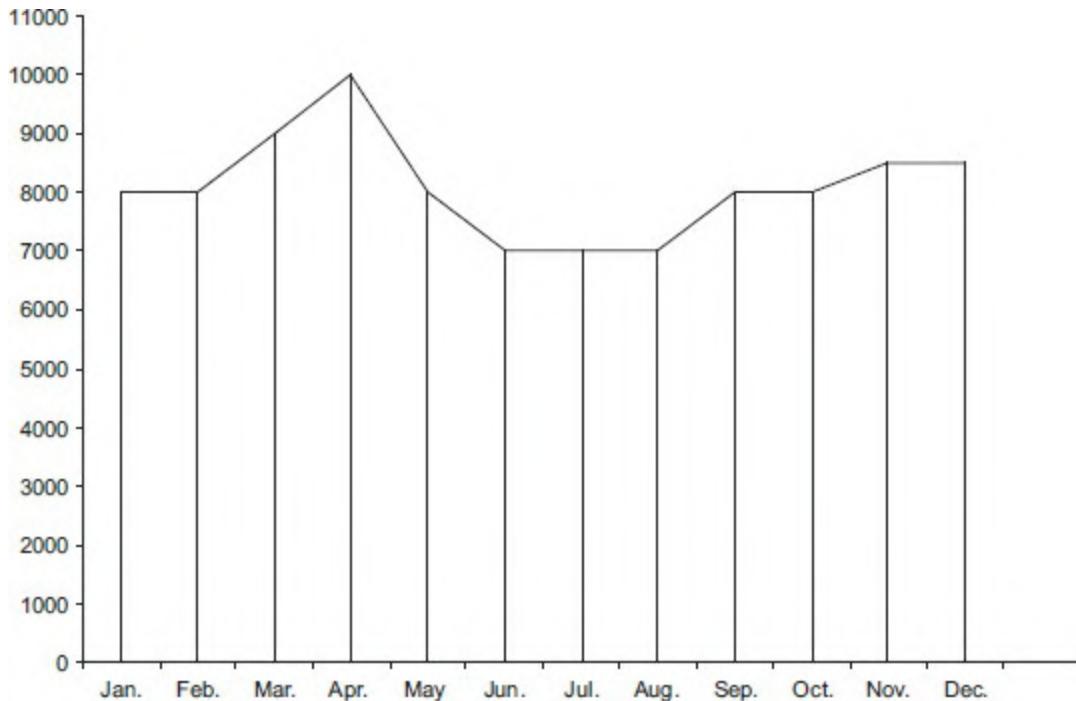
**Figure 4.1** Consumer Price Index in 2008—09

3. For how many months was the CPI greater than 350?
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four
4. In how many months was there a decrease in the CPI?
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four
5. The difference in the number of months in which there was an increase in the CPI and the number of months in which there was a decrease was:
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four

**Directions for Questions 6 to 10:** The following graph ([Figure 4.2](#)) shows the sales history (units) of the Lux brand of soap. Observe the sales curve carefully and answer the following questions.

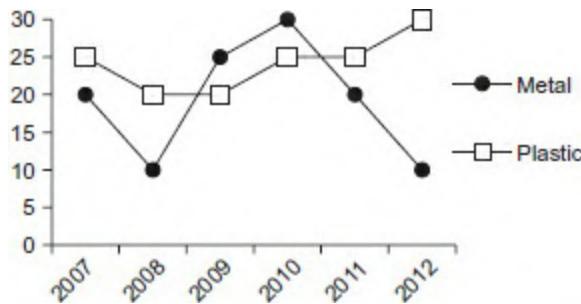
6. For how many months was the sales value (by units) at its lowest monthly level?
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four
7. The ratio of the number of months in which there was a decrease to the number of months in which there was no decrease in the sales value was:
  - (a) 2:9
  - (b) 2:8

- (c) 2:10  
(d) None of these
8. The number of months which exhibited a sales volume greater than 12.5% of the overall annual sales volume was:
- (a) One  
(b) Two  
(c) Three  
(d) None of these
9. The highest percentage increase was shown in which month?
- (a) March  
(b) April  
(c) September  
(d) November
10. The highest absolute increase was shown in which month?
- (a) March  
(b) April  
(c) September  
(d) All of these



**Figure 4.2** Sales History of Lux Brand of Soap

**Directions for Questions 11 to 17:** Consider the following graph (Figure 4.3) and answer the questions based on it. The graph shows the trend of consumption of metals and plastics in the production of cars between 2007–12.



**Figure 4.3** Consumption of Metals versus Plastics in the given Years for Car Manufacturing (in thousand tonnes)

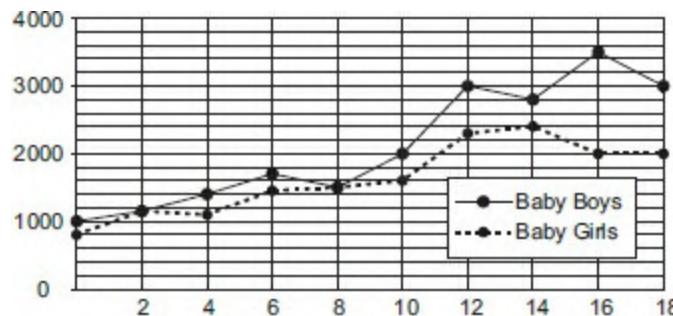
11. The number of years for which the consumption of Metal was less than the consumption of Plastic over the given time period was:
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four
12. The total consumption of plastic (for car manufacturing) divided by the total consumption of Metal (for car manufacturing) over the period will give a ratio closest to:
  - (a) 4:3
  - (b) 5:4
  - (c) 6:5
  - (d) 7:4
13. Which item and for which year shows the highest percentage change in consumption over the previous year?
  - (a) Metal 2010
  - (b) Plastic 2010
  - (c) Metal 2009

- (d) Plastic 2012
14. For the two data series shown, how many years have shown a decrease in consumption (for both the items individually)?
- (a) One  
(b) Two  
(c) Three  
(d) Four
15. The ratio of the highest total consumption in any single year to the lowest total consumption of the two items taken together in any year was equal to:
- (a) 5:3  
(b) 7:4  
(c) 11:6  
(d) 11:7
16. Which year showed the highest percentage increase in the total consumption of the two metals?
- (a) 2008  
(b) 2009  
(c) 2010  
(d) 2011
17. Which year showed the highest percentage decrease in the total consumption of the two metals?
- (a) 2008  
(b) 2009  
(c) 2011  
(d) 2012

**Directions for Questions 18 to 23:** Consider the following graph (Figure 4.4) and answer the questions based on it.

18. At what ages are the requirements of calories for baby boys and baby girls equal?
- (a) 2 months  
(b) 4 months

- (c) 8 months
- (d) 2 months and 8 months



**Figure 4.4** Calories Required Per Day by Baby Boys and Baby Girls in the First Eighteen Months of their Lives

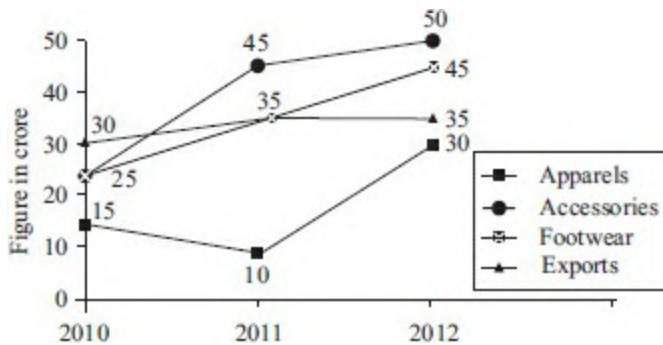
19. The difference between the calorie requirement for baby boys and baby girls at the age of 6 months is approximately equal to:
  - (a) 300 calories
  - (b) 250 calories
  - (c) 400 calories
  - (d) 200 calories
20. If in a family there are four baby boys aged 4, 6, 8, and 12 months respectively, and three baby girls aged 2, 8 and 16 months respectively, then what is the total calorie requirement per day for the babies in the family?
  - (a) 12,100
  - (b) 12,250
  - (c) 12,400
  - (d) None of these
21. For the previous question, if the baby girl aged 16 months goes away, what is the percentage change in the calorie requirement per month for the family?
  - (a) 16.3%
  - (b) 17.4%
  - (c) 14.3%
  - (d) 12.2%
22. For the previous questions, if the great doctor Raju informs Ravi that

the graphs have got mixed up and what is shown for the baby boys is for the baby girls and vice versa, then the answer for Question 20 would have been:

- (a) 12,100
  - (b) 12,250
  - (c) 12,400
  - (d) None of these
23. It can be inferred from the graph that in general, calorie requirements for baby boys and baby girls:
- (a) are quite different at all ages.
  - (b) are similar till the age of 17 months.
  - (c) reaches a peak value at the same age.
  - (d) increase at nearly the same rate till the age of 13.

**Directions for Questions 24 to 26:** Consider the following graph (Figure 4.5) and answer the questions based on it.

24. The percentage increase in the sales of footwear between 2010 and 2011 was
- (a) 20%
  - (b) 30%
  - (c) 40%
  - (d) 50%
25. In 2011, if 20% of the footwear sold within the country had been additionally exported at the local price, the percentage increase in export income in the period 2010 to 2011 would have been
- (a) 20%
  - (b) 30%
  - (c) 40%
  - (d) 50%



**Figure 4.5** Production of Select Leather Industries for the Period 2010—2012 (Assume all production is consumed locally.)

26. If the sales of footwear had touched ₹ 80 crore in 2012, the average annual percentage growth of footwear for the two year period 2010 to 2011 would have been (approximately):
- 50%
  - 75%
  - 80%
  - 90%

**Directions for Questions 27 to 29:** The following graph (Figure 4.6) gives us information about the number of washing machines produced by HLL. Answer questions 27–29 based on the graph.

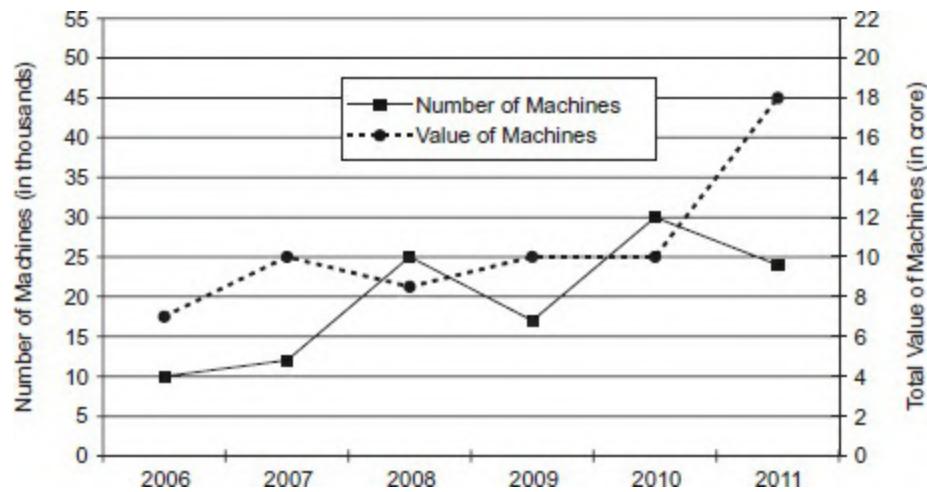
**Note:** Figures for 2011 are estimated figures. Also, assume that everything produced is sold in the same year.

27. What was the value of each machine in 2007?
- ₹ 20,000
  - ₹ 83,33.33
  - ₹ 20,00
  - ₹ 833.33
28. What was the percentage drop in the production of the number of machines from 2008 to 2009?
- 20%
  - 25%
  - 27%

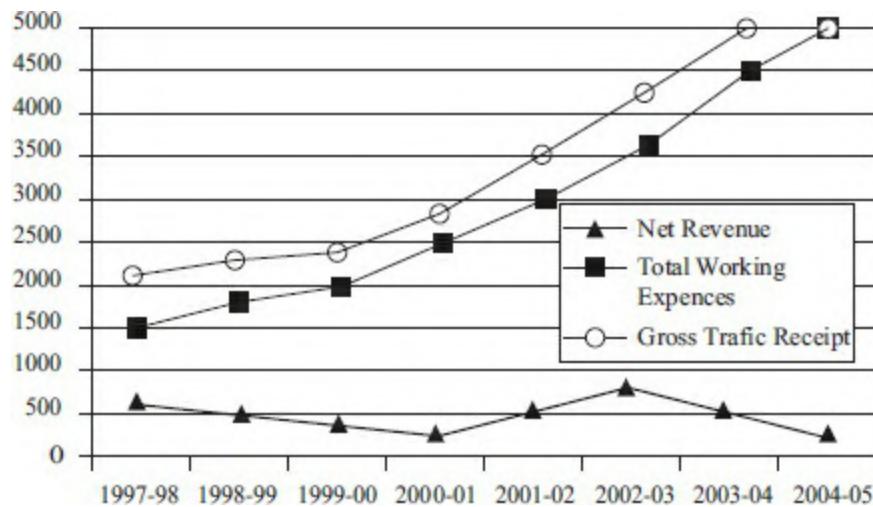
- (d) 32%
29. What was the difference in the value per machine between the years 2007 and 2010?
- (a) ₹ 2000  
(b) ₹ 5000  
(c) ₹ 4000  
(d) None of these

**Directions for Questions 30 to 32:** Use the following graph ([Figure 4.7](#)) showing railway finances for the year 1997–98 to 2004–05, to answer the questions given.

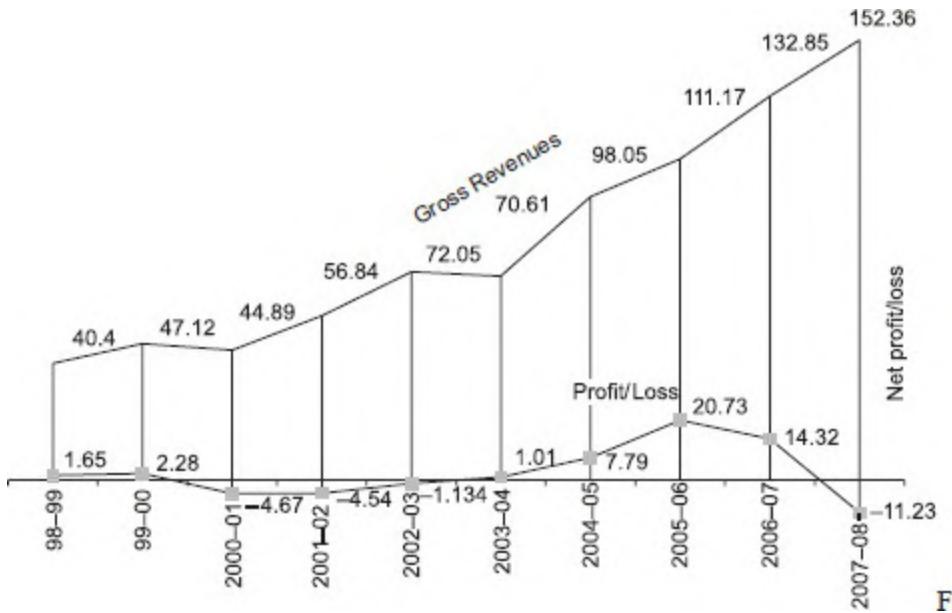
30. The difference between the gross traffic receipt and the total working expenses was highest during which of the following years?
- (a) 1997–98  
(b) 2001–02  
(c) 2002–03  
(d) 2004–05
31. By what per cent did gross traffic receipts increase between 1997–98 and 2004–05?



**Figure 4.6** Washing Machines Manufactured by HLL



**Figure 4.7** Railway Finance: 1997—98 to 2004—05



**Figure 4.8** Gross Revenues and the Profit/Loss for HBL Limited (All figures in ₹ crore)

- (a) 38%  
 (b) 124%  
 (c) 133%  
 (d) 138%
32. Between the years 1997–98 and 1999–00, the ratio of the increase in gross traffic receipts and total working expenses was:
- (a) 5:3

- (b) 3:5
- (c) 2:3
- (d) None of these

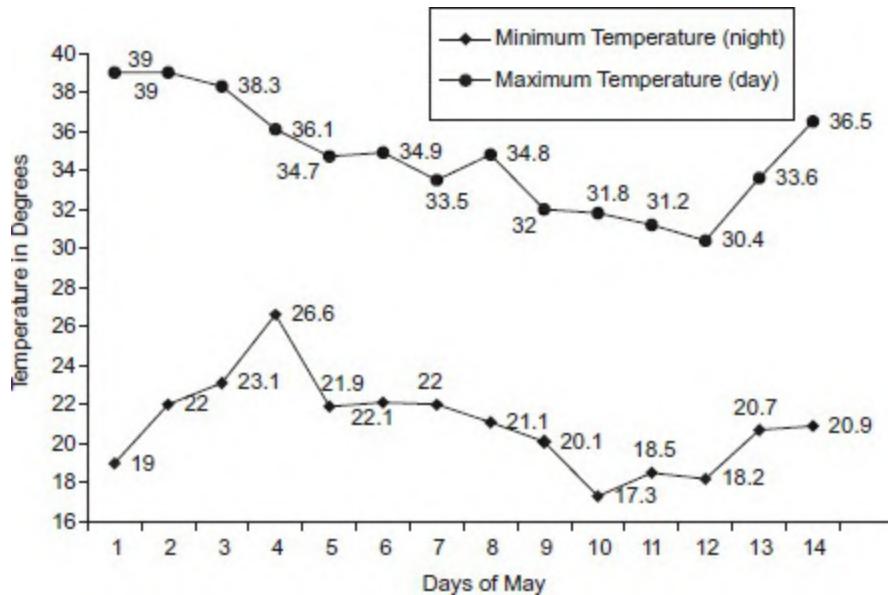
**Directions for Questions 33 to 35:** Study Figure 4.8 carefully and answer the given questions.

- 33. The highest percentage growth in total revenue was recorded in:
  - (a) 2000–01
  - (b) 2001–02
  - (c) 2002–03
  - (d) 2004–05
- 34. In which year was the net profit as a percentage of gross revenue at its second highest level?
  - (a) 2004–05
  - (b) 2005–06
  - (c) 2006–07
  - (d) None of these
- 35. For which of the following years was the trend of gross revenue and net profit/loss dissimilar?
  - (a) 2001–02
  - (b) 2002–03
  - (c) 2003–04
  - (d) 2004–05

**Directions for Questions 36 to 37:** Observe the given graph (Figure 4.9) carefully and answer the following questions.

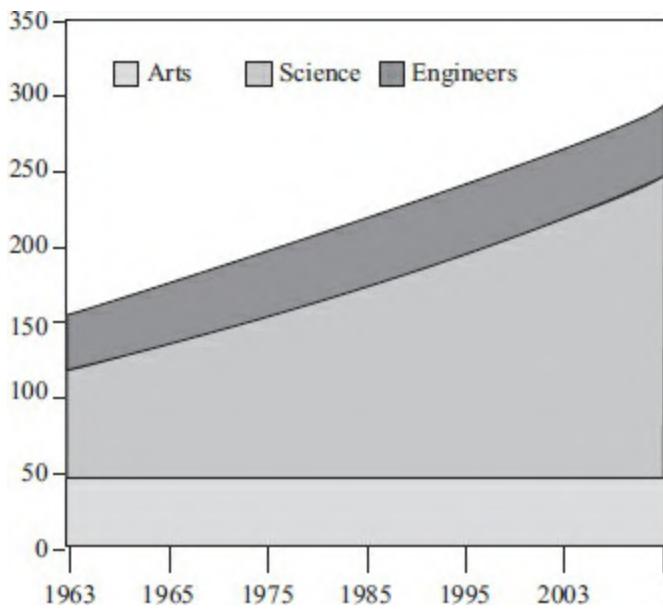
- 36. The minimum difference between day and night temperatures is:
  - (a) 9.5 degrees
  - (b) 11.5 degrees
  - (c) 9.7 degrees
  - (d) None of these
- 37. The highest ratio of the night to day temperature is for:

- (a) 1<sup>st</sup> May
- (b) 3<sup>rd</sup> May
- (c) 4<sup>th</sup> May
- (d) None of these



**Figure 4.9** Min. and Max. Temperatures in the Month of May

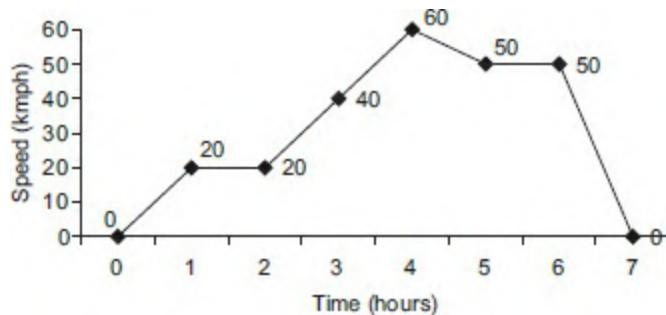
**Directions for Questions 38 to 39:** Study the following graph ([Figure 4.10](#)) carefully and answer the given questions. Assume that the curve between any two years marked on the graph is a straight line and the difference between any two years can be got by interpolation. Beyond 2003 the values go up to 2005 and are the projected values for 2004 and 2005.



**Figure 4.10** Academic Background of Students Joining Harvard Business School (HBS)

38. In 1963, the percentage of HBS students who were engineers was about
  - (a) 20%
  - (b) 25%
  - (c) 30%
  - (d) 35%
39. Which was the first year when more than 200 students were studying in a batch at HBS?
  - (a) 1973
  - (b) 1978
  - (c) 1983
  - (d) 1985

**Directions for Question 40:** The following graph (Figure 4.11) gives the movement of a car with respect to time. (Assume that the speed dimension on the y-axis is marked at every 10 kmph and there is uniform acceleration between hours.)



**Figure 4.11** Movement of a Car with Respect to Time

40. Find the average speed of the car (in kmph).
- (a) 36.28
  - (b) 34.28
  - (c) 33.57
  - (d) None of these

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## ANSWER KEY

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- 1. (b)
- 2. (b)
- 3. (b)
- 4. (b)
- 5. (a)
- 6. (c)
- 7. (a)
- 8. (d)
- 9. (c)
- 10. (d)
- 11. (d)
- 12. (b)
- 13. (c)
- 14. (a)
- 15. (c)
- 16. (b)
- 17. (a)

18. (d)
  19. (b)
  20. (b)
  21. (a)
  22. (d)
  23. (a)
  24. (c)
  25. (a)
  26. (c)
  27. (b)
  28. (d)
  29. (b)
  30. (c)
  31. (d)
  32. (b)
  33. (d)
  34. (c)
  35. (c)
  36. (a)
  37. (c)
  38. (b)
  39. (b)
  40. (b)
- 

## SOLUTIONS

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1. & 2. Visually clear that it is April.
3. April and July — Two.
4. The CPI decreased in March and May.
5. The CPI increased in three months (April, June and July) while it decreased in two months (March and May). Hence, the required answer is  $3-2=1$ .
6. The sales value was at 7000 for three months, viz., June, July and

August.

7. Only two months out of 11 have shown a decrease. Hence, 2:9.
8. The total sales volume was 97,000. 12.5% of this value would mean  $\frac{1}{8}$ th of this value, i.e., more than 12,000. This has never occurred during this time.
9. September shows the highest growth and the least initial value. Hence, highest percentage increase.
10. March, April and September all show an increase of 1,000 units (which is the highest increase during the period shown).
11. Visually seen as 4.
12.  $145:115 = 29:23$  is closest to 5:4.
13. Metals in 2009 is more than doubling over it's 2008 value.
14. 2008 is the only year which satisfies the condition.
15. 55 in 2010 to 30 in 2008. Gives 11:6 as the answer.
16. 50% in 2002.
17. 33.33% between 2007 to 2008.
18. Visually clear that the graphs are equal at the ages of 2 and 8 months.
19. The required answer =  $1700 - 1450 = 250$  calories.
20. Add all the values to get 12250.
21. The required change will be  $2000/12250 = 16.3\%$
22. Reverse the calculation for Question 20 and get 12500 as the total calorie requirement per day.
23. It can be seen that the two lines move differently with respect to each other and do not follow any common pattern. Hence, option (a) is correct.
24.  $10/25 = 40\%$ .
25. Exports would have increased by 20% of the footwear's value, i.e., by 7 on 35–20%.
26. Solve through options. When you try with 80%, you get  $25 + 80\% \text{ of } 25 = 45 + 80\% \text{ of } 45 = 81$ . Hence the answer is just below 80%.
27. 10 crore/12,000.
28. 25,000 to 17,000.
29.  $8333.33 - 3333.33 = 5000$

30. Visually see the net revenue line to be maximum for 2002–03.
31. The required ratio is  $2900/2100$ .
32.  $300/500$
33. Visually seen as 2004–05.
34. 2005–06 is the highest and 2006–07 is the second highest.
35. Visually seen that the gross revenue decreases in 2003–04 but the net profit has increased.
36. 9.5 for 4<sup>th</sup> of May
37. This ratio depends on the difference between the two temperatures on a single day as well as on the day temperature of the same day. The lower the difference, the higher the ratio. Also, the data given is such that the day temperatures are in the same range, hence the effect of the same on the ratio will be minimal. For solving this question find out the days which need to be checked and compare the ratios between those days only. 4<sup>th</sup> of May will give the highest ratio required, since the difference is the lowest on that day.
38. Approximately 40 out of  $160 = 25\%$ .
39. Visually checking the options, we get 1978 as the answer.
40. The average speed will be given by the ratio of total distance by the total time.

The distance covered in any hour will be given by the average speed of the hour.

Distance covered in first hour =  $(20 + 0)/2 = 10$  km.

Distance covered in second hour =  $20$  km/hour =  $20$  km

Distance covered in third hour =  $(20 + 40)/2 = 30$

Distance covered in fourth hour =  $(40 + 60)/2 = 50$  km

Distance covered in fifth hour =  $(60 + 50)/2 = 55$  km

Distance covered in sixth hour =  $50$  km

Distance covered in seventh hour =  $(50+0)/2 = 25$

The required average speed =  $240/7 = 34.28$  km/hour

# 5

# Pie-Charts

## OUTLINE

### Learning Objectives

- Get a first hand view of how data is presented through its organisation in the form of Pie charts.
- Get an understanding of typical data which can be represented through Pie charts. Also understand the concept of how distribution of a whole is done in the form of Pie Charts.
- Get a first hand feel of the typical question types that are asked on the basis of Pie charts.

### Chapter Highlights

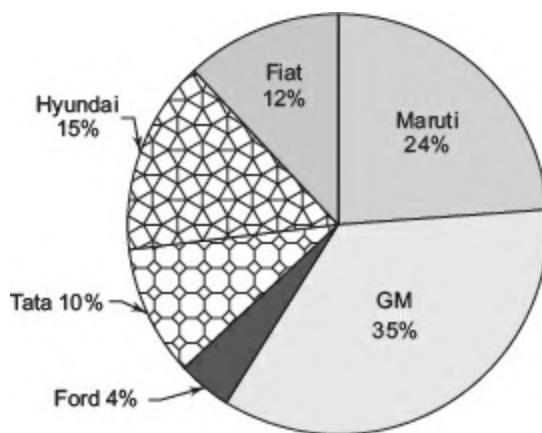
- Introduction to Pie charts
- Practice exercise on Pie charts containing simulated examination questions

Pie charts are specific types of data presentation where the data is represented in the form of a circle. In a pie chart, a circle is divided into various sections or segments such that each sector or segment represents a certain proportion or percentage of the total. In such a diagram, the total of all the given items is equated to 360 degrees and the degrees of angles, representing different items, are calculated proportionately. The entire diagram looks like a pie and its components resemble slices cut from a pie. The pie chart is used to show the break-up of one continuous variable into its component parts.

For example, [Figure 5.1](#) shows the distribution of the sales of the car industry between six car companies.

Looking at [Figure 5.1](#), we can infer that Maruti accounts for 24 per cent of the market share, while GM accounts for 35 per cent of the market share, Ford for 4 per cent of the market share, Tata for 10 per cent of the market share, Hyundai for 15 per cent of the market share and Fiat for 12 per cent of the market share.

The pie chart encompasses a circle of 360 degrees which represents 100 per cent of the value of the continuous variable. Thus, 3.6 degrees on the pie chart represent 1 per cent of the total value of the continuous variable being represented.



**Figure 5.1** Pie Diagram Showing Distribution of Car Sales between Six Companies

A single pie diagram can represent only one continuous variable. Hence, in terms of versatility of data representation, pie charts are less versatile than either bar charts, x-y graphs or tables. However, their utility is in the fact that the representation of data is cleaner and it gives an immediate idea of the relative distribution of the continuous variable amongst different sectors.

The following exercise will make the use of pie charts clear to you.

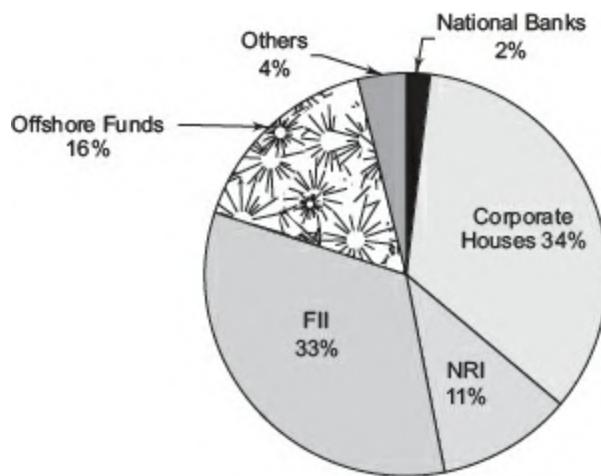
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## EXERCISE

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**Directions for Questions 1 to 7:** The following pie chart ([Figure 5.2](#))

shows the amount of subscriptions generated for India Bonds from different categories of investors.



**Figure 5.2** Subscriptions Generated for India Bonds

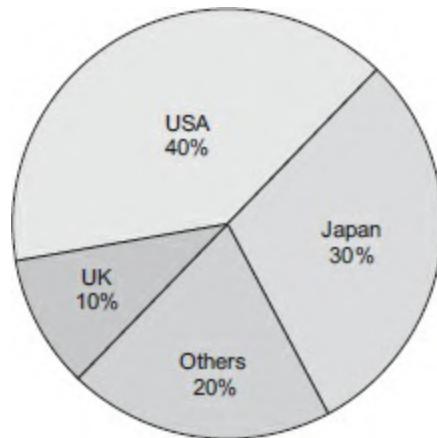
1. If the investments by NRIs are ₹ 4,000 crore, then the investment by corporate houses and FIIs together is:
  - (a) 24,000 crore
  - (b) 24,363 crore
  - (c) 25,423.4 crore
  - (d) 25,643.3 crore
2. What percentage of the total investment is coming from either FIIs or NRIs?
  - (a) 33%
  - (b) 11%
  - (c) 44%
  - (d) 22%
3. If the total investment other than by FII and corporate houses is ₹ 335,000 crore, then the investment by NRIs and Offshore funds will be (approximately):
  - (a) 274,100
  - (b) 285,600
  - (c) 293,000
  - (d) Cannot be determined
4. What is the approximate ratio of investment flows into India Bonds

from NRIs to corporate houses?

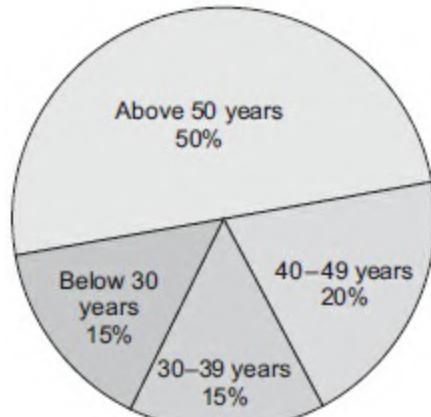
- (a) 1:4
  - (b) 1:3
  - (c) 3:1
  - (d) Cannot be determined
5. In the corporate sector, approximately how many degrees should be there in the central angle?
- (a) 120
  - (b) 121
  - (c) 122
  - (d) 123
6. If the total investment flows from FIIs were to be doubled in the next year and the investment flows from all other sources had remained constant at their existing levels for this year, then what would be the proportion of FII investment in the total investment flows into India Bonds in the next year (approximately)?
- (a) 40%
  - (b) 50%
  - (c) 60%
  - (d) 70%
7. If the inflow from the FIIs after the doubling (of Question 6) were to the tune of US\$ 500 million, what would be the total investment into India Bonds next year (in US \$ millions)?
- (a) 1000
  - (b) 1500
  - (c) 800
  - (d) Cannot be determined

**Directions for Questions 8 to 14:** The following pie charts ([Figures 5.3 \(a\)](#) and [\(b\)](#)) exhibit the distribution of the overseas tourist traffic from India. The two charts show the tourist distribution by country and the age profile of the tourists respectively. Study the charts carefully and answer the questions which follow.

8. What percentage of the Indian tourists went to either USA or UK?
- (a) 40%
  - (b) 50%
  - (c) 60%
  - (d) 70%
9. The ratio of the number of Indian tourists that went to USA to the number of Indian tourists who were below 30 years of age is:
- (a) 2:1
  - (b) 8:3
  - (c) 3:8
  - (d) Cannot be determined



(a)



(b)

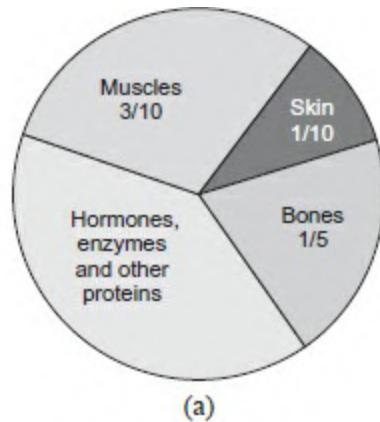
**Figure 5.3** Distribution of Overseas Tourist Traffic from India

10. If amongst other countries, Switzerland accounted for 25% of the

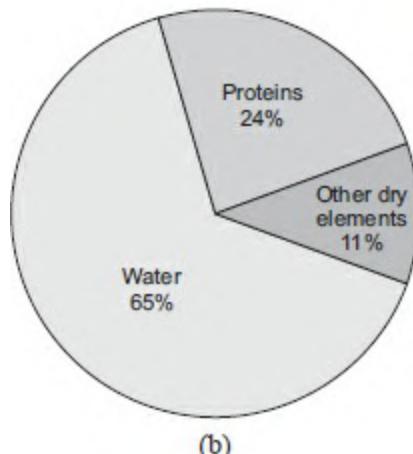
Indian tourist traffic, and it is known from official Swiss records that a total of 25 lakh Indian tourists had gone to Switzerland during the year, then find the number of 30–39-year-old Indian tourists who went abroad in that year.

- (a) 18.75 lakh
  - (b) 25 lakh
  - (c) 50 lakh
  - (d) 75 lakh
11. For Question 10, what was the volume of traffic of Indian tourists in the US?
- (a) 150 lakh
  - (b) 125 lakh
  - (c) 200 lakh
  - (d) None of these
12. For Questions 10 and 11, what can be inferred about the number of 50+-year-olds who visited UK during the year?
- (a) At least 25 lakh
  - (b) Exactly 25 lakh
  - (c) At least 10 lakh
  - (d) Cannot be determined
13. Solve questions 12 assuming that the age distribution of overseas Indian tourists was uniform for all the countries.
- (a) At least 25 lakh
  - (b) Exactly 25 lakh
  - (c) At least 10 lakh
  - (d) Cannot be determined
14. With the assumption of Questions 13 and the data from Questions 10 and 11 taken to be true, find the ratio of the number of 50+ year-olds Indian tourists visiting USA in the year to the number of below 50-year-old Indian tourists visiting UK or Switzerland during the year.
- (a) (2:1)
  - (b) 8:3
  - (c) 3:8
  - (d) Cannot be determined

**Directions for Questions 15 to 17:** The following pie charts [Figures 5.4 (a) and (b)] give the information about the distribution of weight in the human body according to different kinds of components. Study the pie charts carefully and answer the questions given.



(a)



(b)

**FIGURE 5.4** Distribution of Weight in Human Body

15. How much of the human body is neither made of bones nor skin?
  - (a) (40%)
  - (b) 50%
  - (c) (60%)
  - (d) 70%
16. What is the ratio of the distribution of proteins in the muscles to that of the distribution of proteins in the bones?
  - (a) (2:1)

- (b) 2:3
  - (c) 3:2
  - (d) Cannot be determined
17. What percentage of proteins of the human body is equivalent to the weight of its skin?
- (a) (41.66%)
  - (b) 43.33%
  - (c) 44.44%
  - (d) Cannot be determined

**Directions for Questions 18 to 20:** Use the given pie diagrams to answer the following questions. The pie chart [Figures 5.5 (a)] shows the distribution of the New York market share by value of different computer companies in 2012.

The pie chart [Figures 5.5 (b)] shows the distribution of New York market share by volume of different computer companies in 2012.

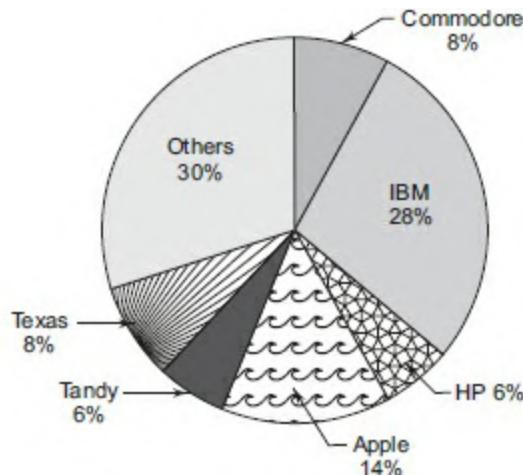
Number of units sold in 2012 in New York = 1,500

Value of units sold in 2012 in New York = US \$ 1,650,000.

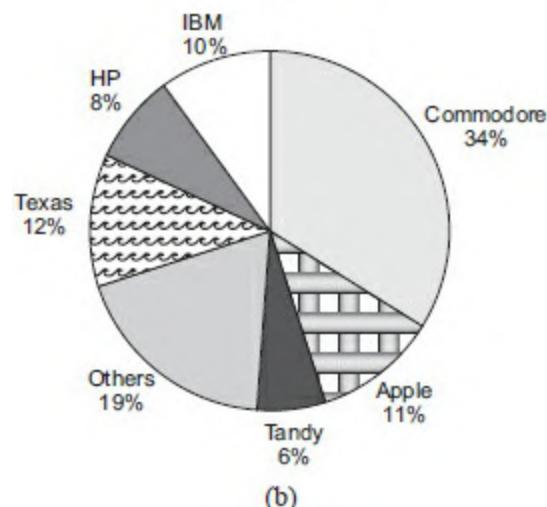
18. In 2012, the average unit sale price of an IBM PC was approximately (in US\$)
- (a) (3180)
  - (b) 2800
  - (c) (393)
  - (d) 3080
19. For the year 2012, which company has realised the lowest average unit sales price for a PC?
- (a) Commodore
  - (b) IBM
  - (c) Tandy
  - (d) Cannot be determined
20. Over the period 2012–13, if sales (value-wise) of IBM PCs increased by 50% and of Apple by 15%, assuming that PC sales of all other computer companies remained the same, by what percentage

(approximately) would the PC sales in New York (value-wise) increase over the same period?

- (a) (16.1%)
- (b) 18%
- (c) 14%
- (d) None of these



(a)



(b)

**Figure 5.5** Distribution of New York Market Share

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## ANSWER KEY

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1. (b)

2. (c)
  3. (a)
  4. (b)
  5. (c)
  6. (b)
  7. (a)
  8. (b)
  9. (b)
  10. (d)
  11. (c)
  12. (d)
  13. (b)
  14. (b)
  15. (d)
  16. (d)
  17. (a)
  18. (d)
  19. (d)
  20. (a)
- 

## SOLUTIONS

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1.  $(67/11) \times 4000 = 24363$  (approximately)
2.  $33 + 11 = 44$
3. Investment other than NRI and corporate houses is 33% = 335000.  
Also, investment by offshore funds and NRIs is equal to 27%. Hence,  
 $27 \times 335,000/33 = 274100$  (approximately)
4. 11:34 is approximately equal to 1:3.
5.  $34 \times 3.6 = 122.4$  (since 1 % = 3.6 degrees).
6. FIIs currently account for 33 out of 100. If their value is doubled and all other investments are kept constant then their new value would be 66 out of 133 → approximately equal to 50%.
7. 500 million would be approximately 50% of the total investment. Then

- 1000 will be the total investment.
8.  $40 + 10 = 70\%$  (from the first chart)
  9.  $40:15 = 8:3$
  10. 5% corresponds to Switzerland's 25 lakh. Hence 15% will be 75 lakh.
  11. US accounts for 40%, i.e., 8 times 5%. Since Switzerland's 5% is 25 lakh, US will be 200 lakh.
  12. Nothing can be said about the age break-up of the Indian tourists who have gone to any destination. Hence, cannot be determined.
  13. If the age distribution is uniform, then 50+ -year-olds will account for 50% of the total Indian tourist traffic in UK, i.e., 5% of the total Indian tourist traffic worldwide will be 50+-year-olds who went to UK,. i.e., 25 lakh based on Switzerland's value from Questions 10.
  14. 50+ year olds for USA are counted as 50% of 40. 50% of 10 represents the 50+ year olds visiting UK and 50% of 5 represents the 50+ year olds visiting Switzerland. Hence, the required ratio =  $20:(5 + 2.5) = 20:7.5 = 8:3$ .
  15.  $20+10 = 30\%$  is made up of either bones or skin. Hence, 70% is made up of neither.
  16. Cannot be determined since the respective distributions are not known.
  17.  $10/24 = 41.66\%$
  18. IBM accounts for 28% of the share by value and 10% of the share by volume. Hence,  $(1,650,000/1500) \times (28/10) = 1,100 \times 2.8 = 3,080$ .
  19. Although it seems to be Commodore, the answer cannot be determined due to the fact that we are unaware of the break-up of the sales value and volume of the companies comprising the others categories.
  20. If we assume the total sales to be 100 in the first year, IBM's sales would go up by 50% (from 28 to 42) contributing an increase of 14 to the total sales value. Similarly, Apple's increase of 15% would contribute an increase of 2.1 to the total sales value. The net change would be  $14 + 2.1$  on 100, i.e., 16.1%.

# 6 Cases

## OUTLINE

### Learning Objectives

- Get a first hand view of how data is presented through cases.
- Get an understanding of typical language used for writing data in the form of language.
- Get a first hand feel of the question types created on the basis of cases.

### Chapter Highlights

- Introduction to data-based Cases
- Practice exercise on Cases

## INTRODUCTION

The case form of data representation is used by question setters in order to test the student's feel for numbers, for variables and their inter-relationships and his/her ability to convert the information provided into a useful data representation format. Questions and their answers hinge on the student's ability to first spot the variables under consideration and then to inter-relate the given variables in order to make sense of the raw information provided by the case.

A case is nothing but a paragraph/passage which provides information about the values of the variables. Most cases are solved by converting the provided information into a tabular format. The student is advised to follow the following steps while solving data interpretation questions based on cases:

## Step 1

During your first reading, identify the variables in the data, the number of instances of the variables provided and the respective inter-relationships amongst the variables.

After having identified these things the student will be in a position to establish a clear picture of the information and the requisite tabular format to solve the given case.

This step is also extremely important from the examination point of view, since it will help you estimate the amount of time required to solve the case. Hence, you will be in a position to make a better decision about whether the case you are pursuing is worth solving under the exam conditions.

## **■ Step 2**

Chart out the table required and fill in the direct data given in the question into the table. At this stage the objective should not be to complete the table but to get down the direct information provided in the case into the table. It is important to distinguish between the two approaches, since trying to complete the table for the sake of completing the table might result in a lot of unnecessary work on the part of the student (which can easily be avoided). Remember, marks are allotted for the answer to the questions asked, not for filling the table. (Hence, we will do only as much as is asked and not one step more.)

## ■ Step 3

With the basic framework of the table ready, the approach of the student should be to identify the required solutions from the questions asked and solve only to get the answer of the question asked.

However, note here that as a rule any intermediate information derived in this process should be directly transferred to the table, since it is quite likely that the calculations you have done for one question might be repeated in the next question. Hence, in order to avoid re-working on things already done once, transfer any information derived during the process of solving one question onto the table so that it is available for all subsequent questions.

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### EXERCISE

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**Case 1** Mr. Hoola Boola is facing a decision problem. He has excellent training products but is not sure about the demand for his products. He wants to set up a training centre to provide training programmes of Sr. Executive, Jr. executive and non-executive level. His financial advisor Mr. Balmas told him that if he wants to set up a non-executive level training centre, the total cost would be on two counts—the first would be a fixed cost which is ₹ 2 lakh per annum. Besides, it would also entail a variable cost of training per candidate. This would be ₹ 1,000 per candidate trained. He further estimated that if a training centre is set up for conducting Jr. executive and non-executive level training programmes, the total fixed cost would be Rs 3.2 lakh per annum and the cost of training per candidate will be ₹ 750. Mr. Balmas motivates Mr. Hoola to set up a combined training centre for Sr. executive, Jr. executive and non-executive, the fixed cost of which is ₹ 5 lakh per annum and the cost of providing training per candidate is ₹ 500.

You as a hotshot IIM Ahmedabad MBA, have some decision making abilities. Please help Mr. Hoola Boola by answering the following questions:

1. What would be the volume that Mr. Hoola should train where he would be indifferent between setting up a non-executive level and non-

executive and Jr. executive level training centre?

- (a) 495
  - (b) 490
  - (c) 480
  - (d) 475
2. What would be the volume that Mr. Hoola should train where he would be indifferent between setting up a training centre for jr and non-executive and sr, jr and non executive level.
- (a) 710
  - (b) 720
  - (c) 730
  - (d) 740
3. What would be the volume that Mr. Hoola should train where he could be indifferent between setting up a training centre for non-executive and for all three categories?
- (a) 450
  - (b) 500
  - (c) 550
  - (d) 600
4. Assume that Mr. Hoola shares the same vision that Mr. Balmas has and sets up a training centre for all three categories. In the first year he manages to train 1200 candidates at ₹ 1250 per candidate. What would be his profits?
- (a) 3.2 lakh
  - (b) 3.6 lakh
  - (c) 4 lakh
  - (d) 4.4 lakh
5. In Question 4, what is the profit percentage in the first year of operation?
- (a) 27.27%
  - (b) 36.66%
  - (c) 40%
  - (d) 44.44%

**Case 2** Not surprisingly the growth of the hotel industry is driven by the increase in the number of people using hotels and the increase in per person use of the hotel. In 2004, it is expected that there will be 200 million hotel users in India, or about 20 per cent of the population will generate ₹ 50 billion in hotel revenues. Industry revenues should expand from ₹ 50 billion to ₹ 150 billion by 2008, while the number of users should grow to over 560 million or to about half the population of India in the same period.

6. What is the estimated population of India in 2004?
  - (a) 98 crore
  - (b) 100 crore
  - (c) 110 crore
  - (d) 115 crore
7. What will be the simple average growth rate of population of India in the given period 2004–2008?
  - (a) 2%
  - (b) 3%
  - (c) 4%
  - (d) 4.5%
8. What will be the growth in percentage of hotel users in India by 2008 with respect to 2004?
  - (a) 100%
  - (b) 150%
  - (c) 180%
  - (d) 200%
9. What will be the percentage growth of the revenues of the hotel industry in the given period?
  - (a) 200%
  - (b) 230%
  - (c) 260%
  - (d) 300%
10. It is believed that if 50% of the population of any country can afford hotel-use, it is economically developed. Can we say that India will be a developed country by 2007?
  - (a) Yes

- (b) No
- (c) Cannot say
- (d) Data inadequate

**Case 3** Bihar and Orissa are the most deprived states of India. While they contain one-fifth of India's population, they have almost one-third of India's illiterates. In 1998, only a small fraction of Orissa and Bihar's population was literate versus 85 per cent of Kerala's population. More than two-thirds of the births are not attended by any medical facility, 1/10<sup>th</sup> of the infants born in Orissa and Bihar die in infancy and an equal number before reaching the age of five. Almost 90 per cent of the under five deaths are due to malnutrition.

From amongst the lucky kids who have survived for the first five years, 1/3<sup>rd</sup> of them work as child labourers and only half of the remaining are sent to school. Of those who attend classes, only 40 per cent are able to reach Std V. In India, 30 per cent of the children under 16 work as labourers. Orissa and Bihar contain 1/3<sup>rd</sup> of the child labourers in India. India has the largest population of child labourers, which is 1/15<sup>th</sup> of its total population.

In Orissa and Bihar, out of 100 children enrolled in school, 32 are girls. And out of 100 who attend Std X, only 10 are girls. Only 38 out of 100 Indian women are literate versus 57 per cent of males. Even in wealthy states such as Punjab, girls suffer from malnutrition seven times more than boys do. The total population of the country was 90 crore in 1998 and the ratio of male to female in India was 10 to 9.

- 11.** According to the information provided, what percentage of the infants in Orissa and Bihar attend Std V?
  - (a) 11.33
  - (b) 10.66
  - (c) 13.33
  - (d) None of these
- 12.** The number of child labourers in India in 1998 are:
  - (a) 15 crore
  - (b) 16 crore
  - (c) 12 crore
  - (d) 6 crore

13. In Orissa and Bihar, out of 100 born, approximately how many children work as child labourers?
- (a) 27
  - (b) 32
  - (c) 13
  - (d) 38
14. What percentage of girl children enrolled in school reach Std X in Orissa and Bihar?
- (a) 10%
  - (b) 32%
  - (c) 60%
  - (d) Insufficient data
15. In 1998, the literates in Kerala exceed the literates in UP and Bihar by:
- (a) 30%
  - (b) 35%
  - (c) 27%
  - (d) Insufficient data
16. The number of literates in India in 1998 is:
- (a) 16.2 crore
  - (b) 27 crore
  - (c) 43.2 crore
  - (d) Insufficient data
17. The number of illiterates in Orissa and Bihar in 1998 is almost :
- (a) 18 crore
  - (b) 13.2 crore
  - (c) 15.6 crore
  - (d) Insufficient data

**Case 4** It was realised by Mindworkzz that for creating awareness in the market, newspaper advertising is very effective but it should be done consistently. *The Times of India* (TOI) which claims to have 40 per cent of the total market share brings out a weekly supplement ‘Education Times’ in which the advertising cost for the range 0 to 240 sq.cm for 1–2 insertions with a validity period of 30 days is ₹ 50/cm<sup>2</sup>, for 3–5 insertions with a validity

period of 60 days is ₹ 43/cm<sup>2</sup> and 6 onwards insertions with validity period of 90 days is ₹ 40/cm<sup>2</sup>. The cost for size of advertisement 241+ cm<sup>2</sup> for 1–2 insertions with validity period 30 days is ₹ 50/cm<sup>2</sup> and for 3–5 insertions with validity period 60 days is ₹ 40/cm<sup>2</sup> and for 6 onwards insertion with validity period of 90 days is ₹ 35/cm<sup>2</sup>. The expected response generation per insertion in TOI in the size 161–200 cm<sup>2</sup> is 40 and in the size 200+ cm<sup>2</sup> is 50. Another great market player is *Hindustan Times* with the weekly supplement ‘HT Horizons’ and it claims to have 35% of the total market share and the cost of advertising in it for 1–2 insertions with validity period: Number of insertion + one week is ₹ 40/cm<sup>2</sup>, for 3–6 insertions with validity period: Number of insertions + 2 weeks is ₹ 37/cm<sup>2</sup> and for 7 insertions onwards with validity period: no. of insertions + 3 weeks is ₹ 34/cm<sup>2</sup>. The expected response generation per insertion is 35 for 160–200 cm<sup>2</sup> and 45 for 200+ cm<sup>2</sup> size.

Please help Mindworkzz with the correct decisions on the following plans.

18. If Mindworkzz looks to generating exactly 95 responses in 2 insertions, which newspaper combination should be selected?
  - (a) TOI
  - (b) HT
  - (c) One TOI and one HT insertion
  - (d) Data inadequate
19. Mindworkzz has decided to advertise in TOI but is confused on length between 80 cm and 81 cm but is sure about the width, i.e., 3 cm and 3 insertions. What should be the length?
  - (a) 80 cm
  - (b) 81 cm
  - (c) either 80 or 81
  - (d) Data inadequate
20. If Mindworkzz wants to go for two insertions of exactly 80 cm<sup>2</sup>, which newspaper should be selected and what is the percentage difference in the cost differential between the campaign cost between the two newspapers with respect to the lower priced newspaper. (Assume that cost is the only consideration.)
  - (a) HT, 20%

- (b) HT, 25%
  - (c) TOI, 20%
  - (d) TOI, 25%
21. If Mindworkzz decides to go in for an advertising campaign of 10 insertions, which will be the best option (in terms of cost) for a size of  $243 \text{ cm}^2$ ?
- (a) HT
  - (b) TOI
  - (c) either HT or TOI
  - (d) Data inadequate
22. In Question 21, if Mindworkzz is considering its decision only on the basis of validity period which is best?
- (a) HT
  - (b) TOI
  - (c) Either HT or TOI
  - (d) Data inadequate
23. If the only consideration for the choice of the newspaper is the number of responses, then Mindworkzz should run the campaign of Question 22 in:
- (a) HT
  - (b) TOI
  - (c) Either HT or TOI
  - (d) Data inadequate

**Case 5** Mr. Kunal Dwivedi wants to buy a motorbike which is priced at ₹ 45,500. The bike is also available at ₹ 25,000 down payment and monthly installments of ₹ 1000 per month for 2 years or ₹ 18,000 down payment and monthly installment of ₹ 1000 per month for 3 years. Mr. Kunal has with him only ₹ 12,000. He wants to borrow the balance money of the down payment from a private lender whose terms are:

If ₹ 6,000 is borrowed for 12 months, the rate of interest is 20 per cent. The interest will be calculated on the whole amount for the whole year, even though the repayment has to be done in 12 equal monthly installments starting from the first month itself. Thus he will have to repay an amount of ₹

600 per month for 12 months to repay  $\text{₹} 6000$  (Principal) +  $\text{₹} 1200$  (Interest @ 20 per cent).

If  $\text{₹} 10,000$  upwards is borrowed for one year, the rate of interest is 30 per cent and is calculated in exactly the same manner as above.

24. If Mr. Kunal is ready to pay either of the down payments then which of the installment schemes is the better option of the two? (Assume that Mr. Kunal will pay the installments out of his own earnings and he keeps his savings with himself and earns no interest on the same.) Also assume that instead of borrowing the remaining money for the down payment, he saves the balance before purchase.
- (a)  $\text{₹} 1000$  for 2 years
  - (b)  $\text{₹} 2000$  for 3 years
  - (c) either of two
  - (d) Data inadequate
25. What is the percentage difference in the total amount paid to the bike dealer, between the two installment schemes (with respect to the total payment of the scheme with  $\text{₹} 25,000$  down payment)?
- (a) 10.2 %
  - (b) 13.5 %
  - (c) 11.4 %
  - (d) None of these
26. If Kunal can spare only a total of  $\text{₹} 2000$  to be paid to the bike dealer and the money lender from his monthly earnings starting from the first month onwards which scheme should he choose?
- (a)  $\text{₹} 1000$  for 2 years
  - (b)  $\text{₹} 1000$  for 3 years
  - (c) either of two
  - (d) Data inadequate

**Case 6** Mindworkzz, Inc. is the leader in selling ideas universe wide but its maximum revenue comes from three principal planets only, viz., Earth, Mars, Jupiter. Further, it has three products, viz., CSP, CC and CP. In a particular year, the number of units sold had a distribution as follows: The number of units of CCs sold on Mars was 12 per cent of the number of units of CPs sold on Earth. The number of units of CPs sold on Jupiter was 1000.

Total number of CC units sold was 2600. Total number of CP units was 200 higher than that of the total number of units of CCs sold. The number of units of CSP sold on Mars was 10 per cent of the number of units of CP sold on Jupiter. The number of units of CSP sold on Earth was 2000. The number of units of CC sold on Earth was 15 per cent of the number of units of CSP sold on Jupiter.

The prices of the units on the different planets were as follows:

Earth → ₦ 15 per unit

Mars → ₦ 10 per unit

Jupiter → ₦ 8 per unit

The number of units of CSP sold on Jupiter was 300.

The number of units of CP sold on Earth was 600.

27. The number of units of CC sold on Jupiter is:

(a) 1520

(b) 2483

(c) 3423

(d) 600

28. The revenue generated on Earth is greater than that generated on Jupiter by about (to the closest 1000)

(a) ₦ 8000

(b) ₦ 9000

(c) ₦ 10,000

(d) None of these

29. The overall revenue generated is the highest from

(a) CSPs

(b) CP

(c) CCs

(d) Can't be determined

**Case 7** George has recently acquired shares of four companies, namely Asian Paintz (AZ), BMZ, ChaeWoo (CW) and Dataman (DT). The financial results of these companies for the financial year ended 2002–03 revealed these interesting facts: Profits of AZ were 10 per cent of its sales, while the

profits of BMZ were 20 per cent of its sales. While the profits of CW and DT were the same, the sales of CW were the same as those of BMZ. The total expenses of CW were 400 per cent more than its profits while the sales of DT were 200 per cent more than its profits. The total expenses of CW were ₦ 10 million and the total expenses of CW were 11.11 per cent more than those of AZ.

30. Which company had the lowest total expenses?
  - (a) AZ
  - (b) BMZ
  - (c) CW
  - (d) DT
31. Which company had the lowest profits?
  - (a) AZ
  - (b) BMZ
  - (c) CW
  - (d) DT
32. If next year, the profits of AZ were to equal CW's current profit, then with an increase of 12.5 per cent in sales, what would be the profit of AZ expressed as a percentage of sales next year?
  - (a) 17.77 per cent
  - (b) 22.22 per cent
  - (c) 18.88 per cent
  - (d) None of these
33. If profits of DT and BMZ were to be exchanged, what would be the ratio of the profit percentage (expressed as a percentage of sales) for these two companies?
  - (a) 7:13
  - (b) 5:12
  - (c) 12:5
  - (d) 5:13
34. What is the ratio of the highest and the lowest profit?
  - (a) 12:5
  - (b) 7:18
  - (c) 5:12

(d) 12:23

**Case 8** Fabric X has to go through three stages of manufacturing, viz., spinning, weaving and dyeing. In Rimal Fabric Company, there are six spinning machines, ten weaving machines and five dyeing machines. Each machine works for 10 hrs a day. One unit of Fabric X needs 40 minutes on a spinning machine, 2 hours on a weaving machine and 30 minutes on a dyeing machine in order to be completed. Similarly one unit of Fabric Y needs 60 minutes on a spinning machine, 30 minutes on a weaving machine and 60 minutes on a dyeing machine in order to be completed.

35. In a day, how many units of Fabric Y can be completed at most?
- (a) 20
  - (b) 30
  - (c) 40
  - (d) 50
36. If 20 units of Fabric Y are made in a day, how many units of Fabric X can be completed the same day?
- (a) 0
  - (b) 20
  - (c) 40
  - (d) 45
37. If only 30 units of Fabric Y are made in a day, how many machine hours will be idle that day?
- (a) 120
  - (b) 130
  - (c) 135
  - (d) 150
38. If one more dyeing machine is added, at the most how many more units of Fabric X can be made in a day?
- (a) 0
  - (b) 5
  - (c) 8
  - (d) 10
39. If only Fabric X has to be made, what machines should be bought so

that there is a maximum increase in production capacity (only one machine has to be bought)?

- (a) spinning machine
  - (b) weaving machine
  - (c) dyeing machine
  - (d) any one of three
40. If only Fabric Y has to be made, what machines should be bought so that there is a maximum increase in production capacity (only one machine has to be bought)?
- (a) spinning machine
  - (b) weaving machine
  - (c) dyeing machine
  - (d) any one of three

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## ANSWER KEY

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- 1. (c)
- 2. (b)
- 3. (d)
- 4. (c)
- 5. (b)
- 6. (b)
- 7. (b)
- 8. (c)
- 9. (a)
- 10. (d)
- 11. (b)
- 12. (d)
- 13. (a)
- 14. (d)
- 15. (d)
- 16. (c)
- 17. (c)

- 18. (c)
  - 19. (b)
  - 20. (b)
  - 21. (a)
  - 22. (a)
  - 23. (b)
  - 24. (a)
  - 25. (a)
  - 26. (b)
  - 27. (b)
  - 28. (d)
  - 29. (a)
  - 30. (d)
  - 31. (a)
  - 32. (a)
  - 33. (c)
  - 34. (a)
  - 35. (d)
  - 36. (d)
  - 37. (c)
  - 38. (a)
  - 39. (b)
  - 40. (c)
- 

## SOLUTIONS

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### Case 1

1. Let  $x$  be the volume. So the cost of training  $x$  candidates in both of these should be the same for indifference between the two options  
i.e.,  $2 \text{ lakh} + 1000x = 3.2 \text{ lakh} + 750x$   
 $\Rightarrow 250x = 1.2 \text{ lakh}$   
 $\Rightarrow x = 120,000/250 = 480$

2. Let  $x$  be the volume.  
 $3.2 \text{ lakh} + 750x = 5 \text{ lakh} + 500x$   
 $\Rightarrow 250x = 1.8 \text{ lakh} \Rightarrow x = 720$
3. Let  $x$  be the volume.  
 $2 \text{ lakh} + 1000x = 5 \text{ lakh} + 500x$   
 $\therefore x = 600.$
4. Total sales =  $1200 \times 1250 = 15 \text{ lakh}$   
Total cost (for all 3 levels) =  $5 \text{ lakh} + 500 \times 1200 = 11 \text{ lakh}$   
Thus profit = Total sales - Total cost =  $15 \text{ lakh} - 11 \text{ lakh} = 4 \text{ lakh}$
5. Total cost =  $11 \text{ lakh}$   
Profit =  $4 \text{ lakh}$   
 $\therefore \text{Profit \%} = (4/11) \times 100 = 36.36\%$

## Case 2

6.  $200 \text{ million} = 20\% \text{ of population}$   
 $\Rightarrow \text{Population} = 200 \times 5 = 1000 \text{ million} = 100 \text{ crore}$
7.  $2004 \text{ population} = 1000 \text{ million}$   
Population in 2008 or after 4 years =  $560 \times 2 = 1120 \text{ million}$   
 $\therefore \text{Growth rate} = (120 \times 100)/(1000 \times 4) = (12/4)\% = 3\% \text{ per annum}$   
simple growth rate.
8. Hotel users in 2004 =  $200 \text{ million}$   
Hotel users in 2008 =  $560 \text{ million}$   
 $\therefore \text{Growth in percentage} = \frac{560 - 200}{200} = \frac{360}{200} = 180\%$
9. Total revenue in 2004 =  $50 \text{ billion}$   
Total revenue in 2008 =  $150 \text{ billion}$   
 $\therefore \text{Growth in percentage} = \frac{150 - 50}{50} \times 100 = \frac{100}{50} = 200\%$
10. By 2008 half or  $50\%$  of the Indian population will be using hotels.  
We do not have any information about 2007. Hence the data is inadequate.

## Case 3

11. Born 100  $\Rightarrow 10$  die at infancy

$90 \Rightarrow 10$  die till age 5

$80 \Rightarrow \frac{2}{3} \times \frac{1}{2} \times 80$  go to school

$\therefore$  Who attend Std. V =  $80 \times \frac{1}{3} \times 0.4 = 10.66\%$

12. No. of child labourers in India =  $\left( 90 \times \frac{1}{15} \right)$  crore = 6 crore

13. Out of 100 born, 20 die by the age of 5.

Number of child labourers in Orissa and Bihar =  $\frac{1}{3} \times 80 \approx 27$

14. Since we do not know how many children reach Std X, the answer cannot be found. Hence, Option (d).

15. Since we do not know the exact population of Kerala, Orissa and Bihar, the answer cannot be found.

16. Number of female literates =  $90 \times \frac{9}{19} \times 0.38 = 16.2$  crore

Number of male literates =  $90 \times \frac{10}{19} \times 0.57 = 27$  crore

$\therefore$  Total literates =  $16.2 + 27 = 43.2$  crore

17. Total illiterates in India =  $90 - 43.2 = 46.8$  crore

$\therefore$  No. of illiterates in Orissa and Bihar =  $\frac{1}{3} \times 46.8 = 15.6$  crore

## Case 4

18. The required 95 responses will be got by combining 50 through the TOI and 45 through the HT in insertions of size  $200 + \text{cm}^2$ .

19. The solution will be got by comparing the cost of the two campaigns against one another. Since the expected response is the same,

Cost of 3 insertions of  $240 \text{ cm}^2 = 43 \times 240 \times 3 = 720 \times 43 = \text{₹} 30,960$

Cost of 3 insertions of  $81 \times 3 = 243 \text{ cm}^2 = 40 \times 243 \times 3 = 729 \times 40 = \text{₹} 29,160$

Mindworkzz should go for a height of 81 cm since the cost of the campaign is lower.

20.  $\text{TOI} = 50 \times 2 \times 80 = 8000$

$\text{HT} = 40 \times 2 \times 80 = 6400$

$\therefore$  Percentage difference =  $(1600/6400) = 25\%$

Since cost is the only consideration, HT should be selected and the required percentage difference is 25% between the two costs over two

insertions of  $80 \text{ cm}^2$ .

21. Cost of campaign in TOI =  $243 \times 35 \times 10$ .  
Cost of campaign in HT =  $243 \times 34 \times 10$ .  
 $\therefore$  HT is better in terms of cost.
22. Validity Period for HT =  $10 + 3 = 13$  weeks = 91 days  
Validity Period for TOI = 90 days  
Hence, HT is the better option in terms of validity.
23. TOI will give an expected response of  $50 \times 10 = 500$  while HT will give an expected response of  $45 \times 10 = 450$ . Hence, TOI will be a better option in terms of numbers of responses.

## Case 5

24. Total cost on cash down of 25,000 =  $25,000 + 24,000 = \text{₹ } 49,000$   
Total cost on cash down of 18,000 =  $18,000 + 36,000 = \text{₹ } 54,000$   
 $\therefore$  Option (a) is better since it is given that Mr. Kunal does not earn any interest on his money.
25. Total cost on down payment of 25,000 =  $25,000 + 24,000 = \text{₹ } 49,000$   
Total cost on down payment of 18,000 =  $18,000 + 36,000 = \text{₹ } 54,000$   
Required answer =  $5000/49,000$  is approximately equal to 10.2%
26. For the second installment scheme he has to borrow ₹ 6000. Hence, his monthly repayment will be ₹ 600 per month towards the money lender and ₹ 1000 per month towards the bike dealer. Hence, the total repayment will be ₹ 1600 per month.  
For the first installment scheme he will have to borrow ₹ 13000, which will entail a monthly repayment of ₹ 1408.33 per month to the money lender. ( $13,000 + 3900$  to be repaid in 12 monthly installments.) Besides, he also has to pay ₹ 1000 per month towards the bike dealer. Hence, the total repayment will be ₹ 2408.33 per month. This is outside his monthly limit of ₹ 2000 repayment per month. Hence he has to go for the second scheme.

## Case 6

The following table emerges out of the case.

|              | Earth |               | Mars  |               | Jupiter |               | TOTAL |         |
|--------------|-------|---------------|-------|---------------|---------|---------------|-------|---------|
|              | Sales | Revenue       | Sales | Revenue       | Sales   | Revenue       | Sales | Revenue |
| CSP          | 2000  | 30,000        | 100   | 1000          | 300     | 2400          | 2400  | 33,400  |
| CC           | 45    | 675           | 72    | 720           | 2483    | 19864         | 2600  | 21259   |
| CP           | 600   | 9000          | 1200  | 12,000        | 1000    | 8000          | 2800  | 29,000  |
| <b>Total</b> |       | <b>39,675</b> |       | <b>13,320</b> |         | <b>30,264</b> |       |         |

The answers can be read out of the table itself.

27. 2483
28. None of these
29. CSP

Note that the table structure has to be created according to the information provided and the filling in of the specific values within the table should only be for the questions asked. Hence, the values which were not sought by the questions asked have been left without being calculated for the table.

## Case 7

The following data table can be formed from the information provided.

| Company | Sales | Expenses | Profits |
|---------|-------|----------|---------|
| AZ      | 10    | 9        | 1       |
| BMZ     | 12    | 9.6      | 2.4     |
| CW      | 12    | 10       | 2       |
| DT      | 6     | 4        | 2       |

The values in the table are got through the following process:

Let sales of AZ =  $x$ , then its profits =  $0.1x$ .

Sales of BMW = Sales of CW =  $y$ .

Profit of BMW = 20% of its sales =  $0.2y$ .

Sales of CW is 400% more than profits of CW. Hence, profit of CW =  $0.166y$  = Profits of DT.

Sales of DT is 200% more than profits of DT. Hence, sales of DT =  $0.5y$

Also expenses of CW =  $y - 0.166y = 0.833y = 10$  million.

Hence,  $y = 12$ .

Also, expenses of AZ =  $0.9x = 9$  million. Hence,  $x = 10$  million.

**Answers:**

30. Lowest total expense = 4 million for DT.
31. Lowest profits = 1 million for AZ.
32.  $2/11.25 = 17.77\%$
33. The respective profit percentages would have been 40% and 16.66%—a ratio of 12:5.
34. The required ratio is 1:2.4 = 5:12.

## Case 8

|                    |            |           |           |                                  |
|--------------------|------------|-----------|-----------|----------------------------------|
| X                  | 0.66 hours | 2 hours   | 0.5 hours | Time required per unit processed |
| Y                  | 1 hour     | 0.5 hours | 1 hour    | Time required per unit processed |
|                    | Spinning   | Weaving   | Dyeing    |                                  |
| Capacity available | 60         | 100       | 50        |                                  |

35. With respect to Fabric Y, 60 units can be made in 60 hours on the spinning machine, 200 units can be woven on the weaving machine and 50 units can be made on the dyeing machine. Since, only 50 units can be dyed, only 50 units can be completed in a day.
36. 20 units of fabric Y will consume 20 hours on spinning, 10 hours on weaving and 20 hours on dyeing. Capacity left will be 40 hours of spinning, 90 hours on weaving and 30 hours on dyeing. In this available time 60 units can be spun, 45 units can be woven and 60 units can be dyed. Hence, only 45 units of X can be completed after 20 units of Y are made.
37. 30 units of Y will consume  $(30+15+30) = 75$  hours totally. 135 hours will remain idle.
38. The capacity constraint for fabric X lies in weaving. Hence, adding any number of dyeing machines is not going to affect the number of units of fabric X that can be produced in a day.
39. As per the logic given for the above question, a weaving machine will be required. Hence, the correct answer is 0.
40. For fabric Y, the constraint lies in the dyeing machine. Hence, if one machine has to be bought and the capacity of Fabric Y has to be increased, a dyeing machine should be procured.

## PART 2

# Developing Your Calculations

### ***Chapter 1***

Additions and  
Subtractions

### ***Chapter 2***

Divisions,  
Percentage  
Calculations and  
Ratio Comparisons

### **In This Part You will Learn:**

- Critical Calculation processes for Data Interpretation
- To Master additions and subtractions, the building blocks for all calculative Data Interpretation questions
- Learn how to use additions to create a competitive advantage for yourself in divisions and percentage calculations
- How to do the all important

ratio                      comparison  
calculations

### **This Part Contains:**

1. Ideas and Short cuts for Additions and Subtractions
2. Ideas and Short cuts for Divisions and Percentage calculations
3. Ideas and Short cuts for Ratio Comparisons

**1**

# Additions and Subtractions (As an Extension of Additions)

## IDEAS FOR ADDING AND SUBTRACTING WELL

Developing your calculations is perhaps the most critical step in doing well at Traditional DI.

Addition is perhaps the most critical skill when it comes to developing your calculations. As you would see through the discussions in the other chapters of this part of the book, if you have the ability to add well you would be able to handle all the other kinds of calculations with consummate ease.

***Skill 1 for addition:*** The ability to react with the addition of two numbers when you see them.

The first and foremost skill in the development of your addition abilities is the ability to react to 2 two digit numbers when you come across them. You simply have to develop the ability to react with their totals whenever you come across 2 two digit numbers.

For instance, suppose I were to give you two numbers at random—5, 7 and ask you to **STOP!! STOP YOUR MIND BEFORE IT GIVES YOU THE SUM OF THESE TWO NUMBERS!!** What happened? Were you able to stop your mind from saying 12? No! of course not you would say.

TRY         $12 + 7$  STOP YOUR MIND!! You could not do it again!!  
AGAIN:

TRY         $15+12$  STOP!! Could not?  
AGAIN:

TRY         $88+ 73 = ??$  STOP!! If you belong to the normal category of  
AGAIN: what I call “addition disabled aspirants” you did not even start,  
did you?

TRY         $57 + 95 = ??$   
AGAIN:

TRY         $78 + 88 = ??$   
AGAIN:

What went wrong? You are not used to such big numbers, you would say. Well, if you are serious about your ability to crack aptitude exams, you better make this start to happen in your mind. You would know what I mean if you just try to look at a 5 year old child who has just learnt to add, struggle with a calculation like  $12 + 7$  on his fingers or his abacus.

His struggle with something like  $12 + 7$  or even  $15 + 12$  would be akin to the average aspirant's ability to react to  $88 + 78$ . However, just as you know  $15 + 12$  is not a special skill so also  $88 + 78$  is not a special skill. It is just a function of how much you practice your calculations especially in the domain of 2 digit additions.

So what am I trying to tell you here?

All I am trying to communicate to you is to tell you to work on developing your ability to react to 2 two digit numbers with their addition as soon as these numbers hit your mind. What I am trying to tell you that the moment you make your mind adept at saying something like  $74 + 87 = 161$  just the way you would do  $9 + 6 = 15$  you would have made a significant movement in your mind's ability to crack aptitude exams.

Why do I say that—you might be justified in asking me at this point of time? In order to answer your question I would like to present the following argument to you:

In numerical questions, a normal student/aspirant would be roughly calculating for approximately 50% of the time that he/she takes to solve a question. This means that half the total time that you would spend in solving questions of Quantitative Aptitude or Data Interpretation would essentially go into calculations. In the current CAT, out of 70 minutes spent on QA and DI, you would spend roughly 30–35 minutes in calculations in the test paper. In other words, 30 minutes would come down to 6 minutes, a saving of 24 minutes thus increasing your calculation speed.

So the contention is this: If you can improve your calculation speed to 5x, the time you would require to do the same calculations would come down to  $1/5^{\text{th}}$  of your original time. In other words 18 minutes would come down to 3.6 minutes – a saving of 14.4 minutes; 24 minutes would come down to 4.8 minutes- a saving of 19.2 minutes just by improving your calculation speed!!

In an exam like the CAT where you would always run out of time (rather than running out of solvable questions) 24 extra minutes could easily mean

anywhere between 15–20 marks (even if you able to solve an additional 6–7 questions in this time).

15–20 extra marks in the prelims exam could very well make the difference between getting a chance to write the mains examination in the same year versus going back to the drawing board and preparing for the prelims for another year!!

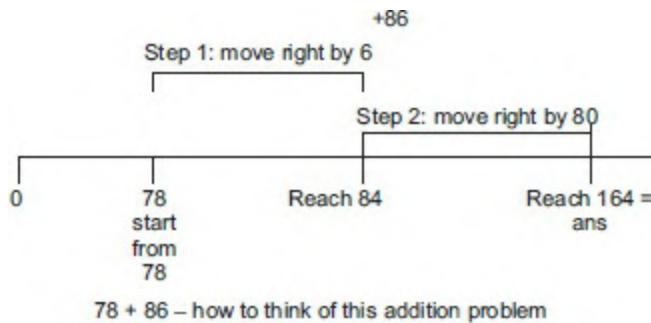
Addition being the mother of all calculations has the potential of giving you the extra edge you require to dominate this all important examination.

In the other chapters in this part of the book, all I am going to show you is how knowing additions well would have an impact on each and every calculation type that you might encounter for this exam and indeed for all aptitude tests. However, before we go that far you need to develop your ability to add well.

Let us look at the simple calculation of  $78 + 88$ . For eternity you have been constrained to doing this as follows using the carry over method:

$$\begin{array}{r} & & 1 \\ & & 7 & 8 \\ & + & 8 & 6 \\ \hline & & 1 & 6 & 4 \end{array}$$

The problem with this thought is that no matter how many times you practice this process you would still be required to write it down. The other option of doing this same addition is to think on the number line as this:



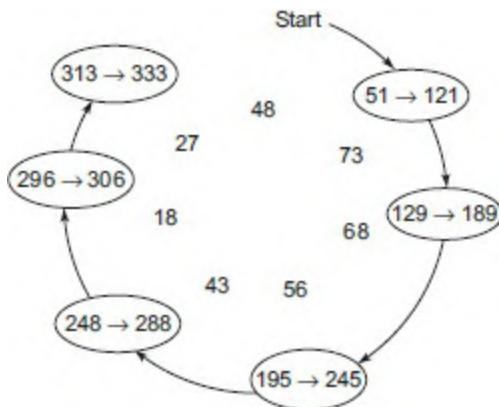
78 + 86 – how to think of this addition problem

As you can see, the above thinking in an addition situation requires no carry over and after some practice would require no writing at all. It is just an extension of how you are able to naturally react to  $5 + 11$  so also you can train your mind to react to  $58 + 63$  and react with a two step thought (as  $61 \rightarrow 121$ —with practice this can be done inside a fraction of a second). It is just a matter of how much you are willing to push your mind for this). Once you can do that your next target is to be able to add multiple 2 digit numbers written randomly on a single page:

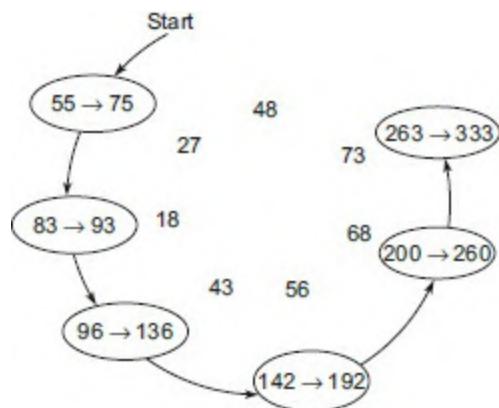
## Try this: Add the following

$$\begin{array}{ccccccc} & & 48 & & & & \\ & & 27 & & 73 & & \\ & 18 & & & 68 & & \\ 43 & & 56 & & & & \end{array}$$

In order to do this addition your thinking should go like this:



Alternately you may also do this the other way. The result would be quite the same:



While you are trying to work on this addition you would realize the following about your abilities to add (if you belong to the normal category of aspirants')

1. Something like  $121 + 68$  would be easier than  $189 + 56$  because the latter requires you to shift hundreds- something that the former does not require you to do.
2. Something like  $48 + 27$  would be easier for you to do initially than  $136 + 56$ ; and  $136 + 56$  would be easier than  $543 + 48$  because your mind

would be more comfortable with smaller numbers than you would be with larger numbers.

However as you start practicing your additions these additions would become automatic for your mind—as they would then fall into the range where your mind can react with the answers. That is the point to which we would want you to target your skill levels for additions.

To put it in other terms, you would need to work on your additions in such a way that 10 numbers written around a circle (as shown above) should be done in around 10–12 seconds in your mind.

Till the time your addition skill levels reach that point we would want you to work aggressively on your addition ability.

The following  $10 \times 10$  table done at least once daily might be a good way to work on your additions:

Inside the table you would broadly do two things:

- (a) For each cell you would add the values in the corresponding row and the corresponding column in order to get the value inside the cell. Thus, the second row and 4<sup>th</sup> column intersection would give you  $54 + 96 = 150$ , the sixth row and the sixth column would add to  $73 + 32 = 105$  as shown in the table.
- (b) Add the total of the 10 numbers seen in each row after you finish doing the values inside the cells in the total. This would give you the final total of the row. Repeat the same process for the addition of the 10 numbers in the columns.

By this time, I guess you would have realized that we are targeting two broad addition skills-

- (i) Your ability to react with the total when you see two 2 digit numbers (like  $57 + 78 = 135$ )
- (ii) Your ability to add multiple 2 digit numbers if they are given to you consecutively (like  $57+78+43+65+91+38+44+18+64+72=570$  in 8–10 seconds)

You might require around 1–2 months of regular practice to get proficient at this. However once you acquire this skill, every conceivable calculation that any aptitude exam can throw at you (or indeed has thrown at you over the past 20 years) would be very much within your zone.

How do you do larger additions?

Once you have the skills to handle two digit additions as specified above handling bigger additions should be a cakewalk.

Suppose you were adding:

$57436 + 64123 + 44586 + 78304 + 84653 + 5836$ . In order to do this, first add the thousands.  $57 + 64 (=121) + 44 (=165) + 78 (=243) + 84 (=327) + 5 (=332)$ . Thus, you have an interim answer of 332 thousands. At this stage you know that your answer would be  $332000 + \text{a maximum of } 6000$  (as there are 6 numbers whose last 3 digits you have neglected). If a range of 332000 to 338000 suffices for you in the addition based on the closeness of the options, you would be through with your calculation at this point. In the event that you need to get to a closer answer than this, the next step would involve taking the 100s digit into account.

Thus for the above calculation: **57436+ 64123 +44586+78304+84653 +5836** when you add the hundreds, you get  $4+1+5+3+6+8 = 27$  hundreds. Your answer gets refined to 334700 and at this point you also know that the upper limit of the addition has to be a maximum of 600 more than 334700 i.e. the answer lies between 334700 to 335300. In case this accuracy level is still not sufficient you may then look at the last 2 digits of the numbers. Our experience tells us that normally that would not be required.

However, in case you still need to add these digits-it would amount to 2 digit additions again. So you would need to add **57436** + **64123** + **44586** + **78304** + **84653** + **5836** → **36** + **23** (= **59**) + **86** (= **145**) + **4** (= **149**) + **53** (= **202**) + **36** (= **238**).

Thus, the correct total would be  $334700 + 238 = 334938$  and while doing this entire calculation we have not gone above 2 digit additions anywhere.

Apart from that, the biggest advantage of the process explained above is that in this process, you could stop the moment you had an answer that was sufficient in the context of the provided options.

## SUBTRACTIONS—JUST AN EXTENSION OF ADDITIONS

The better your additions are, the better you would be able to implement the process explained for subtractions. So, a piece of advice from me—make sure that you have worked on your additions seriously for at least 15 days before you attempt to internalize the process for subtractions that is explained in this chapter.

Throughout school you have always used the conventional carry over method of subtracting. But, we are here to show you that you have an option—something that would be much faster and much more superior to the current process you are using. What is it you would ask me? Well what would you do in case you are trying to subtract 38 from 72?

The conventional process tells us to do this as:

$$\begin{array}{r} \text{Carry over 1} \\ \hline & 7 & 2 \\ - & 3 & 8 \\ \hline & 3 & 4 \end{array}$$

Well, the alternative and much faster way of thinking about subtractions is shown on the number line below:

Difference between any 2 numbers is equal to the distance between the numbers on the number line



The principal used for doing subtractions this way is that the difference between any two numbers can be seen as the distance between them on the number line.

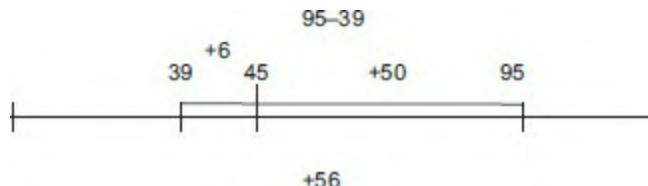
Thus, imagine you are standing on the number 38 on the number line and you are looking towards 72. To make your calculation easy, your first target has to be to reach a number ending with 2. When you start to move to the right from 38, the first number you see that ends in 2 is the number 42. To move from 38 to 42 you need to cover a distance of +4 (as shown in the figure). Once you are at 42, your next target is to move from 42 to 72. The

distance between 42 to 72 is 30.

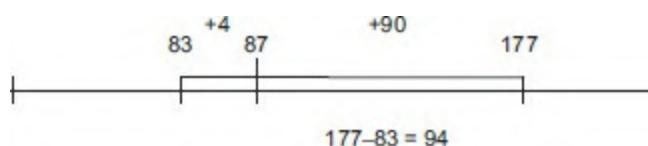
Thus, the subtraction's value for the numbers 72–38 would be 34.

Consider, the following examples:

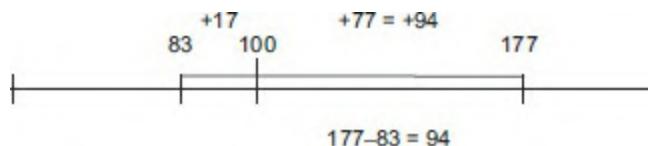
### Illustration 1 $95 - 39$



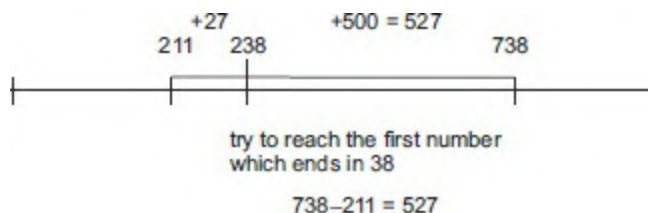
### Illustration 2 $177 - 83$



Alternately:

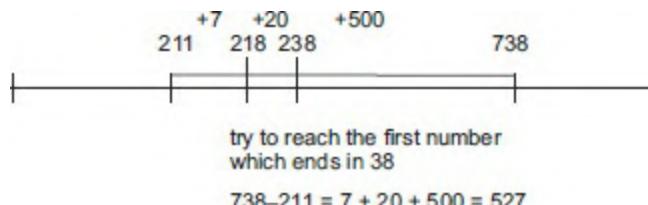


### Illustration 3 $738 - 211$



In this case the first objective is to reach the first number ending in 38 as you start moving to the right of 211. The first such number to the right of 211 being 238, first reach 238 (by adding 27 to 211) and then move from 238 to 738 (adding 500 to 238 to reach 738)

In case you need an intermediate number before reaching 238 you can also think of doing the following:



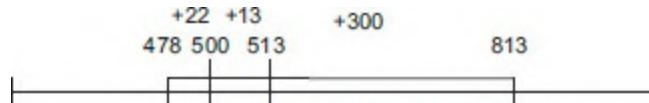
## Illustration 4    $813 - 478$



try to reach the first number  
which ends in 13

$$\text{Thus, } 813 - 478 = 35 + 300 = 335$$

Alternately, this thought can also be done as:



try to reach the first number  
which ends in 13

$$813 - 478 = 22 + 13 + 300 = 335$$

Also, you could have done it as follows:



try to reach the first number  
which ends in 13

$$813 - 478 = 5 + 30 + 300 = 335$$

Even if we were to get 4 digit numbers, you would still be able to use this process quite easily.

**2**

## **Divisions, Percentage Calculations and Ratio Comparisons**

## **CALCULATING DECIMAL VALUES FOR DIVISION QUESTIONS USING PERCENTAGE CALCULATIONS**

I have chosen to club these two together because they are actually parallel to each other—in the sense that for any ratio we can calculate two values—the percentage value and the decimal value. The digits in the decimal value and the percentage value of any ratio would always be the same. Hence, calculating the percentage value of a ratio and the decimal value of the ratio would be the same thing.

How do you calculate the percentage value of a ratio?

## PERCENTAGE RULE FOR CALCULATING PERCENTAGE VALUES THROUGH ADDITIONS

Illustrated below is a powerful method of calculating percentages. In my opinion, the ability to calculate percentage through this method depends on your ability to handle 2-digit additions. Unless you develop the skill to add 2-digit additions in your mind, you are always likely to face problems in calculating percentage through the method illustrated below. In fact, trying this method without being strong at 2-digit additions/subtractions (including 2 digits after decimal point) would prove to be a disadvantage in your attempt at calculating percentages fast.

This process, essentially being a commonsense process, is best illustrated through a few examples:

### EXAMPLE 1

What is the percentage value of the ratio: 53/81?

**Solution** The process involves removing all the 100%, 50%, 10%, 1%, 0.1% and so forth of the denominator from the numerator.

Thus, 53/81 can be rewritten as:  $(40.5 + 12.5)/81 = 40.5/81 + 12.5/81 = 50\% + 12.5/81$

$$\begin{aligned} &= 50\% + (8.1 + 4.4)/81 = 50\% + 10\% + 4.4/81 \\ &= 60\% + 4.4/81 \end{aligned}$$

At this stage you know that the answer to the question lies between 60 – 70% (Since 4.4 is less than 10% of 81)

At this stage, you know that the answer to the calculation will be in the form: 6a.bcde ....

All you need to do is find out the value of the missing digits.

In order to do this, calculate the percentage value of 4.4/81 through the normal process of multiplying the numerator by 100.

$$\text{Thus the \% value of } \frac{4.4}{81} = \frac{4.4 \times 100}{81} = \frac{440}{81}$$

[Note: Use the multiplication by 100, once you have the 10% range. This step reduces the decimal calculations.]

$$\text{Thus } \frac{440}{81} = 5\% \text{ with a remainder of } 35.$$

Our answer is now refined to 65.bcde. (1% Range)

Next, in order to find the next digit (first one after the decimal) add a zero to the remainder;

Hence, the value of 'b' will be the quotient of

$$b \rightarrow 350/81 = 4 \text{ Remainder } 26$$

Answer: 65.4cde (0.1% Range)

$$c \rightarrow 260/81 = 3 \text{ Remainder } 17$$

Answer: 65.43 (0.01% Range)

and so forth.

The advantages of this process are two fold:

- (1) You only calculate as long as you need to in order to eliminate the options. Thus, in case there was only a single option between 60–70% in the above question, you could have stopped your calculations right there.
- (2) This process allows you to go through with the calculations as long as you need to.

However, remember what I had advised you right at the start: Strong Addition skills are a primary requirement for using this method properly.

### To illustrate another example:

What is the percentage value of the ratio  $\frac{223}{72}$ ?

$$223/72 \rightarrow 300 - 310\% \text{ Remainder } 7$$

$$700/72 \rightarrow 9. \text{ Hence } 309 - 310\%, \text{ Remainder } 52$$

$$520/72 \rightarrow 7. \text{ Hence, } 309.7, \text{ Remainder } 16$$

$$160/72 \rightarrow 2. \text{ Hence, } 309.72, \text{ Remainder } 16$$

Hence, 309.7222 (2 recurs since we enter an infinite loop of 160/72 calculations).

In my view, percentage rule (as I call it) is one of the best ways to

calculate percentages since it gives you the flexibility to calculate the percentage value up to as many digits after decimals as you are required to and at the same time allows you to stop the moment you attain the required accuracy range.

Of course I hope you realize that when you get  $53/81 = 65.43\%$  the decimal value of the same would be 0.6543 and for  $223/72$ , the decimal value would be 3.097222.

The kind of exam that the CAT is, I do not think you would not need to calculate ratios beyond 2 digits divided by 2 digits. In other words, if you are trying to calculate  $5372/8164$  you can take an approximation of this ratio as  $53/81$  and calculate the percentage value as shown in the process above. The accuracy in the calculation of  $53/81$  instead of  $5372/8164$  would be quite sufficient to answer questions on ratio values that the CAT may throw up in Quantitative Aptitude or Data Interpretation questions.

## RATIO COMPARISONS

### Calculation Methods Related To Ratios

#### (A) Calculation methods for Ratio comparisons:

There could be four broad cases when you might be required to do ratio comparisons:

The table below clearly illustrates these:

|        | Numerator | Denominator | Ratio                    | Calculations |
|--------|-----------|-------------|--------------------------|--------------|
| Case 1 | Increases | Decreases   | Increase                 | Not required |
| Case 2 | Increases | Increases   | May Increase or Decrease | Required     |
| Case 3 | Decreases | Increases   | Decreases                | Not required |
| Case 4 | Decreases | Decreases   | May Increase or Decrease | Required     |

In cases 2 and 4 in the table, calculations will be necessitated. In such a situation, the following processes can be used for ratio comparisons.

#### 1. The Cross Multiplication Method

Two ratios can be compared using the cross multiplication method as follows. Suppose you have to compare

$12/15$  with  $15/19$

Then, to test which ratio is higher cross multiply and compare  $12 \times 19$  and  $15 \times 17$ .

If  $12 \times 19$  is bigger the ratio  $12/17$  will be bigger. If  $15 \times 17$  is higher, the ratio  $15/19$  will be higher.

In this case,  $15 \times 17$  being higher, the Ratio  $15/19$  is higher.

**Note:** In real time usage (esp. in D.I.) this method is highly impractical and calculating the product might be more cumbersome than calculating the percentage values.

Thus, this method will not be able to tell you the answer if you have to

compare  $\frac{3743}{5624}$  with  $\frac{3821}{5783}$

## 2. Percentage Value Comparison Method

Suppose you have to compare:  $\frac{173}{212}$  with  $\frac{181}{241}$

In such a case just by estimating the 10% ranges for each ratio you can clearly see that —

the first ratio is  $> 80\%$  while the second ratio is  $< 80\%$

Hence, the first ratio is obviously greater.

This method is extremely convenient if the two ratios have their values in different 10% ranges.

However, this problem will become slightly more difficult, if the two ratios fall in the same 10% range. Thus, if you had to compare  $\frac{173}{212}$  with  $\frac{181}{225}$ , both the values would give values between 80 – 90%. The next step would be to calculate the 1% range.

The first ratio here is 81 – 82% while the second ratio lies between 80 – 81%

Hence the first ratio is the larger of the two.

**Note:** For this method to be effective for you, you'll first need to master the percentage rule method for calculating the percentage value of a ratio. Hence if you cannot see that 169.6 is 80% of 212 or for that matter that 81% of 212 is 171.72 and 82% is 173.84 you will not be able to use this method effectively (This is also true for the next method.) However, once you can calculate percentage values of 3 digit ratios to 1% range, there is not much that can stop you in comparing ratios. The CAT and all other management exams normally do not challenge you to calculate further than the 1% range when you are looking at ratio comparisons.

## 3. Numerator Denominator Percentage Change Method

There is another way in which you can compare close ratios like 173/212 and 181/225. For this method, you need to calculate the percentage changes in the numerator and the denominator.

Thus:

173 → 181 is a % increase of 4 – 5%

While 212 → 225 is a % increase of 6 – 7%.

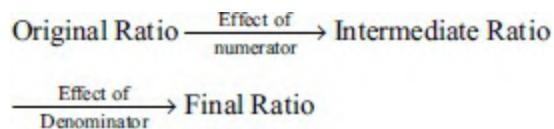
In this case, since the denominator is increasing more than the numerator, the second ratio is smaller.

This method is the most powerful method for comparing close ratios—provided you are good with your percentage rule calculations.

## (B) Method for calculating the value of a percentage change in the ratio:

PCG (Percentage Change Graphic) gives us a convenient method to calculate the value of the percentage change in a ratio.

Suppose, you have to calculate the percentage change between 2 ratios. This has to be done in two stages as:



Thus if  $20/40$  becomes  $22/50$

Effect of numerator =  $20 \rightarrow 22$  (10% increase)

Effect of denominator =  $50 \rightarrow 40$  (25% decrease) (reverse fashion)

Overall effect on the ratio:

$$100 \xrightarrow{\substack{10\% \uparrow \\ \text{Numerator} \\ \text{Effect}}} 110 \xrightarrow{\substack{25\% \downarrow \\ \text{Denominator} \\ \text{Effect}}} 82.5$$

Hence, overall effect = 17.5% decrease.

## PART 3

# How to think in Traditional Data Interpretation

### *Chapter 1*

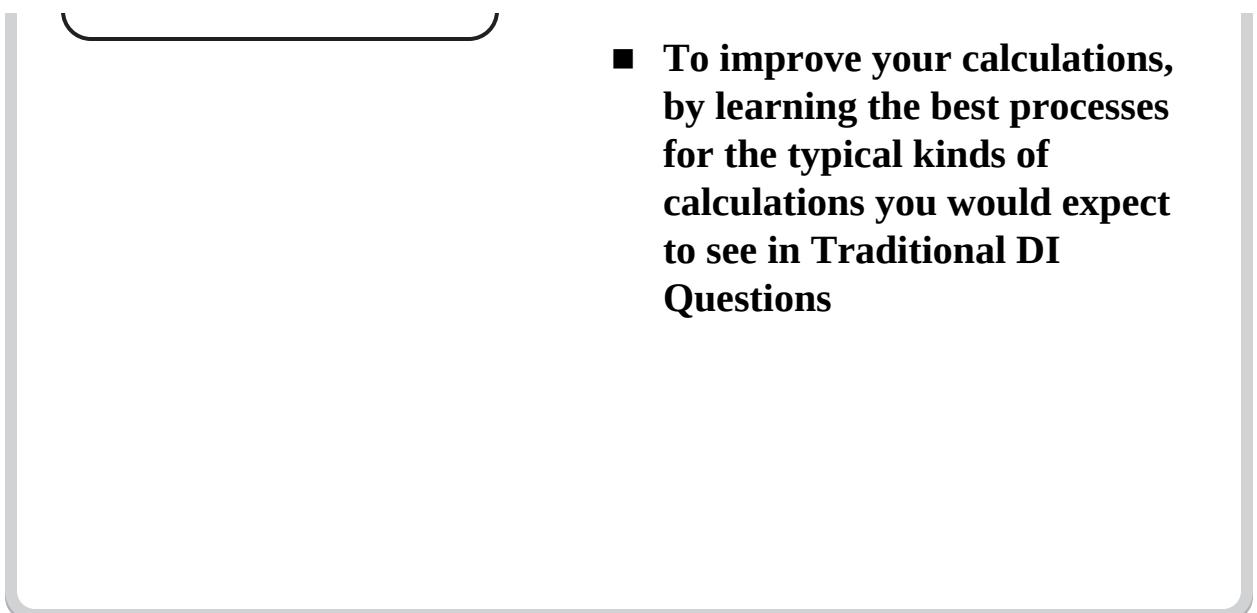
Introduction to Traditional DI & Mathematical Constructs in Traditional DI

### *Chapter 2*

How to Think in Traditional Data Interpretation

### In This Part You will Learn:

- **To identify the Mathematical Structures on which Traditional DI questions are framed**
- **To improve your ability to read, understand and anticipate DI questions in Traditional Data Interpretation Sets.**
- **To improve your line by line understanding of various kinds of DI sets.**

- 
- To improve your calculations, by learning the best processes for the typical kinds of calculations you would expect to see in Traditional DI Questions

**1**

# **Introduction to Traditional DI & Mathematical Constructs in Traditional DI**

As you must have read in the preface, this book is divided into two sections - Traditional Data Interpretation & Logical Data Interpretation. This distinction has not been formally made or announced by any exam conducting body - but has become obvious by looking at the various questions being asked in the latest CAT and XAT papers. It is self evident in the sense that the skills required to master both these question types are very different from each other - you might as well be studying two different subjects. Hence, in order to master aptitude exams like the CAT and the XAT, you need to master both Traditional and Logical Data Interpretation.

For the time being, our focus is on Traditional Data Interpretation.

## ◆ **WHAT IS TRADITIONAL DATA INTERPRETATION?**

A typical question on traditional Data Interpretation would be consisted of some data in the form of graphs/charts/text which would be clearly given to you, followed by questions based on the same. Questions would mostly involve heavy calculations and would be based on one of the principal structures listed in the list below.

Since we are currently in the section of Traditional Data Interpretation, I will first take you through some important thought structures that you need to develop for traditional Data Interpretation.

If you were to take a historical look at the DI questions that have been asked in most examinations, the mathematical constructs of the questions on Data Interpretation can be broken down into the following quantitative divisions:

The main mathematical structures used in DI:

1. DI based on Averages and Alligations
2. DI based on Percentages
3. DI based on Ratio and Proportions
4. DI based on Mixed concepts of the above
5. DI based on Numerical Logic
6. DI based on Set Theory
7. DI sets based on miscellaneous concepts

Almost every DI set that has appeared in any exam (CAT, XAT, Bank PO) over the past decade and more has been based on these mathematical concepts. The key factor in understanding and solving a set in DI is dependent on the ability to identify this mathematical construct—during your first reading. What essentially occurs is that every DI set gives rise to questioning possibilities—possibilities of the kinds of questions that can be asked on the set. The questioning possibilities that emerge out of a Data set are essentially dependent on this mathematical construct of the set.

Obviously, if you get good at identifying the construct of a set, your

ability to pre-assess the difficulty level of the question would automatically improve. This in turn would help you identify the easier DI question sets that you should target to solve in the exam. Of course, if you change your DI to your strength you would want to solve all the DI sets as a matter of strategy in every question paper you would be given—in which case identification of easy and difficult sets might not be an important issue for you.

From the opposite perspective, the identification of the mathematical construct of a DI set is critical because there are only two reasons one is not able to handle a DI set

- a. Inability to understand the data set—This happens mainly because the solver is unable to identify the mathematical construct of the question;
- b. Inability to calculate—This would normally only occur with the unprepared student. Calculations in DI are very repetitive in nature and hence not being prepared for a particular calculation, or being slow at a particular calculation would only be an excuse that could be given by an under-prepared student. I would like to take this opportunity to tell you once again that while solving this book, whatever calculation situations you face—you should focus on creating a strategy/process/technique to get to the answer accurately and quickly. Throughout this book, in various parts of the solutions to the sets given, I have explained to you the best techniques available when you reach a particular calculation situation. I would once again encourage you to identify those situations and rework the best methods to handle those situations, so as to fortify your mind with the best techniques possible for these calculation situations. This is crucial because you are not going to face any new calculation situations inside the CAT, XAT or any other aptitude exam. Everything (calculation wise) that would happen in DI is predictable and hence can be prepared for.

This leaves us with only one variable that we need to control in order to reach a belief level in DI—“I can solve anything in DI”. Once you reach that level of belief, the entire—DI section opens up.

So let us now move onto looking at some of these mathematical structures as used in Data Interpretation. In this discussion, I have chosen random questions asked in previous years papers that are based on the above mathematical structures—and shown you how to think while solving such

questions.

## ■ Key Concepts in Data Interpretation

### 1. Averages

Average is one of the most elementary concepts in Mathematics. It is one of the measures of central tendency (along with median and mode), but is much more popular than the other two. It is used in most statistical analysis and for comparisons. So, one is always interested in knowing about averages of all kinds in various situations – the batting average of a cricket batsman, the bowling average of a bowler, the average price of a commodity, the average sales per territory for a product, the average speed of a car in a journey—and so many other situations.

**Mathematical Concept:** The average for a group of numbers is simply the sum of the numbers divided by the number of numbers.

**Useful for DI:** *The assumed average approach to calculate Averages:*

One of the most common situations that you would come across in DI based on averages is the one where you have to estimate the average of a group of numbers. The assumed average approach explained here is the most powerful approach for handling such situations.

Let's try to look at an example to understand the assumed average approach:

Suppose you have to find the average of 6 numbers. Let us start with an easy set of numbers to understand the process.

Suppose the 6 numbers are 12, 17, 8, 22, 15, 34. Since the calculation of the average is about finding a measure of the central tendency, the first step in this process, as the name itself suggests is to assume an average. Let's say we try to assume the average as 22. The following process shown in the table is self-explanatory and explains what the assumed average approach is all about:

| Numbers | Deviation from the assumed average of 22 | Net deviation = sum of all the deviations | Average deviation = Net deviation/ number of numbers |
|---------|--|---|--|
| 12      | -10                                      | -10 - 5 -                                 | -24/6 = -4   |
| 17      | -5                                       | 14 - 7 + 12                               |  |
| 8       | -14                                      | = -24                                     |  |
| 22      | 0  |   |  |
| 15      | -7                                       |   |  |
| 34      | 12                                       |   |  |

The correct average would be: Assumed average + Average deviation =  $22 - 4 = 18$ .

The best part of this process is that (the correct answer would be got) irrespective of the value you take of the assumed average. For instance, if you were to take the assumed average as 8, the working would go as follows:

| Numbers | Deviation from the assumed average of 8 | Net deviation = sum of all the deviations | Average deviation = Net deviation/ number of numbers |
|---------|---|---|--|
| 12      | 4                                       | 4 + 9 + 0 + 14 +                          | 60/6 = 10  |
| 17      | 9                                       | 7 + 26 = 60                               |  |
| 8       | 0                                       |   |  |
| 22      | 14                                      |   |  |
| 15      | 7                                       |   |  |
| 34      | 26                                      |   |  |

Thus, the correct average would be Assumed average + Average deviation =  $8 + 10 = 18$ .

Obviously, you do not need this technique in this situation since you could have easily added these numbers and got the average automatically by yourself. And it is not for these simple average calculation situations that I am advocating this process here. The assumed average approach becomes a killer thought in many DI situations where you would need to calculate the average or the total of a set of numbers. Let's take a look at a couple of such situations:

Let us suppose you are required to make the average of 5 numbers 98, 95, 95.5, 95 and 1 missing number equal to 96. To find the missing number, your thought could be the following:

If we assume the average of the 5 numbers to be 96, the individual deviations are: +2, -1, -0.5, -1 and 1 unknown value. Since, the net deviation should be zero in this case, we need the deviation of the final number to be 0.5. Hence, the final number would be 96.5.

**Note:** This thought has been asked in CAT and you can look at the question set 15 to 19 in the exercise that follows. (Specifically look at question 15)

The other situation where the Assumed Average Approach would help you would be in finding the average of large numbers. Suppose, you needed to find the average of five five-digit numbers—say: 37484, 52776, 81447, 93829 and 78561.

The first step would be to find the average of 37, 52, 81, 93 and 78 (the left most two digits of each of the above numbers. Using the Assumed Average Approach: Assuming an average of 70 the average of these would come to:  $70 - 9/5 = 70 - 1.8 = 68.2$ .

68.2 here means a value of 68200 (since we had taken 37000 as 37 and 52000 as 52 for the calculation of 68.2 in the first place). So, at this point we know that our answer is ‘68200 + something’. The something here refers to the average of the last three digits in each of the five numbers that we had ignored. A quick glance across the numbers would show us that the minimum of these ignored last three digits is 447 (in the number 81447) and the maximum is 829 (in the number 93829). Thus, the minimum value of this something would be 447 and the maximum value would be 829. So at this point using this minimum and maximum we know that the average of these five numbers comes out to:

**Minimum:**  $68200 + 447 = 68647$ ; **Maximum:**  $68200 + 829 = 69029$ .

So the average of the numbers: 37484, 52776, 81447, 93829 and 78561 lies between 68647 and 69029.

In my experience in most such situations that you are likely to face in Data Interpretation (based on over 20 years of trend and difficulty analysis), I can tell you that this range would be quite sufficient to answer the given question. However, in case you need to get a closer answer the additional effort required is just to find the average of the third digit in the five numbers: The third digits are- 4, 7, 4, 8 and 5 respectively and the average of these five numbers is  $28/5 = 5.6$ . Since, these digits are the hundreds digit of the

numbers, an average of 5.6 means an average of 560. Thus, the average of the numbers evolves to:

$$68200 + 560 + \text{average of the last two digits of the five numbers} =$$

$$68760 + \text{average of the last two digits of the five numbers.}$$

Also, since the least of the last two digits is 29 and the largest is 84, we can work out a minimum average of:  $68760 + 29 = 68789$  and a maximum average of  $68760 + 84 = 68844$ .

I would encourage the reader to practice more of these situations.

## 2. Alligations

The Alligation situation and how to think in such a situation:

Very often we come across quantitative situations where the concept of weighted average comes into the picture. Weighted average is nothing but a situation where multiple groups with their own averages are getting mixed to form a composite group with a single composite average. The number of units in each group, is the weightage that is attached to each average and it plays a role in determining the overall average of the composite group.

Thus, if you were to drive your car at three different speeds, over three different time periods, you would get a single average speed for the entire time period you have traveled for. Similarly, if you have three different sections of students having their own numbers of students in each section, scoring three different averages in an exam—the merging of the three groups would create 1 composite average for the entire group.

The formula for the weighted average situation can be understood by the following situation:

If you have a city A with an average literacy of 80% and a population of 1 lac, City B with an average literacy of 90% and a population of 2 lac and City C with an average literacy of 70% and a population of 3 lac, the weighted average of the three cities would be given by the formula:

$$A_w = \frac{n_1 A_1 + n_2 A_2 + n_3 A_3}{n_1 + n_2 + n_3}$$

So, in this case the value would turn out to be:

$$\frac{80 \times 1 + 90 \times 2 + 70 \times 3}{1 + 2 + 3} = \frac{470}{6} = 78.33$$

Note here, that the value of the weighted average is not dependent on the actual values of the populations, but on the ratio of the populations. Thus, if you were to change the population to 2 lacs, 4 lacs and 6 lacs respectively, the answer would still remain the same. In fact, as far as you would keep the ratio of the numbers equal to 1:2:3, the weighted average of the groups shown above would remain the same.

Note also that in each of the following cases, the same formula would apply:

- a. You drive a car at 80 kmph for 1 hour, 90 kmph for 2 hours and 70 kmph for 3 hours and you want to find out your average speed.
- b. You mix 1 liter of liquid costing 80 ₹/liter, 2 liters of liquid costing 90 ₹/liter and 3 liters of liquid costing 70 ₹/liter and you want to find out the average price of the mixture.
- c. You mix three diet formulations—one having 80% protein, another with 90% protein and a third with 70% protein in the ratio 1:2:3 and you want to work out the average protein percentage in the mixture.

As you can well realise the weighted average formula can work for two, three, four or even more groups. What we need to move to now is to the weighted average formula for 2 groups. In this case, the entire structure of thinking to get to the required answer gets encapsulated into a visual picture—which can be termed as ‘alligation’.

The alligation situation:

Suppose you mixed two diet formulations with 80% protein and 90% protein respectively in the ratio 2:3, and you want to work out the average protein percentage in the total mixture. You can of course solve this through the weighted average formula, but since this is a case of mixing of two groups, the situation can also be solved using the alligation structure on the number line.

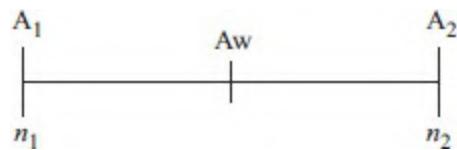
Consider, the following structures of thinking. There are essentially three cases for alligations to be used. Let  $A_1$  and  $A_2$  be the averages of the two groups being mixed,  $n_1:n_2$  be the ratio of the mixing and  $A_w$  be the weighted average. Then we have the following cases:

**Case 1:** When we know the values of  $A_1$ ,  $A_2$  and  $A_w$  and want to know the ratio of  $n_1:n_2$ .

**Case 2:** When we know the values of  $A_1$ ,  $A_2$ , the ratio of  $n_1:n_2$  and we want to know the value of  $A_w$

**Case 3:** When we know the ratio of  $n_1:n_2$  and we know  $A_w$  and the value of one of the two averages. In this situation we would need to find out the second average. i.e. if  $A_1$  is known we would need to find  $A_2$ , while if  $A_2$  is known we would need to find  $A_1$ .

The following illustrations will give you a clear idea of how to use Alligation to think in each of these situations.



Visualise this as a fragment of the number line with points  $A_1$ ,  $A_w$  and  $A_2$  in that order from left to right.

Then,

- $n_2$  is responsible for the distance between  $A_1$  and  $A_w$  or  $n_2$  corresponds to  $A_w - A_1$
- $n_1$  is responsible for the distance between  $A_w$  and  $A_2$ . or  $n_1$  corresponds to  $A_2 - A_w$
- $(n_1 + n_2)$  is responsible for the distance between  $A_1$  and  $A_2$ . or  $(n_1 + n_2)$  corresponds to  $A_2 - A_1$ .

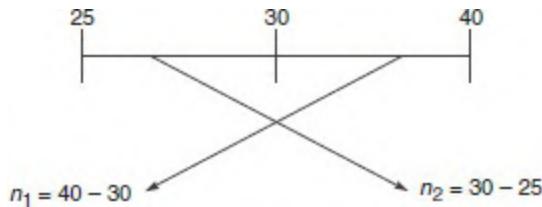
The processes for the 3 cases illustrated above can then be illustrated below:

### Illustration 1

On mixing two classes of students having average marks 25 and 40 respectively, the overall average obtained is 30 marks. Find

- the ratio in which the classes were mixed.
- the number of students in the first class if the second class had 30 students.

*Solution:*



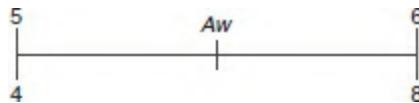
Hence, ratio is 2 : 1, and the second class has 60 students.

Case 2  $A_1, A_2, n_1$  and  $n_2$  are known;  $Aw$  is unknown.

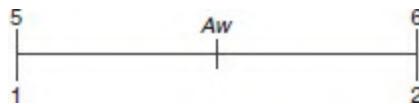
### Illustration 2

4 kg of rice at ₹ 5 per kg is mixed with 8 kg of rice at ₹ 6 per kg. Find the average price of the mixture.

*Solution:*



is the same as



Then, by unitary method:

$$\begin{aligned} n_1 + n_2 \text{ corresponds to } A_2 - A_1 \\ \rightarrow 1 + 2 \text{ corresponds to } 6 - 5 \end{aligned}$$

That is, 3 corresponds to 1

$$\therefore n_2 \text{ will correspond to } \frac{(A_2 - A_1) \times n_2}{(n_1 + n_2)}$$

In this case  $(1/3) \times 2 = 0.66$ .

Hence, the required answer is 5.66.

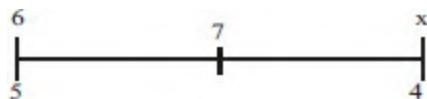
**Note:** In this case, the problem associated with the cross method is overcome and the solution becomes graphical.

Case 3:  $A_1, Aw, n_1$  and  $n_2$  are known;  $A_2$  is unknown.

### Illustration 3

5 kg of rice at ₹ 6 per kg is mixed with 4 kg of rice to get a mixture costing ₹ 7 per kg. Find the price of the costlier rice.

Using straight line method:



4 corresponds to  $7 - 6$  and 5 corresponds to  $x - 7$ .

The thought process should go like:

$$\begin{aligned} 4 &\rightarrow 1 \\ \therefore 5 &\rightarrow 1.25 \\ \text{Hence, } x - 7 &= 1.25 \\ \text{and } x &= 8.25 \end{aligned}$$

### 3. Percentages

There are two basic structures of percentage calculations that are repeatedly used in Data Interpretation. These are illustrated below:

#### A. Percentage Calculations

##### Percentage Rule for Calculating Percentage Values through Additions

Illustrated below is a powerful method of calculating percentages. In my opinion, the ability to calculate percentage through this method depends on your ability to handle 2 digit additions. Unless you develop the skill to add 2 digit additions in your mind, you are always likely to face problems in calculating percentage through the method illustrated below. In fact, trying this method without being strong at 2-digit additions/suBody-text-iractions (including 2 digits after decimal point) would prove to be a disadvantage in your attempt at calculating percentages fast.

This process, essentially being a commonsense process, is best illustrated through a few examples:

**Example:** What is the percentage value of the ratio: 53/81?

**Solution:** The process involves removing all the 100%, 50%, 10%, 1%, 0.1% and so forth of the denominator from the numerator.

Thus,  $53/81$  can be rewritten as:  $(40.5 + 12.5)/81 = 40.5/81 + 12.5/81 = 50\% + 12.5/81$

$$= 50\% + (8.1 + 4.4)/81 = 50\% + 10\% + 4.4/81$$

$$= 60\% + 4.4/81$$

At this stage you know that the answer to the question lies between 60–70% (Since 4.4 is less than 10% of 81)

At this stage, you know that the answer to the calculation will be in the form:  $6a.bcde \dots$

All you need to do is find out the value of the missing digits.

In order to do this, calculate the percentage value of  $4.4/81$  through the normal process of multiplying the numerator by 100.

$$\text{Thus the \% value of } \frac{4.4}{81} = \frac{4.4 \times 100}{81} = \frac{440}{81}$$

[**Note :** Use the multiplication by 100, once you have the 10% range. This step reduces the decimal calculations.]

$$\text{Thus } \frac{440}{81} = 5\% \text{ with a remainder of } 35$$

Our answer is now refined to  $65.bcde$ . (1% range)

Next, in order to find the next digit (first one after the decimal add a zero to the remainder;

Hence, the value of ‘ $b$ ’ will be the quotient of

$$b \rightarrow 350/81 = 4 \text{ remainder } 26$$

Answer:  $65.4cde$  (0.1% range)

$$c \rightarrow 260/81 = 3 \text{ remainder } 17$$

Answer:  $65.43$  (0.01% range)

and so forth.

The advantages of this process are two fold:

- (1) You only calculate as long as you need to in order to eliminate the options. Thus, in case there was only a single option between 60–70% in the above question, you could have stopped your calculations right there.
- (2) This process allows you to go through with the calculations as long as you need to.

However, remember what I had advised you right at the start: Strong Addition skills are a primary requirement for using this method properly.

**To illustrate another example:**

What is the percentage value of the ratio  $\frac{223}{72}$ ?

$223/72 \rightarrow 300 - 310\% \text{ remainder } 7$

$700/72 \rightarrow 9.$  Hence  $309 - 310\%, \text{ remainder } 52$

$520/72 \rightarrow 7.$  Hence,  $309.7, \text{ remainder } 16$

$160/72 \rightarrow 2.$  Hence,  $309.72 \text{ remainder } 16$

Hence,  $309.7222$  (2 recurs since we enter an infinite loop of  $160/72$  calculations).

In my view, percentage rule (as I call it) is one of the best ways to calculate percentages since it gives you the flexibility to calculate the percentage value up to as many digits after decimals as you are required to and at the same time allows you to stop the moment you attain the required accuracy range.

## B. Percentage Change in a Product

### PCG applied to Product Change

Suppose you have a product of two variables say  $10 \times 10$ .

If the first variable changes to 11 and the second variable changes to 12, what will be the percentage change in the product? [Note there is a 10% increase in one part of the product and a 20% increase in the other part.]

The formula given for this situation goes as:  $(a + b + ab/100)$

$$\text{Hence, required \% change} = 10 + 20 + \frac{10 \times 20}{100}$$

(Where 10 and 20 are the respective percentage changes in the two parts of the product) (This is being taught as a shortcut at most institutes across the country currently.)

However, a much easier solution for this case can be visualized as:

$$100 \xrightarrow[+20]{20\% \uparrow} 120 \xrightarrow[+12]{10\% \uparrow} 132. \text{ Hence, the final product shows a 32\% increase.}$$

Similarly suppose  $10 \times 10 \times 10$  becomes  $11 \times 12 \times 13$

In such a case the following PCG will be used:

$$100 \xrightarrow[+30]{30\% \uparrow} 130 \xrightarrow[+26]{20\% \uparrow} 156 \xrightarrow[+15.6]{10\% \uparrow} 171.6$$

Hence, the final product sees a 71.6 percent increase

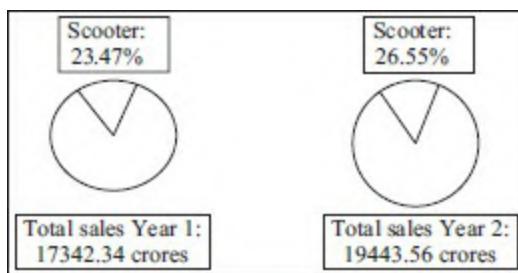
(Since, the product changes from 100 to 171.6)

**Note:** You will get the same result irrespective of the order in which you use the respective percentage changes.

Also note that this process is very similar to the one used for calculating successive percentage change.

### Application for DI:

Suppose you have two pie charts as follows:



If you are asked to calculate the percentage change in the sales revenue of scooters for the company from year one to year two, what would you do?

The formula for percentage change would give us:

$$\frac{(0.2655 \times 19443.56) - (0.2347 \times 17342.34)}{(0.2347 \times 17342.34)} \times 100$$

i.e.  $\frac{\text{New Sales Revenue} - \text{Original Sales Revenue}}{\text{Original Sales Revenue}} \times 100$

Obviously this calculation is easier said than done.

However, the Product change application of PCG allows us to execute this calculation with a lot of ease comparatively. Consider the following solution:

Product for year one is:  $0.2347 \times 17342.34$

Product for year two is:  $0.2655 \times 19443.56$

These can be approximated into:

$234 \times 173$  and  $265 \times 194$  respectively (Note that by moving into three digits we do not end up losing any accuracy. We have elaborated this point in the chapter on Ratio and Proportions.)

The overall percentage change depends on two individual percentage changes:

234 increases to 265: A % change of  $31/234 = 13.2\%$  approx. This calculation has to be done using the percentage rule for calculating the

percentage value of the ratio.

173 increases to 194 – A percentage change of approximately 12%.

Thus PCG will give the answer as follows:

$$100 \xrightarrow[+13.2]{13.2\% \uparrow} 113.2 \xrightarrow[+13.56]{12\% \uparrow} 126.76$$

Hence, 26.76 % increase in the product's value. (Note that the value on the calculator for the full calculation sans any approximations is 26.82 %, and given the fact that we have come extremely close to the answer—the method is good enough to solve the question with a reasonable degree of accuracy.)

## 4. Ratios

There are three essential situations that you repeatedly face with respect to ratios when you are doing data interpretation. These are:

1. Calculating the values for large ratios; Finding the ratio value for two very large ratios like: 41738876/94372258
2. Comparison of ratios: Comparing ratios and placing them in increasing order. For instance finding out how the ratios 45/52, 51/59, 57/65 and 63/71 are stacked when arranged in descending order.

In order to solve both these situations efficiently, the fundamental ratio concept to be utilized can be explained as below. Suppose, you have a situation where you have a ratio of 10/20. Let us say that you add 1 in the numerator and 2 in the denominator. What happens to the ratio? It becomes 11/22 and the value off 11/22 is equal to the value of 10/20. Why does this occur?? Because, the ratio of the additions in the numerator and the denominator is equal to the original ratio!! In such a case, the final ratio (in this case 11/22) would be equal to the original ratio (10/20). It would happen in all such cases and can be seen in the following:

$244/366 = 200/300$  because when we add 44 in the numerator and 66 in the denominator of 200/300, the ratio of the additions (44/66 in this case) is equal to the original ratio.

So, the first conclusion we draw is that if the ratio of the additions is equal to the original ratio, then the value of the new ratio is equal to the original ratio.

Once you have realized this, the next thing to understand is that if the

ratio of the additions in the numerator and the denominator is greater than the original ratio, the result would be that the new ratio would be greater than the original ratio. For instance:

To the ratio  $10/20$ , if we add 2 in the numerator and 3 in the denominator, the ratio would become  $12/23$ . We can easily see that  $12/23 > 10/20$ . The reason for the same is that  $2/3 > 10/20$  (i.e. the ratio of the additions to the numerator and denominator is greater than the original ratio).

Similarly, in case the ratio of the additions in the numerator and the denominator is smaller than the original ratio, the result would be that the new ratio would be smaller than the original ratio. For instance:

To the ratio  $10/20$ , if we add 2 in the numerator and 7 in the denominator, the ratio would become  $12/27$ . We can easily see that  $12/27 < 10/20$ . The reason for the same is that  $2/7 < 10/20$  (i.e. the ratio of the additions to the numerator and denominator is smaller than the original ratio).

This concept can be used in a certain way in order to handle both the above situations. Let us take a look at how we do so now one by one.

Calculating a ratio like:

$41738876/94372258$

The first thing you need to understand is that if the decimal value of the given 8 digit divided by 8 digit number is  $0.\text{abcdefg}$ , and change your calculation to a 3 digit divided by 3 digit calculation, you would by and large be marinating the accuracy of the answer in the first three digits. The following table shows you how much accuracy you lose if you start ignoring digits from the right while calculating such ratios.

| <i>Ratio</i>        | <i>Value</i> | <i>Answer reliable till</i>   |
|---------------------|--------------|---|
| $41738876/94372258$ | 0.44227908   |   |
| $4173887/9437225$   | 0.44227905   | 7 digits after decimal  |
| $417388/943722$     | 0.44227852   | 6 digits after decimal (the change in the 6 <sup>th</sup> digit after decimal is essentially a carry over change that has occurred due to the change in the 7 <sup>th</sup> digit after decimal in this case) |

|                 |             |   |
|-----------------|-------------|---|
| 41738/<br>94372 | 0.442270075 | 5 digits after decimal—Note that you have lost accuracy after 5 digits after decimal  |
| 4173/9437       | 0.44219561  | 4 digits after decimal—Note that you have lost accuracy after 4 digits after decimal.<br>Also note that the change in the 4 <sup>th</sup> digit of the answer is largely because of the carry over change from the 5 <sup>th</sup> digit of the answer. |
| 417/943         | 0.44220572  | The accuracy seems to be till 4 digits after decimal here, but actually this is accurate only till 3 digits after decimals. The fourth digit coming out to be correct has occurred accidentally.  |

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The point I am trying to make here is that you would never need to calculate anything more than 3 digits divided by 3 digits, even if you are faced with an 8 digit divided by 8 digit ratio.

Hence, when you are faced with the ratio 41738876/94372258, we need to just calculate the ratio 417/943. Or in the most challenging cases, you might have to go till 4173/9437. In order to do so, first calculate the percentage value of 41/94 (using the percentage rule explained above).

$$41/94 = 43.6\% \text{ approximately}$$

$$\text{Hence, the decimal value of } 41/94 = 0.436$$

But we are faced with a situation where we need to calculate 4173/9437.

The value of 4100/9400 would remain 0.436 and if we can adjust this answer for the last two digits we would get a very accurate answer.

The above ratio can be looked at as:

$$\frac{4100 + 73}{9400 + 37}$$

If this ratio had been such that the addition ratio had been equal to the original ratio, the answer of 0.436 would have been the correct value for this calculation. However the addition ratio will normally differ from the original ratio. The process for the adjustment for the value of the addition ratio can be done, by thinking as follows:

For a denominator addition of 37, if the numerator addition had been such

that the ratio of additions had been 0.436 in this case, the answer for the 4 digit ratio would have remained at 0.436. So, first try to see how much addition there should have been in the numerator, if the addition in the denominator of 37 had been fixed, so that there would be no change in the ratio necessitated.

**Think:**  $\frac{x}{37} = 43.6\%$  So  $x = ?$ . In order to find  $x$ , we can do an approximate back of the hand calculation and see that 43% of 37 is  $3.7 + 3.7 + 3.7 + 3.7 + 0.37 + 0.37 + 0.37 = 15.91$ . Thus, approximately, if the numerator addition had been 16, with a denominator addition of 37, there would be no need to change the ratio.

So we think as follows from here:

$$\frac{4100+16}{9400+37} = 0.436 \text{ (as no change would be necessitated in the answer)}$$

But we have to calculate:

$$\begin{aligned}\frac{4173}{9437} &= \frac{4116+57}{9437} = 0.436 + \frac{57}{9437} \\ &= 43.6\% + \text{the percentage value of } \frac{57}{9437}.\end{aligned}$$

The percentage value of  $57/9437$  can be seen as approximately 0.6 (since 9.4 added 6 times gets us close to 57).

Hence, the correct answer to  $\frac{4173}{9437} = 43.2\% = 0.432$ .

That's it!! The beauty of this process is that you have done nothing but two digit ratio calculations and got to the answer.

I would encourage you to practice this extensively as you are likely to face many such situations in your examination while solving data interpretation.

### Handling the Ratio Comparison Situation:

In any ratio comparison situation, we are faced with four fundamental situations.

1. Numerator increases, denominator decreases—The ratio would go down. You do not need any calculations to identify this.
2. Numerator decreases, denominator increases—The ratio would go up. Again, no calculations required.

3. Numerator increases, denominator increases.
4. Numerator decreases and denominator decreases

*Note that both of these are opposite cases to each other. So if you know how to do the Numerator increases, denominator increases ratio comparison case, you can do the Numerator decreases and denominator decreases case by just reversing the ratios. What I mean to say here is that if you are trying to compare 53/62 to 46/53—where both numerator and denominator are decreasing, you can compare 46/53 with 53/62—and look at it as a case of both numerator and denominator increasing.*

In this case, the numerator increase would increase the ratio, but the denominator decrease would decrease the ratio. Naturally, whether the ratio increases or decreases, would depend on how much force of change the numerator exerts vis-à-vis how much force of change the denominator is exerting.

In such a situation, we can use the logic of the ratio of the additions to compare two ratios. A little bit of practice in the following logic would show you that even in extremely close situations, finding which ratio is larger and which is smaller is normally a no-brainer.

Lets' see how: Suppose you are comparing 46/53 and 53/62.

The calculator will give you values of 0.8679 and 0.8548—values that are quite close to each other.

Using the additions in the ratio logic we see this situation as:

$$\frac{46+7}{53+9} = \frac{53}{62}$$

In this case, it can be easily seen that the value of 46/53 is above 80%, while the value of 7/9 being 77.77% is below 80%. Since, the ratio of the additions is smaller than the original ratio, the new ratio would be smaller.

This process is by far the best ratio comparison process available. I would encourage you to practice more of these in order to make sure that you make this your default thinking. Ratio comparisons is a repetitive theme in data interpretation and getting good at it will take you a long way in getting stronger at DI solving.

We will now move directly to looking at some traditional DI questions and trying to experience situations that DI throws at us and understanding how to think in such situations.

## 2

# How to Think in Traditional Data Interpretation

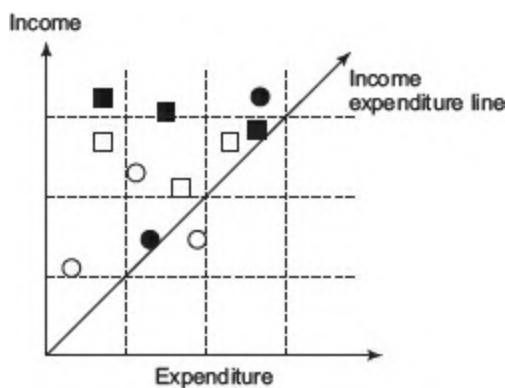
## **Directions for Questions 1 to 4:** (Set based on Averages)

Answer the questions on the basis of the information given below.

The data points in the figure below represent monthly income and expenditure data of individual members of the Ahuja family (■), the Bose family (□), the Coomar family (○), and the Dubey family (●). For these questions, savings is defined as

$$\text{Savings} = \text{Income} - \text{Expenditure}$$

(Your first focus after reading this text that introduces the table below is to note that inside the graph you would be looking at members of the four families marked with their respective signs.)

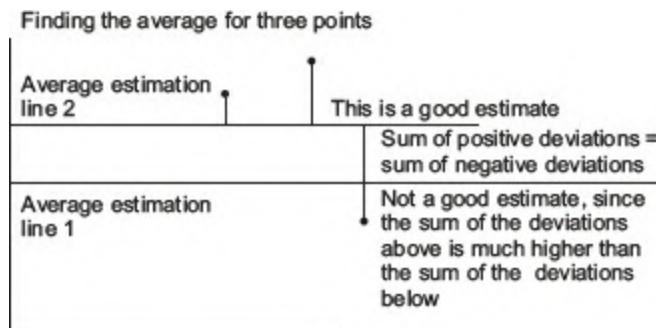
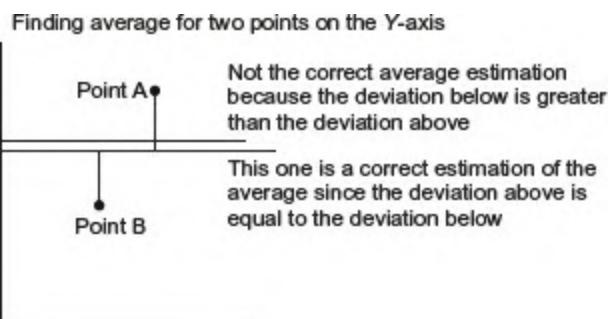


While ‘reading’ the graph, your focus should be on understanding the meaning of the points in the graph. The axes represent ‘Expenditure’ on the  $x$ -axis and ‘Income’ on the  $y$ -axis. As already mentioned in the text above, savings can be calculated for any individual using the equation: Savings =

Income – Expenditure. The other thing you need to understand is the significance of the Income = Expenditure line. Any point on that line obviously signifies Income and Expenditure being equal—hence zero savings. But what you need to also understand is that the points lying above this line would mean Income > Expenditure and hence positive savings. Likewise, a point on the graph that is below the Income = Expenditure line would represent negative savings since for these points Expenditure is greater than Income. Also, you need to be able to work out during your first glance at the graph that the vertical distance from the Income = Expenditure line would signify the savings for any individual. With this understanding you are now ready to face the questions that follow:

1. Which family has the lowest average income?
  - (a) Ahuja
  - (b) Bose
  - (c) Coomar
  - (d) Dubey

Average income can be estimated by visualizing a horizontal line that should be drawn for the members of a family, such that the sum of the vertical deviations for points above the line and the sum of the vertical deviations for points below the horizontal line should be equal.



*In this fashion, if you were to estimate the average incomes for each of the three families by estimating a horizontal line to signify the average income, you can easily visualize in the figure above that the average income would be least for the Coomar family.*

2. Which family has the highest average expenditure?

- (a) Ahuja
- (b) Bose
- (c) Coomar
- (d) Dubey

*The highest average expenditure can be estimated in the same way by visualizing a vertical line to signify the average—in this case the deviations would be to the right and the left of the vertical line, and the correct average estimation would be on the vertical line that has the sum of deviations to the right equal to the sum of deviations to the left. Clearly, the Dubey family has the highest average expenditure as it's estimated vertical line for the average expenditure would be to the right most, when it is compared to the estimated vertical lines of the other families.*

3. Which family has the lowest average savings?

- (a) Ahuja
- (b) Bose
- (c) Coomar
- (d) Dubey

*The savings is estimated by the vertical distance from the Income=Expenditure line. The average savings would be equal to the average vertical distance for all the members of any family. In the given figure it is clear that the average height from the I=E line is for the Dubey family.*

4. The highest amount of savings accrues to a member of which family?

- (a) Ahuja
- (b) Bose
- (c) Coomar
- (d) Dubey

*The savings is estimated by the vertical distance from the Income=Expenditure line. The maximum such distance is exhibited by a*

member of the Ahuja family.

**Directions for Questions 5 to 7:** (Set Based on Percentages and Ratios)

The questions based on the pie charts are given below:

Chart 1 shows the distribution of twelve million tons of crude oil transport through different modes over a specific period of time. Chart 2 shows the distribution of the cost of transporting this crude oil. The total cost was ₹ 30 million. (*The situation presented in this pie chart pair is one of the common uses of pie charts. The relationship between volume and value is that the ratio of value to volume would determine the value per unit volume—which would in effect represent the unit cost.*)

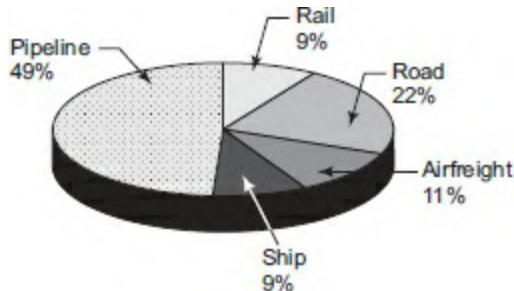


Chart 1

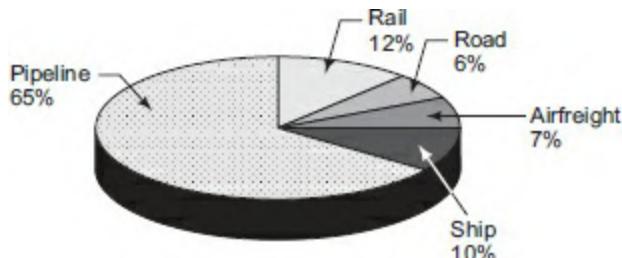


Chart 2

5. If the cost per ton of transport by ship, air and road are represented by  $P$ ,  $Q$  and  $R$  respectively, which of the following is true?
  - (a)  $R > Q > P$
  - (b)  $P > R > Q$
  - (c)  $P > Q > R$
  - (d)  $R > P > Q$

(The actual calculation for each of the three would have been:

Cost per ton by ship =  $\frac{10\% \text{ of } 30 \text{ million}}{9\% \text{ of } 12 \text{ million}} = \frac{0.1 \times 30 \text{ million}}{0.09 \times 12 \text{ million}}$ . If we had to work out the actual cost of transportation per ton for each of the modes of transport, this would have to be the calculation we would need to do.

Likewise the values for Air would be

$$= \frac{7\% \text{ of } 30 \text{ million}}{11\% \text{ of } 12 \text{ million}} = \frac{0.07 \times 30 \text{ million}}{0.11 \times 12 \text{ million}},$$

For road it would be

$$= \frac{6\% \text{ of } 30 \text{ million}}{22\% \text{ of } 12 \text{ million}} = \frac{0.06 \times 30 \text{ million}}{0.22 \times 12 \text{ million}}.$$

However, in this question, we do not need to find out the exact values for the cost per ton transported. The only calculation required in order to place in descending order the cost per ton transported by various means would be the ratio of the two percentages for that mode of transport. Thus, we just need to compare the ratio of percentages of value/volume for each of the three modes being asked for. The value/volume ratio is 10/9 for ship, 7/11 for air and 6/22 for road. The highest ratio is for ship > air > road. So it is  $P > Q > R$ . Option (c) is correct. Note that in this case, we do not need to consider the actual values of the total cost of goods transported or the total volume of the total crude transported.)

6. The cost in rupees per ton of oil moved by rails and road happens to be roughly
  - (a) 3
  - (b) 1.5
  - (c) 4.5
  - (d) 8

$Total \ value = 18\% \ of \ 30 \ million = 5.4 \ million. \ Total \ volume = 31\% \ of \ 12 \ million = 3.72 \ million. \ Approximately \ 1.5$

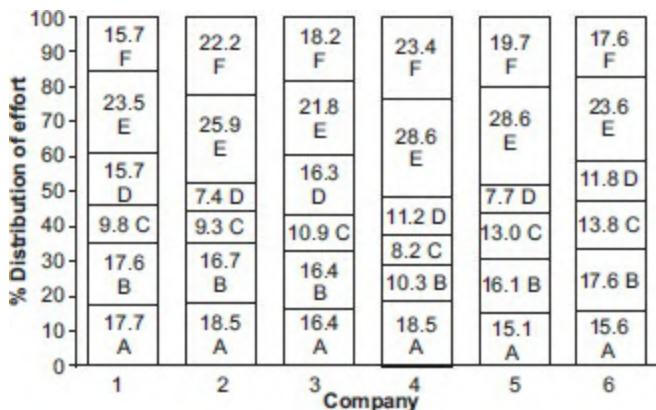
7. From the charts given, it appears that the cheapest mode of transport is:
  - (a) Road
  - (b) Rail
  - (c) Pipeline
  - (d) Ship

*Again we need to consider the least ratio for the value/volume. It is clearly for road at 6/22.*

**Directions for Questions 8 to 10:** (Set based on Percentages)

Answer these questions based on the data given below.

There are six companies, 1 through 6. All of these companies use six operations, A through F. The graph shows the distribution of efforts put in by each company in these six operations. (A quick glance at the bar chart below, shows us that the chart gives us the break down of 100% of effort, distributed between operations A through F. There is nothing more to do at this point than perhaps understand and make sense of a couple of values in the charts. So, what we could explain to ourselves before moving into the questions could be perhaps that a value like 15.7 means that for company 1, the effort in operation F is 15.7% of its' entire effort. With this understanding, you are now in a position to move onto the questions on the data.)



8. Suppose effort allocation is inter-changed between operations B and C, then C and D, and then D and E. (*The effect of this change is going to be that the effort in operation B would become the effort for operation E. Also the efforts of operation E would become the effort of operation D, D would become C and C would become B. In effect, the effort of B would go up by three levels, while the efforts of C, D and E would come down by one each.*) If companies are then ranked in ascending order of effort in operation E, (*We would need to just look at the ascending order of effort involved in operation B in the given chart. The ascending order would be 4, 5, 3, 1 and 6 tied and 2*) which

company would be at third rank (*Company 3 has ranked 3<sup>rd</sup>*)?

- (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
9. Suppose the companies find that they can remove operations *B*, *C* and *D* and re-distribute the effort released equally among the remaining operations. (*Releasing the efforts of B, C and D would mean that the sum of the efforts of B, C and D would be released and then the effort thus released is to be equally distributed amongst operations A, E and F. For instance for company 1, the effort released would be equal to  $17.6 + 9.8 + 15.7 = 43.1$ . When this effort is redistributed equally amongst A, E and F it would mean that the effort in A would become  $17.7 + 43.1/3 = 17.7 + 14.36 = 32.06$ . Similarly, effort in E would become  $23.5 + 14.36 = 38.16$  and effort in F would become  $15.7 + 14.36 = 30.06$ . Note that you might not do all these calculations at this point in time because you still have not been asked to do these calculations. You would just create the mental template of what has to be done at this point and move onto what the question has asked you to do.*) Then, which operation will show the maximum across all companies and all operations (*Given the options, you are just looking at which of the given operations would become the maximum. E for company 1, is 23.5, while it is 28.6 in each of 4 and 5. You can reject F for company 5—option ‘c’ because it is lower than E for company 5, the addition to both being the same?*)
- (a) Operation *E* in company 1
  - (b) Operation *E* in Company 4
  - (c) Operation *F* in company 5
  - (d) Operation *E* in company 5

*A quick glance at the numbers shows us that operation E in company 5, would get a larger allocation than operation E in company 4, since the value released in company 5 is greater than the operation released in company 4. So, the answer is either option (d) or option (a). E in company 5 =  $28.6 + 36.8/3 \approx 40$  to 41 which is higher than  $23.6 + 14.3 \approx 38$ .*

10. A new technology is introduced in company 4 such that the total effort for operations  $B$  through  $F$  gets evenly distributed among these. (*Equal distribution of effort for operations  $B$  through  $F$  would mean a redistribution of 81.5 in 5 equal parts. Thus, each operation  $B$  through  $F$  would become equal to  $81.5/5 = 16.3$ .*) What is the change in the percentage of effort in operation  $E$  (*The effort in operation  $E$  would go down from 28.6 to 16.3, a reduction of 12.3?*)?
- (a) Reduction of 12.3
  - (b) Increase of 12.3
  - (c) Reduction of 5.6
  - (d) Increase of 5.6

**Directions for Questions 11 to 15:** Set based on Averages

In a Class X Board examination, ten papers are distributed over five Groups—PCB, Mathematics, Social Science, Vernacular and English. Each of the ten papers is evaluated out of 100. The final score of a student is calculated in the following manner. First, the group scores are obtained by averaging marks in the papers within the Group. The final score is the simple average of the group scores. The data for the top ten students are presented below. (*A quick glance at the table gives us that the group score for any group being the simple average of the papers within the group—the group score for PCB would be obtained by dividing the total score in Physics, Chemistry and Biology by 3, while for Social Science, Vernacular and English groups it would be divided by 2, and for Mathematics group since the only paper is Mathematics itself, the score in that paper would itself be the group score for the Mathematics group*) (Dipan's score in English Paper II has been intentionally removed in the table.)

| Name of the student | PCB Group |       |      | Mathematics Group | Social Science Group |      | Vernacular Group |          | English Group |          | Final Score |
|---------------------|-----------|-------|------|-------------------|----------------------|------|------------------|----------|---------------|----------|-------------|
|                     | Phy.      | Chem. | Bio. |                   | Hist.                | Geo. | Paper I          | Paper II | Paper I       | Paper II |             |
| Ayesha (G)          | 98        | 96    | 97   | 98                | 95                   | 93   | 94               | 96       | 96            | 98       | 96.2        |
| Ram (B)             | 97        | 99    | 95   | 97                | 95                   | 96   | 94               | 94       | 96            | 98       | 96.1        |
| Dipan (B)           | 98        | 98    | 98   | 95                | 96                   | 95   | 96               | 94       | 96            | ??       | 96.0        |
| Sagnik (B)          | 97        | 98    | 99   | 96                | 96                   | 98   | 94               | 97       | 92            | 94       | 95.9        |
| Sanjiv (B)          | 95        | 96    | 97   | 98                | 97                   | 96   | 92               | 93       | 95            | 96       | 95.7        |
| Shreya (G)          | 96        | 89    | 85   | 100               | 97                   | 98   | 94               | 95       | 96            | 95       | 95.5        |
| Joseph (B)          | 90        | 94    | 98   | 100               | 94                   | 97   | 90               | 92       | 94            | 95       | 95.0        |
| Agni (B)            | 96        | 99    | 96   | 99                | 95                   | 96   | 82               | 93       | 92            | 93       | 94.3        |
| Pritam (B)          | 98        | 98    | 95   | 98                | 83                   | 95   | 90               | 93       | 94            | 94       | 93.9        |
| Tima (G)            | 96        | 98    | 97   | 99                | 85                   | 94   | 92               | 91       | 87            | 96       | 93.7        |

**Note:** B or G against the name of a student respectively indicates whether the student is a boy or a girl

11. How much did Dipan get in English Paper II? (*Dipan's final score is 96, which means that he has lost a total of 20 points out of 500 when his final score is calculated. If we go over the row in which Dipan's scores are mentioned we can easily see that since his average in PCB is 98, he has lost 2 points in PCB. In Mathematics he has lost 5 points, 4.5 points in Social science and 5 points in Vernacular. Thus, over the first four groups he has lost a total of 16.5 points. This means that he must have lost another 3.5 points in the English group. To lose 3.5 points in the English group, his group score viz. the average of Paper I and Paper II in English should be 96.5. Since he has scored 96 in Paper I, his score in Paper II would be 97 to get the required average. Note: I have also given you an alternate process for this situation in the discussion of the assumed average approach in the theory of this part.*)

- (a) 94
- (b) 96.5
- (c) 97
- (d) 98
- (e) 99

*Note this process of calculating points lost rather than points gained would have the effect of drastically reducing the calculations. So much so that it would actually make the whole solution to this problem*

*visual and mental, rather than one involving extensive calculations.*

12. Students who obtained group scores of at least 95 in every group are eligible to apply for a prize. Among those who are eligible, the student obtaining the highest group score in Social Science group is awarded this prize. The prize was awarded to:
- (a) Shreya
  - (b) Ram
  - (c) Ayesha
  - (d) Dipan
  - (e) no one from the top ten

*This question has to be solved visually again. A look through the vernacular group for the bottom 6 students in the table would show you that there is nobody eligible between Sanjiv to Tirna as they score less than 95 in the group score for the Vernacular group. Ram loses out because of the Vernacular group again, while Ayesha loses out because of the Social Science group where she is scoring only 94.*

13. Among the top ten students, how many boys scored at least 95 in at least one paper from each of the groups?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
  - (e) 5

*Ram fails because he does not score 95 in either paper of the Vernacular group. Sagnik, Agni and Pritam are not to be counted because of the English group where they have not scored 95 or more in any of the two papers. Joseph and Sanjiv are not to be counted because they have failed to score 95 or more in the Vernacular group. Only Dipan scores 95 in at least 1 paper in each group. So there is only 1 boy who satisfies this criteria. Option (a) is correct.*

14. Each of the ten students was allowed to improve his/her score in exactly one paper of choice with the objective of maximizing his/her final score. Everyone scored 100 in the paper in which he or she chose to improve. After that the topper among the ten students was:

- (a) Ram
- (b) Agni
- (c) Pritam
- (d) Ayesha
- (e) Dipan

*Looking through the options, we can see that the five names to be considered are Ram, Agni, Pritam, Dipan and Ayesha. In order to solve this question, you first need to understand the equation you are dealing with here. The correct equation of the Average score*

$$\begin{aligned}
 & \frac{\text{Physics} + \text{Chemistry} + \text{Biology}}{3} + \\
 & \frac{\text{Mathematics}}{1} + \\
 & \frac{\text{History} + \text{Geography}}{2} + \\
 & \frac{\text{Vern. Paper 1} + \text{Vern. Paper 2}}{2} + \\
 & \frac{\text{English Paper 1} + \text{Paper 2}}{2} \\
 = & \frac{2}{5}
 \end{aligned}$$

Now, from this equation, it is clear that if a student raises his/her score by 1 mark in any of the papers of the PCB group, it would mean an increment of  $1/15 = 0.06666$  in the final score. An increment of 1 mark in Mathematics would increase the final score of the student by  $1/5 = 0.2$  marks. In the same manner an increment of 1 mark in any of the papers of the other three groups would result in an increase of  $1/10 = 0.1$  in the final score.

With this understanding, if you were to check the five students one by one, you realize that for Ayesha, her maximum score improvement potential is available if she improves on her score in geography. Thus, Ayesha would increase her score to  $96.2 + 0.7 = 96.9$  by improving her geography score to 100 from 93. Likewise, Ram can increase his score to a maximum of  $96.1 + 0.6$  by either improving his Mathematics by 3 marks, or his score in any of the Vernacular group papers by 6 marks. In either case, his final score would go up by 0.6 to 96.7. Dipan on the other hand could improve

his score by 1, by improving his marks in Mathematics from 95 to 100. Thus, Dipan's final score would reach  $96 + 1 = 97$ . The other two students, Agni and Pritam would be able to reach—Agni =  $94.3 + 1.8 = 96.1$ , by improving Vernacular paper I to 100 from 82, Pritam =  $93.9 + 1.7 = 95.6$ , by improving History to 100 from 83. Thus, Dipan would be the new topper in this case, since his score of 97 would be the maximum amongst all students.

15. Had Joseph, Agni, Pritam and Tirna each obtained group score of 100 in the Social Science group, then their standing in decreasing order of final score would be:
- (a) Pritam, Joseph, Tirna, Agni
  - (b) Joseph, Tirna, Agni, Pritam
  - (c) Pritam, Agni, Tirna, Joseph
  - (d) Joseph, Tirna, Pritam, Agni
  - (e) Pritam, Tirna, Agni, Joseph

*By obtaining a score of 100 in Social Science group, Joseph would improve his final score to  $95 + 4.5/5 = 95 + 0.9 = 95.9$ . I would encourage you to work out why the change in his score would come to  $4.5/5$  in this case.*

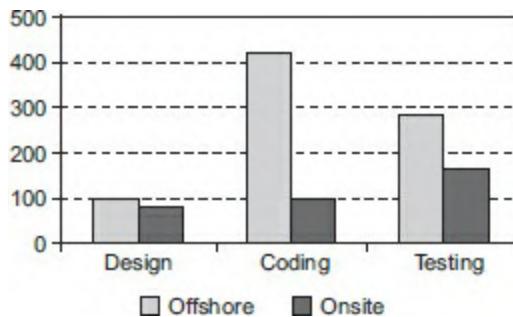
*For Agni, the score would be  $94.3 + 4.5/5 = 95.2$ ; For Pritam, it would be  $93.9 + 11/5 = 93.9 + 2.2 = 96.1$ ; For Tirna, it would be  $93.7 + 10.5/5 = 93.7 + 2.1 = 95.8$ . The required decreasing order would be Pritam, Joseph, Tirna and Agni. Option (a) is the correct answer here.*

### **Directions for Questions 16 to 21: (Set based on percentages)**

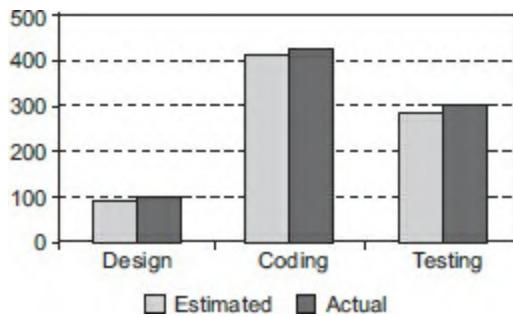
Answer these questions based on the two graphs. [Figure 1](#) shows the amount of work distribution, in man-hours for a software company between offshore and onsite activities. [Figure 2](#) shows the estimated and actual work effort involved in the different offshore activities in the same Company during the same period. (Note: Onsite refers to work performed at the customer's premise and offshore refers to work performed at the developer's premise)

*The first thing you should do for this question is to identify what the bar*

charts are telling you. The first bar chart, as mentioned in the text above, gives us the break up of the work in terms of man-hours, distributed between offshore and onsite activities. For instance, 410 man-hours of coding is done off-shore and 100 man-hours of coding is done onsite. The second bar chart tells us the estimated and actual man-hours of offshore activities for the software company. What you need to spot right at this time is that the value of the actual man-hours of design, coding and testing seen in the second bar chart, would be equal to the number of man-hours of coding in the first bar chart.



**Figure 1**



**Figure 2**

16. If 50 per cent of the offshore work were to be carried out onsite, with the distribution of effort between the tasks remaining the same, which of the following is true of all work carried out onsite? (You need to identify first that this question would be solved from the first bar chart. In order to make any conclusions about the number of man-hours of work carried out onsite after the shift of 50% offshore work to onsite, you would first need to transfer 50% of the offshore work to onsite for each of the activities of design, coding and testing. When you do that, the values would be: Onsite design =  $80 + 50 = 130$ ; Onsite coding =

$100 + 205 = 305$ ; *Onsite testing* =  $160 + 140 = 300$ . Note that we only estimate the fresh values of the onsite activities because the question is pointedly asking us about onsite activities only.)

- (a) The amount of coding done is greater than that of testing. (Can be seen to be just about correct. However, since you have only visual estimates of the individual values of the charts, you would need to be careful before you mark this as the correct answer. Move on to check the other options and ensure that they get rejected).
- (b) The amount of coding done onsite is less than that of design done onsite. (*Rejected*)
- (c) The amount of design carried out onsite is greater than that of testing. (*Rejected*)
- (d) The amount of testing carried out offshore is greater than that of total design. (*Rejected*)

Hence option (a) would be correct.

17. Roughly what percentage of total work is carried on site? (For this question, you would need to overlook the changes you made to the chart by shifting half the offshore to onsite for the previous question. You would just need to look at the amount of onsite activities total as a percentage of the total work as given in the first bar chart. Total offshore =  $100 + 410 + 280 = 790$ ; Total onsite =  $90 + 100 + 160 = 350$ . Percentage of work done onsite =  $350/1140 \approx 30$  per cent. Option (c) is correct.)

- (a) 40
- (b) 20
- (c) 30
- (d) 50

18. The total effort in hours onsite is nearest to which of the following? (From our calculations for the previous question, we know that the total effort in hours onsite = 350. We have to check which of the given options works out closest to 350 man-hours.)

- (a) Sum of estimated and actual effort for offshore design ( $100 + 90$ , not close enough to 350)
- (b) The estimated man-hours of offshore coding (around 400; better

*but we will need to see)*

- (c) The actual man-hours of offshore testing(280)
- (d) Half the no. of estimated man-hours of offshore coding (205)

*Looking at these values, we can clearly see that the closest to 350 is option (b).*

19. If the total working hours were 100 which of the following tasks will account for approx. 50 hours? (*We need to see which of the given options accounts for half the total hours. The total hours we have already calculated as  $790 + 350 = 1140$  in a previous question. We need to see which of the given options comes closest to half of 1140 i.e. 570*)
- (a) Coding (510)
  - (b) Design (190)
  - (c) Offshore testing (280)
  - (d) Offshore testing plus design (380)
- (Option (a)is correct).*
20. If 50 per cent of the offshore work is to be carried out onsite, with the distribution of effort between the tasks remaining the same, the percentage of testing carried out offshore would be (*Total testing =  $280 + 160 = 440$ ; After half the offshore testing is shifted onsite, we get offshore testing as 140 out of 440. This is closest to 30%. Option 2 is correct.*)
- (a) 40%
  - (b) 30%
  - (c) 50%
  - (d) 70%
21. Which of the work requires as many man-hours as that spent in coding? (*Total hours spent in coding =  $410 + 100 = 510$ . Offshore design and coding is clearly equal to the same value. Hence, option 1 is correct.*)
- (a) Offshore, design and coding
  - (b) Offshore coding
  - (c) Testing
  - (d) Offshore testing and coding.

**Directions for Questions 22 to 29:** (Set based on Ratios and Percentages)

Answer these questions based on the following table.

The following table shows the revenue and expenses in millions of Euros (European currency) associated. REPSOL YPF company's oil and gas activities in operations in different parts of the world for the year 1998–2000.

**REPSOL YPF'S Operations of Oil and Gas Producing Activities**

(Since there is no introductory text in this question, it is best to move straight to the table and understand the numbers given in the table. Note that in data heavy question sets, it is advisable to spend a bit of time—as much as required—to understand the data given in the table.)

|                                 | Year | Total World | Spain | North Africa and Middle East | Argentina | Rest of Latin America | Far East | North Sea | Rest of the world |
|---------------------------------|------|-------------|-------|------------------------------|-----------|-----------------------|----------|-----------|-------------------|
| Revenues                        | 1998 | 916         | 70    | 366                          | 281       | 34                    | 82       | 78        | 5                 |
|                                 | 1999 | 3374        | 55    | 666                          | 2006      | 115                   | 301      | 140       | 91                |
|                                 | 2000 | 8328        | 394   | 1290                         | 5539      | 482                   | 603      | 0         | 20                |
| Operating Costs                 | 1998 | 668         | 39    | 255                          | 187       | 57                    | 63       | 52        | 15                |
|                                 | 1999 | 1999        | 48    | 325                          | 1168      | 131                   | 204      | 65        | 58                |
|                                 | 2000 | 3709        | 43    | 530                          | 2540      | 252                   | 311      | 0         | 33                |
| Income before taxes and charges | 1998 | 248         | 31    | 111                          | 94        | —23                   | 19       | 26        | —10               |
|                                 | 1999 | 1375        | 7     | 341                          | 838       | —16                   | 97       | 75        | 33                |
|                                 | 2000 | 4619        | 351   | 760                          | 2999      | 230                   | 292      | 0         | —13               |
| Taxes and charges               | 1998 | 152         | 6     | 104                          | 33        | —3                    | 9        | 6         | —3                |
|                                 | 1999 | 561         | 3     | 169                          | 338       | —6                    | 39       | 21        | —3                |
|                                 | 2000 | 1845        | 126   | 404                          | 1150      | 61                    | 103      | 0         | 1                 |
| Income after taxes and charges  | 1998 | 96          | 25    | 7                            | 61        | —20                   | 10       | 20        | —7                |
|                                 | 1999 | 814         | 4     | 172                          | 500       | —10                   | 58       | 54        | 36                |
|                                 | 2000 | 2774        | 225   | 356                          | 1849      | —169                  | 189      | 0         | —14               |

**(Note on interpretation of the table:** First get a grip of what the rows are telling you, then look through the column headings anchoring your eyes and mind onto individual values in the table in order to understand the information given in the table. For instance, looking down the third column gives us a complete grip of the information in the table. 916 is the total revenues of the company in 1998. Looking further down we can make out that 668 is the operating cost and the subtraction of  $916 - 668 = 248$  is

*the value of the income before taxes and charges. Further, from 248 if you subtract taxes and charges (152)—you are left with 96 which is the value for income before taxes and charges in 1998. The other relationship you should be able to identify during the reading of the table is the fact that the total world revenue equals the sum of the revenues of the seven operations of the country).*

Based on the table above, answer the following questions:

22. How many operations (Spain, North Africa and Middle East...) of the company accounted for less than 5% of the total revenue earned in the year 1999? (*The first thing you should do to solve this is to calculate an approximate value of 5% of 3374  $\approx$  167–168. Naturally, we need to look for operations with revenues less than 167–168. Spain, Rest of Latin America, North Sea and Rest of the world are the four operations that satisfy this criterion.*)
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) none of these
23. How many operations (Spain, North Africa and Middle East...) of the company witnessed more than 200% revenue growth from the year 1999 to 2000? (*200% revenue growth means trebling of revenues. Looking at the relevant part of the table as shown below, we see that trebling of revenues is occurring in Spain and Rest of Latin America from 1999 to 2000. Hence, option (b) is correct.*)

---

| Year                                | 1999 | 2000 |
|-------------------------------------|------|------|
| <i>Total World</i>                  | 3374 | 8328 |
| <i>Spain</i>                        | 55   | 394  |
| <i>North Africa and Middle East</i> | 666  | 1290 |
| <i>Argentina</i>                    | 2006 | 5539 |
| <i>Rest of Latin America</i>        | 115  | 482  |

|                          |     |     |
|--------------------------|-----|-----|
| <i>Far East</i>          | 301 | 603 |
| <i>North Sea</i>         | 140 | 0   |
| <i>Rest of the world</i> | 91  | 20  |

- (a) 1  
 (b) 2  
 (c) 3  
 (d) none of these
24. How many operations registered a sustained yearly increase in income before taxes and charges from 1998 to 2000? (*The relevant part of the table to look at for this would be:*)

| Year                                | Income before taxes and charges |      |      |
|-------------------------------------|---------------------------------|------|------|
|                                     | 1998                            | 1999 | 2000 |
| <i>Total World</i>                  | 248                             | 1375 | 4619 |
| <i>Spain</i>                        | 31                              | 7    | 351  |
| <i>North Africa and Middle East</i> | 111                             | 341  | 760  |
| <i>Argentina</i>                    | 94                              | 838  | 2999 |
| <i>Rest of Latin America</i>        | —23                             | —16  | 230  |
| <i>Far East</i>                     | 19                              | 97   | 292  |
| <i>North Sea</i>                    | 26                              | 75   | 0    |
| <i>Rest of the world</i>            | —10                             | 33   | —13  |

*Sustained yearly increase from 1998 to 2000 is seen to occur in North Africa and Middle East, Argentina, Rest of Latin America and Far East. Option (b) is correct.)*

- (a) 3  
 (b) 4  
 (c) 5  
 (d) none of these
25. Ignoring the loss making operations of the company in 1998 (*We will need to ignore Rest of Latin America and Rest of the world for the purpose of this question*), for how many operations was the percentage increase in net income before taxes and charges higher than the

average from 1998 to 1999? (First create a benchmark value for the average percentage increase in net income before tax and charges from 1998 to 1999—The total world's percentage increase can be estimated in the form of the multiplier that has been applied on the 1998 value to get the 1999 value. When 248 has grown to 1375, the multiplier is approximately 5.5. In order to find the answer to this question, we need to look at the profit making operations for 1998 and see how many of those had a multiplier greater than 5.5. Only two operations come into the picture—with Argentina being comfortably higher than 5.5 ( $838/94$  – clearly above 7); while Far East at  $97/19$  would be comfortably below 5.5. Thus there is only one operation that satisfies this requirement. Option (b) is correct.)

- (a) 0
  - (b) 1
  - (c) 2
  - (d) none of these
26. If profitability is defined as the ratio of net income after taxes and charges to expenses, which of the following statements is true?
- (a) The Far East operations witnessed its highest profitability in 1998.
  - (b) The North Sea operations increased its profitability from 1998 to 1999.
  - (c) The operations in Argentina witnessed a decrease in profitability from 1998 to 1999.
  - (d) Both (b) and (c) are true.

The relevant aspects of the table to look at, is given below. This question moves into the domain of ratio comparisons. Testing the statement given in option ‘a’, we get that we need to compare the value of  $10/63$ —i.e. the profitability for 1998 and see whether it is the highest amongst the three years for the Far East. In 1999 itself, the profitability for this operation goes up to  $58/204$  and hence we can reject this option at this point itself. Testing the second option, we need to see whether the North Sea operations have indeed increased their profitability from 1998 to 1999? We observe from the table that the profitability ratio has gone up from  $20/52$  to  $54/65$ , which is a

definite increase. Thus, the statement of this option is correct. However, we cannot mark this as the answer since the 4<sup>th</sup> option talks about both (b) and (c) being true. Testing option (c), we see that the operations in Argentina went from a profitability ratio of 61/187 to 500/1168—i.e. from below 1/3 to above 1/3. This is not a decrease and hence this option is not true. Thus, we reject options (c) and (d) and choose option (b) as the correct answer.

|                                      | Year | Total<br>World | Spain | North Africa and<br>Middle East | Argentina | Rest of Latin<br>America | Far<br>East | North<br>Sea | Rest of the<br>world |
|--------------------------------------|------|----------------|-------|---------------------------------|-----------|--------------------------|-------------|--------------|----------------------|
| Operating<br>Costs                   | 1998 | 668            | 39    | 255                             | 187       | 57                       | 63          | 52           | 15                   |
|                                      | 1999 | 1999           | 48    | 325                             | 1168      | 131                      | 204         | 65           | 58                   |
|                                      | 2000 | 3709           | 43    | 530                             | 2540      | 252                      | 311         | 0            | 33                   |
| Income after<br>taxes and<br>charges | 1998 | 96             | 25    | 7                               | 61        | -20                      | 10          | 20           | -7                   |
|                                      | 1999 | 814            | 4     | 172                             | 500       | -10                      | 58          | 54           | 36                   |
|                                      | 2000 | 2774           | 225   | 356                             | 1849      | -169                     | 189         | 0            | -14                  |

27. In the year 2000, which among the following countries had the best profitability? (*The ratios to compare would be 356/550 (is <1 for North Africa and Middle East), 225/43 (is >5 for Spain), we can ignore Rest of Latin America and realise that Far East is again below 1 and hence does not challenge for the highest profitability. Option (b) is correct).*
- (a) North Africa and Middle East
  - (b) Spain
  - (c) Rest of Latin America
  - (d) Far East
28. If efficiency is defined as the ratio of revenue to expenses, which operation was the least efficient in the year 2000?
- (a) Spain
  - (b) Argentina
  - (c) Far East
  - (d) None of these

*The effective part of the table we need to look at for this question is given here. Since there is a ‘None of these’ option, it might be better not to look for individual values of the options in the table. Just move*

*to the table and create your own calculations for trying to find out the least efficient operation.*

|                 | Year | Total World | Spain | North Africa and Middle East | Argentina | Rest of Latin America | Far East | North Sea | Rest of the world |
|-----------------|------|-------------|-------|------------------------------|-----------|-----------------------|----------|-----------|-------------------|
| Revenues        | 2000 | 8328        | 394   | 1290                         | 5539      | 482                   | 603      | 0         | 20                |
| Operating Costs | 2000 | 3709        | 43    | 530                          | 2540      | 252                   | 311      | 0         | 33                |

*As you move into the table to check for the least efficient operation you start from left to right. Spain starts off at  $394/43 > 9$ , Middle East and Argentina at  $1290/530$  and  $5539/2540$  respectively are both  $> 2$ , Rest of Latin America and Far East both are  $> 1$ , while Rest of the World is  $< 1$  and hence is the least profitability. Option (d) is correct.*

29. Of the following statements which one is not true?
- (a) The operations in Spain had the best efficiency in 2000.
  - (b) The Far East operations witnessed an efficiency improvement from 1999 to 2000.
  - (c) The North Sea operations witnessed an efficiency improvement from 1998 to 1999.
  - (d) In the year 1998, the operations in Rest of Latin America were the least efficient.

*Looking at the options again, we realise that this question is also about efficiency. So we would need to look at only the relevant parts of the table viz. Revenues and Operating Costs*

*The relevant part of the table you need to look at for this question is given here:*

|                 | Year | Total World | Spain | North Africa and Middle East | Argentina | Rest of Latin America | Far East | North Sea | Rest of the world |
|-----------------|------|-------------|-------|------------------------------|-----------|-----------------------|----------|-----------|-------------------|
| Revenues        | 1998 | 916         | 70    | 366                          | 281       | 34                    | 82       | 78        | 5                 |
|                 | 1999 | 3374        | 55    | 666                          | 2006      | 115                   | 301      | 140       | 91                |
|                 | 2000 | 8328        | 394   | 1290                         | 5539      | 482                   | 603      | 0         | 20                |
| Operating Costs | 1998 | 668         | 39    | 255                          | 187       | 57                    | 63       | 52        | 15                |
|                 | 1999 | 1999        | 48    | 325                          | 1168      | 131                   | 204      | 65        | 58                |
|                 | 2000 | 3709        | 43    | 530                          | 2540      | 252                   | 311      | 0         | 33                |

*Statement 1, operations in Spain have the best efficiency in 2000, is clearly true. Remember, we are looking for what is not true. For Far East, efficiency in 1999 was  $301/204$ , while in 2000 it was  $603/311$ . While the first ratio is lower than 1.5, the second one is clearly quite close to 2, hence*

definitely above 1.5. Thus, there is indeed an efficiency improvement from 1999 to 2000 for the Far East. Testing statement in option (c), we see that the efficiency of the North Sea operation has gone from 78/52 to 140/65, which is clearly an improvement. This is also clearly true. Only option (d) is left as a feasible answer and hence must be the correct answer, in that the statement must be false. A quick check (though unnecessary here) reveals that the Rest of the World's efficiency in 1998 is much lower than for the Rest of Latin America. Hence, option (d) is not true and hence the correct answer.

### **Directions for Questions 30 to 33:** (Set based on Averages)

Bankatlal works  $x$  hours a day and rests  $y$  hours a day. This pattern continues for 1 week, with an exactly opposite pattern next week, and so on for four weeks. Every fifth week he has a different pattern. When he works longer than he rests, his wage per hour is twice what he earns per hour when he rests longer than he works. The following are his daily working hours for the weeks numbered 1 to 13.

|      | 1 <sup>st</sup> week | 5 <sup>th</sup> week | 9 <sup>th</sup> week | 13 <sup>th</sup> week |
|------|----------------------|----------------------|----------------------|-----------------------|
| Rest | 2                    | 3                    | 4                    | —                     |
| Work | 5                    | 7                    | 6                    | 8                     |

A week consists of six days and a month consists of 4 weeks.

(The data here is pretty simple to understand, the values of  $x$  and  $y$  are changing after every 4 weeks. Hence, there is nothing to be done in this case)

30. If Bankatlal is paid ₹ 20 per working hour in the 1st week, what is his salary for the 1<sup>st</sup> month?
- (a) ₹ 1760
  - (b) ₹ 1440
  - (c) ₹ 1320
  - (d) ₹ 1680

The first thing you should do in this situation is to make a table for the number of hours he has worked and rested each week, with the rates per hour mentioned along with. A suitable table to create is the most important decision while solving this question. The following tabular structure might be a good one to make for the first 4 weeks in order to solve the first question:

|                    | Week 1               | Week 2               | Week 3               | Week 4               |
|--------------------|----------------------|----------------------|----------------------|----------------------|
| Rest               | 2 hours              | 5                    | 2 hours              | 5                    |
| Work               | 5 hours              | 2                    | 5 hours              | 2                    |
| Total work hours   | $5 \times 6 = 30$    | $2 \times 6 = 12$    | $5 \times 6 = 30$    | $2 \times 6 = 12$    |
| Wage rate per hour | ₹ 20                 | ₹ 10                 | ₹ 20                 | ₹ 10                 |
| Total wages        | $30 \times 20 = 600$ | $12 \times 10 = 120$ | $30 \times 20 = 600$ | $12 \times 10 = 120$ |

The total wages earned in the first month = 1440. Option (b) is correct.

31. Referring to the data given in Q.54, Bankatlal's average monthly salary at the end of the first four months will be
- (a) ₹ 1780
  - (b) ₹ 2040
  - (c) ₹ 1830
  - (d) ₹ 1680

In the first month he has earned ₹ 1440. In the second month, he would earn  $7 \times 6 \times 20 = ₹ 840$  each in the 5<sup>th</sup> and 7<sup>th</sup> weeks, while he would earn  $3 \times 6 \times 10 = ₹ 180$  each in weeks 6 and 8. His total income in the second month would be 2040. In the third month his income would be  $2 \times 6 \times 6 \times 20 + 2 \times 4 \times 6 \times 10 = ₹ 1920$ . In the fourth month his income would be  $2 \times 8 \times 6 \times 20 = ₹ 1920$ . Thus, his average income for the four months would be given by:

$$\frac{1440 + 2040 + 1920 + 1920}{4} = 1830$$

Option (c) is correct.

32. The new manager Khushaldas stipulated that ₹ 5 be deducted for every hour of rest and ₹ 25 be paid per hour starting 9<sup>th</sup> week, then what will be the change in Bankatlal's salary for the 3<sup>rd</sup> month? (Hourly deductions are constant for all weeks starting 9<sup>th</sup> week)
- (a) ₹ 540
  - (b) ₹ 480
  - (c) ₹ 240
  - (d) ₹ 120

Bankatlal's salary under the new scheme for the third month would be:

$6 \times 6 \times 25 - 4 \times 6 \times 5 = ₹ 780$  each for weeks 9 and 11. Thus a total of

1560;

$4 \times 6 \times 25 - 6 \times 5 = \text{Rs} 420$  per week for weeks 10 and 12. Thus, his total earning for month 3 would be 2400. This is an increase of  $2400 - 1920 = \text{Rs} 480$  on his salary based on the earlier scheme of payment. Option (b) is correct.

33. Using the data in the previous questions, what will be the total earning of Bankatlal at the end of sixteen weeks.

- (a) Rs 7320
- (b) Rs 7800
- (c) Rs 8400
- (d) Rs 9600

His total income would be as follows:

Weeks 1 and 3:  $2 \times (5 \times 6 \times 25 - 2 \times 6 \times 5) = 1380$

Weeks 2 and 4:  $2 \times (2 \times 6 \times 25 - 5 \times 6 \times 5) = 300$

Weeks 5 and 7:  $2 \times (7 \times 6 \times 25 - 3 \times 6 \times 5) = 1920$

Weeks 6 and 8:  $2 \times (3 \times 6 \times 25 + 7 \times 6 \times 5) = 480$

Month 3, his income is Rs 2400 (as calculated for the previous question)

Month 4: Weeks 13 and 15:  $2 \times (8 \times 6 \times 25 - 0) = 2400$

Weeks 14 and 16: Negative income of  $2 \times 8 \times 6 \times 5 = 480$ .

Total income for the 4 months = Rs 8400.

**Directions for Questions 34 to 36:** Answer these questions with reference to the table given below:

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Information Technology Industry in India  
(Figures are in million US dollars)

|                          | 1994—<br>95 | 1995—<br>96 | 1996—97 | 1997—<br>98 | 1998—<br>99 |
|--------------------------|-------------|-------------|---------|-------------|-------------|
| Software<br>Domestic     | 350         | 490         | 670     | 950         | 1250        |
| Exports                  | 485         | 734         | 1083    | 1750        | 2650        |
| Hardware<br>Domestic     | 590         | 1037        | 1050    | 1205        | 1026        |
| Exports                  | 177         | 35          | 286     | 201         | 4           |
| Peripherals<br>Domestic  | 148         | 196         | 181     | 229         | 329         |
| Exports                  | 6           | 6           | 14      | 19          | 18          |
| Training                 | 107         | 143         | 185     | 263         | 302         |
| Maintenance              | 142         | 172         | 182     | 221         | 236         |
| Networking<br>and others | 36          | 73          | 156     | 193         | 237         |
| Total                    | 2041        | 2886        | 3807    | 5031        | 6052        |

34. The total annual exports lay between 35 and 40 per cent of the total annual business of the IT industry in the years

- (a) 1997–98 & 1994–95
- (b) 1996–97 & 1997–98
- (c) 1996–97 & 1998–99
- (d) 1996–97 & 1994–95

*Sol. (b) The requisite percentage range is occurring in the years 1996–97 and 1997–98. It is below 35% in the first two years, while in the last year (1998–99) it is above 40%.*

35. The highest percentage growth in the total IT business relative to the previous year was achieved in

- (a) 1995–96
- (b) 1996–97
- (c) 1997–98
- (d) 1998–99

*Sol. (a) 1995–96 exhibits a growth rate of over 40% (See this as 204 to 288 to 380 to 503 to 605). It is evident that the highest growth rate happens between 1994–95 to 1995–96.*

36. Which one of the following statements is correct?

- (a) The annual software exports steadily increased but annual hardware exports steadily declined during 1994–99.

- (b) The annual peripheral exports steadily increased during 1994–1999.
- (c) The business in training during 1994–1999 was higher than the total IT business in maintenance during the same period.
- (d) None of the above statements is true.

*Sol. (c) The statement in Option (c) is correct and can be verified by looking at the gap between the two values in every year and aggregating. Training vis-a-vis Maintenance would be – 35 – 29 + 3 + 42 + 66 a positive value.*

*Option (a) is wrong as hardware exports have not shown a steady decline over the period. Option (b) is wrong as peripheral exports cannot be said to have steadily increased during the period.*

**Directions for Questions 37 to 38:** For any activity, A, year X dominates year Y if IT business in activity A, in the year X, is greater than the IT business, in activity A, in the year Y. For any two IT business activities, A & B, year X dominates year Y if

- (i) the IT business in activity A, in the year X, is greater than or equal to the IT business, in activity A in the year Y,
- (ii) the IT business in activity B, in the year X, is greater than or equal to the IT business in activity B in the year Y and
- (iii) there should be strict inequality in the case of at least one activity.

37. For the hardware business activity which one of the following is not true?
- (a) 1997–98 dominated 1996–97
  - (b) 1997–98 dominated 1995–96
  - (c) 1997–98 dominated 1998–99
  - (d) None of these

*Sol. (d) Each of the first three options is seen as correct. Since we are looking for not true—the correct answer would be option (d).*

*Option (a) is true because 1997–98 (1406) dominates 1996–97 (1336)*

*Option 2 is true because 1997–98 (1406) dominates 1995–96 (1072)*

*Option (a) is true because 1997–98 (1406) dominates 1998–99 (1030)*

38. For the two IT business activities hardware and peripherals which one of the following is true?
- 1996–97 dominated 1995–96
  - 1998–99 dominates 1995–96
  - 1997–98 dominates 1998–99
  - None of these

*Sol. (d) In order to solve this question, the following tabular format might prove useful:*

|             | Column 1 | Column 2 | Column 3 | Column 4 | Column 5 |
|-------------|----------|----------|----------|----------|----------|
|             | 1994–95  | 1995–96  | 1996–97  | 1997–98  | 1998–99  |
| Hardware    | 767      | 1072     | 1336     | 1406     | 1030     |
| Peripherals | 154      | 202      | 195      | 248      | 347      |

*To test option (a), compare columns 3 and 1. The inequalities are  $1072 < 1336$  and  $202 > 195$ . So neither year dominates the other.*

*To test option (b), compare columns 5 and 2. The inequalities are  $1072 > 1030$  and  $202 < 347$ . So neither year dominates the other.*

*To test option (c), compare columns 4 and 5. The inequalities are  $1406 > 1030$  and  $248 < 347$ . So neither year dominates the other.*

*Thus, the correct answer is option (d). i.e. none of the given options is true.*

**Directions for Questions 39 to 43:** Answer these questions based on the data provided in the table below.

| Sector                      | Factories | Employment | Fixed capital | Gross output | Value added |
|-----------------------------|-----------|------------|---------------|--------------|-------------|
| Public                      | 7.0       | 27.7       | 43.2          | 25.8         | 30.8        |
| Central Govt.               | 1.0       | 10.5       | 17.5          | 12.7         | 14.1        |
| State/Local Govt.           | 5.2       | 16.2       | 24.3          | 11.6         | 14.9        |
| Central & State/Local Govt. | 0.8       | 1.0        | 1.4           | 1.5          | 1.8         |
| Joint                       | 1.8       | 5.1        | 6.8           | 8.4          | 8.1         |
| Wholly Private              | 90.3      | 64.6       | 46.8          | 63.8         | 58.7        |
| Others                      | 0.9       | 2.6        | 3.2           | 2.0          | 2.4         |
|                             | 100       | 100        | 100           | 100          | 100         |

39. Suppose the average employment level is 60 per factory. The average employment in wholly private factories is approximately:

- (a) 43
- (b) 47
- (c) 50
- (d) 54

*Sol. (a) The average employment per factory is Total employment/Total factories = x/y (say). This implies that, the average employment per factory in wholly private factories would be 0.646x/0.903y = approximately 0.7 times x/y. The closest answer is 43.*

40. Among the firms in different sectors value added per employee is highest in

- (a) Central government
- (b) Central and State/Local Governments
- (c) Joint sector
- (d) Wholly private

*Sol. (b) The required ratio is highest for Central and State/Local Government (1.8/1).*

41. Capital productivity is defined as the gross output value per rupee of fixed capital. The three sectors with the higher capital productivity arranged in descending order are:

- (a) Joint, Wholly private, Central and State/Local
- (b) Wholly private, Joint, Central and State/Local

- (c) Wholly private, Central and State/Local, Joint
- (d) Joint, Wholly private, Central.

*Sol. (b) We have to compare the ratios for Wholly private ( $63.8/46.8$ ), joint ( $8.4/6.8$ ) and Central and State Local ( $1.5/1.4$ ). In this context,  $63.8/46.8 > 8.4/6.8 > 1.5/1.4$*

42. A sector is considered “pareto efficient” if its value added per employee and its value added per rupee of fixed capital is higher than those of all other sectors. Based on the table data the pareto efficient sector is
  - (a) Wholly private
  - (b) Joint
  - (c) Central and state/local
  - (d) Others

*Sol. (c) Since we already know that the sector with the highest value added per employee is the Central and State/Local Government (From answering question 141), and we are in a situation where there are close ended options i.e. one of the 4 options has to be the correct answer, it follows that none of the options (a), (b) or (d) can be the pareto-efficient sector. Thus, we can choose option (c) as the answer to this question on the basis of this logic without calculating anything.*

43. The total value added in all sectors is estimated at ₹ 140,000 crore. Suppose that the number of firms in the joint sector is 2700. The average value added per factory in ₹ crore in the Central Government is
  - (a) 141
  - (b) 14.1
  - (c) 131
  - (d) 13.1

*Sol. (d) The number of factories in the Joint sector = 1.8% of the total number of factories = 2700. There must be 1,50,000 factories. This means that the number of factories in the Central Government is 1500 and the value added in Central Government factories is 14.1% of the total value added =  $0.141 \times 140000$  crore = 19740. Thus, value added per factory in this sector would be  $19740/1500 = 13.1$*

**Directions for Questions 44 to 49:** Answer these questions based on the tables given below.

There are six refineries, seven depots and nine districts. The refineries are BB, BC, BD, BE, BF and BG. The depots are AA, AB, AC, AD, AE, AF and AG. The districts are AAA, AAB, AAC, AAD, AAE, AAF, AAG, AAH, and AAI. **Table A** gives the cost of transporting one unit from refinery to depot. **Table B** gives the cost of transporting one unit from depot to a district.

Table A

|    | BB     | BC    | BD    | BE     | BF     | BG     |
|----|--------|-------|-------|--------|--------|--------|
| AA | 928.2  | 537.2 | 567.8 | 589.9  | 589.9  | 800.1  |
| AB | 311.1  | 596.7 | 885.7 | 759.9  | 759.9  | 793.9  |
| AC | 451.1  | 0     | 320.1 | 780.1  | 720.7  | 1000.1 |
| AD | 371.1  | 150.1 | 350.1 | 750.1  | 650.4  | 980.1  |
| AE | 1137.3 | 314.5 | 0     | 1157.7 | 1157.7 | 1023.4 |
| AF | 617.1  | 516.8 | 756.5 | 1065.9 | 1065.9 | 406.3  |
| AG | 644.3  | 299.2 | 537.2 | 1093.1 | 1093.1 | 623.9  |

Table B

|     | AA    | AB    | AC    | AD    | AE     | AF    | AG    |
|-----|-------|-------|-------|-------|--------|-------|-------|
| AAA | 562.7 | 843.2 | 314.5 | 889.1 | 0      | 754.8 | 537.2 |
| AAB | 532.7 | 803.2 | 284.5 | 790.5 | 95.2   | 659.6 | 442   |
| AAC | 500.7 | 780.2 | 0     | 457.3 | 205.7  | 549.1 | 331.5 |
| AAD | 232.9 | 362.1 | 286.2 | 275.4 | 523.6  | 525.3 | 673.2 |
| AAE | 345.1 | 268.6 | 316.2 | 163.2 | 555.9  | 413.1 | 227.8 |
| AAF | 450.1 | 644.3 | 346.2 | 372.3 | 933.3  | 402.9 | 379.1 |
| AAG | 654.5 | 0     | 596.7 | 222.7 | 885.7  | 387.6 | 348.5 |
| AAH | 804.1 | 149.6 | 627.2 | 360.4 | 1035.3 | 537.2 | 498.1 |
| AAI | 646   | 255   | 433.5 | 137.7 | 698.7  | 112.2 | 161.5 |

44. What is the least cost of sending one unit from any refinery to any district?
- (a) 95.2
  - (b) 0
  - (c) 205.7
  - (d) 284.5

*Sol. (b) BC-AC-AAC would cost 0. Hence, option (b) is the correct answer.*

45. What is the least cost of sending one unit from any refinery to district AAB?

- (a) 0
- (b) 284.5
- (c) 95.2
- (d) none of these

*Sol. (c) Looking first at the AAB row of the second table, it is clear that the least cost is 95.2 (through AE). Next looking at the AE row in the first column, it is clear that BD-AE is no cost. Hence, the least cost would be given by  $95.2 + 0 = 95.2$ .*

46. What is the least cost of sending one unit from refinery BB to any district?

- (a) 284.5
- (b) 311.1
- (c) 451.1
- (d) none of these

*Sol. (b) The least cost from BB to any depot is 311.1 and this is supplemented by AB to AAG which costs 0. Hence, the required answer is 311.1.*

47. What is the least cost of sending one unit from refinery BB to district AAA?

- (a) 765.6
- (b) 1137.3
- (c) 1154.3
- (d) none of these

*Sol. (a) Looking at the AAA row in the second Table and matching it with the BB column of the first table; adding the value of the column with the corresponding value of the row we would get BB-AC-AAA with the total cost of 765.6.*

48. How many possible ways are there for sending one unit from any refinery to any district?

- (a) 63
- (b) 42

- (c) 54
- (d) 378

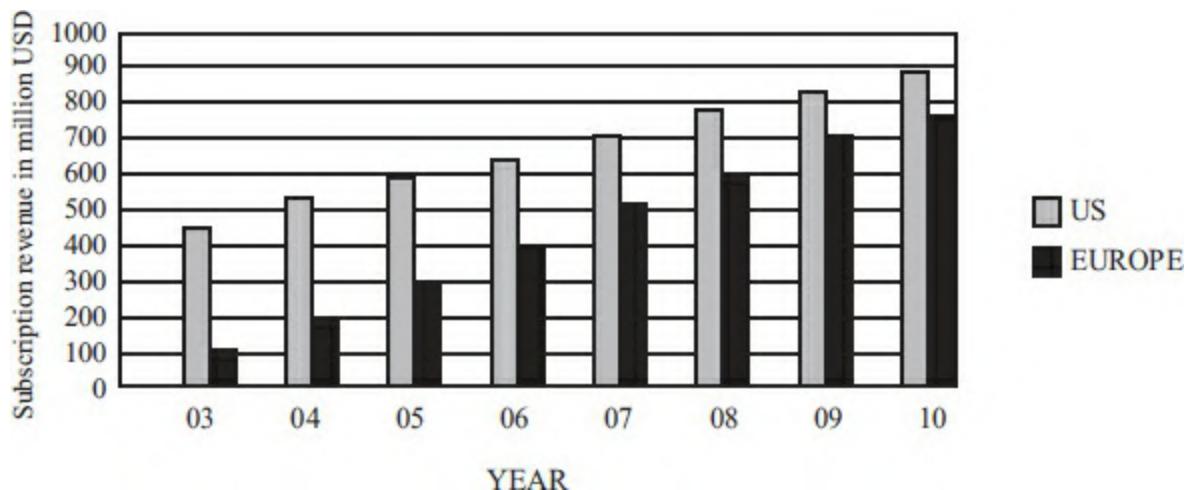
*Sol. (d) There are 6 refineries, 7 depots and 9 districts. Number of ways would be given by  $6 \times 7 \times 9 = 378$*

49. The highest cost of sending one unit from any refinery to any district is
- (a) 2172.6
  - (b) 2193.0
  - (c) 2091.0
  - (d) none of these

*Sol. (b) The maximum cost is the combination of the two highest costs—BF-AE-AAH which gives us 2193.*

**Directions for Questions 50 to 53:** Answer the following questions based on the information given below.

The bar chart below shows the revenue received, in million US Dollars (USD), from subscribers to a particular internet service. The data covers the period 2003–2007 for the United States (US) and Europe. The bar chart also shows the estimated revenues from subscription to this service for the period 2008–2010.



50. In 2003, 60 per cent of subscribers in Europe were men. Given that women subscribers increase at the rate of 10 per cent per annum and men at the rate of 5 per cent per annum, what is the approximate percentage growth of subscribers between 2003 and 2010 in Europe?

The subscription prices are volatile and may change each year.

- (a) 62
- (b) 15
- (c) 84
- (d) 78
- (e) 50

*Sol. (a)* In 2003,

60 men + 40 women

In 2008, men would go up by:

60  $\xrightarrow{5\% \uparrow}$   $\xrightarrow{5\% \uparrow}$

An increase of approximately 24.

[Note: For a detailed description of how to handle this calculation quickly, please go through compound interest in my book ‘QA for CAT’].

Also, 40 women would become

40  $\xrightarrow{10\% \uparrow}$   $\xrightarrow{10\% \uparrow}$

An increase of approximately 38.

Thus, the net percentage increase would be 62 per cent approximately (option (a)).

51. Consider the annual per cent change in the gap between subscription revenues in the US and Europe. What is the year in which the absolute value of this change is the highest?

- (a) 2003–04
- (b) 2005–06
- (c) 2006–07
- (d) 2008–09
- (e) 2009–10

*Sol. (d)* Visually this can be seen for 2008–09 (option (d)).

52. While the subscription in Europe has been growing steadily towards that of the US, the growth rate in Europe seems to be declining. Which of the following is closest to the per cent change in growth rate of 2007 (over 2006) relative to the growth rate of 2005 (over 2004)?

- (a) 17

- (b) 20
- (c) 35
- (d) 60
- (e) 100

*Sol. (c)* Growth rate in 2007  $\rightarrow$  380 to 5000 gives  $(120/500) \times 100 = 31\%$  approx

Growth rate in 2005  $\rightarrow$  180 to 270 gives  $(90/180) \times 100 = 50\%$

Percentage change from 50 to 31  $= (19/50) \times 100 = 35\%$  approx.

The closest value of the percentage change is 35% (option (c)).

53. The difference between the estimated subscription in Europe in 2008, and what it would have been if it were computed using the percentage growth rate of 2007 (over 2006), is closest to:

- (a) 50
- (b) 80
- (c) 20
- (d) 10
- (e) 0

*Sol. (a)* The growth rate in 2007 (as seen for the previous question) is around 31%.

With this growth rate, the value of European subscription would be approximately 650.

The actual prediction for 2008 is 600.

Thus, the closest option would be 50 (option (a)).

## PART 4

# DI Exercises (Without Options)

***Chapter 1***  
DI Exercises  
(Without options)

### In This Part You will Learn:

- What are the various question patterns and types in Data Interpretation. The questions you have encountered in Part 1 were exclusively based on single types of data representations while in this part you would come across multiple data representations used together to form DI question sets.
- To solve actual questions

based on question patterns used in exams and will also find out ways:

- To improve your interpretation of data
- To improve your anticipation of questions when you see data
- To improve your DI problem solving skills, and
- To improve your speed and understanding of DI questions.

### ***This Part Contains:***

- Various practice exercises without options
- Practice questions covering various question types asked in exams (like CAT, banking and other management and aptitude exams)

1. Try to solve each question set with a time limit of 1 minute per question. If you finish solving a set of questions within a time limit then in case there is/are question/s left, solve them till you get all the answers correct.
2. After you finish solving a question set, try to focus on thinking about additional data possibilities which could be added to the given data set (A note on this is attached after the first question set in this part).
3. Focus on learning through every question that you come across in this part. Remember that DI is a subject which is experientially learnt.

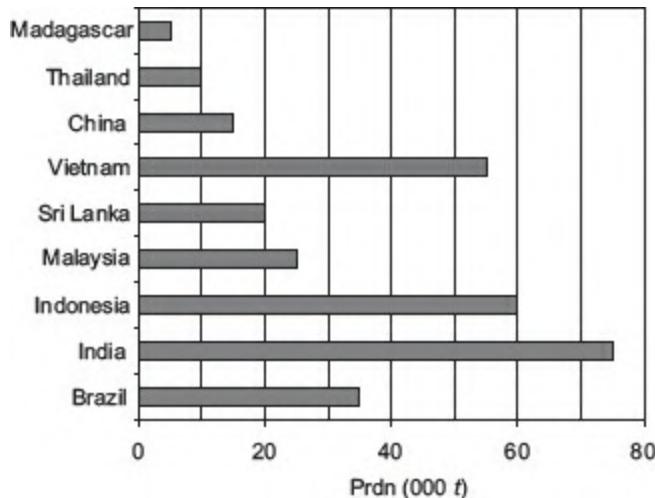
# 1

# DI Exercises (Without Options)

## EXERCISE

### I

The following bar chart (Figure 1.1) gives the information of the pepper production in nine countries of the world.



**Figure 1.1** Global Pepper Production (2004)

(Assume that there are only nine countries in the world which produce pepper.)

1. What percentage of the world's total pepper production in 2004 is contributed by India's pepper production in the same year?
2. What percentage of India's pepper production for the year is the total

production of Madagascar, Thailand, Sri Lanka and Malaysia?

3. If India's productivity of pepper production is twice that of Vietnam, find what percentage of the land used for pepper production in Vietnam is the land used for pepper production in India?
4. Arrange the nine countries according to the increasing order of their pepper production in 2004.
5. The production of Vietnam is how much more/less percentage than the production of each country. (Find all eight respective values.)
6. Find the percentage deviation from the average value of production per country for each of the nine countries. (Find all the nine respective values.)
7. Find the minimum difference between the pepper productions between any two countries.
8. Find the maximum difference between the pepper productions between any two countries.
9. The ratio of the maximum difference (Q.8) to the minimum difference (Q.7) is:
10. The minimum difference (Q.7) is what percentage of the maximum difference (Q.8).
11. Convert the data shown in the above bar chart into:
  - (a) A pie chart.
  - (b) A table.
  - (c) Write a paragraph which will capture the entire information.

**Note on Interpretation:** The information provided shows the production of pepper amongst the nine pepper producing countries of the world. Since these are the only countries which produce pepper in the world, we can add up the total production in these nine countries to get the overall world pepper production in 2004. [This information can also be presented in the form of a pie chart.] Note that in case there were more than 9 countries producing pepper, the production of the remaining countries could have been aggregated into one more bar below Brazil as Others. In such a case, the total world production would have been the addition of the ten figures in the chart (9 shown + Others).

## **Additional Data Possibilities to Link with the Given Data:**

1. The trend of global pepper production over a 5-year period could be shown on another bar, then the figure above would show the break-up for the year 2004 production.
  2. Area used for pepper production in each of these countries could be provided. This would help us estimate the productivity per unit area in each of the nine countries and compare it between each other and/or with global average productivity.
  3. Price of pepper in each of these countries—This would give us the estimate of the value of pepper production, which in turn can be linked to GDP of these countries.
- 

### **Task for Student**

Create additional information based on what is provided above and on whatever else you can imagine to link to the above bar chart, then try to create questions on these. Please do this for each and every graph/chart in this part of the book and also go ahead and follow this practice with all graphs and charts that you see in magazines and newspapers.

---

**Importance**—Improvement in scores in DI will occur in small invisible incremental steps. What is needed is that you follow a process that will develop your mind and help it solve questions faster. Doing the task prescribed above, will give you a clearer perspective of more complex data and will significantly improve the process of interpretation in your mind.

Furthermore, the task of creating questions on data provided/created will also help you get a perspective on the kind of questions that can be created on any given chart/diagram/graph. The end result would be that under strenuous examination conditions, you will be able to select the lesser complicated graphs more easily—thus saving time and ensuring better scores through avoiding the more complicated data sets (thus avoiding errors).

## II

Study the following table ([Table 1.1](#)) and answer the questions given below that.

---

**Table 1.1** Productivity of Oilseeds (kg/ha)

| Crop             | India | World | Highest productivity<br>in the world |
|------------------|-------|-------|--------------------------------------|
| Groundnut        | 913   | 1336  | 6075                                 |
| Rapeseed–mustard | 875   | 1543  | 6667                                 |
| Soybean          | 1008  | 2148  | 3571                                 |
| Sunflower        | 556   | 1247  | 2858                                 |
| Sesame           | 332   | 389   | 1175                                 |
| Castor           | 1221  | 1014  | 1221                                 |
| Sunflower        | 606   | 846   | 2250                                 |
| Linseed          | 344   | 858   | 2136                                 |

1. For which of the oilseeds categories does India show the highest productivity in the world?
2. In how many categories is India's productivity not more than 50 per cent of the world's productivity?
3. What percentage of the world's productivity is India's productivity in the groundnut category?
4. What percentage of the world's productivity is India's productivity in the sunflower category?
5. What percentage of the world's productivity is India's productivity in the linseed category?
6. What percentage of India's productivity is the world's productivity in castor?
7. In which of the oilseeds categories does India exhibit the lowest productivity in the world?
8. Find the percentage difference between India's productivity in the rapeseed-mustard category and the world's highest productivity in castor.
9. Find the percentage difference between India's productivity in the castor category and the world's highest productivity in the linseed

category.

10. Find the percentage difference between India's productivity in the sesame category and the weighted average of the world's highest productivity in castor and the world's highest productivity in sunflower.

**Note on Interpretation:** The data provided shows productivity of different crops in kg/hectare for India, for the whole world and for the country with the highest productivity in the world.

$$\text{Productivity is defined as} = \frac{\text{Production}}{\text{Area used for production}}$$

The world's total productivity comes from the world's total production and the total area used for production in the entire world.

The world's highest productivity is for a country whose name is undisclosed.

## Additional Data Possibilities

A table showing production in India, world's total production and the production in the country which shows the highest productivity in the world for each crop. This will lead to questions on area under production, ratios of area under production, apart from questions on production value comparisons.

## III

Study the following table ([Table 1.2](#)) and answer the questions given below that.

---

**Table 1.2** Area and Production of Important Spices in India (1999–2000)

| Spices           | Area (000 ha) | Production (000 t) |
|------------------|---------------|--------------------|
| Black pepper     | 192.3         | 58.3               |
| Cardamom (small) | 72.4          | 9.3                |

|                   |        |        |
|-------------------|--------|--------|
| Chilli            | 915.2  | 1018.0 |
| Ginger            | 77.6   | 263.2  |
| Turmeric          | 161.3  | 653.2  |
| Coriander         | 546.5  | 290.0  |
| Cumin             | 264.0  | 108.7  |
| Garlic            | 114.4  | 495.3  |
| Other seed spices | 84.7   | 99.4   |
| Tree spices       | 28.4   | 11.1   |
| Others            | 43.2   | 16.7   |
| Total             | 2500.0 | 3023.2 |

1. Which of the spices has the largest production in India?
2. Find out the productivity of black pepper in India.
3. For which of the spices, is the productivity in India the highest, (excluding others)?
4. For which of the spices, is the productivity in India the lowest, (excluding others)?
5. By what percentage is the maximum productivity of any spice more than that of all spices?
6. By what minimum percentage is the productivity of any spice less than that of all spices?
7. Find out the productivity of cardamom (small) in India.
8. Find out the productivity of coriander in India.
9. Find out the productivity of turmeric in India.
10. Find out the productivity of garlic in India.
11. Represent the above data as a line graph and as a set of pie charts.
12. Arrange the productivity and the area under production in increasing order excluding others.

**Note on Interpretation:** Production divided by area gives productivity in tonnes/hectare

$$\text{T/ha} * 1000 = \text{kg/ha}$$

Also if a conversion factor is provided between hectare and another unit of area measurement such as acre, sq. yard, sq. km, etc. then productivity would be measured in t/acre, t/sq yard, t/sq km or kg/acre, kg/sq yard, kg/sq km.

## **Additional Data Possibilities**

- (a) The trend of production and the areas under usage could be provided for any particular spice over a ten-year period.
- (b) An additional column of fertilizer used/ha would give us an idea of the total use of fertilizers. Similarly, other columns can be added like—man-hour / ha, price in ₹/tonne for each of the spices mentioned.

## **IV**

Study the following table ([Table 1.3](#)) and answer the questions following that.

---

**Table 1.3** Per cent Contribution of Select Crops in Total Food Grain Production of India

| <i>Year</i> | <i>Crop</i> | <i>Per cent contribution</i> |
|-------------|-------------|------------------------------|
| 1970        | Rice        | 39.45                        |
| 2000        |             | 42.79                        |
| 1970        | Wheat       | 22.02                        |
| 2000        |             | 34.83                        |
| 1970        | Coarse      |                              |
|             | Cereals     | 27.52                        |
| 2000        |             | 15.42                        |
| 1970        | Pulses      | 11.01                        |
| 2000        |             | 06.96                        |

Total food grain production in 1970 is equal to 2343.34 million tonnes.

Total food grain production in 2000 is equal to 3865.73 million tonnes.

1. Arrange the entire crop in the increasing order of their percentage point difference in the percentage contribution to total food grain production between 1970 and 2000.
2. Find the percentage increment in the production of rice during the given period.
3. Find the percentage increment in the production of wheat during the given period.
4. Find the percentage increment in the production of coarse cereals during the given period.
5. Find the percentage increment in the production of pulses during the given period.
6. The total production of rice and wheat in 1970 increased by what percentage during the given period?
7. Find the difference between the production of coarse cereals in 1970 and the production of wheat in 2000.
8. By what percentage has the difference between the production of coarse cereals and pulses in 1970 increased during the given period?
9. Find the difference between the production of pulses in 1970 and the production of rice in 2000.
10. Find the highest ratio between the production of any variety of food grain in 1970 to any variety of food grain in 2000.
11. Convert the data given in [table 1.3](#) into:
  - (a) A pie chart.
  - (b) A bar chart.
  - (c) Write a paragraph which will capture the entire information.

**Notes on Interpretation:** The data provides the percentage breakup of the food grain production in India in 1970 and 2000.

While it can be seen clearly that the proportion of rice and wheat has gone up, that of coarse cereals and pulses has come down. Understand that a conclusion about the absolute values of the production of each of these food grains, can only be drawn by using the additional data provided (total food grain production in 1970 and 2000).

# V

From the information given in Table 1.4, answer the questions following that.

1. Find the percentage growth in the quantity of the consumption during the entire period.
2. Find the total net increase in the quantity of the closing stock during the entire period.
3. During which year is the percentage growth of consumption the highest?
4. During which year is the percentage growth of consumption the lowest?
5. Find the quantity of production in 1993–1994.
6. Find the quantity of production in 1999–2000.
7. Find the percentage growth in the quantity of production during the entire period.
8. For which year is the ratio of export to import the maximum?
9. For which year is the ratio of export to import the minimum?
10. Find the difference between the quantity of export and the quantity of import over the entire period.
11. Convert the data shown in the above table into:
  - (a) A pie chart.
  - (b) A bar chart.

**Notes on Interpretation:** The availability of any commodity is defined as:

$$\text{opening stock} + \text{production} + \text{imports}.$$

The usage of any commodity occurs out of the availability and happens through:

consumption + exports + wastage.

The difference between availability and usage is reflected in the change in stock.

There can be two situations in this context:

1. Increase in stock—occurs when production + import is greater than consumption + exports + wastage

Decrease in stock—occurs when production + import is less than  
 2. consumption + exports + Wastage.

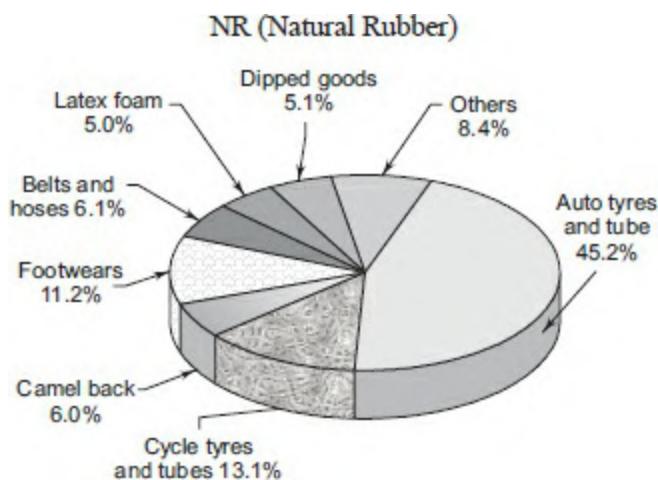
**Note:** In this case, the wastage has to be ignored, since it is not provided.

## VI

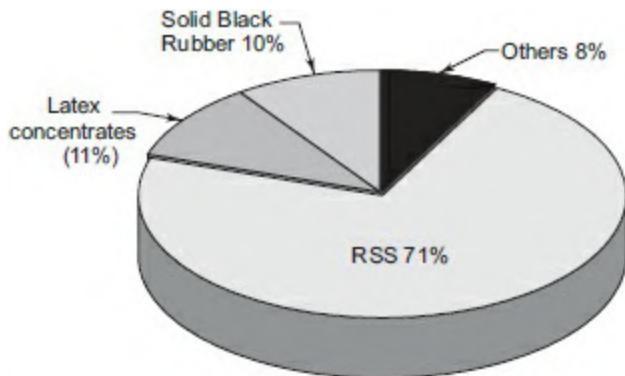
Study the following figure ([Figure 1.2](#)) and answer the questions given below that.

**Table 1.4** Data on Production and Consumption (Production + Import = Consumption + Export + Increase in Closing Stock)

| Year    | Consumption (tonnes) | Export (tonnes) | Import (tonnes) | Increase (Decrease) in Closing Stock (tonnes) |
|---------|----------------------|-----------------|-----------------|---|
| 1993–94 | 450,480              | 186             | 19,940          | 7015  |
| 1994–95 | 485,850              | 1,961           | 8,093           | (7465)  |
| 1995–96 | 525,465              | 1,130           | 51,635          | 33640   |
| 1996–97 | 561,765              | 1,598           | 19,770          | 4120  |
| 1997–98 | 571,820              | 1,415           | 32,070          | 39990   |
| 1998–99 | 591,545              | 1,840           | 29,534          | 40665   |
| 1999–00 | 628,110              | 5,989           | 20,207          | 4605  |
| 2000–01 | 631,475              | 13,356          | 8,572           | (8580)  |



**Figure 1.2** Consumption of Natural Rubber According to End-Products for the Year 2001  
 (Total Consumption: 120 mt)



**Figure 1.3** Natural Rubber Production in India for the Year 2001  
 (Total Production: 150 mt)

1. If natural rubber of the type RSS is capable of being consumed anywhere, then what is the least number of consumption modes which can be used to consume the entire RSS type natural rubber, that has been produced in the year 2001?
2. Solve Question 1 for Solid Black.
3. Solve Question 2 for Solid Black for the maximum number of consumption modes instead of for the minimum number of consumption modes.
4. Solve Question 1 for latex concentrates for the maximum number of consumption modes instead of for the minimum number of consumption modes.
5. Find the difference between the quantity of production of RSS natural rubber and latex concentrate natural rubber.
6. Find the difference between the quantity of natural rubber consumed for dipped goods and for latex foam.
7. Find the difference between the quantity of natural rubber consumed for footwear and for auto tyres and tubes.
8. Find the percentage increment in the production of RSS type Natural Rubber, if in the next year the production of natural rubber is equal to 200 mt and all other types of natural rubber have increased by exactly 10 per cent.
9. Find the percentage increment in the total consumption of natural rubber in the next year if the consumption of auto tyres and tubes and cycle tyres and tubes goes up by 20 per cent each next year. (Assume

that there is no change in the consumption in any other category.)

10. Find the average of production of all types of rubber in 2001.
11. Convert the data shown above into:
  - (a) table.
  - (b) bar charts.
  - (c) paragraph capturing the entire information.

**Notes on Interpretation:** The two pies shown typically represent the consumption and production of natural rubber in India for the year 2001. Both the figures are in M.T. Normally in such cases the value of the consumption and production is the same. However, in this case, it can be seen that such is not the case. The production is higher by 30 M.T. than the consumption. This can be interpreted to have gone into either increase in stock of natural rubber or in export or in other sectors. Since no information is available about either of these two, we cannot draw any definite conclusion.

## VII

Study the following tables ([Tables 1.5](#) and [1.6](#)) and answer the questions given below that.

[Table 1.5](#) shows the advertisement tariff plan of a national monthly magazine.

1. Find the difference between the cost of eight monthly full page black and white insertions booked every month and one annual full page black and white insertion (for 12 insertions).
2. Find the difference between the cost of 6 half page black and white insertions booked monthly and one half-year black and white insertion of full page.

We define percentage annual saving as the following:

Percentage annual saving

---

**Table 1.5** Advertisement Tariffs (Black and White)

| <i>Black &amp; White Advertisement</i> | <i>1 Monthly Insertion</i> | <i>3 Quarter Insertion</i> | <i>6 Half-year Insertion</i> | <i>12 Annual Insertion</i> |
|--|----------------------------|----------------------------|------------------------------|----------------------------|
| Full Page                              | 4000                       | $3500 \times 3$            | $3000 \times 6$              | $2500 \times 12$           |
| Half Page                              | 2500                       | $2000 \times 3$            | $1500 \times 6$              | $1250 \times 12$           |
| Quarter Page                           | 1000                       | $800 \times 3$             | $700 \times 6$               | $600 \times 12$            |
| Strip                                  | 400                        | $350 \times 3$             | $300 \times 6$               | $250 \times 12$            |

**Table 1.6** Advertisement Tariffs (Colour)

| <i>Colour Ad.</i>  | <i>Monthly Insertion</i> | <i>Quarter Insertion</i> | <i>Half-year Insertion</i> | <i>Annual Insertion</i> |
|--------------------|--------------------------|--------------------------|----------------------------|-------------------------|
| Inside Front Cover | 12000                    | $10000 \times 3$         | $8000 \times 6$            | $6000 \times 12$        |
| Inside Back Cover  | 10000                    | $8000 \times 3$          | $6000 \times 6$            | $5000 \times 12$        |
| Back Cover         | 12500                    | $11000 \times 3$         | $9500 \times 6$            | $7500 \times 12$        |
| Full Page          | 7000                     | $6000 \times 3$          | $5000 \times 6$            | $4000 \times 12$        |

$$\begin{aligned} & \text{(cost of 12 monthly insertions)} \\ & = \frac{-\text{Cost of one annual insertion} \times 100}{\text{Cost of 12 montly insertions}} \end{aligned}$$

Similarly there are percentage half-yearly savings and percentage quarterly savings which can be defined.

3. Find the percentage annual saving for a full page black and white advertisement.
4. Arrange in increasing order the percentage annual saving for different categories of black and white advertisements.
5. Arrange the percentage annual saving for different categories of colour advertisements in increasing order.
6. Find the percentage half-yearly savings for different sizes of black and white advertisements.
7. Find the percentage half-yearly saving for different sizes of colour advertisements.
8. Arrange the percentage quarterly saving for different categories of advertisements on black and white paper in ascending order.
9. Arrange the percentage quarterly saving for different categories of advertisements on colour paper.
10. Arrange the percentage quarterly saving for different categories of advertisements on both types of paper.
11. Convert the data shown in the above chart into a set of bar charts.

**Notes on Interpretation:** The data presented is typical of the advertisement tariffs of most newspapers and magazines. As can be clearly seen, the rate of an insertion depends upon:

- 1—The size of an advertisement;
- 2—The colour of the advertisement,
- 3—The number of times it is booked for,
- 4—The placement of the advertisement – (inside front, inside back, back cover, etc.)

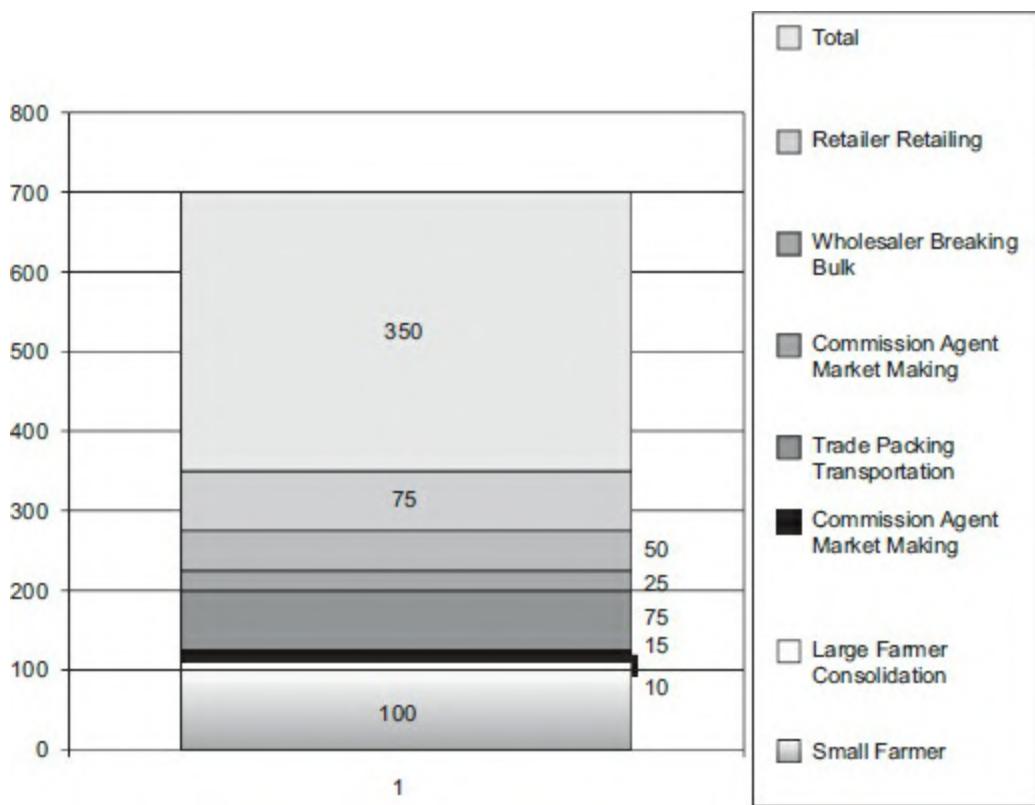
In general, if an advertiser books an advertisement for more number of times, it costs him less every time the advertisement is printed.

## VIII

Study the following figure ([Figure 1.4](#)) and answer the questions given below.

Figure 1.7 shows the distribution of ₹ 350 paid by the end customer to the retailer for one unit of fruits and vegetables. The distribution can be seen to be made to different categories of intermediaries and producers

1. The small farmer's share is what percentage of the price paid by the customer?
2. The total commission agents market making share is by what percentage less than the small farmer's share?
3. If the total value of the fruits and vegetables produced by the small farmer is ₹ 476,000 (measured in terms of the price received by the small farmer), then find the 'trade packing transportation making' cost on the fruits and vegetables.
4. The share of the retailer's retailing is by what percentage more/less than the total share of the commission agent market making in the entire marketing process?
5. The share of the wholesaler (wholesaler breaking bulk) is what percentage of the price paid by the customer?
6. The share of the trade packing transportation making is what percentage of the price paid by the customer?



**Figure 1.4** Intermediary Economics (Fruits & Vegetables)

7. The share of the retailer (retailer retailing) is what percentage of the price paid by the customer?

For the following Questions (8–12) assume that the money spent by the end customer on fruits and vegetables is ₹ 21,000 crore.

8. Find the amount, which the small farmers will receive.
9. Find the amount, which the retailers will receive.
10. Find the difference between the share of the wholesaler and the small farmer.
11. Find the percentage difference between the share of the wholesaler and the small farmer.
12. Convert the above data into:
  - (a) a pie chart.
  - (b) paragraph form that captures the entire data.

**Notes on Interpretation:** This chart is essentially all about interpretation. It shows the composition of ₹ 350 that the end user pays in terms of who gets

how much out of the same.

Thus, the interpretation is that while the small farmer gets ₹ 100, the large farmer gets ₹ 10 for consolidation, the commission agent gets ₹ 15 for his market making activities, ₹ 75 goes towards trade packing, another ₹ 25 to a second commission agent, for market making at the wholesaler's level, ₹ 50 goes to the wholesaler for breaking bulks into smaller lots and ₹ 75 goes to the retailer for his retailing activities.

## IX

Based on the data given below ([Table 1.7](#)) answer the questions following that.

---

**Table 1.7** Average Productivity of Select Vegetables in the World and India

| Vegetables     | World's average productivity (q/ha) | Productivity in India (q/ha) | Capacity of production (q/ha) |
|----------------|-------------------------------------|------------------------------|-------------------------------|
| Eggplant       | 127.30                              | 130.80                       | 500.00                        |
| Cabbage        | 216.20                              | 156.80                       | 450.00                        |
| Cauliflower    | 136.24                              | 147.00                       | 300.00                        |
| Chilli (green) | 8.292                               | 8.80                         | 70.00                         |
| Cucumber       | 145.12                              | 67.50                        | 130.00                        |
| Beans          | 68.83                               | 22.00                        | 80.00                         |
| Okra           | 143.57                              | 85.00                        | 200.00                        |
| Onion          | 137.96                              | 141.90                       | 400.00                        |
| Pea            | 60.83                               | 72.90                        | 150.00                        |
| Radish         | 123.45                              | 123.90                       | 250.00                        |
| Tomato         | 250.96                              | 156.00                       | 1000.00                       |

Define the following ratios:

$$\text{CP/PI Ratio} = \frac{\text{Capacity of Production}}{\text{Productivity in India}}$$

$$\text{CP/WP Ratio} = \frac{\text{Capacity of Production}}{\text{World's Average Productivity}}$$

1. Find the number of crops for which India's productivity is more than the world's average productivity.
2. The productivity of certain crops in India is greater than the world's

average productivity. For each of these crops, what is the percentage difference between the world's productivity and India's productivity?

3. The difference between the productivity of cabbage in India and in the world is:
4. For which crop is the CP/PI ratio the maximum?
5. For which crop is the CP/PI ratio the minimum?
6. For which crop is the CP/WP ratio the maximum?
7. For which crop is the CP/WP ratio the minimum?
8. The productivity of beans in India is what percentage of the world's average productivity of beans?
9. The productivity of tomatoes in India is what percentage of the world's average productivity of tomatoes?
10. The productivity of okra in India is what percentage of the world's average productivity of okra?
11. If beans production had occurred at it's capacity for production for the entire world, then what would have been the estimated increment in the production in terms of:
  - (a) absolute value increase?
  - (b) percentage increase?
12. Represent the data above in the form of a set of:
  - (a) bar charts.
  - (b) pie charts.
  - (c) line graph.

**Notes on Interpretation:** The average productivity of any vegetable is defined as the ratio of:

$$\frac{\text{Total Production in quintals}}{\text{Total area under Production}}$$

When these values are considered for the whole world, we get the world's average productivity.

When the same values are considered for India only, we get the productivity in India.

The capacity of production (defined in quintals / hectare) has to be interpreted as the maximum possible production per hectare of land.

[Normally this figure is what farmers and agriculturists should aspire for.]

We also need to realise that India's production as well as India's area under production are both parts of the overall world's production and area under production.

Besides, it should also be noted that if India's productivity is higher than the world's productivity then the productivity of the rest of the world will drop below that of the whole world's productivity.

The reverse will also be true.

## X

Study [Table 1.8](#) and answer these questions

Assume opening inventory = 20 lakh bales. Then closing inventory = opening inventory + production + import – consumption – export – wastage.

For the entire period assume the wastage to be zero,

1. Find the closing inventory for each period.
2. Find the difference between the closing inventories of consecutive periods.
3. Find the percentage growth of production of cotton from 1996–97 to 2000–01.
4. Find the average annual growth rate of production of cotton from 1995–96 to 2000–01.
5. Find the absolute increase in the consumption during the entire period.
6. Find the number of years for which the ratio of the import to the export is greater than 1.
7. Find the number of years for which the ratio of the production to the consumption is more than 1.5.
8. For which year is the percentage growth in the production the maximum?
9. For which year is the percentage change in the consumption the minimum?
10. For which category (amongst production, consumption, import, export) is the percentage growth during the entire period the maximum?

11. Find the total amount of consumption during the entire period.

**Table 1.8** Trend in Production, Consumption, Import and Export of Cotton for India

| Period      | National level trends (lakh bales of 170 kg each) |           |           |           |           |           |
|-------------|---|-----------|-----------|-----------|-----------|-----------|
|             | 1995–1996   | 1996–1997 | 1997–1998 | 1998–1999 | 1999–2000 | 2000–2001 |
| Production  | 167.45  | 178.70    | 158.00    | 165.00    | 156.00    | 146.00    |
| Consumption | 138.29  | 158.30    | 149.78    | 145.53    | 150.60    | 149.88    |
| Import      | 0.50  | 0.30      | 4.13      | 7.87      | 19.00     | 16.00     |
| Export      | 8.40  | 16.82     | 3.50      | 1.01      | 1.00      | 0.60      |

12. Represent the data above in the form of a set of:
- bar charts
  - pie charts
  - line graphs.

**Notes on Interpretation:** The concepts used in this question have already been explained in the question set XXI.

Besides, since wastage for the entire period shown is given as zero, we can use the formula:

Closing inventory = opening inventory + production + import – consumption – export.

[Note that there is no difference between closing inventory and closing stock i.e., they are the same.]

## XI

Study the following table (Table 1.9) and answer the questions given below that.

- What percentage of the unique visitors of [ford.com](http://ford.com) are the unique visitors of [carclub.com](http://carclub.com)?
- For which site is the number of unique visitors nearest to the average number of unique visitors?
- Of the sites given, what can be the maximum difference between the number of unique visitors of pool A and pool B if each of pool A and

pool B can contain any 5 distinct sites with no site common?

**Table 1.9** Top 10 Research-related Automotive Sites in the US

| Rank | Site           | Unique Visitors (in 000s) |
|------|----------------|---------------------------|
| 1    | KBB.com        | 2,402                     |
| 2    | CarPoint.com   | 2,144                     |
| 3    | AutoTrader.com | 1,792                     |
| 4    | Edmunds.com    | 1,421                     |
| 5    | Ford.com       | 1,300                     |
| 6    | Cars.com       | 1,192                     |
| 7    | EbayMotors.com | 1,156                     |
| 8    | CarClub.com    | 1,107                     |
| 9    | Autobytel.com  | 1,015                     |
| 10   | AutoWeb.com    | 930                       |

4. If the objective is to maximise the average unique visitors of all the sites by discarding any one site, then which site should be discarded?
5. How many sites contain more than three vowels in their name?
6. If all the sites names are taken together then what is the average number of letters per site (to the nearest integer)?

**Directions for Questions 7–11** Read the passage given below and solve the questions based on it.

A new kind of ranking system is devised to rank all the sites. According to this system, sorting is done by giving priority to the 1<sup>st</sup> letter of the site according to their occurrence in alphabet and then the number of unique visitors in descending order.

7. What will be the new rank of Cars.com?
8. Which site will be ranked 8<sup>th</sup>?
9. How many sites will have a change in their ranks when the new

system of ranking is adopted?

10. Which two companies show the maximum difference in the number of unique visitors?
11. The ratio of number of visitors between which two sites will be closest to 1 (& greater than 1)?

**Notes on Interpretation:** The popularity of web sites are often measured on the basis of parameters like number of clicks, number of page views, number of search requests, number of unique visitors etc. The ratio of the number of clicks to the number of unique visitors will give the number of times an average visitor accesses the site over a given time period.

The table given is low on complexity as the information is very limited.

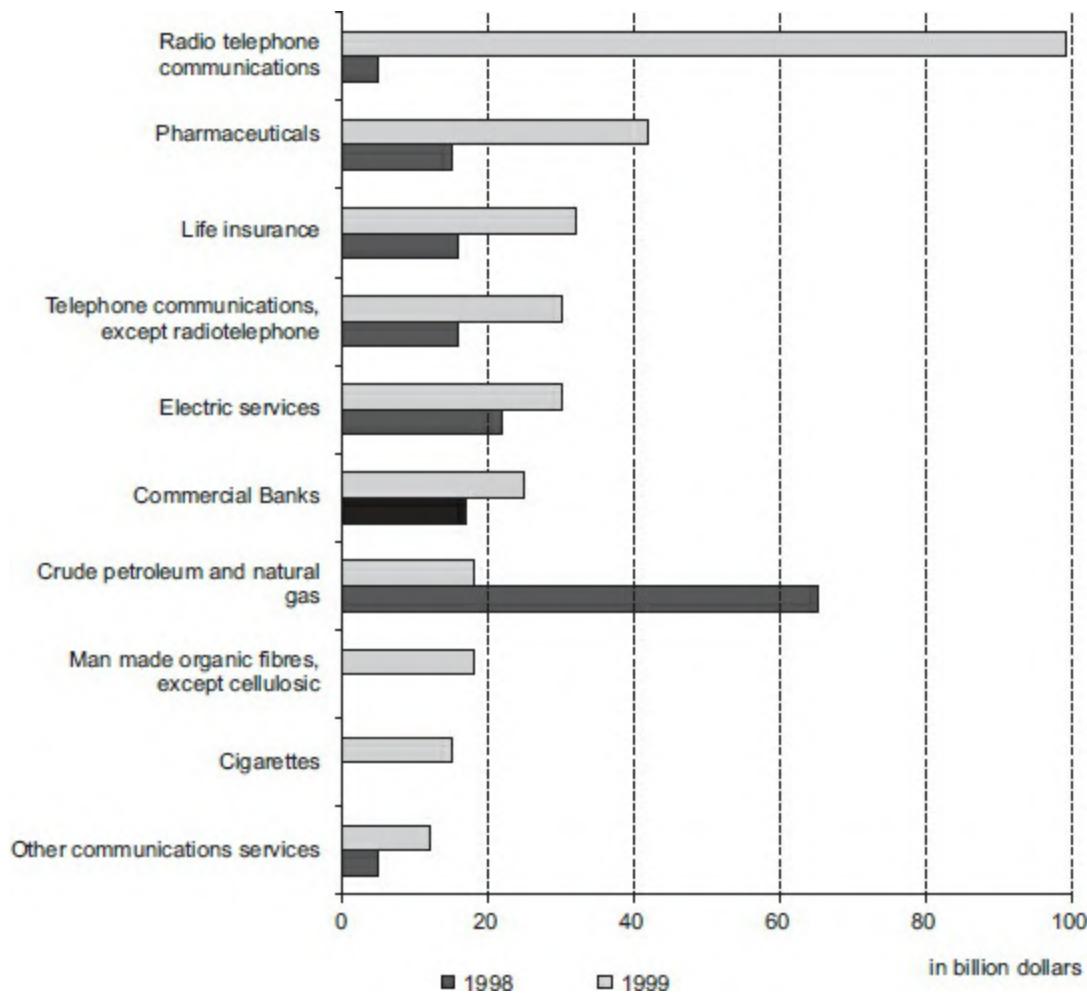
## XII

Study [Figure 1.15](#) and answer the following questions.

1. Which sector has witnessed the maximum percentage change in 1999 over 1998?
2. Which sector has witnessed the minimum percentage change in 1999 over 1998?
3. What is the difference (in billion \$) in between the total sales of 1998 and the total sales of 1999?
4. How many sectors have witnessed an increase in the sales in 1999 over the sales in 1998?
5. What is the average sales (in billion \$) in 1998 (consider all the sectors represented in 1998)? (approximately)
6. According to a new policy enforced in 1999, all kinds of communication are required to be put under one sector. What percentage of Pharmaceuticals sales in 1999 is the combined total sales of all kinds of communication in 1999?
7. What percentage of the life insurance sales in 1999 is the cigarette sales in 1999?
8. “Smoking is injurious to health.” And owing to this government imposed a blanket ban over the selling of cigarettes. By what

percentage will the total sales value decrease due to this in 1999?

9. If all the sectors are assigned the ranks on the basis of the total sales value in both the years in descending order, which sector will occupy the 5<sup>th</sup> position?
10. In the above question, what will be the rank of the “Crude Petroleum and natural gas” sector?



**Figure 1.5** Cross-Border M&A Sales

## XIII

**Table 1.10** Polaris vs Orbitech

|                   | (All figures in ₹ crore) |          |          |
|-------------------|--------------------------|----------|----------|
|                   | Polaris                  | Orbitech | Combined |
| Revenue           | 293.8                    | 321      | 614.8    |
| Net profit        | 58.86                    | 107      | 165.86   |
| Equity            | 25.59                    | 20       | 55       |
| Offshore Revenue: | 63:37                    | 85:15    | —        |
| Onsite Revenue    |                          |          |          |
| Products Revenue: | 2:98                     | 40:60    | —        |
| Services Revenue  |                          |          |          |
| Employee strength | 2544                     | 1256     | 3800     |

1. What is the revenue per employee of Polaris?
2. What is the difference between revenue per employee and profit per employee of Orbitech?
3. If the utilisation percentage is defined as the net profit as a percentage of revenue, then what is the utilisation percentage of Orbitech?
4. What is the value of the offshore revenue of Polaris?
5. What percentage of the total revenue of Orbitech is services revenue?
6. Which of the following is greater:
  - i. utilisation percentage of Polaris
  - ii. utilisation percentage of Orbitech.
7. What is the ratio of the combined revenue of both the companies to the total employee strength of both the companies?
8. Convert the above data into a set of pie and bar charts.

**Notes on Interpretation:** The table shows a typical comparison between two software companies and their business profile. The relevant interpretations based on this table are:

Revenue per employee and profit per employee—These are standard measures of company performance used to benchmark and compare the performance of different companies.

## XIV

Study [Table 1.11](#) and answer the questions given below that.

---

**Table 1.11** Power Rankings of Career Management Sites: Reach (Share) ×

Avg. Pages/Visitor = Power Rank

| <i>Sites pages/visitor</i> | <i>Reach</i> | <i>Average Pages/visitor</i> |
|----------------------------|--------------|------------------------------|
| Techies.com                | 0.2          | 6.0                          |
| Monster.com                | 7.3          | 31.1                         |
| Net-temps.com              | 0.6          | 7.5                          |
| Jobs.com                   | 0.4          | 5.6                          |
| Dice.com                   | 0.4          | 19.5                         |
| Nationjob.com              | 0.4          | 6.8                          |
| Headhunter.net             | 1.9          | 18.2                         |
| Careerbuilder              | 2.5          | 4.8                          |
| Compterjobs.com            | 0.3          | 17.2                         |
| Hotjobs                    | 4.5          | 7.6                          |
| Jobsonline.com             | 5.2          | 4.4                          |

1. Which company has the highest power rank?
2. What is the average reach per site?
3. If all the sites are ranked on the basis of power ranks, which site will be ranked 4<sup>th</sup>?
4. In the above question, what will be the rank of [dice.com](#)?
5. Which site is visited by the maximum number of visitors?
6. How many pages are visited at [nationjob.com](#)?
7. What percentage of the number of pages visited at careerbuilder is the number of pages visited at [jobsonline.com](#)?
8. What is the overall average number of pages visited at all the sites?
9. What is the difference in the number of pages visited at [jobs.com](#) and [techies.com](#)?
10. How many site names have starting and ending letters as consonants and at least two vowels in between them?

**Notes on Interpretation:** The interpretation of this table is self-explanatory. The higher the product of reach and average pages/visitor the higher will be

the power rank.

## XV

Based on the information given in [Table 1.12](#), answer these questions.

1. The states, which showed the following:
  - (a) Highest proposed employment per IEM filed.
  - (b) Lowest proposed investment per IEM filed.
  - (c) Highest proposed investment per IEM filed.
  - (d) The highest ratio of LOI in the total proposal.
2. How many states accounted for less than 5 per cent of the national total proposed investment figure?
3. How many states showed a ratio of proposed investment to the IEM's filed above the national average ratio?
4. What is the minimum number of states required to be taken into account in order to account for 80 per cent of the IEM proposals filed in the country?

---

**Table 1.12** State-wise Industrial Investment Proposals (August 1991–December 2000)

|                      | Total proposals |                      | Industrial Entrepreneur Memoranda (IEMs) |                     |                |                            |                               |
|----------------------|-----------------|----------------------|--|---------------------|----------------|----------------------------|-------------------------------|
|                      | (IEM + LOI)     | Numbers filed (IEMs) | Proposed investment (Numbers)            | Proposed Employment | Numbers Issued | Proposed Investment (₹ Cr) | Proposed Employment (Numbers) |
| Maharashtra          | 8854            | 8338                 | 197909                                   | 1471949             | 516            | 2315                       | 123669                        |
| Gujarat              | 5878            | 5464                 | 46458                                    | 889627              | 414            | 20148                      | 63116                         |
| Uttar Pradesh        | 4326            | 3966                 | 68740                                    | 632586              | 360            | 9919                       | 103100                        |
| Tamil Nadu           | 4278            | 3632                 | 54564                                    | 57539               | 646            | 10679                      | 119254                        |
| Andhra Pradesh       | 3032            | 2644                 | 59045                                    | 43225               | 388            | 10344                      | 758                           |
| Haryana              | 2724            | 2511                 | 27681                                    | 375756              | 213            | 4231                       | 60198                         |
| Madhya Pradesh       | 2441            | 2286                 | 63849                                    | 473144              | 155            | 3673                       | 33421                         |
| Rajasthan            | 2208            | 2113                 | 35117                                    | 295393              | 95             | 1621                       | 15368                         |
| Punjab               | 2125            | 1969                 | 36969                                    | 465700              | 156            | 4699                       | 50857                         |
| West Bengal          | 1899            | 1816                 | 30094                                    | 299029              | 83             | 3959                       | 18681                         |
| Karnataka            | 1732            | 1515                 | 36676                                    | 248836              | 217            | 9320                       | 69495                         |
| Dadra & Nagar Haveli | 1281            | 1256                 | 17436                                    | 141253              | 25             | 158                        | 2910                          |
| Daman & Diu          | 604             | 586                  | 3726                                     | 45221               | 18             | 72                         | 3405                          |
| Bihar                | 486             | 442                  | 13350                                    | 70628               | 44             | 1808                       | 15723                         |
| Kerala               | 481             | 426                  | 7462                                     | 67475               | 55             | 2513                       | 13447                         |
| Delhi                | 481             | 460                  | 6450                                     | 46711               | 21             | 30                         | 1652                          |
| Pondicherry          | 481             | 424                  | 5905                                     | 40326               | 17             | 1254                       | 2868                          |
| Himachal Pradesh     | 412             | 380                  | 8460                                     | 86366               | 32             | 476                        | 6140                          |
| Goa                  | 393             | 357                  | 5028                                     | 36033               | 36             | 5444                       | 3526                          |
| Orissa               | 326             | 289                  | 20135                                    | 103662              | 37             | 2430                       | 11882                         |
| Assam                | 119             | 108                  | 3596                                     | 16492               | 11             | 66                         | 4278                          |
| Jammu & Kashmir      | 80              | 76                   | 591                                      | 35276               | 4              | 5                          | 1705                          |
| Meghalaya            | 37              | 36                   | 372                                      | 4789                | 1              | 0                          | 62                            |
| Chandigarh           | 1               | 0                    | 433                                      | 5317                | 1              | 5                          | 9                             |
| Sikkim               | 12              | 1                    | 28                                       | 849                 | 0              | 0                          | 204                           |
| Andaman & Nicobar    | 9               | 9                    | 332                                      | 2610                | 4              | 1                          | 0                             |
| Arunachal Pradesh    | 7               | 3                    | 40                                       | 172                 | 1              | 0                          | 522                           |
| Nagaland             | 6               | 5                    | 158                                      | 972                 | 0              | 0                          | 0                             |
| Tripura              | 5               | 5                    | 1041                                     | 1372                | 0              | 0                          | 0                             |
| Lakshadweep          | 1               | 1                    | 4  | 278                 | 0              | 0                          | 0                             |
| Uttaranchal          | 1               | 1                    | 0  | 0                   | 0              | 0                          | 0                             |
| Jharkhand            | 0               | 0                    | 0  | 0                   | 0              | 0                          | 0                             |
| Mizoram              | 0               | 0                    | 0  | 0                   | 0              | 0                          | 0                             |
| Chattisgarh          | 0               | 0                    | 0  | 0                   | 0              | 0                          | 0                             |
| Manipur              | 0               | 0                    | 0  | 0                   | 0              | 0                          | 0                             |
| Total                | 44720           | 41119                | 751649                                   | 5958586             | 3550           | 95170                      | 726250                        |

## ANSWER KEY

# I

1. 25
2. 80%
3. 68.18%
4. Madagascar, Thailand, China,  
Sri Lanka, Malaysia, Brazil, Indonesia, Vietnam, India.
5. 1000% more than Vietnam  
450% more than Thailand,  
266.67% more than China.  
175% more than Sri Lanka,  
120% more than Malaysia.  
8.33% less than Indonesia,  
26.66% less than India  
57.14% more than Brazil
6. 85% less than for Madagascar,  
70% less for Thailand  
55% less for China, 65% more for Vietnam  
40% less for Sri Lanka 25% less for Malaysia  
80% more for Indonesia, 125% more for India.  
5% more for Brazil
7. 5000 t
8. 70,000 t
9. 14 : 1
10. 7.14%

# II

1. Castor
2. Soybean, Sunflowers (A).  
Linseed
3. 68.33%
4. 44.58%

- 5. 40.09%
- 6. 83.04%
- 7. Can't be determined
- 8. 39.54%
- 9. 74.93%
- 10. Can't be determined

### III

- 1. Chilli
- 2. 0.3031 t/ha
- 3. Garlic
- 4. Cardamon (small)
- 5. Can't be determined
- 6. Can't be determined
- 7. 0.125 t/ha
- 8. 0.530 t/ha
- 9. 4.049 t/ha
- 10. 4.329 t/ha
- 12. Can't be determined

### IV

- 1. Rice < Pulses < Coarse Cereals < Wheat
- 2. 78.92%
- 3. 160.92%
- 4. -7.57%
- 5. 4.27%
- 6. -27.23%
- 7. 701.85
- 8. -15.48%
- 9. 1396.13%
- 10. 3.435:1

## V

- 1. 40.17%
- 2. 113990
- 3. 1995–96
- 4. 2000–01
- 5. 437741
- 6. 618497
- 7. 43.39%
- 8. 2000–01
- 9. 1993–94
- 10. 162346

## VI

- 1. Six
- 2. One
- 3. Three
- 4. Three
- 5. 90 mt
- 6. 0.12 mt
- 7. 40.8 mt
- 8. 42.86%
- 9. 11.66%
- 10. Can't be determined

## VII

- 1. 2000
- 2. 3000
- 3. 37.5%
- 4. Full Page (37.5%) = Strip(37.5%) < Quarter page (40%) < Half page (50%)

5. 40% (Back Cover) < 42.85%  
 (Full Page) < 50% (Inside, Front Cover) = 50 (Inside Back Cover)
6. Full page → 25%  
 Half page → 40%  
 Quarter page → 30%  
 Strip → 25%
7. Inside Front Cover → 33.33%  
 Inside Back Cover → 40%  
 Back Cover → 24%  
 Full Page → 28.57%
8. 12.5% (Full Page) = 12.5%  
 (Strip) < 20% (Half Page) = 20%  
 (Quarter Page)
9. 12% (Back Cover) < 14.28%  
 (Full Page) < 16.66% (Inside  
 Front Cover) < 20% (Inside Back Cover)
10. 12% Back Cover Colour  
 12.5% Full Page B&W  
 12.5% Strip B&W  
 14.28% Full Page Colour  
 16.66% Inside Front Cover Colour  
 20% Inside Back Cover Colour  
 20% Half Page B&W  
 20% Quarter Page B&W

## VIII

1. 28.57%
2. 60%
3. ₦ 10,2000
4. 87.5%
5. 14.28%
6. 21.42%

- 7.** 21.42%
- 8.** ₹ 6000 Cr.
- 9.** ₹ 4500 Cr.
- 10.** ₹ 3000 Cr.
- 11.** 100%

## IX

- 1.** Six
- 2.** Eggplant                            2.74%
  - Cauliflower                            7.89%
  - Chilli                                    6.12%
  - Onion                                    2.85%
  - Pea                                        19.84%
  - Radish                                    0.36%
- 3.** 59.4 g/ha
- 4.** Chilli (green)
- 5.** Cucumber
- 6.** Chilli (green)
- 7.** Cucumber
- 8.** 31.96%
- 9.** 62.16%
- 10.** 59.20%
- 11.** (a) Cannot be determined      (b) 16.22%

## X

- 1.** 41.26, 45.14, 53.99, 80.32, 103.72, 115.24
- 2.** 3.88, 8.85, 26.33, 23.4, 11.52
- 3.** -18.3%
- 4.** -2.7%
- 5.** 11.59
- 6.** Four

7. Zero
8. 1996–97
9. 2000–01
10. Import
11. 892.38

## XI

1. 85.15%
2. Edmunds.com
3. 3659
4. Autoweb.com
5. 5
6. 10
7. 5th
8. EbayMotors.com
9. 10
10. KBB.com and Autoweb.com
11. Cars.com & EbayMotors.com

## XII

1. Radio Telephone Communication
2. Electric Services
3. 149
4. 9
5. 20.125
6. 331% approx.
7. 50% approx.
8. 5% approx.
9. Life Insurance
10. 2nd

## XIII

1. Rs. 11.54 lakh
2. Rs. 17.03 lakh
3. 33.33%
4. 185.09 crore
5. 60%
6. ii
7. 0.043

## XIV

1. Monster.com
2. 2.15
3. Jobsonline.com
4. 6th
5. Can't be determined
6. Can't be determined
7. Can't be determined
8. Can't be determined
9. Can't be determined
10. 11

## XV

1. (a) Sikkim  
(b) Uttaranchal  
(c) Tripura  
(d) Chandigarh
2. 29
3. 11
4. 10

## SOLUTIONS

### I

1. World's total pepper production in 2004 =  $5 + 10 + 15 + 55 + 20 + 25 + 60 + 75 + 35 = 300$  (thousand tones)

India's pepper production in 2004 = 75 (thousand tones)

$$\text{Percentage contribution of India in world's total pepper production in 2004} = \frac{75}{300} \times 100 = 25\%$$

2. India's pepper production in 2004 = 75 (thousand tones)

Total production of Madagascar, Thailand, Sri Lanka and Malaysia =  $5 + 10 + 20 + 25 = 60$  (thousands tones)

$$\text{Required percentage} = \frac{60}{75} \times 100 = 80\%.$$

3. Productivity = Total Production/Total land area

Let the land area of India and Vietnam are 'I' and 'V' respectively.

$$\text{Productivity of India} = 75/I$$

$$\text{Productivity of Vietnam} = 55/V$$

$$\text{According to the question: } \frac{75}{I} = 2 \times \frac{55}{V}$$

$$I/V = 75/110 = 15/22$$

$$\text{Required percentage} = 15/22 \times 100 = 68.18\%$$

4. From the graph it is evident that: Madagascar < Thailand < China < Sri Lanka < Malaysia < Brazil < Vietnam < Indonesia < India

5. Let's calculate the required quantity for each country one by one.

1. Madagascar:  $\frac{55-5}{5} \times 100 = \frac{50}{5} \times 100 = 1000\% \text{ more}$
2. Thailand:  $\frac{55-10}{10} \times 100 = \frac{45}{10} \times 100 = 450\% \text{ more}$
3. China:  $\frac{55-15}{15} \times 100 = \frac{40}{15} \times 100 = 266.67\% \text{ more}$
4. Sri Lanka:  $\frac{55-20}{20} \times 100 = 175\% \text{ more}$
5. Malaysia:  $\frac{55-25}{25} \times 100 = \frac{30}{25} \times 100 = 120\% \text{ more}$
6. Indonesia:  $\frac{55-60}{60} \times 100 = -\frac{5}{60} \times 100 = -8.33\% \text{ (less)}$
7. India:  $\frac{55-75}{75} \times 100 = -26.66\% \text{ (less)}$
8. Brazil:  $\frac{55-35}{35} \times 100 = \frac{20}{35} \times 100 = 57.14\% \text{ more}$
6. Average production =  $\frac{5+10+15+55+20+25+60+75+35}{9} = \frac{300}{9} = \frac{100}{3} = 33.333333$

| Country    | Percentage Deviation from average production |
|------------|--|
| Madagascar | $\frac{5-33.33}{33.33} \times 100 = -85\%$   |
| Thailand   | $\frac{20-33.33}{33.33} \times 100 = -70\%$  |
| China      | $\frac{15-33.33}{15} \times 100 = -55\%$     |
| Vietnam    | $\frac{55-33.33}{33.33} \times 100 = 65\%$   |
| Sri Lanka  | $\frac{20-33.33}{33.33} \times 100 = -40\%$  |
| Malaysia   | $\frac{25-33.33}{33.33} \times 100 = -25\%$  |
| Indonesia  | $\frac{60-33.33}{33.33} \times 100 = 80\%$   |
| India      | $\frac{75-33.33}{33.33} \times 100 = 125\%$  |
| Brazil     | $\frac{35-33.33}{33.33} \times 100 = 5\%$    |

7. Minimum difference in pepper production between two countries = 5 (000 t), which is between Madagascar and Thailand and between Sri Lanka and Malaysia.
8. From the given bar chart it is clear that maximum difference in the

pepper production is between India and Madagascar, which is 7000t.

9. Maximum difference is between Madagascar and India, which is equal to  $75 - 5 = 70$  (in thousand tones)

Required ratio =  $70 : 5 = 14 : 1$ .

10. Required percentage =  $\frac{5}{70} \times 100 = 7.14\%$

## II

1. India shows the highest production in the world for Castor.

2. For Groundnuts the productivity of world = 1336

$50\% \text{ of } 1336 = 668 \text{ kg/ha}$

Hence, India's productivity is more than that of 50% of the productivity of the world.

Similarly check for the other options but we don't have any need to calculate the exact 50% of the total production.

For example for Soybean the productivity of world = 2148 (000 tones).

If India's productivity is less than 50% of 2100 then it must be less than 50% of 2148 (000 tones).

$50\% \text{ of } 2100 = 1050$  (000 tones). Since, India's productivity is only 1008, the condition is met for Soybean.

Similarly check for the other options. We get that for three seeds (Soybean, Sunflower and Linseed) the productivity of India is not more than 50% of the world's productivity.

3. Required productivity =  $\frac{\text{India's productivity in groundnut category}}{\text{World's productivity in Groundnut category}} \times 100 = \frac{913}{1336} \times 100 = 68.33\%$ .

4. Required productivity =  $\frac{\text{India's productivity in Sunflower category}}{\text{World's productivity in Sunflower category}} \times 100 = \frac{556}{1247} \times 100 = 44.58\%$ .

5. Required productivity =  $\frac{\text{India's productivity in Linseed category}}{\text{World's productivity in Linseed category}} \times 100 = \frac{344}{858} \times 100 = 40.09\%$ .

6. Required productivity =  $\frac{\text{World's productivity in Castor category}}{\text{India's productivity in Castor category}} \times 100 = \frac{1014}{1221} \times 100 = 83.04\%$

As we don't have any idea about the productivities of the other

7. countries. Hence, we cannot determine the exact answer of this question.

8. Highest productivity in Castor category = 1221 kg/ha

India's productivity in rapeseed mustard = 875 kg/ha

$$\text{Required percentage} = \frac{1221 - 875}{875} \times 100 = 39.54\%$$

9. Highest productivity in linseed category = 2136 kg/ha

India's productivity in Castor mustard = 1221 kg/ha

$$\text{Required percentage} = \frac{2136 - 1221}{1221} \times 100 = 74.93\%$$

10. The weighted average of the world's highest productivity in castor and the world's highest productivity in sunflower depends on the value of the area under production for the countries showing these highest productivities. This information is not available.

### III

1. From the above table it is clear that chili has the largest production in India.

2. Productivity =  $\frac{\text{Total Production of black pepper}}{\text{Total area}} = \frac{58.3}{192.3} = 0.3031$

3. Productivity =  $\frac{\text{Total Production}}{\text{Total area}}$

For Chili, Turmeric, Ginger and Garlic the total area is less than the total production. Hence, the productivity is greater than 1.

For chili the productivity =  $\frac{1018}{915.2} \approx 1.1$  ( $1018 = 915 + 103$  (which is slightly more than 0.1 times of 915)). Similarly, we can think approximately about the other ratios:

$$\text{Productivity of Turmeric} = \frac{653.2}{161.3} \approx 4 \quad (653 = 644 + 9)$$

$$\text{Productivity of Ginger} = \frac{263.2}{77.6} < 4 \quad (263 = 231 + 32)$$

$$\text{Productivity of Garlic} = \frac{495.3}{114.4} \approx 4.5 \quad (495 = 456 + 40\% \text{ of } 114)$$

Hence, Garlic's productivity is highest for India.

4. Visually it is clear from the table that productivity is the highest/lowest for Cardamom (Small) (because  $\frac{\text{Total Production}}{\text{Total area}} \approx \frac{1}{8}$ , which is lowest for

any of the given country).

5. Cannot be determined because the spice whose productivity is the highest/lowest in India cannot be found— (It may form some component amongst others).
6. Cannot be determined because the spice whose productivity is the highest/lowest in India cannot be found— (It may form some component amongst others).

$$7. \text{ Productivity of cardamom (small)} = \frac{9.3}{72.4} \approx 0.128 \text{ t/ha}$$

$$8. \text{ Productivity of Coriander} = \frac{290}{546.6} \approx 0.5305 \text{ t/ha}$$

$$9. \text{ Productivity of Turmeric} = \frac{653.2}{161.3} \approx 4.05 \text{ t/ha}$$

$$10. \text{ Productivity of Garlic} = \frac{495.3}{114.4} \approx 4.32 \text{ t/ha}$$

12.

| Spices            | Production (000 t) | Area (000 ha) | Productivity (t/h) |
|-------------------|--------------------|---------------|--------------------|
| Black Pepper      | 58.3               | 192.3         | 0.30               |
| Cardamom (small)  | 9.3                | 72.4          | 0.13               |
| Chili             | 1018               | 915.2         | 1.11               |
| Ginger            | 263.2              | 77.6          | 3.39               |
| Turmeric          | 653.2              | 161.3         | 4.045              |
| Coriander         | 290                | 546.5         | 0.53               |
| Cumin             | 108.7              | 264           | 0.41               |
| Garlic            | 495.3              | 114.4         | 4.32               |
| Other seed spices | 99.4               | 84.7          | 1.17               |
| Tree spices       | 11.1               | 28.4          | 0.39               |
| Others            | 16.7               | 43.2          | 0.38               |

#### Productivity in increasing order:

Cardamom (small) < Black pepper < Others < Tree spices < Cumin < Coriander < Chili < Other seed spices < Ginger < Turmeric < Garlic

#### Area in increasing order:

Tree spices < Others < Cardamom (small) < Ginger < Other seed spices < Garlic < Turmeric < Black Pepper < Cumin < Coriander < Chili

IV

| Crop           | Percentage contribution in 1970 | Percentage contribution in 2000 | Difference between percentage contribution in 1970 and 2000 |
|----------------|---------------------------------|---------------------------------|---|
| Rice           | 39.45                           | 42.79                           | 3.34  |
| Wheat          | 22.02                           | 34.83                           | 12.81   |
| Coarse Cereals | 27.52                           | 15.42                           | 12.10   |
| Pulses         | 11.01                           | 6.96                            | 4.05  |

- From the above table: Rice < Pulses < Coarse cereals < Wheat
- Percentage increase in the production of rice during the period 1970 to 2000 =  $\frac{3865.73 \times 42.79 - 2343.34 \times 39.45}{2343.34 \times 39.45} = 78.92\%$
- Percentage increase in the production of wheat during the period 1970 to 2000 =  $\frac{3865.73 \times 34.83 - 2343.34 \times 22.02}{2343.34 \times 22.02} = 160.92\%$
- Percentage increase in the production of coarse cereals during the period 1970 to 2000 =  $\frac{3865.73 \times 15.42 - 2343.34 \times 27.52}{2343.34 \times 27.52} = -7.52\%$
- Percentage increase in the production of pulses during the period 1970 to 2000 =  $\frac{3865.73 \times 6.96 - 2343.34 \times 11.01}{2343.34 \times 11.01} = 4.27\%$
- $\frac{(42.79 + 34.83)3865.73 - (39.45 + 22.02)2343.34}{(39.45 + 22.02)2343.34} = -27.23\%$
- $34.83 \times 3865.73 - 27.52 \times 2343.34 = 701.85$  million tones.
- $\frac{(3865.73 \times 15.42 - 3865.73 \times 6.96) - 2343.34 \times 27.52 - 2343.34 \times 11.01}{(2343.34 \times 27.52 - 2343.34 \times 11.01)} = -15.48\%$
- Production of pulses in 1970 = 01% of 2343.34 million tones  
Production of rice in 2000 = 42.79% of 3865.73 million tones  
Required difference = 42.79% of 3865.73 – 11.01% of 2343.34 = 1396.13 million tones.
- To get the highest ratio we need to maximize the numerator and minimize the denominator.  
Hence, the required ratio = 39.45% of 2343.34: 6.96% of 3865.73 = 3.435: 1.

## V

- Percentage growth in the quantity of consumption during the entire period =  
 $(\text{Consumption in 2000} - 01 - \text{Consumption in 1993-94}) / (\text{Consumption on 1993-94}) =$

$$\frac{631475 - 450480}{450480} \times 100 \approx \frac{631.475 - 450.480}{450.480} \times 100 \approx \frac{631 - 450}{450} \times 100 = \frac{181}{450} \times 100 \approx 40\%$$

2. Net increase in closing stock =  $7015 - 7465 + 33640 + 4120 + 39990 + 40665 + 4605 - 8580 = 113990$

3. Here we just need to get percentage growth in consumption. If we ignore the last three digits then for growth for the year 1994–95 =  $35/450$ ,

For the year 1995–96 =  $40/485$

For the year 1996–97 =  $36/525$

For the year 1997–98 =  $10/561$

For the year 1998–99 =  $20/571$

For the year 1999–00 =  $37/591$

For the year 2000–01 =  $3/628$

From the above data it is very clear that for the year 1995–96 the growth is maximum.

4. From the above solution it is clear that the percentage growth in consumption is lowest for the year 2000–01

5. Production in 1993–94 =  $450,480 + 186 + 7015 - 19,940 = 437,741$

6. Production in 1999–2000 =  $628,110 + 5,989 + 4605 - 20,207 = 618,497$

7. Production in 2000–01 =  $631,475 + 13,356 - 8580 - 8572 = 627,679$

Increase in production during the entire period = (Production in 2000 – 01 – Production in 1993–94)/Production on 1993–94) =  $\frac{627,679 - 437,741}{437,741} \times 100 \approx 43.39\%$

8. From the given table it is very clear that ratio of export to import is maximum for 2000 – 01. Because for this year the ratio of export and import is greater than 1.

9. From the given table it is very clear that ratio of export to import is minimum for 1993–94. Because for this year the ratio of export and import is less than 1/100.

(No need to do any kind of calculation just multiply the export values by 100 for each of the given country and check. You will get that for each of the year the import value is less than  $100 * \text{Export value}$  except for year 1993–94. Hence, this is correct.)

10. Quantity of export =  $186 + 1961 + 1130 + 1598 + 1415 + 1840 + 5989 + 13356 = 27475$   
 Quantity of import =  $19940 + 8093 + 51635 + 19770 + 32070 + 29534 + 20207 + 8572 = 189821$   
 Required difference =  $189821 - 27475 = 162346.$

## VI

1. RSS accounts for 71% of 150 mt, while the consumption percentages are given out of 120 mt. Hence, you need approximately 90% of the total consumption to cover for the total production. (Since, 120 is 80% of 150 and 80% of 90 is 72).
2. Total production of solid black = 10% of 150 = 15 mt.  
 To minimize the modes we should use the modes for which the consumptions is maximum.  
 Total use of Auto and Tyre tube = 45.2% of 120 = 55 mt.  
 So, the entire solid black type rubber can be used only for one type of mode. Hence, the correct answer is 1.
3. For the maximum number of consumption modes for Solid Black's 15 MT of production, we would need to use those consumption modes that utilize less quantities of raw materials— or modes for which consumption is minimum. In such a case, solid black can get used for 3 consumption modes – viz: Latex foam, Dipped goods and Camel Black. Hence, the correct answer is 3.
4. Total production of Latex concentrate is 16.5 MT. This can be completely consumed again by Latex foam, Dipped goods and Camel Black, if we want to maximize the number of consumption modes. Hence, the correct answer is 3.
5. Production of RSS natural rubber = 71% of 150 mt  
 Production of Latex concentration natural rubber = 11% of 150  
 Required difference = 71% of 150 mt – 11% of 150 = (71–11)% of 150 = 60% of 150 = 90 mt.
6. Required difference = 5.1% of 120 – 5% of 120 = (5.1–5)% of 120 = 0.1% of 120 = 0.12 mt.

7. Required difference = 45.2% of 120 – 11.2% of 120 = (45.2–11.2)% of 120 = 34% of 120 = 40.8mt.

8. Production of RSS type natural rubber in 2001 = 71% of 150 = 106.5 mt.

Production of all the other types of natural rubber (except RSS type) in 2001 = 150 – 106.5 = 43.5 mt.

In the next year production of the all the other types (except RSS type) of natural rubber was increased by 10% hence, the new production of all the other type of natural rubber = 43.5 + 10% of 43.5 = 47.85 mt.

New production of RSS type of natural rubber = 200 – 47.85 = 152.15 mt.

Hence, the percentage growth of RSS type natural rubber =  $\frac{152.15 - 106.5}{106.5} \times 100 = 42.86\%$ .

9. Auto tyres and tubes consumption in 2001 = 45.2% of 120

Auto tyres and tube consumption increment in 2002 = 20% of 45.2% of 120 = 9.04% of 120

Similarly, cycle tyres and tube consumption increment in 2002 = 20% of 13.1% of 120 = 2.62% of 120

Net increment in consumption = 9.04% of 120 + 2.62% of 120 = 11.66% of 120

Hence, the required percentage increment in consumption = 11.66%.

10. As we don't have data for all types of rubbers (as we do not know the break up of the others category) so, we cannot determine the value of average production of all types of rubber in 2001.

## VII

1. From the table a single insertion of a full page black and white advertisement costs Rs. 4000, while the same advertisement would costs only Rs. 2500 if it is booked under an annual scheme of 12 insertions.

The cost difference would be =  $4000 \times 8 - 2500 \times 12 = \text{Rs. } 2000$ .

2. Cost difference =  $6 \times 2500 - 3000 \times 6 = \text{Rs. } 3000$ .

3. Percentage annual savings for full page black and white advertisement

$$= \frac{12 \times 4000 - 2500 \times 12}{12 \times 4000} \times 100$$

$$= \frac{12 \times 1500}{12 \times 4000} \times 100 = \frac{150}{4} = 37.5\%.$$

#### 4. Percentage annual savings:

| <i>Advertisement (Black and White)</i> | <i>Percentage annual savings</i>   |
|--|--|
| Full page                              | $\frac{12 \times 4000 - 2500 \times 12}{12 \times 4000} \times 100 = 37.5\%$ |
| Half page                              | $\frac{12 \times 2500 - 1250 \times 12}{12 \times 2500} \times 100 = 50\%$   |
| Quarter page                           | $\frac{12 \times 1000 - 600 \times 12}{12 \times 1000} \times 100 = 40\%$    |
| Strip page                             | $\frac{12 \times 400 - 250 \times 12}{12 \times 400} \times 100 = 37.5\%$    |

No need to do the whole calculation just check the percentage change in monthly charges in various offers (monthly, quarterly, half yearly and annual).

For example, percentage change in Full page subscriptions =  $\frac{4000 - 2500}{4000} \times 100 = 37.5\%$

Similarly, we can do the calculations for other offers as well.

The increasing order arrangement would be as follows:

Strip page < Full page < Quarter page < Half Page

#### 5. Percentage annual savings:

| <i>Advertisement (Coloured)</i> | <i>Percentage annual savings</i>                   |
|---------------------------------|--|
| Inside front cover              | $\frac{12000 - 6000}{12000} \times 100 = 50\%$     |
| Inside back cover               | $\frac{10000 - 5000}{10000} \times 100 = 50\%$     |
| Back cover                      | $\frac{12500 - 7500}{12500} \times 100 = 40\%$     |
| Full page                       | $\frac{7000 - 4000}{7000} \times 100 \approx 43\%$ |

Back cover < Full page < Inside back cover = Inside front cover

#### 6. Percentage six monthly savings:

| <i>Advertisement (Black and White)</i> | <i>Percentage annual savings</i>             |
|--|--|
| Full page                              | $\frac{4000 - 3000}{4000} \times 100 = 25\%$ |
| Half page                              | $\frac{2500 - 1500}{2500} \times 100 = 40\%$ |
| Quarter page                           | $\frac{1000 - 700}{1000} \times 100 = 30\%$  |
| Strip page                             | $\frac{400 - 300}{400} \times 100 = 25\%$    |

## 7. Percentage six monthly savings

| <i>Advertisement (Coloured)</i> | <i>Percentage annual savings</i>                  |
|---------------------------------|---|
| Inside front cover              | $\frac{12000 - 8000}{12000} \times 100 = 33.33\%$ |
| Inside back cover               | $\frac{10000 - 6000}{10000} \times 100 = 40\%$    |
| Back cover                      | $\frac{12500 - 9500}{12500} \times 100 = 24\%$    |
| Full page                       | $\frac{7000 - 5000}{7000} \times 100 = 28.57\%$   |

## 8. Percentage quarterly savings:

| <i>Advertisement (Black and White)</i> | <i>Percentage annual savings</i>               |
|--|--|
| Full page                              | $\frac{4000 - 3500}{4000} \times 100 = 12.5\%$ |
| Half page                              | $\frac{2500 - 2000}{2500} \times 100 = 20\%$   |
| Quarter page                           | $\frac{1000 - 800}{1000} \times 100 = 20\%$    |
| Strip page                             | $\frac{400 - 350}{400} \times 100 = 12.5\%$    |

Strip page = Full page < Quarter page = Half page

## 9. Percentage quarterly monthly savings

| <i>Advertisement (Colored)</i> | <i>Percentage annual savings</i>                   |
|--------------------------------|--|
| Inside front cover             | $\frac{12000 - 10000}{12000} \times 100 = 16.66\%$ |
| Inside back cover              | $\frac{10000 - 8000}{10000} \times 100 = 20\%$     |
| Back cover                     | $\frac{12500 - 11000}{12500} \times 100 = 12\%$    |
| Full page                      | $\frac{7000 - 6000}{7000} \times 100 = 14.28\%$    |

Back cover < Full page < Inside front cover < Inside back cover

10. From the solution of question 8 and 9, we get the following arrangement:

Back cover < Full page (B and W) < Strip < Full page (color) < Inside front page < Inside back side < Half page < Quarterpage

## VIII

1. Small farmer share = Rs. 100

$$\text{Required percentage} = \frac{100}{350} \times 100 = 28.57\%$$

2. Total commission agents market making share = Commission agent Market Making share + Making commission Agent Market Making =  $15 + 25 = 40$

$$\text{Required percentage} = \frac{100 - 40}{100} \times 100 = 60\%.$$

3. Small farmer share = 100

Trade and Packing cost = 75

According to the question: 100(Small farmer share) is equivalent to Rs. 476000

$$\text{Hence, trade and packing cost} = \frac{75}{100} \times 476000 = \text{Rs. 342000.}$$

4. Share of retailer retailing = 75

Share of commission agent market making =  $25 + 15 = 40$

$$\text{Hence, the required percentage} = \frac{75 - 40}{75} \times 100 = 46.66\%$$

5. Share of the wholesaler = 50

$$\text{Required percentage} = \frac{50}{350} \times 100 = \frac{100}{7} = 14.28\%$$

6. Share of trade packing transportation making = Rs. 75

$$\text{Required percentage} = \frac{75}{350} \times 100 = \frac{750}{35} = \frac{150}{7} = 21.42\%$$

7. Share of retailer = Rs. 75

$$\text{Required percentage} = \frac{75}{350} \times 100 = \frac{750}{35} = \frac{150}{7} = 21.42\%$$

8. According to the question Rs. 350 is equivalent to Rs. 21000 crore

$$\text{Hence, small farmer will receive} = \frac{100}{350} \times 21000 = \text{Rs. } 6000 \text{ crore}$$

9. According to the question Rs. 350 is equivalent to Rs. 21000 crore

$$\text{Hence, retailer will receive} = \frac{75}{350} \times 21000 = \text{Rs. } 4500 \text{ crore}$$

10. Difference between share of wholesaler and small farmer =  $\frac{100 - 50}{350} \times 21000 = \text{Rs. } 3000 \text{ crore}$

11. Percentage difference between the wholesaler and the small farmer =  $\frac{100 - 50}{50} \times 100 = 100\%$

## IX

1. For six crops India's productivity is more than world's average productivity.

2.

| Vegetables    | World's productivity (q/ha) | India's productivity (q/ha) | Percentage difference between India's productivity and World's productivity = $(\text{India's productivity} - \text{world's productivity}) / \text{World's productivity}$ |
|---------------|-----------------------------|-----------------------------|---|
| Eggplant      | 127.3                       | 130.8                       | 2.74  |
| Cauliflower   | 136.24                      | 147                         | 7.89  |
| Chili (Green) | 8.292                       | 8.8                         | 6.12  |
| Onion         | 137.96                      | 141.9                       | 2.85  |
| Pea           | 60.83                       | 72.9                        | 19.84   |
| Radish        | 123.45                      | 123.9                       | 0.36  |

3. The difference between the productivity of Cabbage in India and in the world =  $216.20 - 156.80 = 59.40 \text{ q/ha}$

4. If we look at the table carefully then without doing any calculation we get that CP/PI is maximum either for Chili(Green). Because for Chilli the CP/PI is certainly greater than 5 (for all the other vegetables the CP/PI is certainly less than 5).

For Chilli (Green) CP/PI is certainly greater than 7 ( $8.8 \times 7 < 70$ ). Hence, CP/PI is maximum for Chilli (Green).

5. Again we can solve this problem without doing any calculation. If we look at the table carefully we can see that except Cucumber for all vegetables capacity of production is more than twice of the Productivity of India. For Cucumber it is less than 2. Hence, the CP/PI ratio is minimum for Cucumber.
6. If we look at the table carefully then without doing any calculation we get that CP/WP is maximum for Chili(Green). Because for Chili (Green) the CP/WP is certainly greater than 5 (for all the other vegetables the CP/WP is certainly less than 5). Hence, CP/PW is maximum for Chilli (Green).
7. Again we can solve this problem without doing any calculation. If we look at the table carefully we can see that except Cucumber for all vegetables capacity of production is more than that of the World's average productivity. Hence, the CP/WP ratio is minimum for Cucumber.

8. Required percentage =  $\frac{22.00}{68.83} \times 100 = 31.96\%$

9. Required percentage =  $\frac{156}{250.93} \times 100 = 62.15\%$

10. Required percentage =  $\frac{85}{143.57} \times 100 = 59.20\%$

11. (a) The Beans productivity is 68.83 q/ha. This would grow to 80 q/ha. However, since we do not know area under cultivation in terms of the number of hectares, we cannot find the absolute increase in the beans production.
- (b) The percentage increase would be given by  $\frac{80 - 68.83}{68.83} \times 10 \approx 16.22\%$

## X

1.

| <i>Period</i> | <i>Closing Inventory (in Lakh Bales of 170 kg each)</i> |
|---------------|---|
| 1995–96       | $20 + 167.45 + 0.50 - 138.29 - 8.40 = 41.26$            |

|         |  |
|---------|--|
| 1996–97 | $41.26 + 178.70 + 0.30 - 158.30 - 16.82 = 45.14$ |
| 1997–98 | $45.14 + 158 + 4.13 - 149.78 - 3.50 = 53.99$     |
| 1998–99 | $53.99 + 165 + 7.87 - 145.53 - 1.01 = 80.32$     |
| 1999–00 | $80.32 + 156 + 19 - 150.60 - 1 = 103.72$         |
| 2000–01 | $103.72 + 146 + 16 - 149.88 - 0.60 = 115.24$     |

2.

| <i>Period</i>      | <i>Closing Inventory (Lakh Bales of 170 kg each)</i> |
|--------------------|--|
| 1995–96 to 1996–97 | $45.14 - 41.26 = 3.88$                               |
| 1996–97 to 1997–98 | $53.99 - 45.14 = 8.85$                               |
| 1997–98 to 1998–99 | $80.32 - 53.99 = 26.33$                              |
| 1998–99 to 1999–00 | $103.72 - 80.32 = 23.4$                              |
| 1999–00 to 2000–01 | $115.24 - 103.72 = 11.52$                            |

3. Percentage growth in production from 1996–97 to 2000–01 =  $\frac{146 - 178.70}{178.70} \times 100 = -18.29\%$

4. The average annual percentage change in a value is like the compound interest calculation. The total percentage change in production between 1995–96 to 2000–01 is Percentage growth in production from 1995–96 to 2000–01 =  $\left( \frac{146 - 167.45}{167.45} \right) \times 100 = -12.8\%$ . On a compounded basis this means that after 5 successive percentage changes of the same amount, a value of 100 has dropped down to 87.2. A rough compounding calculation (using Percentage change graphic – explained in details in my book ‘How to prepare for Quantitative Aptitude for the CAT’) would give us that this would mean an average annual percentage drop of 2–3% approximately (closer to 2 than to 3). Hence, we can mark approximately 2.3 to 2.4%.
5. Absolute increase in consumption during the entire period =  $149.88 - 138.29 = 11.59$  (in Lakh bales of 170 kg each)
6. Ratio of Import to export is greater than 1, when import > export. This happened four times. Hence, the correct answer is 4.
7. No need to calculate we can check this visually by analyzing the table carefully.

$167 = 138 + 29$  (which is less than 50% of 138)

$$178 = 158 + 20(\text{less than } 50\% \text{ of } 178)$$

$$158 = 149 + 9(\text{less than } 50\% \text{ of } 149)$$

$$165 = 145 + 20(\text{less than } 50\% \text{ of } 145)$$

$$156 = 150 + 6(\text{less than } 50\% \text{ of } 150)$$

$$146 < 149$$

Hence, for none of the given years Production/consumption is more than 1.5. The correct answer is 0.

8. Growth in production happened only twice in 1996–97 and in 1998–99.

$$\text{In 1996-97: } \frac{178-167}{167} \times 100 = \frac{11}{167} \times 100 = 6.58$$

$$\text{In 1998-99: } \frac{165-158}{158} \times 100 = \frac{7}{158} \times 100 = 4.43$$

Hence, growth in production is maximum in 1996–97.

9. No need to calculate this. A visual inspection gives us that in the given data it is clear that in 2000–01 the change in consumption is 0.72 Lakh barrels which is not even 1% of 150.60 (in lakh bales of 170 kg each(s)). Hence, 2000-01 is the correct answer.
10. Again no need to calculate this. Check the question visually:

From the given table during the entire period growth happens only in consumption and Import.

For consumption growth is less than twice. For import the growth is much more than twice of the import in 1995-96. Hence, import is the correct answer.

11. Total amount of consumption during the entire period =  $138.29 + 158.30 + 149.78 + 145.53 + 150.60 + 149.88 = 892.38$ (in lakh bales of 170 kg each).

## XI

1. Required percentage =  $\frac{1107}{1300} \times 100 = \frac{1107}{13} = 85.14\%$

2. Let the average of the unique visitors = 2000 (in 000s)

| <i>Rank</i> | <i>Site</i>      | <i>Unique visitors (in 000s)</i> | <i>Deviation (in 000s)</i> |
|-------------|------------------|----------------------------------|----------------------------|
| 1           | KBB.com          | 2402                             | 402                        |
| 2           | CarPoint.com     | 2144                             | 144                        |
| 3           | Auto Trader. Com | 1792                             | -208                       |
| 4           | Edmunds.com      | 1421                             | -579                       |
| 5           | Ford.com         | 1300                             | -700                       |
| 6           | Cars.com         | 1192                             | -808                       |
| 7           | EbayMotors.com   | 1156                             | -844                       |
| 8           | CarClub.com      | 1107                             | -893                       |
| 9           | Autobytel.com    | 1015                             | -985                       |
| 10          | Autoweb.com      | 930                              | -1070                      |
|             |                  |                                  | -5541                      |

Hence, the required average =  $2000 + (-5541/10) = 2000 - 554.1 = 1445.9$

$\therefore$  For **Edmunds.com**, the number of unique visitors is nearest to the average number of unique visitors.

3. The difference in the number of visitors would be maximum if we choose top five sites in pool A and bottom five sites in Pool B.

Hence, the required difference =  $2402 + 2144 + 1792 + 1421 + 1300 - (1192 + 1156 + 1107 + 1015 + 930) = 3659$ .

4. The site with lowest number of visitors should be discarded. Hence, the correct answer is **AutoWeb.com**
5. **AutoTrader.com**, **Autobytel.com** and **AutoWeb.com** have more than three vowels in their names. Hence, the correct answer is 3.
- 6.

| <i>Rank</i> | <i>Site</i>    | <i>Number of letters</i> |
|-------------|----------------|--------------------------|
| 1           | KBB.com        | 6                        |
| 2           | CarPoint.com   | 11                       |
| 3           | AutoTrader.Com | 13                       |
| 4           | Edmunds.com    | 10                       |
| 5           | Ford.com       | 7                        |
| 6           | Cars.com       | 7                        |
| 7           | EbayMotors.com | 13                       |
| 8           | CarClub.com    | 10                       |
| 9           | Autobytel.com  | 12                       |
|             |                |                          |

|    |             |    |
|----|-------------|----|
| 10 | Autoweb.com | 10 |
|    | Total       | 99 |

Required average =  $99/10 = 9.9 \approx 10$ .

**Questions 7–11:** New ranking table according to the new ranking system is as shown below:

| Rank | Site           |
|------|----------------|
| 1    | AutoTrader.com |
| 2    | Autobytel.com  |
| 3    | AutoWeb.com    |
| 4    | CarPoint.com   |
| 5    | Cars.com       |
| 6    | CarClub.com    |
| 7    | Edmunds.com    |
| 8    | EbayMotors.com |
| 9    | Ford.com       |
| 10   | KBB.com        |

7. 5<sup>th</sup>
8. [EbayMotors.com](#)
9. All the ten sites will have a change in their ranks when the new system of ranking is adopted.
10. [KBB.com](#) and [AutoWeb.com](#) show the maximum difference in the number of unique visitors.
11. For [Cars.com](#) and [Ebaymotors.com](#) the ratio of number of visitors will be close to 1.

## XII

1. From the given chart it is clear that for Radio telephonic communication the percentage growth was maximum. (No need to calculate this, just compare the bars of year 1998 and 1999.)
2. From the given bar chart it is clear that the minimum percentage

growth occurs either for the Electric services or for Commercial Banks. (For these two sectors the bar length in 1999 is less than twice of the bar length of 1998.)

For these two sectors the growth were almost the same but the sales in Electric Services was more than that of Commercial banks in 1998. Hence, growth in electric services was less than that of growth of Commercial banks. Hence, the correct answer is Electric Services

3. Difference in sales =  $331 - 164 = 167$ (BILLION DOLLARS) and it can be seen from the table:
4. For all the sectors except Crude petroleum and natural gas the sales in 1999 is more than that of the sales in 1998. Hence, correct answer is  $10 - 1 = 9$ .
5. Average sales per sector in 1998 =  $164/10 = 16.4$  (billion dollars)
- 6.

| <i>Sector</i>                             | <i>Sales in 1998 (in billion dollars)</i> | <i>Sales in 1999 (in billion dollars)</i> |
|---|---|---|
| Radio telephonic communications           | 5   | 99  |
| Pharmaceuticals                           | 15  | 42  |
| Life Insurance                            | 17  | 32  |
| Telephone communications                  | 17  | 30  |
| Electric Services                         | 22  | 30  |
| Commercial Banks                          | 18  | 32  |
| Crude petroleum and natural gas           | 65  | 18  |
| Man made organic fibres except cellulosic | 0   | 18  |
| Cigarettes                                | 0   | 16  |
| Other communication services              | 5   | 14  |
| Total                                     | 164                                       | 331                                       |

Pharmaceutical sales in 1999 = 42 billion dollars

Communication sector sales = Radio telephone communication sales + Telephone Communications + Other communication services = 99 +

$$30 + 12 = 141 \text{ (billion dollars)}$$

$$\text{Required percentage} = \frac{42}{141} \times 100 \approx 29.8\%$$

7. From the table of solution 3, we get the required percentage =  $\frac{16}{32} \times 100 = 50\%$ .

8. Total sales of all the products and services in 1999 = 331 billion dollars

$$\text{Total sales of Cigarettes} = 16 \text{ billion dollars}$$

$$\text{Hence, the required percentage} = \frac{16}{331} \times 100 = 4.833\%$$

9. From the given bar chart first two positions are occupied by Radio Telephone and Crude petroleum and natural gases.

3<sup>rd</sup> place is definitely occupied by Pharmaceuticals.

4<sup>th</sup> position is occupied by Electric services.

5<sup>th</sup> position is occupied either by Life Insurance or by Telephone communications.

From the bar chart it is clear that in 1998 the sales Life Insurance and Telephonic communications were the same, but in 1999 the sales of Life Insurance was slightly higher. Hence, Life Insurance is the correct answer.

10. 2<sup>nd</sup>

## XIII

1. Revenue per employee of Polaris =  $293.8/2544 = 0.1154$  crores or 11.54 lakhs.
2. Difference between revenue per employee and Profit per employee of Orbitech =  $\frac{321}{1256} - \frac{107}{1256} = \frac{214}{1256} = 0.1703$  crore or 17.03 lakhs.
3. Utilisation percentage of Orbitech =  $\frac{107}{321} \times 100 = 33.33\%$
4. Offshore revenue of Orbitech =  $\frac{63}{63+37} \times 293.8 = 185.09$  crore.
5. 60% of total revenue (ratio of product and services revenue is 40: 60)

6. Utilisation percentage of Orbitech =  $\frac{107}{321} \times 100$

$$\text{Utilisation percentage of Polaris} = \frac{58.86}{293.8} \times 100$$

No need to do any calculation as it is evident that  $107/321 > 58.86/293.8$ . Hence, utilisation percentage of Orbitech is greater.

7. Required ratio =  $614.8 : 3800 = 0.16 : 1$  (in crore)

## XIV

- Power rank is the product of reach and average Pages/Visitor. Without doing any calculation it is evident that power rank for [Monster.com](#) is  $31.1 \times 7.1$  which is greater than 210. No other site can reach on that power rank.
- Average reach per site =  $23.7/11 \approx 2.15$
- [Jobsonline.com](#) gets the 4<sup>th</sup> rank.

| Sites pages/ visitor | Reach | Average Pages/ visitor | Power rank |
|----------------------|-------|------------------------|------------|
| Techies.com          | 0.2   | 6                      | 1.2        |
| Monster.com          | 7.3   | 31.1                   | 227.03     |
| Net-temps.com        | 0.6   | 7.5                    | 4.5        |
| Jobs.com             | 0.4   | 5.6                    | 2.24       |
| Dice.com             | 0.4   | 19.5                   | 7.8        |
| Nationjob.com        | 0.4   | 6.8                    | 2.72       |
| Headhunter.net       | 1.9   | 18.2                   | 34.58      |
| careerbuilder        | 2.5   | 4.8                    | 12         |
| Compterjobs.com      | 0.3   | 17.2                   | 5.16       |
| Hotjobs              | 4.5   | 7.6                    | 34.2       |
| Jobsonline.com       | 5.2   | 4.4                    | 22.88      |
| Total                | 23.7  | 128.7                  |            |

- From the above table it is clear that [Dice.com](#) gets the 6<sup>th</sup> rank.
- We don't have any information regarding the number of visitors of any of the given site. So we cannot determine the site, which has the maximum number of visitors.
- Can't be determined.
- Can't be determined.
- As we don't have any idea about the number of visitors so we cannot determine the total number of pages visited from the given data about

the average pages per visitor. Hence, we can't determine the answer of this question.

9. Can't be determined.
10. All the eleven sites names have starting and ending letters as consonants and at least two vowels in between them.

## XV

1. (a) The ratio is the highest at  $849/1 = 849$  for Sikkim. No other state comes close to that for the given ratio. Hence, Sikkim is the correct answer.  
(b) Uttaranchal has a proposed investment of 0 despite having 1 IEM filed. Hence, the least ratio is for Uttaranchal.  
(c) The highest proposed investment per IEM filed is for Tripura ( $1041/5 = 208.2$ ). None of the other states come close to this figure. Hence, Tripura is the correct answer.  
(d) Chandigarh has 0 IEMs filed, even though there is 1 in the (IEM + LOI) column. This means that Chandigarh has received one LOI and 0 IEMs. Thus, 100% of proposals received by Chandigarh are LOIs. This is the highest ratio amongst all states. Hence, Chandigarh is the correct answer.
2. The total proposed investment is 751649. 5% of this works out to approximately 37500. There are 29 states that have a proposed investment below 37500. (Note: For this question, you do not need to calculate the 5% value exactly, as there is no doubt about the value for any state, as to whether it lies above or below the 5% benchmark.) Hence, the correct answer is 29.
3. The national average is  $8547/411 = 20.8$ . There are eleven states above this figure.
4. The total number of IEMs filed is 41159. To cross 80% of this figure using the minimum number of states, start adding the states in reducing order of the number of IEMs filed.

## PART 5

# Ten Minute Test Papers

Ten Minutes Test  
Papers

### In This Part You will Learn:

- To solve DI tests under time pressure.
- To take DI tests effectively by finding out ways
  - To further improve the depth of your understanding and interpretation of data
  - To further improve your anticipation of questions when you see a data set
  - To improve the depth and breadth of your exposure to DI questions as well as your DI problem solving skills

- To improve your accuracy while solving DI questions
- To further improve your speed of solving and understanding of DI questions

***This Part Contains:***

- Ten Minute Test Papers containing good quality questions (with options) that cover the breadth and depth of questions that could be asked in Data Interpretation

**AFTER YOU FINISH SOLVING A TEST:**

- (a) Check your errors and closely analyse the reasons for these errors. You would need to work on eliminating the error sources to become better at DI.
- (b) In case there are many unsolved questions and/or questions that you have not understood, go back and solve these questions.
- (c) Keep a chart of your scores as you progress through the tests in this part.

Your score would be given by:

No. of correct answers  $\times$  3 – No. of wrong answers.

**1**

# Ten Minute Test Papers

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## TEN MINUTE TEST-1

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**Directions for Questions 1 to 7:** Study the table ([Table 1.1](#)) and solve the questions given below that.

All countries that have reported more than five hundred cancer cases to the WHO in 2007 are listed here. The left column gives the total number of cases reported by each country for 2006, the middle column gives the 2006 rate (cancer cases per 10,000 population) and the last column shows the number of cases reported in early 2007.

Most of the 2007 reports were for only the first quarter or a third of the year. Owing to reporting delays of six months or more, cases reported in 2007 actually were diagnosed in 2006.

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**Table 1.1** Number of Cancer Cases over Two Years for Selected Countries

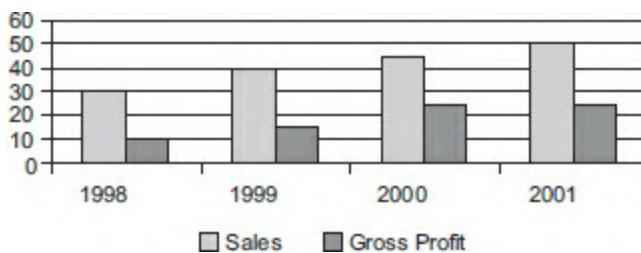
| Country | 2006<br>(In'00 cases) | 2006<br>(Rate per cent) | 2007<br>(In'00 cases) |
|---------|-----------------------|-------------------------|-----------------------|
| A       | 53                    | 0.1                     | 46                    |
| B       | 345                   | 2.1                     | 145                   |
| C       | 87                    | 1.1                     | 39                    |
| D       | 81                    | 33.9                    | 26                    |
| E       | 84                    | 0.8                     | 23                    |
| F       | 1365                  | 0.9                     | 209                   |
| G       | 661                   | 13.0                    | 239                   |
| H       | 516                   | 1.9                     | 236                   |
| J       | 36                    | 0.2                     | 16                    |
| K       | 95                    | 1.8                     | 23                    |
| L       | 262                   | 3.9                     | 156                   |
| M       | 19                    | 0.0                     | 18                    |
| N       | 1862                  | 3.3                     | 563                   |
| P       | 47                    | 56.2                    | 11                    |
| Q       | 49                    | 0.5                     | 18                    |
| R       | 337                   | 5.0                     | 235                   |
| S       | 61                    | 1.2                     | 35                    |
| T       | 17                    | 0.3                     | 12                    |
| U       | 896                   | 1.5                     | 235                   |
| V       | 39                    | 1.4                     | 14                    |
| W       | 31                    | 0.0                     | 5                     |
| X       | 501                   | 0.6                     | 12                    |
| Y       | 217                   | 1.4                     | 73                    |
| Z       | 31                    | 0.9                     | 22                    |
| AA      | 39                    | 0.8                     | 13                    |
| AB      | 46                    | 0.4                     | 35                    |
| AC      | 48                    | 0.1                     | 21                    |
| AD      | 71                    | 0.8                     | 32                    |
| AE      | 162                   | 2.4                     | 83                    |
| AF      | 655                   | 1.1                     | 241                   |
| AG      | 21,861                | 8.9                     | 6445                  |
| AH      | 869                   | 1.4                     | 219                   |
| AJ      | 19                    | 0.0                     | 13                    |

1. What is the population of AD on the basis of the reported cases of cancer in 2006 (in thousands)?
  - (a) 810,000
  - (b) 812,500
  - (c) 825,000
  - (d) 887,500
2. Which country has reported the second highest number of cancer cases to WHO during 2006?
  - (a) F
  - (b) AG

- (c) N
  - (d) U
3. The countries which have reported less than 2000 cases both in 2006 and early 2007 are
- (a) W, M, and T
  - (b) V, AJ and W
  - (c) M, J and P
  - (d) M, T and AJ
4. The ratio of cancer cases reported in early 2007 is 7:6 for
- (a) V and T
  - (b) T and X
  - (c) AC and V
  - (d) None of these
5. How many countries have reported 25000+ cancer cases in early 2007?
- (a) Two
  - (b) One
  - (c) Three
  - (d) None
6. The number of countries for which the number of cancer cases (in thousand) in 2006 is more than five is
- (a) 22
  - (b) 23
  - (c) 20
  - (d) 24
7. Which of the following are true from the table?
- I. The reported cancer cases of M, W and AJ as compared to their population are negligible.
  - II. The 2006 rate is highest for P though the reported cases are only 4700.
  - III. The population of R is 664,000 in 2006.
  - IV. P reported more than 20,000 cases of cancer in early 2007.
- (a) I and II

- (b) II and III
- (c) I, II and III
- (d) I, II and IV

**Directions for Questions 8 to 12:** Study the figure ([Figure 1.1](#)) and solve the questions given below that. Assume that all numbers end in either 5 or 0.



**Figure 1.1** Sales and Gross Profit for the Period 1998–2001 (In ₹ Crore)

8. The year in which the gross profit is half of the sales is:
  - (a) 1999
  - (b) 1998
  - (c) 2001
  - (d) 2000
9. The ratio of gross profit to sales for the entire period is:
  - (a) 17:18
  - (b) 5:11
  - (c) 6:11
  - (d) 4:9
10. What is the average gross profit as a percentage of sales for the entire period?
  - (a) 45.6%
  - (b) 45.45%
  - (c) 40%
  - (d) None of these
11. Average annual growth of sales is:
  - (a) more than ₹ 6 crore
  - (b) less than ₹ 5 crore

- (c) exactly ₹ 6 crore  
(d) exactly ₹ 5 crore.
12. The year in which the increase in gross profit is greater than that in sales is:
- (a) 1998  
(b) 2000  
(c) 1999  
(d) 2001
- 

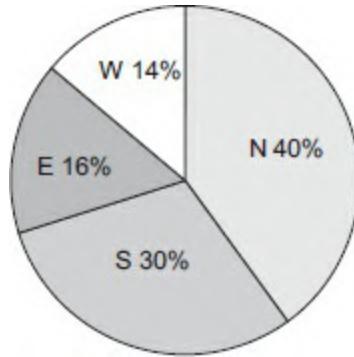
## TEN MINUTE TEST-2

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**Directions for Questions 1 to 4:** Study the table ([Table 1.2](#)) and solve the questions below that. Total number of respondents is 5000, with percentage distribution among the different zones as shown below.

**Table 1.2** Results of a Survey on Worries that People Have

| S.No. |                                    | North | East | West | South | (in percentage) |
|-------|------------------------------------|-------|------|------|-------|-----------------|
| 1.    | Rising prices                      | 87    | 56   | 74   | 83    |                 |
| 2.    | Joblessness                        | 57    | 58   | 69   | 69    |                 |
| 3.    | Stagnating salaries                | 18    | 14   | 6    | 11    |                 |
| 4.    | Rental house                       | 7     | 6    | 7    | 6     |                 |
| 5.    | Scarcity of essential times        | 9     | 11   | 4    | 2     |                 |
| 6.    | Bad/Very bad standard of living    | 4     | 11   | 3    | 2     |                 |
| 7.    | Savings rate                       | 17    | 21   | 19   | 13    |                 |
| 8.    | Pollution                          | 33    | 28   | 19   | 39    |                 |
| 9.    | Education                          | 41    | 32   | 49   | 25    |                 |
| 10.   | Not living better than 5 years ago | 41    | 44   | 48   | 24    |                 |
| 11.   | House ownership                    | 45    | 46   | 45   | 51    |                 |



1. The number of persons surveyed having house ownership worries is minimum in the \_\_\_\_\_ zone.
  - (a) North
  - (b) South
  - (c) West
  - (d) East
  
2. What is the percentage of persons surveyed who do not have worries about increase in saving or about pollution?
  - (a) 9
  - (b) 19
  - (c) 29
  - (d) Cannot be determined
  
3. What is the number of persons having worries regarding rising prices in the four zones put together?
  - (a) 3652
  - (b) 3862
  - (c) 3753
  - (d) 3951
  
4. What percent of persons with job have worries of ‘stagnating salaries’ in the South?
  - (a) 35.5
  - (b) 38.2
  - (c) 25.7
  - (d) Cannot be determined

**Directions for Questions 5 to 10:** From the data given in [Table 1.3](#),

solve the questions given below that.

---

**Table 1.3** Present and Past Users of Different Toilet Soaps.

|                                  |               | Present Users (Number of people) |       |      |       |               |      |
|----------------------------------|---------------|----------------------------------|-------|------|-------|---------------|------|
|                                  |               | Lux                              | Liril | Dove | Nivea | No soap usage |      |
| Past users<br>(Number of people) | Lux           | 300                              | 75    | 90   | 60    | 45            | 570  |
|                                  | Liril         | 60                               | 240   | 45   | 60    | 30            | 435  |
|                                  | Dove          | 90                               | 45    | 90   | 15    | 00            | 240  |
|                                  | Nivea         | 135                              | 30    | 00   | 60    | 30            | 255  |
|                                  | No soap usage | 210                              | 15    | 00   | 30    | 210           | 465  |
|                                  |               | 795                              | 405   | 225  | 225   | 315           | 1965 |

5. The percentage increase in the number of people using any kind of soap is:
  - (a) 10%
  - (b) 15%
  - (c) 20%
  - (d) Cannot be determined
6. How many brands of soap have shown a decrease in their market shares?
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four
7. If from the present users, the total soap usage increases by 20% and Lux users increase by 25%, approximately what per cent of the soap using market would be Lux users?
  - (a) 39%
  - (b) 47%
  - (c) 50.2%
  - (d) 55%
8. If a consumer uses 1.5 kg of soap a month (on an average), what is the present soap usage amongst the consumers surveyed?
  - (a) 22 tonnes/month

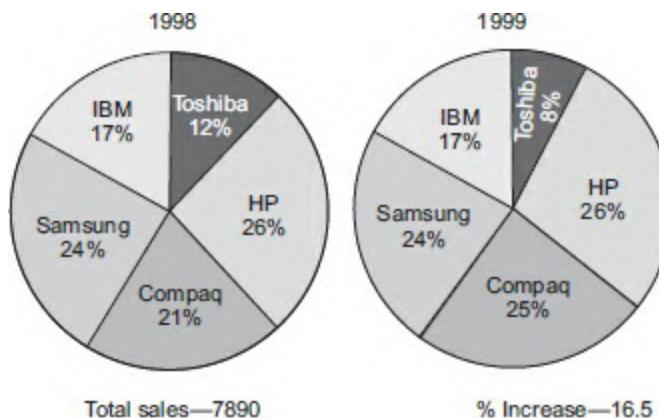
- (b) 22.5 tonnes/month  
(c) 24.75 tonnes/month  
(d) Cannot be determined
9. What is the decrease in the usage of Liril as a percentage of the total present soap users from the sample population?  
(a) 1.7%  
(b) 1.81%  
(c) No change  
(d) 18.1%
10. If a new brand Palmolive is introduced into the market, and the brand shift to Palmolive from the present users is Lux 10%, Liril 10%, Dove 8% and Nivea 6%, how many users will Palmolive have (round off all decimal values of number of people to the higher integer)?  
(a) 151  
(b) 152  
(c) 153  
(d) 154

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### TEN MINUTE TEST-3

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**Directions for Questions 1 to 5:** Based on the data given on the pie-chart ([Figure 1.2](#)), solve the questions which follow:



**Figure 1.2** Percentage Sales of Different Models of Computers in

## Allahabad in Two Different Years

1. The percentage change in the sales of Toshiba in 1999 is approximately:
  - (a) 16%
  - (b) 61%
  - (c) 22%
  - (d) 68%
2. Which brand of computers among those shown, exhibited the second highest rate of growth in the two years and had less sales in 1999 than 1998?
  - (a) HP
  - (b) IBM
  - (c) Samsung
  - (d) All of these
3. What is the ratio between the Compaq sales in 1998 and those of IBM in 1999?
  - (a) 0.94
  - (b) 1.06
  - (c) 1.13
  - (d) 0.89
4. For which brand of computers, did the sale increase the maximum in terms of absolute value between the two years?
  - (a) IBM
  - (b) Samsung
  - (c) HP
  - (d) Compaq
5. IBM's sales in 1998 is what percentage of the sales of Samsung in 1999?
  - (a) 46.34%
  - (b) 52.34%
  - (c) 57%
  - (d) 60.8%

**Directions for Questions 6 to 10:** Refer the information given to answer the following questions.

The demand function for a product is described as

$$Q = 25 - P$$

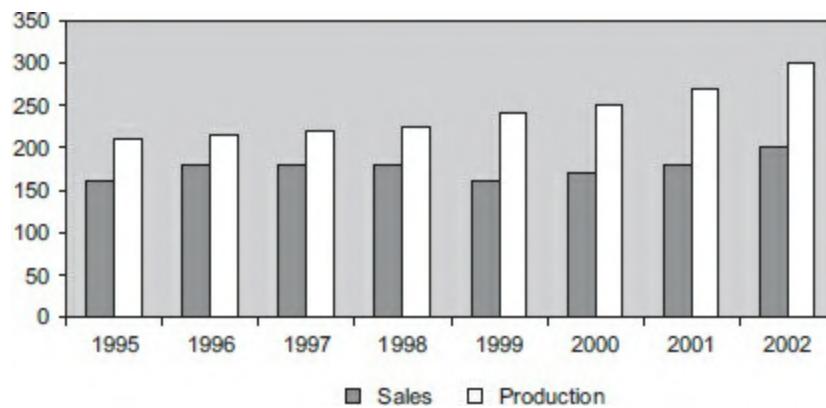
Where  $Q$  = quantity demanded,

$$P = \text{price},$$

The revenue  $R$  is given by the product of Price and Quantity.

6. If the price is increased by 25% from a price of ₹ 12, what will be the percentage change in the revenue?
  - (a) - 4%
  - (b) + 4%
  - (c) - 3.7
  - (d) None of these
7. For what price will the revenue be the highest?
  - (a) 14.5
  - (b) 14
  - (c) 13
  - (d) 12.5
8. If due to the liberalisation of the economy, the functional relationship between Quantity and Price changes to  $Q = 125 - P$ , the quantity at which total revenue is the highest, will:
  - (a) increase
  - (b) remain the same
  - (c) decrease
  - (d) not exist
9. To get a minimum revenue of ₹ 156, a possible price (in Rupees) is:
  - (a) ₹ 12
  - (b) ₹ 13
  - (c) ₹ 12.5
  - (d) all of the above
10. Which of the following statement (s) is/are true?

- I. As the quantity of goods sold increases, the price decreases.
  - II. As the price decreases, quantity decreases, then increases.
  - III. As price increases, revenue decreases then increases.
- (a) (I) and (ii) only
  - (b) (ii) and (iii) only
  - (c) (i) only
  - (d) None of these



**Figure 1.3** Nokia's Cell Phone Production and Sales

### TEN MINUTE TEST-4

**Directions for Questions 1 to 5:** Based on the figures in the bar chart (Figure 1.3), answer the following questions. (Assume all numbers in the bar graph above end in ten thousands.)

1. The sale of cell phones for 1999 is:
  - (a) 160,000
  - (b) 16,00,000
  - (c) 16,000
  - (d) None of these
2. What is the percentage increase in sales between 1995 and 2002?
  - (a) More than 40%
  - (b) Less than 20%
  - (c) 25%

- (d) None of these
3. What percentage of the total production has been sold during the year 1999?
- (a) Less than 70%
  - (b) More than 75%
  - (c) 75%
  - (d) 80%
4. The year in which there was the maximum percentage change in production was:
- (a) 1999
  - (b) 2000
  - (c) 2001
  - (d) 2002
5. In which of the following years has the sale of Cell phones shown a negative trend?
- (a) 1999
  - (b) 2000
  - (c) 2001
  - (d) 1998

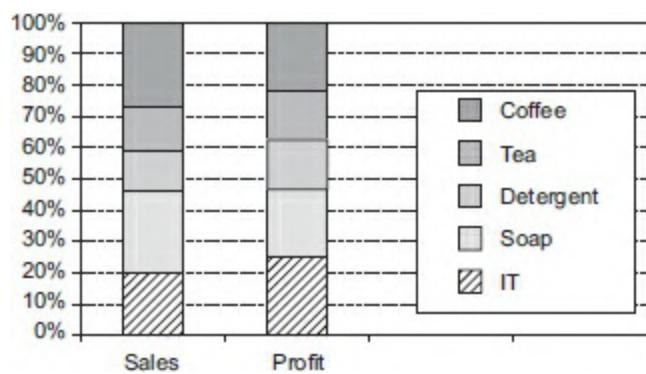
**Directions for Questions 6 to 8:** Each of the letters P, Q, R and S represent a non-equal digit. The questions are independent of each other.

6. If  $Q > P$  and  $PR \times QR = SSS$ . Then  $(PR)^2 =$
- (a) 676
  - (b) 441
  - (c) 625
  - (d) 729
7.  $QP + P = PQ$ , then  $P =$
- (a) 9
  - (b) 8
  - (c) 3
  - (d) 6
8.  $RRR + Q = QPPP$ , then  $P =$

- (a) 1
- (b) 0
- (c) 5
- (d) 6

**Directions for Questions 9 to 13:** Study the following figure (Figure 1.4) and answer the questions given below that.

Performance of a company in terms of sales and profits. Overall profit was ₹500 crore on a turnover of ₹7,500 crore (2001 figure).



**Figure 1.4** Financial Results of a Company

9. If profit had grown at 20 per cent compounded since 1999 what would its projected profit have been in 1999? (Assume that relative contribution of the various products categories have remained unchanged between 1999 and 2001.)
  - (a) 336 crore
  - (b) 374 crore
  - (c) 416 crore
  - (d) 347 crore
10. What would have been the company's overall profit to sales ratio in 2006 if profits had doubled and sales trebled, over the 2001 figure?
  - (a) 1 : 7.5
  - (b) 1 : 22.5
  - (c) 1 : 12.5
  - (d) Can't be determined

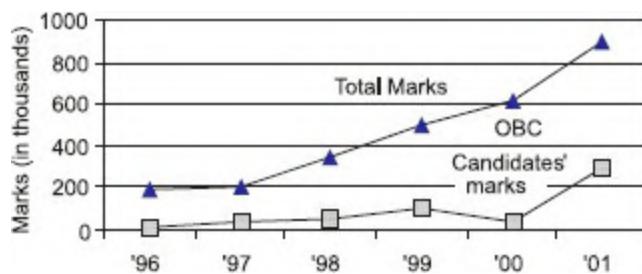
11. The products category with the highest profitability (i.e. profit/sales  $\times$  100) is:
- IT
  - Detergent
  - Coffee
  - Soap
12. What is the ratio of sales of the company's soap to its detergent division?
- 11 : 8
  - 2 : 1
  - 1 : 2
  - 8 : 11
13. What is the total cost (i.e. sales–profits) of the tea division? (in ₹ crore)
- 975
  - 625
  - 1500
  - 1800

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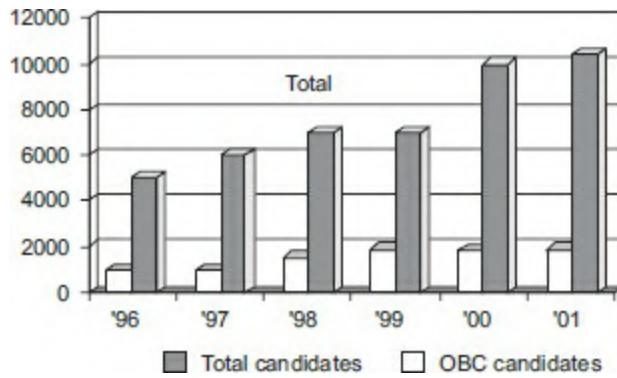
## TEN MINUTE TEST-5

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**Directions for Questions 1 to 6:** The questions are based on the following graph (Figure 1.5), which give the value of the total marks scored in the given years by the candidates appearing for the CAT as also the number of candidates (Figure 1.6).



**Figure 1.5** Value of Total Marks

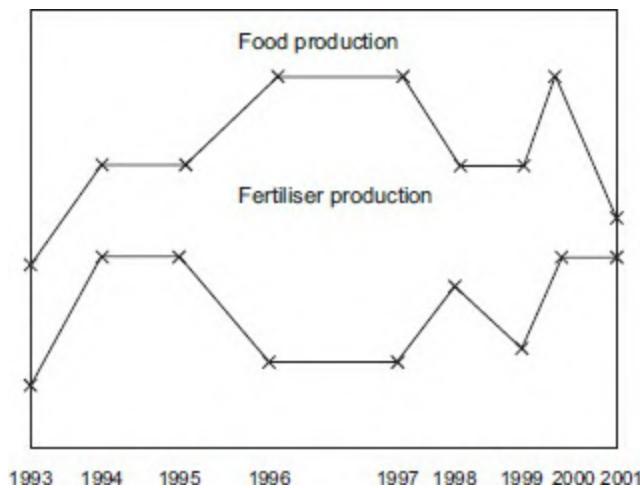


**Figure 1.6** Number of Candidates

1. What is the average marks per candidate in the CAT in 2001?
  - (a) 91
  - (b) 84
  - (c) 77
  - (d) cannot be determined
2. The average marks per candidate of CAT from 1996 to 2001:
  - (a) has remained almost the same
  - (b) has increased
  - (c) has decreased
  - (d) has almost doubled
3. What were the average marks in 1998 of candidates other than the OBC candidates (approx.)?
  - (a) 55
  - (b) 65
  - (c) 75
  - (d) 85
4. What are the average marks per student in the OBC category in 1996? (approx.)
  - (a) 25
  - (b) 23
  - (c) 7
  - (d) 33
5. Which of the following statements is not true?
  - (a) The total marks of all candidates has increased every year from

- 1996 to 2001.
- (b) There has been a steady consistent increase in the number of OBC candidates from 1996–2001.
- (c) The number of deals has almost doubled in 2001 over 1996.
- (d) None of the above.
6. What is the average marks per student in the OBC category in the year 2000?
- (a) 16
- (b) 48
- (c) 37
- (d) 26

**Directions for Questions 7 to 11:** Study the following graph ([Figure 1.7](#)) carefully and answer the given questions.



**Figure 1.7** Trends in Food and Fertiliser Production

7. If food production is related to the previous year's fertiliser production, then the food production is most puzzling for the year:
- (a) 2001
- (b) 1997
- (c) 2000
- (d) Both '00 and '01
8. Looking at the trend in the graph, food production in the year 2002 is

expected to:

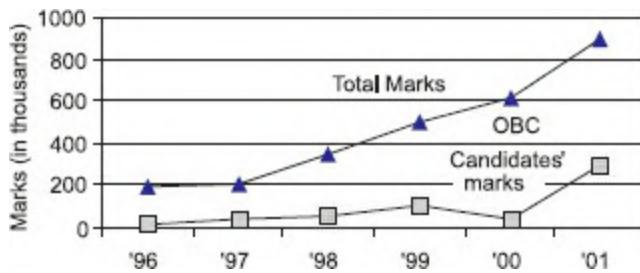
- (a) go up
  - (b) go down
  - (c) remain the same as for the previous year
  - (d) indeterminate
9. Fertiliser production in the year 2002 is expected to:
- (a) go up
  - (b) go down
  - (c) remain the same as that for the previous year
  - (d) indeterminate
10. Based on the data for four years, Mr Rishi concluded that food production is inversely related to fertiliser production. This conclusion was based on the data for the years:
- (a) 1993–96
  - (b) 1995–98
  - (c) 1997–2000
  - (d) 1998–01
11. Which of the following statements is true?
- (a) Food production in any given year depends on the fertiliser production in the previous year.
  - (b) Food production in any given year depends on the fertiliser production in the year before the previous one.
  - (c) There is no clear relationship between food and fertiliser production.
  - (d) Food production is inversely related to the fertiliser production.

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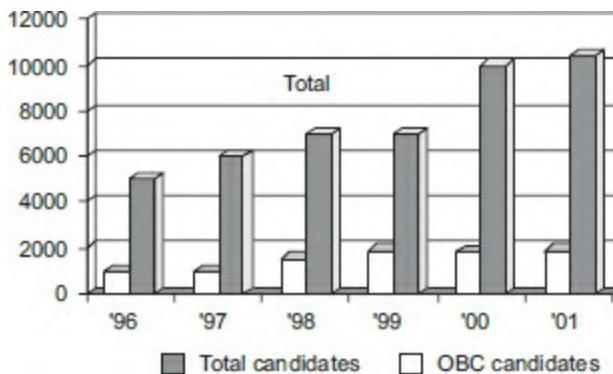
## TEN MINUTE TEST-6

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**Directions for Questions 1 to 10:** The questions are based on the following graph ([Figure 1.8](#)), which give the value of the total marks scored in the given years by the candidates appearing for the CAT as also the number of candidates ([Figure 1.9](#)).



**Figure 1.8** Value of Total Marks



**Figure 1.9** Number of Candidates

**Directions for Questions 1 to 4:** From the following data answer the questions given below that.

Roads P, Q and T run from south to north and roads R and S run from north to south. The order of the roads, from left to right, is P, Q, R, S and T. Road U runs from west to east and road V runs in a south-eastern direction. U, V and T intersect at B. Road W run from east to west. W, V and R intersect at A.

All roads are one-way roads and the traffic is allowed only in the direction of the road. In going from one point to another no intersection is crossed more than once.

1. How many routes connect the intersections of roads U and R, and V and T?  
 (a) 8  
 (b) 1  
 (c) 6  
 (d) None of these

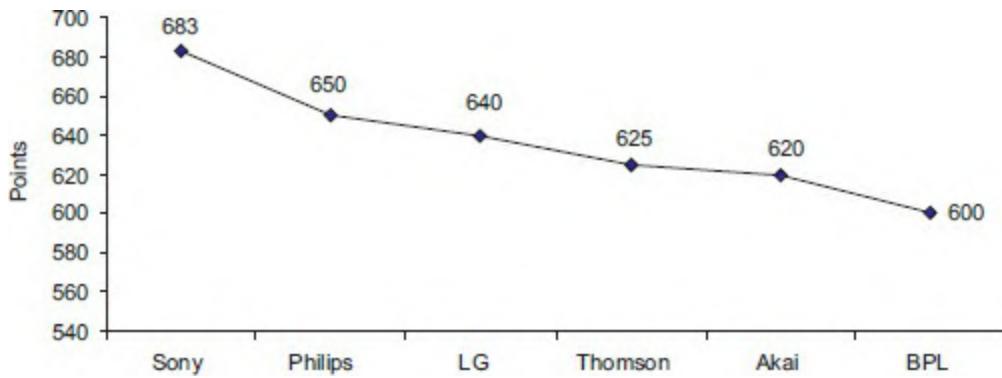
2. How many different routes can one take in going from A to B?

  - (a) 1
  - (b) 2
  - (c) 3
  - (d) None of these
3. How many routes can one take in going from the intersection of roads W and Q to the intersection of roads T and V?

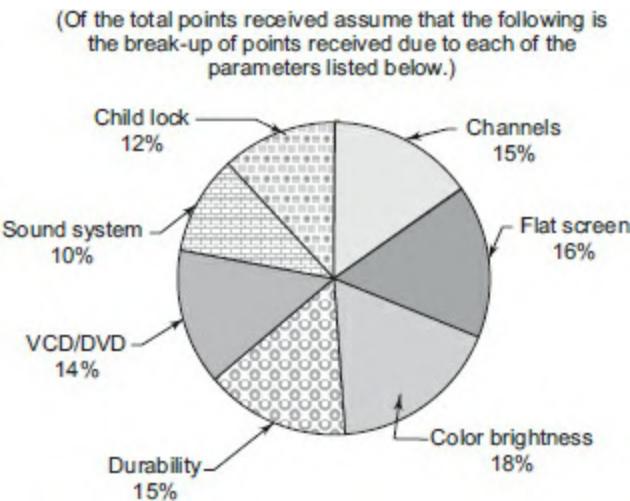
  - (a) 2
  - (b) 4
  - (c) 6
  - (d) None of these
4. In taking the longest route from B to A, what is the maximum number of intersections, excluding B and A that one has to cross?

  - (a) 8
  - (b) 6
  - (c) 2
  - (d) None of these

**Directions for Questions 5 to 9:** Study the following figures [[Figures 1.10\(a\)](#) and [1.10\(b\)](#)] and answer the questions given below that.



**Figure 1.10(a)**



**Figure 1.10(b)**

5. The points obtained by Thomson for durability is equal to which of the following?
  - (a) LG—sound system
  - (b) Akai—color brightness
  - (c) BPL—flat screen
  - (d) Thomson—channels
6. What is the total number of points earned by all the TVs for channels?
  - (a) 490.42
  - (b) 513.72
  - (c) 553.70
  - (d) 572.70
7. What are the average points per CTV earned for child lock?
  - (a) 80.34
  - (b) 76.36
  - (c) 70.42
  - (d) 86.89
8. The sound system of L.G. is approximately what percentage of the flat screen of Sony?
  - (a) 52%
  - (b) 171%
  - (c) 59%

- (d) 64%
9. The points earned by Philips for VCD/DVD is what percentage more/less than the points earned by BPL for color brightness?
- (a) 15.74% (less)  
(b) 15.74% (more)  
(c) 22.84% (more)  
(d) 22.84% (less)

**Directions for Questions 10 to 13:** From the data given below solve the questions:

Two brothers, Harish and Sanjay bought four acres of land in 1990 and started cultivating it in 1991. They produced 1,000 kg of jowar per acre that year. Being the elder brother, Harish decided the proportion in which the total production would be shared. He retained 1,800 kg and gave the rest to Sanjay. In 1994, when the production was twice that in 1991, Harish gave 60% of the production to Sanjay. Sanjay found that Harish was more considerate in that year than in 1992, when he had received 2,700 kg which was only 200 kg more than what Harish would have retained, had the production been divided equally. In 1995, when the production was twice that of 1993, Harish retained 9,000 kg, which was 75% of the total production in 1995.

10. In 1991 Harish and Sanjay had shared the production in the ratio:
- (a) 1 : 1  
(b) 9 : 11  
(c) 11 : 9  
(d) none of the above
11. The increase in production between 1993 and 1994 was:
- (a) 1,000 kg  
(b) 1,500 kg  
(c) 2,000 kg  
(d) 3,500 kg
12. The quantity of jowar received by Harish in 1991 as a ratio of quantity received in 1995 is closer to:

- (a) 1 : 2
  - (b) 1 : 3
  - (c) 1 : 5
  - (d) 1 : 4
13. The quantity received by Sanjay in 1994 was:
- (a) four times the production of 1993
  - (b) one-fourth the production of 1993
  - (c) twice the production of 1992
  - (d) 40% of the production of 1995
- 

## TEN MINUTE TEST-7

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**Directions for Questions 1 to 5:** Study the data given below and answer the questions following that.

In a test of 400 students at IIM Ahmedabad, the number of students who pass in three different areas is given below.

|                           |     |
|---------------------------|-----|
| Finance only              | 80  |
| Finance but not marketing | 100 |
| Finance and HR            | 30  |
| Finance                   | 130 |
| Marketing and HR          | 35  |
| HR                        | 130 |
| None of the three areas   | 120 |

Finance-F; Marketing-M; HR-H.

1. The frequencies of which of the following are equal?
  - (a) F and M
  - (b) F only and H only
  - (c) F and H but not M and F and M but not H
  - (d) None of the above
2. The number of students who pass in marketing but not in finance.

- (a) 75
  - (b) 50
  - (c) 85
  - (d) 105
3. The number of students who didn't pass in any of the area is how many times to that of who pass in all the three areas?
- (a) 12
  - (b) 10
  - (c) 6
  - (d) 15
4. The percentage of students who pass in marketing only
- (a) 12.5
  - (b) 20
  - (c) 16
  - (d) 10
5. The number of students who pass in only two areas is
- (a) 75
  - (b) 65
  - (c) 50
  - (d) 45

**Directions for Questions 6 to 11:** Study the table ([Table 1.5](#)) and answer the questions based on the information contained in the table.

6. If NP/NW ratio is considered to be an index of performance, which of the companies is the best performer?
- (a) TISCO
  - (b) Raymond
  - (c) Bajaj Auto
  - (d) Hero Honda
7. Highest gross profit on sales has been achieved by:
- (a) RIL
  - (b) HLL
  - (c) ITC

- (d) HINDALCO
8. If executive compensation is a function of only net profit on sales, which organisation could be expected to be most remunerative for an executive?
- (a) RIL
  - (b) Bajaj Auto
  - (c) Hero Honda
  - (d) Raymond
9. RIL is the best in:
- (a) Gross Profit over Total Assets
  - (b) Net Profit over Net Worth
  - (c) Net Worth over Total Assets
  - (d) None of these
10. If returns on investment are a function of only net profit over net worth, which company should a person invest in?
- (a) TISCO
  - (b) HLL
  - (c) RIL
  - (d) Bajaj Auto

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**Table 1.5** Financial Performances of Ten Companies for a Particular Year

| Company    | Total Assets | Net Worth | Total Borrowing | Net Sales | Op. profits |
|------------|--------------|-----------|-----------------|-----------|-------------|
| TISCO      | 3,124,567    | 876,547   | 11,213.45       | 2,133,467 | 345,612     |
| HINDALCO   | 2,114,326    | 899,764   | 778,585         | 1,343,216 | 332,541     |
| RIL        | 1,321,453    | 689,764   | 165,764         | 564,327   | 154,323     |
| HLL        | 1,211,134    | 332,415   | 544,315         | 167,753   | 87,654      |
| Raymond    | 616,634      | 408,863   | 460,613         | 466,452   | 61,332      |
| Bajaj Auto | 387,644      | 586,757   | 586,535         | 401,517   | 31,863      |
| ACC        | 332,826      | 476,067   | 545,456         | 216,376   | 13,604      |
| L&T        | 355,664      | 455,057   | 61,671          | 271,334   | 15,608      |
| ITC        | 243,863      | 541,133   | 547,334         | 252,830   | 64,416      |
| Hero Honda | 502,622      | 64,677    | 602,613         | 5,655,462 | 46,301      |
| TISCO      | 430,344      | 516,306   | 20.17111        | 13.77292  | 58.90226    |
| HINDALCO   | 446,760      | 531,133   | 33.26047        | 21.13014  | 59.03026    |
| RIL        | 523,268      | 576,301   | 92.72425        | 39.59793  | 83.55046    |
| HLL        | 67,876       | 16,320    | 40.46187        | 5.604334  | 4.909526    |
| Raymond    | 40,665       | 53,620    | 8.717939        | 6.594674  | 13.11442    |
| Bajaj Auto | 46,687       | 546,678   | 11.62765        | 12.04378  | 93.1694     |
| ACC        | 22,066       | 44,354    | 10.19799        | 6.629891  | 9.316756    |
| L&T        | 33,774       | 46,626    | 12.44739        | 9.496041  | 10.24619    |
| ITC        | 13,645       | 22,264    | 5.396907        | 5.595355  | 4.11433     |
| Hero Honda | 562.26       | 9871      | 0.994189        | 11.18654  | 15.26199    |

NP = Net Profits NW= Net Worth GP = Gross Profit TA= Total Assets N Sales= Net Sales

11. Suppose, lower the total borrowings in relation to total assets, the safer the investment in the company, which company should a person invest in? (If safety is the only consideration for investment)
- (a) TISCO
  - (b) RIL
  - (c) L&T
  - (d) Hero Honda

## TEN MINUTE TEST-8

**Directions for Questions 1 to 5:** Four newspapers were evaluated on four parameters and their scores listed ([Table 1.6](#)). The net score on which the rankings are based, is calculated as a weighted average of the four scores. Read the data carefully and answer the questions that follow. Assume equal weightages unless otherwise stated.

**Table 1.6** Score Card

|                | <i>Price</i> | <i>International</i> | <i>Sports</i> | <i>Political</i> |
|----------------|--------------|----------------------|---------------|------------------|
| HT             | 5            | 7                    | 6             | 7                |
| TOI            | 8            | 6                    | 5             | 5                |
| Telegraph      | 7            | 7                    | 6             | 6                |
| Indian Express | 6            | 7                    | 7             | 5                |

1. What would be HT's rank if equal weightages were given to all the four parameters?
  - (a) 2<sup>nd</sup>
  - (b) 1<sup>st</sup>
  - (c) 4<sup>th</sup>
  - (d) Cannot be determined
2. If a new newspaper offers sports like TOI, price like Indian Express, international news as good as Telegraph and political news equal to that of HT, then what would be its rank?
  - (a) 2<sup>nd</sup>
  - (b) 3<sup>rd</sup>
  - (c) 4<sup>th</sup>
  - (d) 5<sup>th</sup>
3. Which newspaper was ranked second best?
  - (a) HT
  - (b) Indian Express
  - (c) Telegraph
  - (d) Both (a) and (b)
4. If price is not a consideration and equal weights are given to the other parameters, which newspaper should be chosen?
  - (a) HT
  - (b) TOI
  - (c) Telegraph
  - (d) Both (a) and (b)
5. In how many parameters does TOI get the least score among all newspapers?
  - (a) One
  - (b) Two
  - (c) Three

(d) Four

**Directions for Questions 6 to 10:** Refer to the information given below to answer the following questions.

The modern Alladin has a charm which has 6 switches A, B, C, D, E and F in that order arranged in a row. They can be switched on in various combinations to call different animals to his service. We also know that:

When all the switches are off, no animal appears.

When only one switch or two alternate switches are on, a cat appears.

When only two adjacent switches are on, a dog appears.

When three consecutive switches are on, a tiger appears.

For all other combinations, a squirrel appears.

At a time, only one animal appears.

6. If C is kept on as a constraint, how many ways are there of calling a tiger?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
7. In how many ways can a cat be called?
  - (a) 8
  - (b) 10
  - (c) 11
  - (d) 12
8. Alladin is in a difficult situation where only a tiger or a dog can help him. In how many ways can he save himself?
  - (a) 8
  - (b) 9
  - (c) 10
  - (d) 11
9. In how many ways can a dog be called if F is kept on?
  - (a) 6
  - (b) 1

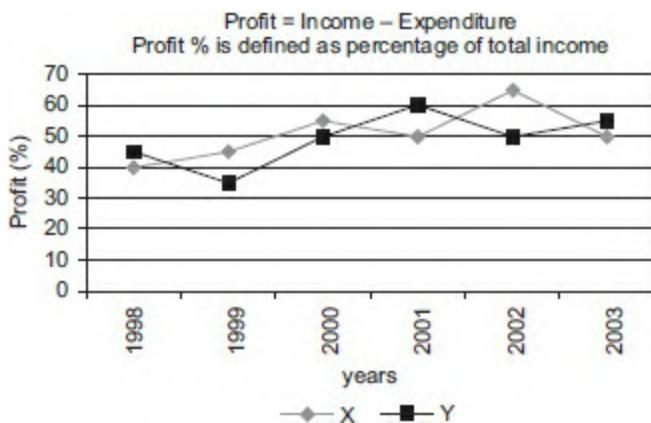
- (c) 2  
(d) 5
10. If A is always on, in how many ways can a cat be called?
- (a) 3  
(b) 2  
(c) 0  
(d) 1

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## TEN MINUTE TEST-9

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**Directions for Questions 1 to 5:** Study the following graph carefully and answer the questions which follow. Assume that all the values either end in 0 or 5.



**Figure 1.11** Profits for Companies X and Y

- If the profit of Company Y in the year 1999 was ₦ 108,000, what was its approximate expenditure in that year?
  - ₦ 900,000
  - ₦ 80,000
  - ₦ 185,000
  - ₦ 200,000
- If Company X spent ₦ 350,000 in the year 2000, the income of Company X in that year was approximately equal to:
  - ₦ 542,500

- (b) ₹ 525,000  
(c) ₹ 525,800  
(d) None of these
3. If the expenditures of both the Companies X and Y in the year 2002 were equal, then what was the ratio between the income of Company X to Company Y?
- (a) 5 : 4  
(b) 10 : 7  
(c) 16 : 5  
(d) 15 : 6
4. In which of the following years was the second highest percentage change in profit percentage over the previous year in the case of Company X?
- (a) 2002  
(b) 2000  
(c) 2001  
(d) None of these
5. If the expenditure of Company X in the year 2000 was ₹ 250,000 and the income of 2000 was the expenditure in the year 2001, find out its percentage change in income for the year 2001.
- (a) 50%  
(b) 100%  
(c) 75%  
(d) None of these

**Directions for Questions 6 to 10:** From the information given below answer the questions.

In a certain code, the symbol for 0 (zero) is A and for 1 is B. There are no other symbols for all other numbers greater than 1. The numbers greater than 1 are to be written only by using the two symbols given above. Some examples have been done for you.

0 is written as A.

1 is written as B.

*2 is written as BA.*

*3 is written as BB.*

*4 is written as BAA and so on.*

6. Which of the following will represent 13?
  - (a) BBAA
  - (b) BBAB
  - (c) BABA
  - (d) BAAB
7. Which of the following will represent the value of the expression  $4 \times 3 + 2 \times 2 + 1$ ?
  - (a) BABAA
  - (b) BABAB
  - (c) BAABA
  - (d) BAAAB
8. Which of the following numbers will be represented by: BABAABB?
  - (a) 82
  - (b) 81
  - (c) 85
  - (d) 83
9. Which of the following numbers will be represented by BAAABBBA?
  - (a) 144
  - (b) 142
  - (c) 140
  - (d) None of the above
10. Which of the following will represent 18?
  - (a) BABAA
  - (b) BABBA
  - (c) BAABA
  - (d) BAAAB

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## TEN MINUTE TEST-10

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**Directions for Questions 1 to 4:** Based on the information available in Table 1.7, answer the questions.

**Table 1.7** Income Patterns of the African Republic of Hara Kiri over 4 Years

| Period | Direct Taxes | Indirect Taxes | Loans  | Total   |
|--------|--------------|----------------|--------|---------|
| 2001   | 352.5        | 214.8          | 637.9  | 1205.2  |
| 2002   | 710.1        | 700.4          | 1037.9 | 2448.4  |
| 2003   | 1196.0       | 1302.9         | 2151.2 | 4650.1  |
| 2004   | 4547.5       | 3846.7         | 2585.1 | 10979.3 |

1. More than one third of the total amount generated in the year 2004 was due to:
  - (a) Direct taxes
  - (b) Indirect taxes
  - (c) Loans
  - (d) Direct taxes & indirect taxes
2. Which of the following is/are true?
  - I. Value of the total income in every year was more than twice that of the previous year for every year.
  - II. Over the period shown more than 50% of the total income was contributed by direct taxes.
  - III. Value of total income generated by the country of Hara Kiri increased by more than 800% in the given four years.
  - (a) I and III
  - (b) II and III
  - (c) I and II
  - (d) III only
3. The highest percentage growth in income was shown in which year?
  - (a) 2002
  - (b) 2003
  - (c) 2004
  - (d) 2002 & 2004

4. Percentage of contribution by which of the following in the year 2004 was less than that of the year 2001?
- (a) Direct Taxes
  - (b) Indirect Taxes
  - (c) Loans
  - (d) None of the above

**Directions for Questions 5 to 10:** Study the following table (Table 1.8) and solve the questions based on it.

5. Approximately what is the maximum difference numbering between the percentages of total marks obtained by any two students?
- (a) 15
  - (b) 10
  - (c) 12
  - (d) 20
6. Approximately what is the average of marks obtained by the seven students in Corporate Awareness?
- (a) 126
  - (b) 116
  - (c) 106
  - (d) 96
7. What is the difference between the percentage of marks obtained by student E in Data Interpretation and Maths together and the percentage of marks obtained by student A in Reasoning and English together?
- (a) 16.3%
  - (b) 28.9%
  - (c) 12
  - (d) 27.4%
8. The average of marks obtained by all students in Maths is how many times the average of their marks in English?
- (a) 3
  - (b) 3.25
  - (c) 3.75

- (d) 4
9. Approximately, what are the average marks obtained by the seven students in Reading Comprehension?
- (a) 62  
(b) 61  
(c) 65  
(d) 64
10. What is the percentage of marks obtained by student F in Corporate Awareness, English and Reasoning together?
- (a) 52  
(b) 56  
(c) 68  
(d) 65

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**Table 1.8** Marks Obtained by Seven Students in Different Subjects in the AMS Open CAT Challenge

| Students' Subject                  | A   | B   | C   | D   | E   | F   | G   |
|------------------------------------|-----|-----|-----|-----|-----|-----|-----|
| Reading comprehension (out of 100) | 65  | 58  | 73  | 75  | 68  | 56  | 51  |
| Data interpretation (out of 100)   | 59  | 63  | 69  | 52  | 71  | 49  | 72  |
| Maths (out of 150)                 | 132 | 105 | 141 | 128 | 119 | 120 | 135 |
| Reasoning (out of 200)             | 138 | 126 | 162 | 144 | 150 | 118 | 132 |
| English (out of 150)               | 32  | 27  | 33  | 41  | 29  | 35  | 37  |
| Corporate awareness (out of 150)   | 105 | 98  | 112 | 106 | 119 | 107 | 96  |
| Total (out of 750)                 | 531 | 477 | 590 | 546 | 556 | 485 | 523 |

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## ANSWER KEY

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### Test 1

1. (d)
2. (c)
3. (d)
4. (a)
5. (a)
6. (c)

7. (a)
8. (c)
9. (b)
10. (b)
11. (a)
12. (b)

## Test 2

1. (c)
2. (d)
3. (d)
4. (d)
5. (a)
6. (c)
7. (c)
8. (c)
9. (b)
10. (c)

## Test 3

1. (c)
2. (d)
3. (b)
4. (d)
5. (d)
6. (d)
7. (d)
8. (a)
9. (d)
10. (c)

## Test 4

1. (a)

- 2. (b)
- 3. (a)
- 4. (d)
- 5. (a)
- 6. (d)
- 7. (a)
- 8. (b)
- 9. (d)
- 10. (b)
- 11. (b)
- 12. (b)
- 13. (a)

## Test 5

- 1. (a)
- 2. (d)
- 3. (d)
- 4. (a)
- 5. (d)
- 6. (b)
- 7. (b)
- 8. (b)
- 9. (c)
- 10. (b)
- 11. (a)

## Test 6

- 1. (b)
- 2. (c)
- 3. (d)
- 4. (c)
- 5. (d)
- 6. (d)

- 7. (b)
- 8. (c)
- 9. (a)
- 10. (b)
- 11. (c)
- 12. (c)
- 13. (d)

## Test 7

- 1. (c)
- 2. (a)
- 3. (a)
- 4. (a)
- 5. (b)
- 6. (c)
- 7. (a)
- 8. (b)
- 9. (a)
- 10. (d)
- 11. (a)

## Test 8

- 1. (a)
- 2. (a)
- 3. (d)
- 4. (a)
- 5. (c)
- 6. (c)
- 7. (b)
- 8. (b)
- 9. (b)
- 10. (b)
- 11. (d)

12. (d)

## Test 9

1. (d)
2. (d)
3. (b)
4. (d)
5. (b)
6. (b)
7. (d)
8. (d)
9. (b)
10. (c)

## Test 10

1. (d)
2. (d)
3. (c)
4. (c)
5. (a)
6. (c)
7. (d)
8. (c)
9. (d)
10. (a)

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## SOLUTIONS

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## Test 1

1. (d) Given

For a population of 10000 we have 0.8% cancer cases.

So for  $x$  population there will be  $\frac{0.8}{10000} \times \frac{x}{100}$  cancer cases

For country AD, in 2006, cancer cases for  $x$  population =  $\frac{71}{100}$

$$\Rightarrow \frac{71}{100} = \frac{0.8x}{10,000} \times \frac{1}{100}$$

$$x = 8,87,500$$

2. (c) Country N has the second highest number of cancer cases during 2006.
3. (d) From the table we can see that M, AJ and T have cancer cases less than 2000 in both 2006 & 2007.
4. (a) The ratio of cancer cases reported in early 2007 is 14/12 for V & T  
so  $\frac{14}{12} = \frac{7}{6}$ .
5. (a) 25000+ cancer cases are in N  $\rightarrow$  56300 & in AG  $\rightarrow$  644500.
6. (c) Divide each numbering the data by 10 to check whether the resultant value is greater than 5. We will get 20 such countries.
7. (a) I) The reported cancer cases of M, W & AJ in rate percent = 0.0%  
So it is true.

II) P has 4700 cancer cases given in table.

III) Population of R is 674000—so the given statement is false.

$$\frac{5}{10000} \times \frac{x}{100} = \frac{337}{100}$$

$$x = 674000.$$

IV) P reported only 1100 cases, so the given statement is false.

8. (c) From the figure we can see that sales in 2001 is 50 crore and gross profit is 25 crore.

9. (b) Sum of gross profit for the entire period = 75.

$$\text{Sum of sales for the entire period} = 165. \text{ Ratio} = \frac{75}{165} = \frac{5}{11}$$

10. (b) The avg gross profit = (Total Profit / Total Sales)

$$\times 100 = \frac{75}{165} = 100 \times 45.45\%$$

11. (a) The avg annual growth in sales

$$= \frac{50 - 30}{3} = \frac{20}{3} = 6.66$$

12. (b) Increase in gross profit in the year 2000 is 10 crore and increase in sales in the same year is only 5 crore. Thus, the year 2000 exhibits

higher increase in gross profit than increase in sales.

## Test 2

1. (c) West zone has the minimum house ownership worries.
2. (d) It cannot be determined.
3. (d) Calculate the number of persons from the table and pie chart as follows:

$$\frac{87}{100} \times \frac{40}{100} \times 5000 \text{ for North,}$$

$$\frac{56}{100} \times \frac{16}{100} \times 5000 \text{ for South and so on.}$$

Then adding all of them we will get 3951.

4. (d) Cannot be determined.
5. (a) Present users of all the soaps —  $795 + 405 + 225 + 225 = 1650$ . Past users of all the soaps —  $570 + 435 + 240 + 255 = 1500$ . Percentage increase =  $(1650 - 1500) * 100 / 1500 = 10\%$ .
6. (c) From the table we can see that market shares of Liril, Dove and Nivea have decreased.
7. (c) 20% increase in total soap users ( $795 + 405 + 225 + 225 = 1650$ ) = 1980.  
25% increase in Lux users = 993.75. So we get  $993.75 * 100 / 1980 = 50.2\%$
8. (c)  $1650 * 1.5 / 100 = 24.75$  tonnes per month.
9. (b) The decrease in usage of Liril =  $\frac{435 - 405}{1650} \times 100$   
 $= 1.81\%$
10. (c) Palmolive will have =  $10\%$  of  $795 + 10\%$  of  $405 + 8\%$  of  $225 + 6\%$  of  $225 = 153$ .

## Test 3

1. (c) Toshiba sales in 1998 →  $12\%$  of  $7890 = 946.8$

In 1999 sales increases by  $16.5\% = 9191.85$

Toshiba sales →  $8\%$  of  $9191.85 = 735.34$

$$\% \text{ change in sales} = \frac{946.8 - 735.34}{946.8} \% = 22\%$$

2. (d) All of these.

3. (b) Ratio of Compaq sales (1998) to IBM sales (1999)

$$= \frac{1656.9}{1562.6} = 1.06$$

4. (d) Compaq has the maximum increase in sales from 21% of 7890 to 25% of 7890  $\times$  1.165  $\rightarrow$  change of 641

5. (d) IBM's sales in 1998 = 1341

Samsung's sales in 1999 = 2206

$$\text{In terms of \%} = \frac{1341}{2206} \times 100 = 60.8\%$$

6. (d) Price = ₹ 12

25% increase in price, so the price  $\rightarrow 12 + 3 = 15$

$$\text{Now } Q = 25 - P$$

$$= 25 - 12$$

$$= 13$$

$$\text{Revenue, } R = PQ = 156$$

$$\begin{aligned}\text{New revenue} &= 15 \times (25 - 15) \\ &= 150\end{aligned}$$

$$\% \text{ change in revenue} = \frac{150 - 156}{156} \times 100 = -3.84\%$$

7. (d) Revenue =  $P \times Q$

$$= (25 - P) \times P$$

For price = ₹ 12.5

$$\begin{aligned}\text{Revenue} &= 12.5(25 - 12.5) \\ &= 156.25\end{aligned}$$

It is the highest revenue.

8. (a) The value of  $Q$  should be larger to maximise the revenue.

9. (d) In all the cases revenue is same as 156.

10. (c) As the price decreases, quantity will increase and revenue will decrease. As the price increases, the quantity will decrease and revenue will also increase. So the only statement that holds true is— as the quantity of goods sold increases, the price decreases.

## Test 4

1. (a) From the bar chart  $\rightarrow$  160000—sale of cell phones for 1999.

$$2. (b) \text{The \% increase in sale} = \frac{190 - 160}{160} \% = 18.75\%$$

3. (a) Percentage of total production sold in 1999 =  $\frac{160}{230} \times 100$   
 $= 69.5\% = \text{Less than } 70\%$

4. (d) In 2002, there was maximum % change in production.
5. (a) In 1999, the sale of cell phones shows a negative trend as the sale fell as compared to that in 1998.
6. (d) From the options we have to select 729 which is  $(27)^2$ , because in this case only the equation  $PR \times QR = SSS$  gets satisfied.  
 So  $P \rightarrow 2$ ,  $R \rightarrow 7$ ,  
 $Q > P$  so  $Q = 3$ .  
 $PR \times QR = 27 \times 37 = 999$
7. (a) From the options select  
 $P = 9$   
 $Q9 + 9 = 9Q$ , then Q should be 8.  
 $89 + 9 = 98$ .
8. (b) In order to solve this question, you need to realise that an expression like  $RRR + Q = QPPP$  means a 3-digit number is getting changed to a 4-digit number on addition of a single digit number. This can only occur if  $Q = 1$ .  
 Thus, we have  $RRR + 1 = 1PPP$ .  
 Clearly the equation should be  $999 + 1 = 1000 \rightarrow$  giving us  $P = 0$ .
9. (d)  $A = P(1 + r/100)^n$  so,  $500 = P*(1.2)^2$ , hence  $P = 347$ .
10. (b) Since the profits have doubled so new profit =  $500 \times 2$  crore  
 And sales have doubled, so new sale =  $7500 \times 3$  crore  
 $\text{Ratio} = \frac{500 \times 2}{7500 \times 3}$   
 $= 1/22.5$
11. (b)  $\frac{\text{Profit}}{\text{sales}} \times 100$  is the highest for detergent, i.e, 8.48.
12. (b) Sales of soap = 28% of 7500 crore  
 Sales of detergent = 11% of 7500 crore  
 Ratio =  $2.4 \approx 2 : 1$  (closest one).
13. (a) Sales of tea division = 14% of 7500 crore  
 Profit of tea division = 15% of 500 = 75 crore  
 Sales – Profit =  $1050 - 75 = 975$  crore

## Test 5

1. (a) The average marks are approximately  $900000/10000 = 90$ . Option (a) is the closest.
2. (b) Here the safest answer is option (b). Since it can be seen that the marks per student has actually grown.
3. (b)  $\text{Average marks} = \frac{380 - 50}{6800 - 1800} \times 1000 = 66$   
The closest option is (b).
4. (c)  $\text{Average marks for OBC category} = \frac{5}{700} \times 1000 = 7.14$   
The closest option is (c).
5. (b) The number of OBC candidates shows a fall in 2000.
6. (a)  $\text{Average marks per student} = \frac{30}{1900} \times 1000 = 15.7 \approx 16$
7. (d) Food production shows an opposite trend to fertiliser production of the previous year for the years 2000 and 2001. Hence, it is most puzzling during those years.
8. (a) A close look at the chart shows us that the food production is lagging behind fertiliser production by two years. Hence, since fertiliser production in 2000 has gone up, fertiliser production in 2002 would be expected to go up.
9. (d) It cannot be determined.
10. (b) The inverse relationship is seen in the figure from 1995–1998.
11. (b) Food production depends on the fertilizer production in the year before the previous one. It can be seen in the graph.

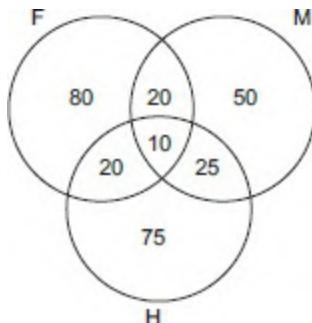
## Test 6

1. (b) There is only 1 route.
2. (c) 3
3. (d) There are 3 routes.
4. (c) There are two intersections – TW and SW
5. (d) Channels and Durability both have the same break up of points.
6. (d)  $15\% \text{ of } (683 + 650 + 640 + 625 + 620 + 600) = 572.70$
7. (b)  $12\% \text{ of } (\text{average of all the given points})$

8. (c) Sound system of LG has 64 points  
Flat screen of Sony has 109.28 points  
So we get  $\frac{64}{109.28} \times 100 = 58.9\%$ .  
Closest option is (c).
9. (a)  $14\% \text{ of } 650 = 91$  (for Philips)  
 $18\% \text{ of } 600 = 108$  (for BPL)  
 $\frac{108 - 91}{108} \times 100 = 15.74\%$  (less)
10. (b) The production in 1991 = 1000 kg per acre. So total = 4000 kgs, so share =  $1800:2200 = 9:11$
11. (c) Production in 1993 = 6000 kgs and in 1994 = 8000 kgs, so 2000 kgs increase.
12. (c) Share in 1991 = 1800 and in 1995 = 9000, so ratio =  $1800:9000 = 1:5$ .
13. (d) Production in 1995 = 12000 kgs and Sanjay's share in 1994 = 4800 Kgs, which is 40% of 12000.

## Test 7

- 1 (c) From the table we can see that F and H have same frequencies i.e. 130.



2. (a) From the figure, we can see that the number of students who pass in Marketing but not in Finance =  $50 + 25 = 75$ .
3. (a)
- $$\frac{\text{number of students who didn't pass in any of the areas}}{\text{number of students who pass in all the three areas}} \times 100 = 12$$

4. (a) Percentage of students who pass in M only  
 $= \frac{50}{400} \times 100 = 12.5\%$
5. (b) Number of students who pass in only two areas =  $20 + 20 + 25 = 65$
6. (c)  $\frac{546678}{586757} = 0.931$ . So Bajaj Auto is the best performer.
7. (a) From the GP/N sales column we can see that RIL has the highest profit on sales, i.e., 92.72425.
8. (b) Net profit/sales for Bajaj Auto is the highest i.e. 1.36.
9. (a) RIL is the best in gross profit over total assets.
10. (d) Bajaj Auto has the maximum net profit over net worth.  
 $= \frac{546678}{586757} = 0.931$ .
11. (a) TISCO has the lowest total borrowing over total assets.

## Test 8

1. (a) HT's score is  $5 + 7 + 6 + 7 = 25$  which is the second highest score.
2. (a) Score of that new newspaper =  $6 + 7 + 5 + 7 = 25$   
 Rank is 2nd.
3. (d) Indian Express got the second best rank with score = 25.
4. (a) HT got the maximum point in this case  $7 + 7 + 6 = 20$ .
5. (c) In three parameters, namely, international sports, news and political, TOI got the least score.
6. (c) Three consecutive switches must be on in order to call a tiger. Since, C is already on, the tiger can be called in 3 ways by additionally putting on the switches AB, BD or DE.
7. (b) 6 switches separately and two alternate switches as AC, BD DF CE.  
 So the number of ways is  $6 + 4 = 10$  ways.
8. (b) For calling a dog there are AB, BC, CD, DE, EF = 5 ways.  
 For calling a tiger there are ABC, BCD, CDE, DEF = 4 ways.  
 Total number of ways =  $5 + 4 = 9$ .
9. (b) Only one way EF, should be ON.
10. (b) Cat can be called by two ways A & AC.

## Test 9

1. (d) Profit of company Y = ₹ 108000

Suppose income = x

$$35x/100 = x - 108000 \rightarrow x = 308571.42$$

Expenditure = income - profit

$$= 308571.42 - 108000$$

$$= 200571 \dots \text{closest option is d.}$$

2. (d) Suppose income of company X = x

$$55x/100 = x - 350000$$

$$x = ₹ 777777$$

3. (b) Assume the expenditure of both X and Y = E

Suppose income of x = I<sub>1</sub> and income of Y = I<sub>2</sub>.

$$\frac{65I_1}{100} = I_1 - E \text{ and } \frac{50I_2}{100} = I_2 - E$$

$$\text{So } E = 0.35 I_1 \text{ and } E = 0.50 I_2$$

$$0.35I_1 = 0.50I_2$$

$$I_1/I_2 = 50/35 \rightarrow 10/7$$

4. (d) The year 2000 shows the second highest percentage change—a change of 10% on 45% which represents a percentage change of 22.22%. This is lower than the percentage change in the year 2002. However, 2003 exhibits a higher percentage change than this. Hence, option (d) is correct.

5. (b) If expenditure in 2000 was 250000, it means that the income in that year was  $- 250000 \times 100/45 = 250000 \times 20/9 = 555555.55$

If this value is the expenditure for the next year- it means that the income for the next year would be double this number (since the profit % of company X for 2001 is 50%).

Hence, there would be a 100% increase in the income of company X in year 2001.

6. (d) Binary coding of B is 1101. 1 – B, 0 – A = BBAB

|   |    |   |
|---|----|---|
| 2 | 13 | 1 |
| 2 | 6  | 0 |
| 2 | 3  | 1 |
| 2 | 1  | 1 |
|   | 0  |   |

↑ remainder

7. (d)  $4 \times 3 + 2 \times 2 + 1 = 17$

Binary code of 17 is 10001. 1 – B, 0 – A = BAAAB.

8. (d) BABAABB can be written as 1010011 in binary form

$$1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 83.$$

9. (b) BAAABBBA can be written as 10001110 in binary form

$$1 \times 2^7 + 0 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 = 142.$$

10. (c) Binary code of 18 is 10010 = BAABA.

## Test 10

1. (d)  $4547.5/10979.3 = 0.41$

$$3846.7/10979.3 = 0.35$$

In both the cases we get more than one – third (0.33) of the total amount generated.

2. (d)  $\frac{10979.3 - 1205.2}{1205.2} \times 100 = 810\%$

3. (c) Highest percentage growth in income is shown in 2004.

4. (c) Percentage of contribution of loan in

$$2001 = \frac{637.9}{1205.2} \times 100 = 52.9\%$$

$$\text{And in 2004} = \frac{2585.1}{10979.3} \times 100 = 23.54\% .$$

5. (a) C got 78.6%, B got 63.6%

Maximum difference=15%

6. (c)  $(105 + 98 + 112 + 106 + 119 + 107 + 96)/7 = 106$

7. (d) Percent marks obtained by E in DI and Maths =  $190 * 100 / 250 = 76\%$

Percent marks obtained by A in Reasoning and English =  $170 * 100 / 350 = 48.5\%$

Difference is 27.5%.

8. (c) Average marks of all the students in Maths is  $880/7 = 125.71$

Average marks of all the students in English is  $234/7 = 33.42$

Ratio is  $125.7/33.42 = 3.76$

9. (d)  $(65 + 58 + 73 + 75 + 68 + 56 + 51)/7 = 64$

10. (a) Percent marks in all the three subjects  $(107 + 35 + 118) * 100 / (150 + 150 + 200) = 52\%$

## PART 6

# Mock Test Papers (Based on the Latest CAT Pattern)

***Chapter 1***  
Test Papers 1 to 30

### In This Part You will Learn:

- To solve simulated DI tests under time pressure and get an actual feel of the examination.
- To tackle CAT like simulated tests of the DI part of the QA and DI section.
  - To further improve the depth of your understanding and interpretation of data
  - To further improve your anticipation of questions when you see a data set

- To improve the depth and breadth of your exposure to DI questions as well as your DI problem-solving skills
- To improve your accuracy while solving DI questions
- To further improve your speed of solving and understanding of DI questions

***This Part Contains:***

- Model Test Papers containing good quality examination-level questions (with options) that cover the breadth and depth of questions that could be asked in Data Interpretation.

1. For each model test, first take the test under a strict thirty minute time frame. Ideally, you should be able to complete the paper in thirty minutes.

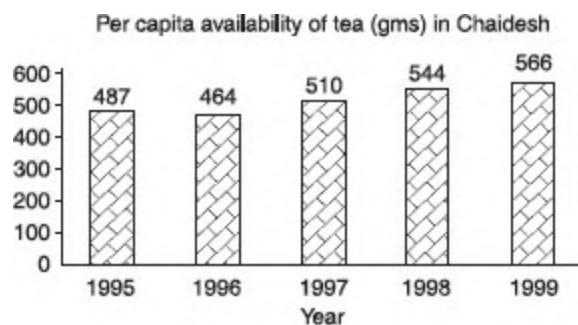
## 2. AFTER YOU FINISH SOLVING A TEST:

- (a) Check your errors and closely analyse the reasons for these errors. You would need to work on eliminating the error sources to become better at DI.
- (b) In case there are many unsolved questions and/or questions that you have not understood, go back and solve these questions.
- (c) Keep a chart of your scores as you progress through the tests in this part. Your score would be given by:  
No. of correct answers  $\times$  3 - numbers of wrong answers.
- (d) Because, each test consists of between 16–17 questions, each paper is out of 48 to 51 marks. You would be guided by the following numbers:  
Net Score: 40 + You are doing really well and just need to make sure that you execute the same in the actual exams;  
Net Score: 30 – 40 → There is room for improvement. Work on improving your understanding, your analysis and your speed and accuracy while solving DI.  
Net Score: Below 30: Clearly DI is not proving to be your strength. Focus on learning what errors you are making while solving. Think about how you can improve your speed and accuracy while solving. Focus on improving your understanding of data and try to push yourself first in the 30–40 category and finally in the 40+ category.

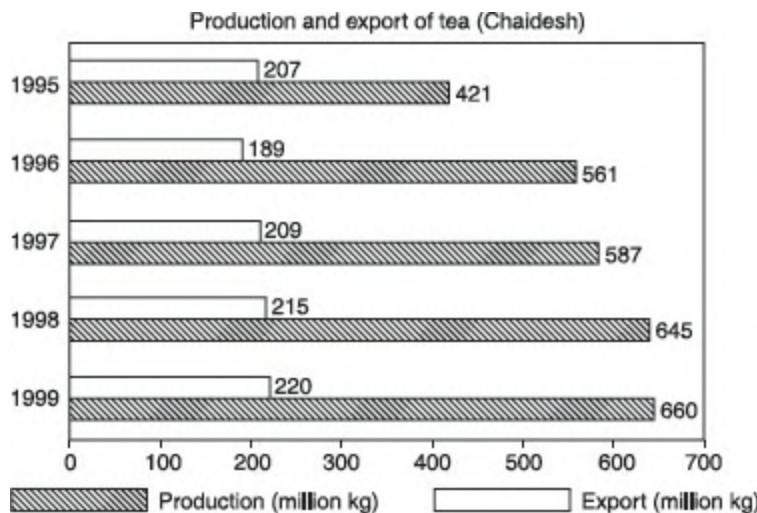
# 1

# Mock Test Paper

**Directions for Questions 1 to 3:** Answer the questions on the basis of the following charts.



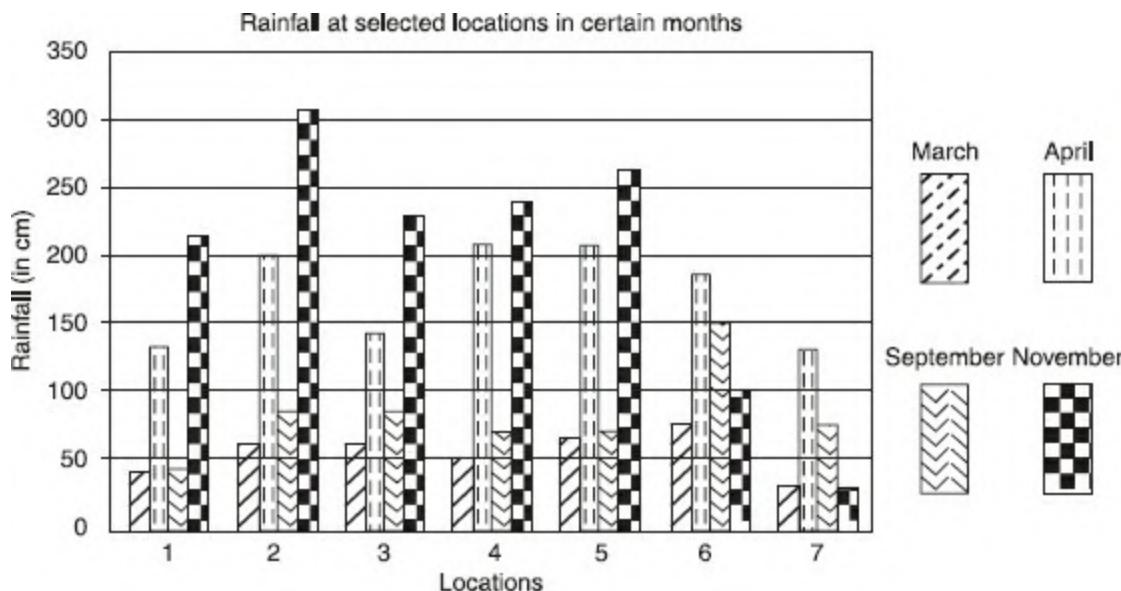
**Note:** Availability is defined as production less export.



1. In which year during the period 1996–99 was Chaidesh's export of tea, as a proportion of tea produced, the highest?
  - (a) 1996
  - (b) 1997

- (c) 1998  
 (d) 1999
2. In which of the following years was the population of Chaidesh the lowest?  
 (a) 1995  
 (b) 1996  
 (c) 1997  
 (d) 1999
3. The area under tea cultivation continuously decreased in all four years from 1996 to 1999, by 10%, 7%, 4%, and 1%, respectively. In which year was tea productivity (production per unit of area) the highest?  
 (a) 1999  
 (b) 1998  
 (c) 1997  
 (d) 1996

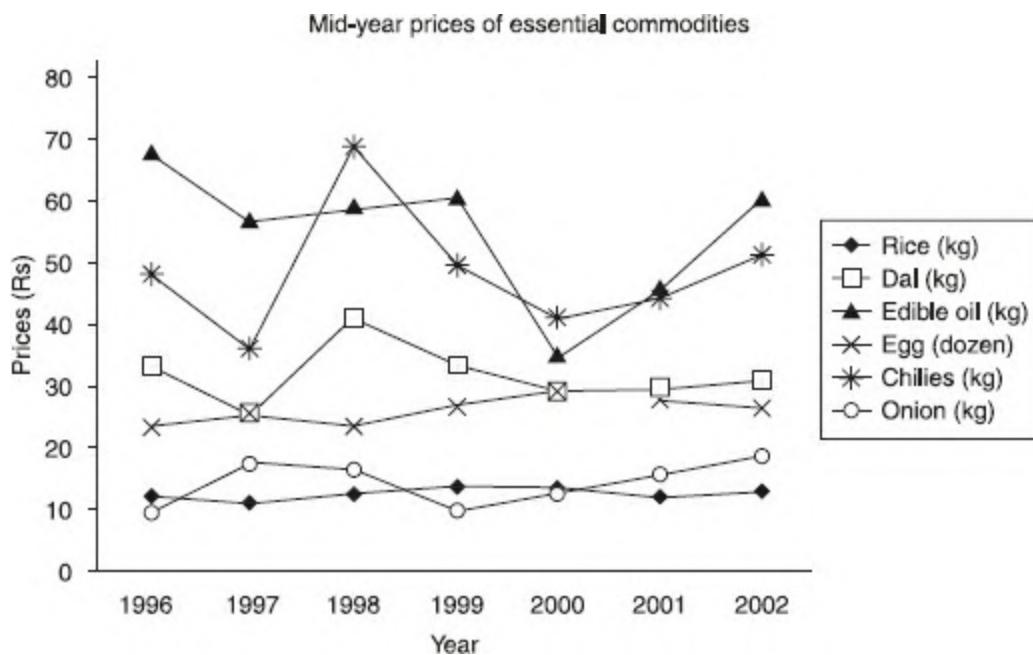
**Directions for Questions 4 to 5:** Answer the questions on the basis of the data presented in the figure below.



4. Which of the following statements is correct?  
 (a) November rainfall exceeds 100 cm in each location.  
 (b) September rainfall exceeds 50 cm in each location.

- (c) March rainfall is lower than September rainfall in each location.  
 (d) None of the above.
5. Locations 6 and 7 differ from all the rest because only in these two locations,  
 (a) April rainfall exceeds March rainfall.  
 (b) Peak rainfall occurs in April.  
 (c) November rainfall is lower than March rainfall.  
 (d) April rainfall is less than 200 cm.

**Directions for Questions 6 to 8:** Answer the questions on the basis of the data presented in the figure below.



6. During 1996–2002, the number of commodities that exhibited a net overall increase and a net overall decrease, respectively, were  
 (a) 3 and 3.  
 (b) 2 and 4.  
 (c) 4 and 2.  
 (d) 5 and 1.
7. The number of commodities that experienced a price decline for two or more consecutive years is  
 (a) 2

- (b) 3
  - (c) 4
  - (d) 5
8. For which commodities did a price increase immediately follow a price decline only once in this period?
- (a) Rice, Edible oil, and Dal
  - (b) Egg and Dal
  - (c) Onion only
  - (d) Egg and Onion

**Directions for Questions 9 to 11:** Answer the questions on the basis of the table given below.

9. Each of the following statements pertain to the number of states with females outnumbering males in a given census year. Which of these statements is NOT correct?
- (a) This number never exceeded 5 in any census year.
  - (b) This number registered its sharpest decline in the year 1971.
  - (c) The number of consecutive censuses in which this number remained unchanged never exceeded 3.
  - (d) Prior to the 1971 census, this number was never less than 4.

*Sex Ratio (Number of females per 1000 males) of Selected States in India: 1901–2001*

|             | 1901 | 1911 | 1921 | 1931 | 1941 | 1951 | 1961 | 1971 | 1981 | 1991 | 2001 |
|-------------|------|------|------|------|------|------|------|------|------|------|------|
| AP          | 985  | 992  | 993  | 987  | 980  | 986  | 981  | 977  | 975  | 972  | 978  |
| Assam       | 919  | 915  | 896  | 874  | 875  | 868  | 869  | 896  | 910  | 923  | 932  |
| Bihar       | 1061 | 1051 | 1020 | 995  | 1002 | 1000 | 1005 | 957  | 948  | 907  | 921  |
| Goa         | 1091 | 1108 | 1120 | 1088 | 1084 | 1128 | 1066 | 981  | 975  | 967  | 960  |
| Gujarat     | 954  | 946  | 944  | 945  | 941  | 952  | 940  | 934  | 942  | 934  | 921  |
| Haryana     | 867  | 835  | 844  | 844  | 869  | 871  | 868  | 867  | 870  | 865  | 861  |
| HP          | 884  | 889  | 890  | 897  | 890  | 912  | 938  | 958  | 973  | 976  | 970  |
| J&K         | 882  | 876  | 870  | 865  | 869  | 873  | 878  | 878  | 892  | 896  | 900  |
| Karnataka   | 983  | 981  | 969  | 965  | 960  | 966  | 959  | 957  | 963  | 960  | 964  |
| Kerala      | 1004 | 1008 | 1011 | 1022 | 1027 | 1028 | 1022 | 1016 | 1032 | 1036 | 1058 |
| MP          | 972  | 967  | 949  | 947  | 946  | 945  | 932  | 920  | 921  | 912  | 920  |
| Maharashtra | 978  | 966  | 950  | 947  | 949  | 941  | 936  | 930  | 937  | 934  | 922  |
| Orissa      | 1037 | 1056 | 1086 | 1067 | 1053 | 1022 | 1001 | 988  | 981  | 971  | 972  |
| Punjab      | 832  | 780  | 799  | 815  | 836  | 844  | 854  | 865  | 879  | 882  | 874  |
| Rajasthan   | 905  | 908  | 896  | 907  | 906  | 921  | 908  | 911  | 919  | 910  | 922  |
| TN          | 1044 | 1042 | 1029 | 1027 | 1012 | 1007 | 992  | 978  | 977  | 974  | 986  |
| UP          | 938  | 916  | 908  | 903  | 907  | 998  | 907  | 876  | 882  | 876  | 898  |
| WB          | 945  | 925  | 905  | 890  | 852  | 865  | 878  | 891  | 911  | 917  | 934  |
| India       | 972  | 964  | 955  | 950  | 945  | 946  | 941  | 930  | 934  | 927  | 933  |

10. The two states which achieved the largest increases in sex ratio over the period 1901–2001 are
- Punjab and HP
  - HP and Kerala
  - Assam and J&K
  - Kerala and J&K
11. Among the states which have a sex ratio exceeding 1000 in 1901, the sharpest decline over the period 1901–2001 was registered in the state of
- Goa
  - TN
  - Bihar
  - Orissa

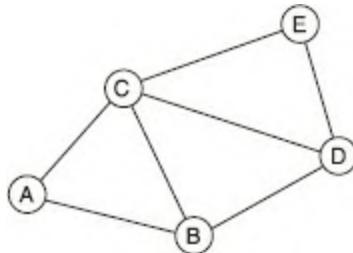
**Directions for Questions 12 to 13:** Answer the questions on the basis of the following information.

Shown below is the layout of major streets in a city. Two days (Thursday and Friday) are left for campaigning before a major election, and the city administration has received requests from five political parties for taking out their processions along the following routes.

Congress: A-C-D-E   BJP: A-B-D-E   SP: A-B-C-E

BSP: B-C-E CPM: A-C-D

Street B-D cannot be used for a political procession on Thursday due to a religious procession. The district administration has a policy of not allowing more than one procession to pass along the same street on the same day. However, the administration must allow all parties to take out their processions during these two days.



12. Congress procession can be allowed
- only on Thursday.
  - only on Friday.
  - on either day.
  - only if the religious procession is cancelled.
13. Which of the following is NOT true?
- Congress and SP can take out their processions on the same day.
  - The CPM procession cannot be allowed on Thursday.
  - The BJP procession can only take place on Friday.
  - Congress and BSP can take out their processions on the same day.

**Directions for Questions 14 to 17:** Each question is followed by two statements, A and B. Answer each question using the following instructions:

Choose 1 if the question can be answered by using statement A alone but not by using B alone.

Choose 2 if the question can be answered by using statement B alone but not by using A alone.

Choose 3 if the question can be answered by using both statements together.

Choose 4 if the question cannot be answered by using both the statements together.

14. In a cricket match, the ‘man of the match’ award is given to the player scoring the highest number of runs. In case of a tie, the player (out of those locked in the tie) who has taken the higher number of catches is chosen. Even thereafter if there is a tie, the player (out of those locked in the tie) who has dropped fewer catches is selected. Aakash, Biplab, and Chirag who were contenders for the award dropped at least one catch each. Biplab dropped 2 catches more than Aakash did, scored 50, and took 2 catches. Chirag got two chances to catch and dropped both. Who was the ‘man of the match’?
- A. Chirag made 15 runs less than both Aakash and Biplab.
  - B. The catches dropped by Biplab are 1 more than the catches taken by Aakash.
15. Four friends, A, B, C, and D got the top four ranks in a test but A did not get the first, B did not get the second, C did not get the third, and D did not get the fourth. Who secured which rank?
- A. Neither A nor D were among the first 2.
  - B. Neither B nor C was third or fourth.
16. The members of a local club contributed equally to pay ₹ 600 towards a donation. How much did each one pay?
- A. If there had been five fewer members, each one would have paid an additional ₹ 10.
  - B. There were at least 20 members in the club, and each one paid no more than ₹ 30.
17. A family has only one kid. The father says “after ‘n’ years, my age will be 4 times the age of my kid.” The mother says “after ‘n’ years, my age will be 3 times that of my kid.” What will be the combined ages of the parents after ‘n’ years?
- A. The age difference between the parents is 10 years.
  - B. After ‘n’ years the kid is going to be twice as old as she is now.

## 2 Mock Test Paper

**Directions for Question 1:** Answer the question on the basis of the following information.

1. Seventy per cent of the employees in a multinational corporation have VCD players, 75 percent have microwave ovens, 80 percent have ACs and 85 percent have washing machines. At least what percentage of employees has all four gadgets?
  - (a) 15
  - (b) 5
  - (c) 10
  - (d) Cannot be determined.

**Directions for Questions 2 to 5:** Answer the questions on the basis of the information given below.

A study was conducted to ascertain the relative importance that employees in five different countries assigned to five different traits in their Chief Executive Officers. The traits were compassion (C), decisiveness (D), negotiation skills (N), public visibility (P), and vision (V). The level of dissimilarity between two countries is the maximum difference in the ranks allotted by the two countries to any of the five traits. The following table indicates the rank order of the five traits for each country.

2. Which amongst the following countries is most dissimilar to India?
  - (a) China
  - (b) Japan
  - (c) Malaysia
  - (d) Thailand

3. Which of the following pairs of production are most dissimilar?
- China & Japan
  - India & China
  - Malaysia & Japan
  - Thailand & Japan
4. Three of the following four pairs of countries have identical levels of dissimilarity. Which pair is the odd one out?
- Malaysia & China
  - China & Thailand
  - Thailand & Japan
  - Japan & Malaysia
5. Which of the following countries is least dissimilar to India?
- China
  - Japan
  - Malaysia
  - Thailand

| Rank | Country |       |       |          |          |
|------|---------|-------|-------|----------|----------|
|      | India   | China | Japan | Malaysia | Thailand |
| 1    | C       | N     | D     | V        | V        |
| 2    | P       | C     | N     | D        | C        |
| 3    | N       | P     | C     | P        | N        |
| 4    | V       | D     | V     | C        | P        |
| 5    | D       | V     | P     | N        | D        |

**Directions for Questions 6 to 11:** Each question is followed by two statements, A and B. Answer each question using the following instructions:

Choose 1 if the question can be answered by using one of the statements alone but not by using the other statement alone.

Choose 2 if the question can be answered by using either of the statements alone.

Choose 3 if the question can be answered by using both statements together but not by either statement alone.

Choose 4 if the question cannot be answered on the basis of the two statements.

6. Tarak is standing 2 steps to the left of a red mark and 3 steps to the right of a blue mark. He tosses a coin. If it comes up heads, he moves one step to the right; otherwise he moves one step to the left. He keeps doing this until he reaches one of the two marks, and then he stops. At which mark does he stop?
- A: He stops after 21 coin tosses.  
B: He obtains three more tails than heads.
7. Ravi spent less than ₹ 75 to buy one kilogram each of potato, onion, and gourd. Which one of the three vegetables bought was the costliest?
- A: 2 kg potato and 1 kg gourd cost less than 1 kg potato and 2 kg gourd.  
B: 1 kg potato and 2 kg onion together cost the same as 1 kg onion and 2 kg gourd.
8. Four candidates for an award obtain distinct scores in a test. Each of the four casts a vote to choose the winner of the award. The candidate who gets the largest number of votes wins the award. In case of a tie in the voting process, the candidate with the highest score wins the award. Who wins the award?
- A: The candidates with top three scores each vote for the top scorer amongst the other three.  
B: The candidate with the lowest score votes for the player with the second highest score.
9. Nandini paid for an article using currency notes of denominations Re 1 ₹ 2. ₹ 5 and ₹ 10 using at least one note of each denomination. The total number of five and ten rupee notes used was one more than the total number of one and two rupee notes used. What was the price of the article?
- A: Nandini used a total of 13 currency notes.  
B: The price of the article was a multiple of ₹ 10.
10. Zakib spends 30% of his income on his children's education, 20% on recreation and 10% on healthcare. The corresponding percentages for Supriyo are 40%, 25%, and 13%. Who spends more on children's education?
- A: Zakib spends more on recreation than Supriyo.

- B: Supriyo spends more on healthcare than Zakib.
11. In a class of 30 students, Rashmi secured the third rank among the girls, while her brother Kumar studying in the same class secured the sixth rank in the whole class. Between the two, who had a better overall rank?
- A: Kumar was among the top 25% of the boys merit list in the class in which 60% were boys.
- B: There were three boys among the top five rank holders, and three girls among the top ten rank holders

**Directions for Questions 12 to 14:** The table below reports the gender, designation and age-group of the employees in an organisation. It also provides information on their commitment to projects coming up in the months of January (Jan), February (Feb), March (Mar) and April (Apr), as well as their interest in attending workshops on: Business Opportunities (BO), Communication Skills (CS), and E-Governance (EG).

| Sl No. | Name      | Gender | Designation | Age group | Committed to projects during | Interested in workshop on |
|--------|-----------|--------|-------------|-----------|------------------------------|---------------------------|
| 1.     | Anshul    | M      | Mgr         | Y         | Jan, Mar                     | CS, EG                    |
| 2.     | Bushkant  | M      | Dir         | I         | Feb, Mar                     | BO, EG                    |
| 3.     | Charu     | F      | Mgr         | I         | Jan, Feb                     | BO, CS                    |
| 4.     | Dinesh    | M      | Exe         | O         | Jan, Apr                     | BO, CS, EG                |
| 5.     | Eashwaran | M      | Dir         | O         | Feb, Apr                     | BO                        |
| 6.     | Fatima    | F      | Mgr         | Y         | Jan, Mar                     | BO, CS                    |
| 7.     | Gayatri   | F      | Exe         | Y         | Feb, Mar                     | EG                        |
| 8.     | Hari      | M      | Mgr         | I         | Feb, Mar                     | BO, CS, EG,               |
| 9.     | Indira    | F      | Dir         | O         | Feb, Apr                     | BO, EG                    |
| 10.    | John      | M      | Dir         | Y         | Jan, Mar                     | BO                        |
| 11.    | Kalindi   | F      | Exe         | I         | Jan, Apr                     | BO, CS, EG                |
| 12.    | Lavanya   | F      | Mgr         | O         | Feb, Apr                     | CS, EG                    |
| 13.    | Mandeep   | M      | Mgr         | O         | Mar, Apr                     | BO, EG                    |
| 14.    | Nandlal   | M      | Dir         | O         | Jan, Feb                     | BO, EG                    |
| 15.    | Parul     | F      | Exe         | Y         | Feb, Apr                     | CS, EG .                  |
| 16.    | Rahul     | M      | Mgr         | Y         | Mar, Apr                     | CS, EG                    |
| 17.    | Sunita    | F      | Dir         | Y         | Jan, Feb                     | BO, EG                    |
| 18.    | Urvashi   | F      | Exe         | I         | Feb, Mar                     | EG                        |
| 19.    | Yamini    | F      | Mgr         | O         | Mar, Apr                     | CS, EG                    |
| 20.    | Zeena     | F      | Exe         | Y         | Jan, Mar                     | BO, CS, EG                |

M = Male, F = Female; Exe = Executive, Mgr = Manager, Dir = Director;

*Y= Young, I = In - between, O = Old.*

*For each workshop, exactly four employees are to be sent, of which at least two should be Females and at least one should be Young. No employee can be sent to a workshop in which he/she is not interested in. An employee cannot attend the workshop on*

- *Communication Skills, if he/she is committed to internal projects in the month of January;*
- *Business Opportunities, if he/she is committed to internal projects in the month of February;*
- *E-governance, if he/she is committed to internal projects in the month of March.*

12. Assuming that Parul and Hari are attending the workshop on Communication Skills (CS), then which of the following employees can possibly attend the CS workshop?
- (a) Rahul and Yamini
  - (b) Dinesh and Lavanya
  - (c) Anshul and Yamini
  - (d) Fatima and Zeena
13. How many Executives (Exe) cannot attend more than one workshop?
- (a) 2
  - (b) 3
  - (c) 15
  - (d) 16
14. Which set of employees cannot attend any of the workshops?
- (a) Anshul, Charu, Eashwaran and Lavanya
  - (b) Anshul, Bushkant, Gayatri, and Urvashi
  - (c) Charu, Urvashi, Bushkant and Mandeep
  - (d) Anshul, Gayatri, Eashwaran and Mandeep

**Directions for Questions 15 to 17:** The table given below reports annual statistics related to rice production in select states of India for a particular year.

15. How many states have a per capita production of rice (defined as total

rice production divided by its population) greater than Gujarat?

- (a) 3
  - (b) 4
  - (c) 5
  - (d) 6
16. An intensive rice producing state is defined as one whose annual rice production per million of population is at least 400,000 tonnes. How many states are intensive rice producing states?
- (a) 5
  - (b) 6
  - (c) 7
  - (d) 8
17. Which two states account for the highest productivity of rice (tonnes produced per hectare of rice cultivation)?
- (a) Haryana and Punjab
  - (b) Punjab and Andhra Pradesh
  - (c) Andhra Pradesh and Haryana
  - (d) Uttar Pradesh and Haryana

| State            | Total Area<br>(in million hectares) | % of Area Under<br>Rice Cultivation | Production<br>(in million tonnes) | Population<br>(in millions) |
|------------------|-------------------------------------|-------------------------------------|-----------------------------------|-----------------------------|
| Himachal Pradesh | 6                                   | 20                                  | 1.2                               | 6                           |
| Kerala           | 4                                   | 60                                  | 4.8                               | 32                          |
| Rajasthan        | 34                                  | 20                                  | 6.8                               | 56                          |
| Bihar            | 10                                  | 60                                  | 12.0                              | 83                          |
| Karnataka        | 19                                  | 50                                  | 19.0                              | 53                          |
| Haryana          | 4                                   | 80                                  | 19.2                              | 21                          |
| West Bengal      | 9                                   | 80                                  | 21.6                              | 80                          |
| Gujarat          | 20                                  | 60                                  | 24.0                              | 51                          |
| Punjab           | 5                                   | 80                                  | 24.0                              | 24                          |
| Madhya Pradesh   | 31                                  | 40                                  | 24.8                              | 60                          |
| Tamilnadu        | 13                                  | 70                                  | 27.3                              | 62                          |
| Maharashtra      | 31                                  | 50                                  | 48.0                              | 97                          |
| Uttar Pradesh    | 24                                  | 70                                  | 67.2                              | 166                         |
| Andhra Pradesh   | 28                                  | 80                                  | 112.0                             | 76                          |

# 3 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the following questions based on the information given below:

A health-drink company's R and D department is trying to make various diet formulations, which can be used for certain specific purposes. It is considering a choice of 5 alternative ingredients (O, P, Q, R and S), which can be used in different proportions in the formulations. The table below gives the composition of these ingredients. The cost per unit of each of these ingredients is O: 150, P: 50, Q: 200, R: 500, S: 100.

| Ingredient | Composition       |              |          |               |
|------------|-------------------|--------------|----------|---------------|
|            | Carbohydrate<br>% | Protein<br>% | Fat<br>% | Minerals<br>% |
| O          | 50                | 30           | 10       | 10            |
| P          | 80                | 20           | 0        | 0             |
| Q          | 10                | 30           | 50       | 10            |
| R          | 5                 | 50           | 40       | 5             |
| S          | 45                | 50           | 0        | 5             |

1. In what proportion P, Q and S should be mixed to make a diet having at least 60% carbohydrate at the lowest per unit cost?
  - (a) 2 : 1 : 3
  - (b) 4 : 1 : 2
  - (c) 2 : 1 : 4
  - (d) 3 : 1 : 2
  - (e) 4 : 1 : 1
2. The company is planning to launch a balanced diet required for growth needs of adolescent children. This diet must contain at least 30% each of carbohydrate and protein, no more than 25% fat and at least 5% minerals. Which one of the following combinations of equally mixed

ingredients is feasible?

- (a) O and P
  - (b) R and S
  - (c) P and S
  - (d) Q and R
  - (e) O and S
3. For a recuperating patient, the doctor recommended a diet containing 10% minerals and at least 30% protein. In how many different ways can we prepare this diet by mixing at least two ingredients?
- (a) One
  - (b) Two
  - (c) Three
  - (d) Four
  - (e) None
4. Which among the following is the formulation having the lowest cost per unit for a diet having 10% fat and at least 30% protein? The diet has to be formed by mixing two ingredients.
- (a) P and Q
  - (b) P and S
  - (c) P and R
  - (d) Q and S
  - (e) R and S

**Directions for Questions 5 to 8:** Each question is followed by two statements, A and B. Answer each question using the following instructions:

Mark (1) if the question can be answered by using the statement A alone but not by using the statement B alone.

Mark (2) if the question can be answered by using the statement B alone but not by using the statement A alone.

Mark (3) if the question can be answered by using either of the statements alone.

Mark (4) if the question can be answered by using both the statements together but not by either of the statements alone.

*Mart (5) if the question cannot be answered on the basis of the two statements.*

5. Thirty per cent of the employees of a call centre are males. Ten per cent of the female employees have an engineering background. What is the percentage of male employees with engineering background?
  - A. Twenty five per cent of the employees have engineering background.
  - B. Number of male employees having an engineering background is 20 per cent more than the number of female employees having an engineering background.
6. In a football match, at the half-time, Mahindra and Mahindra Club was trailing by three goals. Did it win the match?
  - A. In the second-half Mahindra and Mahindra Club scored four goals.
  - B. The opponent scored four goals in the match.
7. In a particular school, sixty students were athletes. Ten among them were also among the top academic performers. How many top academic performers were in the school?
  - A. Sixty per cent of the top academic performers were not athletes.
  - B. All the top academic performers were not necessarily athletes.
8. Five students Atul, Bala, Chetan, Dev and Ernesto were the only ones who participated in a quiz contest. They were ranked based on their scores in the contest. Dev got a higher rank as compared to Ernesto, while Bala got a higher rank as compared to Chetan. Chetan's rank was lower than the median. Who among the five got the highest rank?
  - A. Atul was the last rank holder.
  - B. Bala was not among the top two rank holders.

**Directions for Questions 9 to 12:** Answer the following questions based on the information given below:

The following table shows the break-up of actual costs incurred by a company in last five years (year 2002 to year 2006) to produce a particular product:

The production capacity of the company is 2000 units. The selling price for

the year 2006 was ₹ 125 per unit. Some costs change almost in direct proportion to the change in volume of production, while others do not follow any obvious pattern of change with respect to the volume of production and hence are considered fixed. Using the information provided for the year 2006 at the basis for projecting the Figures for the year 2007, answer the following questions:

|                                       | Year<br>2002 | Year<br>2003 | Year<br>2004 | Year<br>2005 | Year<br>2006 |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Volume of production and sale (units) | 1000         | 900          | 1100         | 1200         | 1200         |
| Costs (Rs.)                           |              |              |              |              |              |
| Material                              | 50,000       | 45,100       | 55,200       | 59,900       | 60,000       |
| Labour                                | 20,000       | 18,000       | 22,100       | 24,150       | 24,000       |
| Consumables                           | 2,000        | 2,200        | 1,800        | 1,600        | 1,400        |
| Rent of building                      | 1,000        | 1,000        | 1,100        | 1,100        | 1,200        |
| Rates and taxes                       | 400          | 400          | 400          | 400          | 400          |
| Repair and maintenance expenses       | 800          | 820          | 780          | 790          | 800          |
| Operating cost of machines            | 30,000       | 27,000       | 33,500       | 36,020       | 36,000       |
| Selling and marketing expenses        | 5,750        | 5,800        | 5,750        | 5,800        | 5,800        |

9. What is the approximate cost per unit in rupees, if the company produces and sells 1400 units in the year 2007?
  - (a) 104
  - (b) 107
  - (c) 110
  - (d) 115
  - (e) 116
10. What is the minimum number of units that the company needs to produce and sell to avoid any loss?
  - (a) 313
  - (b) 350
  - (c) 384
  - (d) 747
  - (e) 928
11. If the company reduces the price by 5 per cent, it can produce and sell as many units as it desires. How many units the company should produce to maximise its profit?
  - (a) 1400
  - (b) 1600

- (c) 1800  
 (d) 1900  
 (e) 2000
12. Given that the company cannot sell more than 1700 units, and it will have to reduce the price by ₹ 5 for all units, if it wants to sell more than 1400 units, what is the maximum profit, in rupees, that the company can earn?
- (a) 25,400  
 (b) 24,400  
 (c) 31,400  
 (d) 32,900  
 (e) 32,000

**Directions for Questions 13 to 16:** Answer the following questions based on the information given as follows:

The proportion of male students and the proportion of vegetarian students in a school are given below. The school has a total of 800 students, 80% of whom are in the Secondary Section and rest equally divided between Class 11 and 12.

|                   | Male (M) | Vegetarian (V) |
|-------------------|----------|----------------|
| Class 12          | 0.600    |                |
| Class 11          | 0.550    | 0.50           |
| Secondary Section |          | 0.55           |
| Total             | 0.475    | 0.53           |

13. What is the percentage of male students in the secondary section?
- (a) 40  
 (b) 45  
 (c) 50  
 (d) 55  
 (e) 60
14. In the Secondary Section, 50% of the students are vegetarian males.

Which of the following statements is correct?

- (a) Except vegetarian males, all other groups have same number of students.
- (b) Except non-vegetarian males, all other groups have same number of students.
- (c) Except vegetarian females, all other groups have same number of students.
- (d) Except non-vegetarian females, all other groups have same number of students.
- (e) All of the above groups have the same number of students.

15. What is the percentage of vegetarian students in Class 12?

- (a) 40
- (b) 45
- (c) 50
- (d) 55
- (e) 60

16. In Class 12, twenty five per cent of the vegetarians are male. What is the difference between the number of female vegetarians and male non-vegetarians?

- (a) less than 8
- (b) 10
- (c) 12
- (d) 14
- (e) 16

## 4

# Mock Test Paper

**Directions for Questions 1 to 4:** Answer the following questions based on the information given below:

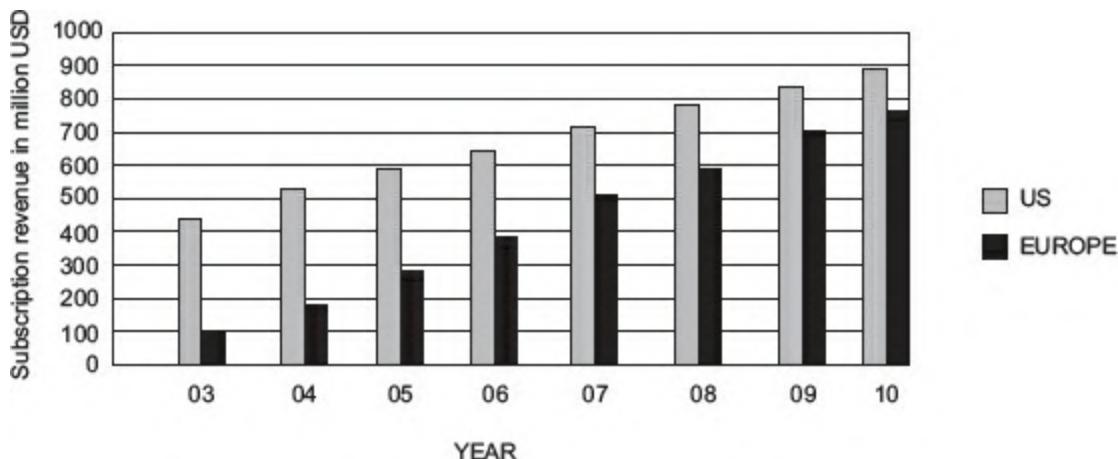
The bar chart below shows the revenue received, in million US Dollars (USD), from subscribers to a particular internet service. The data covers the period 2003 to 2007 for the United States (US) and Europe. The bar chart also shows the estimated revenues from subscription to this service for the period 2008 to 2010.

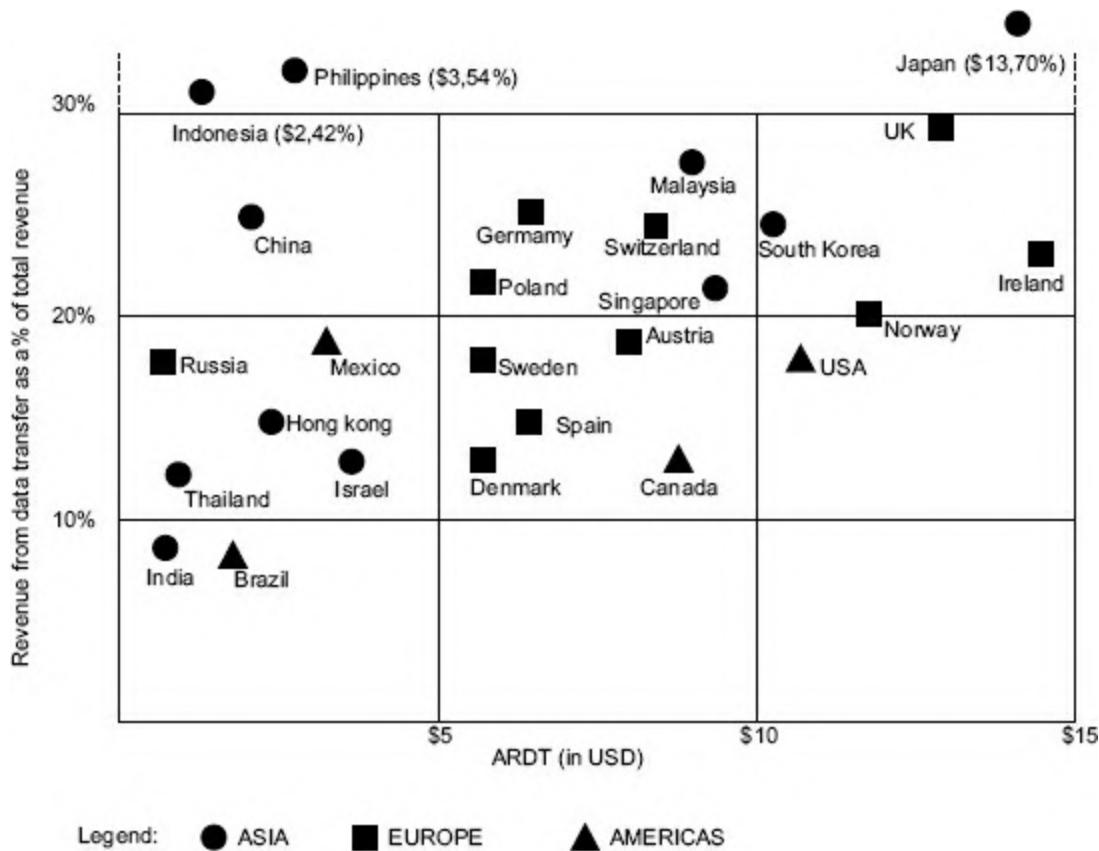
1. In 2003, 60 per cent of subscribers in Europe were men. Given that women subscribers increase at the rate of 10 per cent per annum and men at the rate of 5 per cent per annum, what is the approximate percentage growth of subscribers between 2003 and 2010 in Europe? The subscription prices are volatile and may change each year.
  - (a) 62
  - (b) 15
  - (c) 84
  - (d) 78
  - (e) 50
2. Consider the annual per cent change in the gap between subscription revenues in the US and Europe. What is the year in which the absolute value of this change is the highest?
  - (a) 03–04
  - (b) 05–06
  - (c) 06–07
  - (d) 08–09
  - (e) 09–10

3. While the subscription in Europe has been growing steadily towards that of the US, the growth rate in Europe seems to be declining. Which of the following is closest to the percentage change in growth rate of 2007(over 2006) relative to the growth rate of 2005(over 2004)?
- 17
  - 20
  - 35
  - 60
  - 100
4. The difference between the estimated subscription in Europe in 2008 and what it would have been if it were computed using the percentage growth rate of 2007(over 2006), is closest to:
- 50
  - 80
  - 20
  - 10

**Directions for Questions 5 to 7:** Answer the following questions based on the information given below:

Telecom operators get revenue from transfer of data and voice. Average revenue received from transfer of each unit of data is known as ARDT. In the diagram below, the revenue received from data transfer as percentage of total revenue received and the ARDT in US Dollars (USD) are given for various countries.





5. It is expected that by 2010, revenue from data transfer as a percentage of total revenue will triple for India and double for Sweden. Assume that in 2010, the total revenue in India is twice that of Sweden and that the volume of data transfer is the same in both the countries. What is the percentage increase of ARDT in India if there is no change in ARDT in Sweden?
- 400%
  - 550%
  - 800%
  - 950%
  - Can't be determined
6. If the total revenue received is the same for the pairs of countries listed in the options below, choose the pair that has approximately the same volume of data transfer.
- Philippines and Austria
  - Canada and Poland
  - Germany and USA

- (d) UK and Spain
  - (e) Denmark and Mexico
7. It was found that the volume of data transfer in India is the same as that of Singapore. Then which of the following statements is true?
- (a) Total revenue is same in both the countries.
  - (b) Total revenue in India is about 2 times that of Singapore.
  - (c) Total revenue in India is about 4 times that of Singapore.
  - (d) Total revenue in Singapore is about 2 times that of India.
  - (e) Total revenue in Singapore is about 4 times that of India.

**Directions for Questions 8 to 11:** Answer the questions on the basis of the information given below.

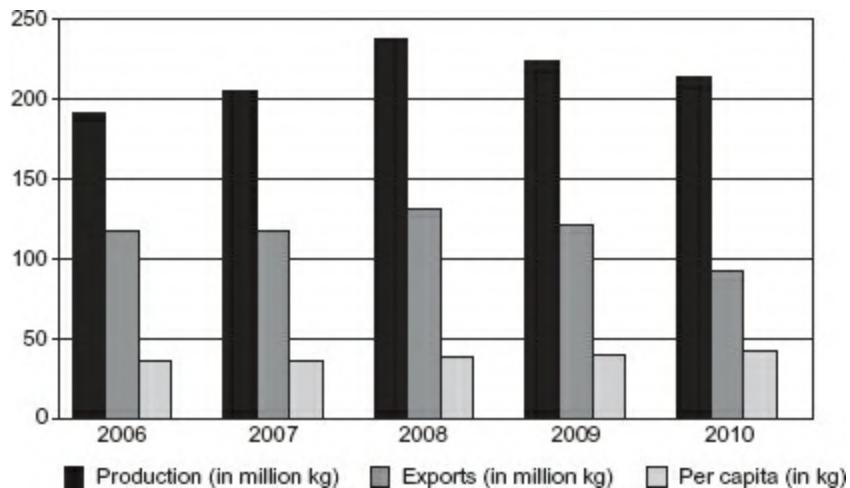
The following bar graph gives the production, exports and per capita consumption of rice in country A, for the five years from 2006 to 2010.

Consumption = Production – Exports

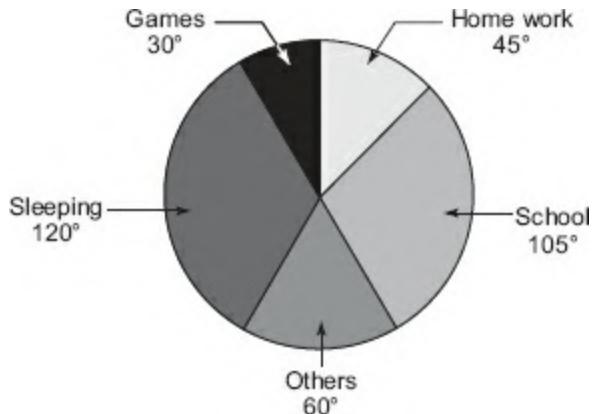
Per Capita Consumption = (Consumption)  $\div$  (Population)

- 8. In which year was the percentage increase in the consumption of rice over the previous year, the highest?
  - (a) 2007
  - (b) 2008
  - (c) 2009
  - (d) 2010
- 9. What is the population of country A in the year 2008 (in million)?
  - (a) 2.64 million
  - (b) 2.72 million
  - (c) 2.79 million
  - (d) 2.85 million
- 10. The ratio of exports to consumption in the given period was the highest in the year
  - (a) 2006
  - (b) 2007
  - (c) 2008
  - (d) 2009

11. In which of the given years was the population of country A, the highest?
- 2007
  - 2008
  - 2009
  - 2010



**Directions for Questions 12 to 16:** The following pie chart shows the hourly distribution (in degrees) of all the major activities of a student



12. The percentage of time which he spends in school is
- 37%
  - 30%
  - 40%
  - 27%
13. How much time (in per cent) does he spend in games in comparison to

sleeping?

- (a) 30%
- (b) 35%
- (c) 25%
- (d) None of these

14. If he spends the time in games equal to the home work and remains constant in other activities, then the percentage decrease in time of sleeping (assume that all the extra game time came from reducing sleeping time):

- (a) 15%
- (b) 12.5%
- (c) 20%
- (d) None of these

15. What is the difference in time (in hours) spent in school and in home work?

- (a) 2
- (b) 3
- (c) 4
- (d) 8

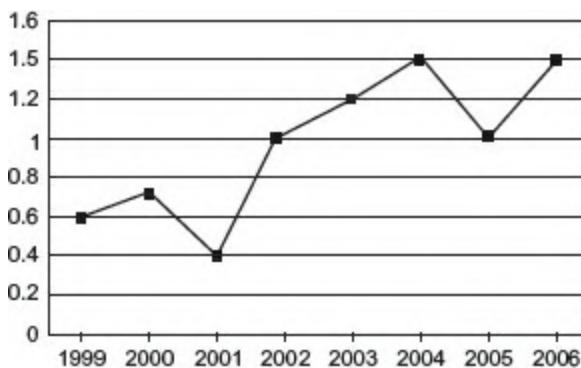
16. If he spends  $1/3^{\text{rd}}$  time of homework in Mathematics then the number of hours he spends in rest of the subjects in home work:

- (a) 1
- (b) 2
- (c) 3
- (d) 4

## 5

# Mock Test Paper

**Directions for Questions 1 to 3:** The following line graph shows the ratio of wheat production to rice production of a state in India over a period of 7 years from the 1999–2006. Answer the questions based on provided in the graph.



1. If the rice production in 2003 was 4 lakh tons what was its wheat production during 2003?
  - (a) 1.2 lakh tons
  - (b) 3.6 lakh tons
  - (c) 4.8 lakh tons
  - (d) 5.0 lakh tons
2. In how many years wheat production was more than the rice production?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
3. If the total annual grain requirement (wheat and rice together) of the

state is 5 lakh tons and if the rice production during 2001 was 3 lakh tons, how much grain had to be imported from another state of India to fulfill the requirement?

- (a) 2.00 lakh tons
- (b) 1.55 lakh tons
- (c) 1.05 lakh tons
- (d) 0.8 lakh tons

**Directions for Questions 4 to 6:** The following table gives the speed of a train over a 3-hour period. The time count does not begin from starting of train.

| Time (Minutes)                   | 0  | 30 | 45   | 60 | 90 | 120 | 150 | 180 |
|----------------------------------|----|----|------|----|----|-----|-----|-----|
| Speed at given time (in km/hour) | 40 | 45 | 47.5 | 50 | 55 | 60  | 65  | 70  |

- 4. During the three-hour period shown in the table, the speed of the train increased by:
  - (a) 25%
  - (b) 100%
  - (c) 75%
  - (d) 125%
- 5. At time  $t$ , measured in minutes after the beginning of the time period, which of the following gives the speed of the train in accordance with the table?
  - (a)  $t/6$
  - (b)  $6t$
  - (c)  $40 + t$
  - (d)  $40 + t/6$
- 6. How fast was the train traveling  $2\frac{1}{2}$  hours after the beginning of the time period?
  - (a) 50 km/hr
  - (b) 55 km/hr
  - (c) 60 km/hr
  - (d) 65 km/hr

**Directions for Questions 7 to 10:** The following table presents the data collected for an on-line job portal infinite [Jobs.com](#). For each question, there are two statements, each of which could be either True or False. Choose one of the following options as an answer.

- (a) Only [X] is True
- (b) Only [Y] is True
- (c) Both [X] and [Y] are true
- (d) Neither [X] nor [Y] is True

| Year | Category   | Number of Registrations | Number of candidates who posted their CV's | Number of candidates shortlisted by Employers | Number of jobs offered |
|------|------------|-------------------------|--|---|------------------------|
| 2004 | Technical  | 61,205                  | 59,981                                     | 684   | 181                    |
|      | Managerial | 19,236                  | 15,389                                     | 138   | 48                     |
| 2005 | Technical  | 63,298                  | 60,133                                     | 637   | 115                    |
|      | Managerial | 45,292                  | 40,763                                     | 399   | 84                     |

- 7. Statement X:** The percentage increase in number of Registrations from 2004 to 2005 is higher for Managerial candidates than for Technical candidates
- Statement Y:** The overall Registrations have grown by more than 25%
- 8. Statement X:** The percentage of drop-outs (from Registration stage to posting (CV's) had decreased from 2004 to 2005 for Managerial category
- Statement Y:** The percentage of drop-out was higher for Technical than for Managerial category in 2005
- 9. Statement X:** The success rate of candidates getting shortlisted based on CV's is higher for Managerial category than for technical category in 2005.
- Statement Y:** The success rate of candidates getting shortlisted based on CV's is better for Managerial category in 2005 than in 2004.
- 10. Statement X:** In 2004, the proportion of the number of CV's posted was higher for Technical than for Managerial candidates
- Statement Y:** In 2004, among those shortlisted by Employers, the technical category had a higher success rate in securing jobs than the Managerial category.

**Directions for Questions 11 to 13:** The following table gives cost data of select stock prices on 3rd Dec. 2003 in two markets, BSE of India and NQE of Kya Kya island. Closing stock refers to the price at the close of trading hours and opening stock to the price at the beginning of the day. The currency of Kya Kya is # and the exchange rate is # = ₹11.

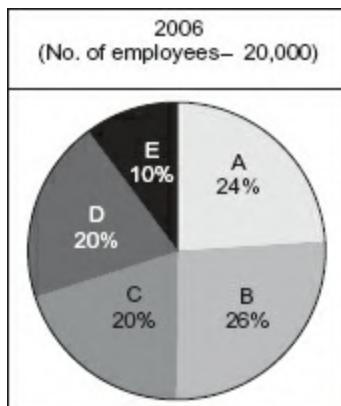
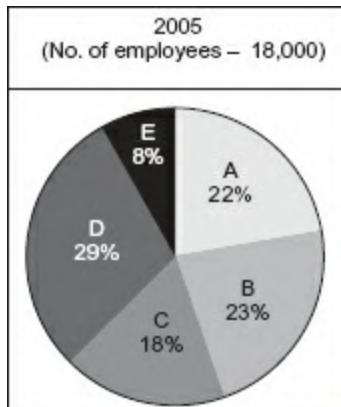
|       | 3rd Dec 2003 |            |         |            |
|-------|--------------|------------|---------|------------|
|       | Closing      |            | Opening |            |
|       | BSE (₹)      | NQE (in #) | BSE (₹) | NQE (in #) |
| SIFY  | 247          | 22         | 232     | 21         |
| INFY  | 115          | 10.5       | 105     | 9.5        |
| WIPRO | 65           | 6.5        | 60      | 5.5        |
| TCS   | 444          | 40         | 450     | 40.5       |

11. Which share and which market showed the highest percentage increase on 3<sup>rd</sup> Dec. 2003?
  - (a) SIFY on BSE
  - (b) INFY on NQE
  - (c) Wipro on NQE
  - (d) TCS on NQE
12. Arbitrage means buying in one market and selling simultaneously in another market. If Mr. Ghosh Babu were to buy a share at the opening price on one exchange and was able to sell it at the closing price on the other exchange on which share does he make maximum percentage profit?
  - (a) SIFY
  - (b) INFY
  - (c) WIPRO
  - (d) TCS
13. In an M & A deal, SIFY is purchased by its parent company SATYAM which purchases 15% of SIFY's equity shares. SIFY's total equity shares are 1 million. How much does Satyam pay in ₹ for the stake if 50% of its purchases were on BSE's opening price and balance on BSE's closing price?
  - (a) 36 million

- (b) 3.5 million
- (c) 363 million
- (d) 217 million

**Directions for Questions 14 to 17:** The following pie-charts give the percentage distribution of employees in different departments in XYZ Company Ltd. during the years 2005 and 2006. Answer the questions using this data.

**A-Administration; B-Operations;  
C-Sales & Marketing;  
D-Finance & Accounts; E-Corporate HQ**



14. If the average monthly salary of employees in Administration was ₹ 12,000 in 2005, what was the approximate total salary expense of Administration in 2005?
- (a) ₹ 57 crores
  - (b) ₹ 4.7 crores

- (c) ₹ 66 crores  
 (d) ₹ 66 lacs
15. What is the percentage increase in the number of employees in Sales & Marketing?
- (a) 2%  
 (b) 2.34%  
 (c) 23.45%  
 (d) None of these
16. In which department is the variation in strength the maximum in 2006?
- (a) A  
 (b) B  
 (c) D  
 (d) E
17. If 300 employees left Operations at the end of 2005, how many joined in 2006?
- (a) 480  
 (b) 960  
 (c) 1360  
 (d) None of these
18. A bank customer had ₹ 100 in his account. He made 6 withdrawals, totaling ₹ 100. He kept a record of these withdrawals and the balance remaining in the account, as follows.

| Withdrawals | Balance left |
|-------------|--------------|
| ₹ 50        | ₹. 50        |
| ₹ 25        | ₹ 25         |
| ₹ 10        | ₹ 15         |
| ₹ 8         | ₹ 7          |
| ₹ 5         | ₹ 2          |
| ₹ 2         | ₹ 0          |
| ₹ 100       | ₹ 99         |

So, why are the totals not exactly right?

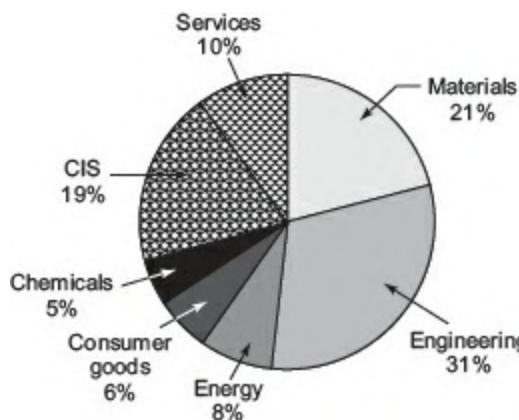
- (a) There is a mistake in the total of withdrawals.
- (b) There is a mistake in the total of the balance
- (c) The two totals need not be equal.
- (d) The bank has cheated the customer.

## 6

# Mock Test Paper

**Directions for Questions 1 to 2:** The following pie-chart gives the sectorwise sales of a group of companies for the financial year 2004–2005. Study the chart and answer the following questions.

**Sectorwise Sales 2004–2005**



| Sectors                                | (₹ million) | % share |
|--|-------------|---------|
| Materials                              | 164,430     | 21.0    |
| Engineering                            | 244,830     | 31.2    |
| Energy                                 | 62,990      | 8.0     |
| Consumer goods                         | 47,880      | 6.1     |
| Chemicals                              | 35,510      | 4.5     |
| Communications and information systems | 148,160     | 18.9    |
| Services                               | 78,950      | 10.1    |

|       |         |
|-------|---------|
| Total | 782,750 |
|-------|---------|

\* Sales turnover was US \$ 17.4 billion (₹ 78,274 crore) representing a year-on-year growth of 30.3 per cent in dollar terms and 27.4 per cent in rupee terms.

\* Sales figures shown are net of excise duty.

1. This group of companies operates in multiple sectors. The holding company has decided to closely monitor minimum number of sectors (not exceeding 5) contributing together a major part (at least 80%) of sales of the group. Identify the correct set of sectors.
  - (a) Engineering, Services, CIS and Consumer Goods
  - (b) Engineering, Services, CIS, Energy and Consumer Goods.
  - (c) Engineering, Material, Services and CIS
  - (d) Engineering, Mateiral, CIS and Energy
2. The average profit against the sales across the sectors is 10% while the profit margin of engineering is 12% and CIS 20%. What is the average profit across the remaining sectors?
  - (a) 5.87%
  - (b) 7.6%
  - (c) 4.96%
  - (d) 8.9%

**Directions for Questions 3 to 8:** Study the following two tables (on the next page) of data on Agriculture Import and Export of India during 1998–2001 and answer the following questions.

3. Which was the single largest contributor to the total agri exports in 2000–2001? If the total agri export were valued at US \$ 6 billion, what is its contribution in dollar terms?
  - (a) Cereal, US \$ 1.49 billion
  - (b) Marine Products, US \$ 1.27 billion
  - (c) Marine Products, US \$ 1.39 billion
  - (d) Cereal, US \$ 1.03 billion
4. Which product has shown the strongest growth in exports during the 3-year period?
  - (a) Meat and Meat Preparations

- (b) Fruits and vegetables
- (c) Processed Fruits and vegetables
- (d) None of these

### India's Export of Principal Agricultural Products

| Products                         | 1998–1999 | % of Agri Export | 1999–2000 | % of Agri Export | 2000–2001 | % of Agri Export |
|----------------------------------|-----------|------------------|-----------|------------------|-----------|------------------|
| 1. Tea                           | 538       | 8.9              | 412       | 7.3              | 433       | 7.2              |
| 2. Coffee                        | 411       | 6.8              | 331       | 5.9              | 259       | 4.3              |
| 3. Cereals                       | 1,495     | 24.8             | 724       | 12.9             | 744       | 12.4             |
| 4. Tobacco                       | 181       | 3                | 233       | 4.2              | 191       | 3.2              |
| 5. Spices                        | 388       | 6.4              | 408       | 7.3              | 354       | 5.9              |
| 6. Cashew                        | 387       | 6.4              | 567       | 10.1             | 411       | 6.8              |
| 7. Sesame and Niger Seeds        | 78        | 1.3              | 86        | 1.5              | 131       | 2.2              |
| 8. Guar gum Meal                 | 173       | 2.9              | 188       | 3.4              | 132       | 2.2              |
| 9. Oil Meals                     | 462       | 7.7              | 378       | 6.7              | 448       | 7.5              |
| 10. Fruits and Vegetables        | 184       | 3                | 209       | 3.7              | 248       | 4.1              |
| 11. Processed Fruit & Vegetables | 69        | 1.1              | 86        | 1.5              | 122       | 2                |
| 12. Meat & Meat Preparations     | 187       | 3.1              | 189       | 3.4              | 322       | 5.4              |
| 13. Marine Products              | 1,038     | 17.2             | 1,183     | 21.1             | 1,394     | 23.2             |
| 14. Others                       | 446       | 7.4              | 614       | 11               | 815       | 13.6             |
| Agri Exports                     | 6,037     | 100              | 5,608     | 100              | 6,004     | 100              |
| % of Agri to Total Exports       | 18.2      |                  | 15.2      |                  | 13.5      |                  |
| Total Exports                    | 33,218    |                  | 36,822    |                  | 44,560    |                  |

### India's Agricultural Imports

| Commodity          | 1998–1999 | % of Agri Imports | 1999–2000 | % of Agri Imports | 2000–2001 | % of Agri Imports |
|--------------------|-----------|-------------------|-----------|-------------------|-----------|-------------------|
| 1. Cereal          | 288       | 9.9               | 222       | 7.8               | 19        | 1                 |
| 2. Pulses          | 169       | 5.8               | 82        | 2.9               | 109       | 5.9               |
| 3. Milk and Cream  | 3         | 0.1               | 25        | 0.9               | 2         | 0.1               |
| 4. Cashew nuts     | 230       | 7.9               | 276       | 9.7               | 211       | 11.3              |
| 5. Nuts and Fruits | 159       | 5.5               | 136       | 4.8               | 175       | 9.4               |
| 6. Sugar           | 264       | 9                 | 256       | 9                 | 7         | 0.4               |
| 7. Oil seeds       | 2         | 0.1               | 4         | 0.1               | 2         | 0.1               |
| 8. Veg. oils       | 1,804     | 61.8              | 1,857     | 65                | 1,334     | 71.8              |
| Total Agri Imports | 2,919     | 100               | 2,858     | 100               | 1,858     | 100               |
| % of Agri Imports  | 6.9       |                   | 5.8       |                   | 3.7       |                   |
| Total Imports      | 42,389    |                   | 49,671    |                   | 50,536    |                   |

5. Which was the dominant import commodity in 2000–2001 after vegetable oil?
- (a) Pulses
  - (b) Cereals
  - (c) Cashew nuts
  - (d) nuts and fruits

6. From the import data about Sugar and Cereals it can be said that
  - (a) India has raised its domestic production of these commodities.
  - (b) India's demand for these commodities has gone down.
  - (c) India's gap in production and requirement of these commodities has gone down.
  - (d) India's population consuming these commodities has gone down.
7. In some circles concerns were expressed that liberalization of imports, resulting from lifting of quantitative restrictions on agri products would lead to surge of agri imports affecting the Indian farmers. What does the data depict?
  - (a) The concerns were justified because India continued to import agri commodities.
  - (b) The concerns were not justified because the value of agri imports in aggregate terms has come down during the period.
  - (c) The concerns were justified because vegetable oil and pulses formed a major component of the imports.
  - (d) The concerns were not justified because the total exports in aggregate terms were higher than the total imports in aggregate terms.
8. Over the period under study both percentages of the total agri-exports to the total exports and that of the total agri-imports to the total imports show a downward trend. This indicates that
  - (a) India should not get into export of agri products and concentrate on other sectors.
  - (b) India should find ways and means of increasing imports.
  - (c) India should restrict its imports and exports only to a limited number of commodities and products.
  - (d) India should work on strategies to enhance exports and reduce imports.

**Directions for Questions 9 to 12:** A survey of movie goers from five cities—A, B, C, D and E is summarised below. The second column gives the percentage of viewers in each city who watch less than one movie a week. The third column gives the total number of viewers who view one or more

*than one movie per week.*

| <i>City</i> |    |      |
|-------------|----|------|
| A           | 60 | 2400 |
| B           | 20 | 3000 |
| C           | 85 | 2400 |
| D           | 55 | 2700 |
| E           | 75 | 8000 |

9. How many viewers in the city C watch less than one movie a week?
  - (a) 2040
  - (b) 13600
  - (c) 1600
  - (d) 3600
10. Which city has the highest number of viewers who watch less than one movie a week?
  - (a) City E
  - (b) City D
  - (c) City B
  - (d) City C
11. The city with the second lowest number of movie watchers is
  - (a) City E
  - (b) City D
  - (c) City B
  - (d) City C
12. The total number of all movie goers in the five cities who watch less than one movie per week is
  - (a) 50000
  - (b) 36000
  - (c) 18500
  - (d) 45250

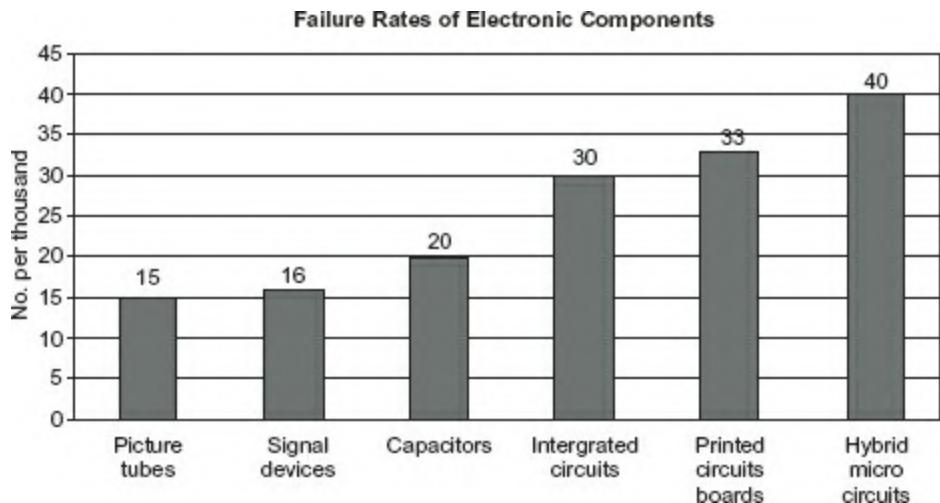
**Direction for Question 13:** Answer Question 5 based on the following table.

| Relative Sweeteners of Different Substances |        |         |      |
|---|--------|---------|------|
| Lactose                                     | 0.16   | Maltose | 0.32 |
| Glucose                                     | 0.74   | Sucrose | 1.00 |
| Saccharin                                   | 675.00 |         |      |

13. What is the ratio of glucose to lactose in a mixture as sweet as maltose?
- (a) 8 : 21
  - (b) 1: 3
  - (c) 3 : 2
  - (d) 16 : 9

**Directions for Questions 14 to 17:** Study the following chart carefully and answer the questions.

14. From the failure data of electronics components presented here, which statement is true?
- (a) Integrated circuits and Printed circuit boards are more reliable.
  - (b) Capacitors are more reliable than pictures tubes.
  - (c) Higher number of components' failures is likely to be due to pictures tubes.
  - (d) The least reliable component is Hybrid Micro circuits.
15. Which of the following components has a failure rate 25% more than that of signal devices?
- (a) Pictures tubes
  - (b) Capacitors
  - (c) Integrated circuits
  - (d) Printed Circuits boards.
16. Lowest priority for investing in any changes or additions to the component manufacturing units, in the company's investment plans, may be given to the following:



- (a) Printed circuits boards and hybrid micro circuits.
- (b) Capacitors and integrated circuits.
- (c) Pictures tubes and signal devices
- (d) Signal devices and capacitors
17. For the equipments using Integrated Circuit Board: 400, Capacitors: 240 and Printed Circuits boards: 120 to run with minimum downtime, how many spares should be kept in the store respectively?
- (a) 12, 4, 3
- (b) 12, 5, 4
- (c) 5, 12, 4
- (d) 12, 4, 4

## 7

# Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the following table (Table 7.1).

**Table 7.1** Short-Term Plans—Growing Day by Day

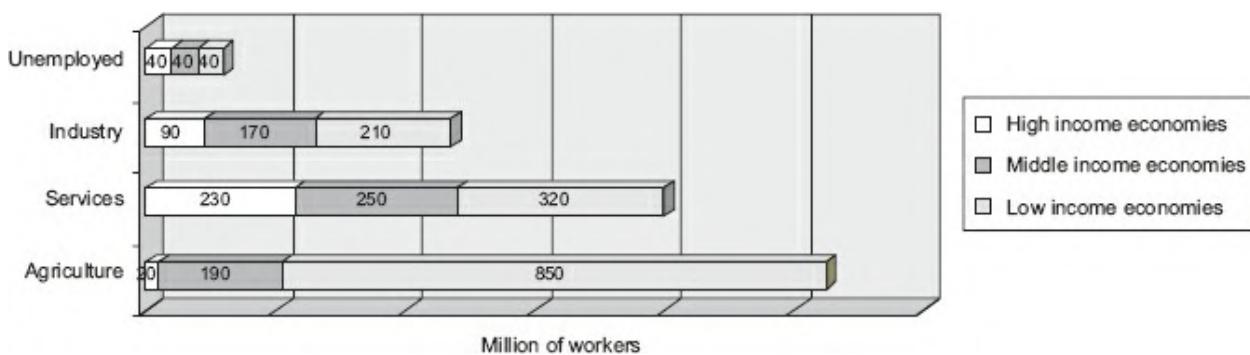
| Scheme<br>₹ in Cr) as on<br>on 30/08/02 | Fund Size<br>30/08/02 | Nav (in ₹) as | 7 days | 15 days | 30 days |
|---|-----------------------|---------------|--------|---------|---------|
| Zurich (I) HIF-STP                      | 1028.79               | 10.5866       | 0.1675 | 0.2775  | 0.8795  |
| Tata ST Bond                            | 134.49                | 10.1150       | 0.1396 | 0.2955  | 0.8756  |
| Templeton (I) ST Inc                    | 481.357               | 10.58         | 0.1978 | 0.3275  | 0.8693  |
| Birla Bond Plus                         | 480.62                | 10.7020       | 0.1347 | 0.2698  | 0.8386  |
| Grindlays SSI-ST                        | 1039.56               | 11.5896       | 0.1824 | 0.2908  | 0.8230  |
| HDFC STP                                | 1335.32               | 10.5014       | 0.1478 | 0.2798  | 0.8034  |
| JM ST Fund                              | 284.67                | 10.2314       | 0.1556 | 0.3118  | 0.7980  |
| Pru ICICI STP                           | 1508.23               | 10.8414       | 0.1598 | 0.3072  | 0.7921  |
| IL&FS Bond-STP                          | 196.17                | 10.5647       | 0.1479 | 0.2810  | 0.7890  |
| Alliance ST Fund                        | 312.66                | 10.3572       | 0.1334 | 0.2934  | 0.7814  |
| IDBI-PRIN Inc-STP                       | 321.81                | 10.3548       | 0.1528 | 0.2808  | 0.7708  |
| K Bond STP                              | 418.89                | 10.3366       | 0.1444 | 0.2638  | 0.7466  |
| Chola Freedom Inc ST                    | 100.04                | 16.6492       | 0.1456 | 0.2807  | 0.7284  |

1. If the ratio of fund size to NAV gives the value for the number of units of the mutual fund, then the lowest number of units is for:
  - (a) Tata ST Bond
  - (b) Templeton (I) St Inc
  - (c) Pru ICICI STP
  - (d) none of these
2. The fund having the highest number of units is:

- (a) Pru ICICI STP
  - (b) HDFC STP
  - (c) Zurich (I) HIF–STP
  - (d) None of these
3. The number of units of Chola Freedom Inc ST is closest to
- (a) 5 crore
  - (b) 6 crore
  - (c) 60 lakh
  - (d) None of these
4. How many funds have more than 80 crore units?
- (a) 3
  - (b) 4
  - (c) 5
  - (d) 6

**Directions for Questions 5 to 8:** Refer to the Bar Chart (Figure 7.1).

The following additional information is available:



**Figure 7.1** Income Economies

Total worldwide working population: 2.5 billion (2500 million)

Working population in low income economies: 1400 million

Working population in middle income economies: 660 million

Working population in high income economies: 440 million

Total unemployed population: 120 million

The following definitions hold true:

Poor or low income economies: Annual per capita income less than \$695

*Rich or high income economies: Annual per capita income more than \$8626*

5. Approximately what percentage of the poor economies total workforce is in agriculture?
  - (a) 43%
  - (b) 52%
  - (c) 61%
  - (d) 78%
6. Approximately what percentage of the middle income economies total workforce is in services?
  - (a) 23%
  - (b) 38%
  - (c) 49%
  - (d) 62%
7. Which of the following statements is/are not true?
  - (i) Of the total workforce in services, over 50% do not come from the poor economies
  - (ii) Poor economies account for nearly one-third of the total unemployed workers in the world
  - (iii) High income economies account for over 25% of the total industrial work force
  - (iv) Middle income economies account for nearly one-third of the total services sector employees in the world.
    - (a) All of the above
    - (b) (iii) only
    - (c) (iii) and (iv)
    - (d) None of these
8. Which of the following statements is true?
  - (a) Unemployed workforce accounts for approximately 7% of the world's total working population.
  - (b) For both high and middle income economies, the services sector is the highest provider of employment
  - (c) Low income economies contribute a higher proportion of the total workforce engaged in the services sector than either the high or the middle income economies, yet the services sector is not the

- biggest provider of jobs in the low income economies.
- (d) Both (b) and (c)

**Directions for Questions 9 to 12:** Refer to *Table 7.2* and answer the questions that follow.

**Table 7.2** Peer-to-peer Evaluation

| <i>EPFO<br/>MALAYSIA</i>       | <i>PARAMETER</i>                  | <i>EPFO INDIA</i>                       |
|--------------------------------|-----------------------------------|---|
| 11% by employee,               | Contribution                      | 12% by both employee and employer       |
| 12% by employer                |                                   |   |
| 3 accounts; 60% in retirement, | Fund Channelled into              | 2 accounts; 65.3% into provident funds, |
| 30% in housing,                |                                   | 34.7% into pension scheme               |
| 10% in health care             |                                   |   |
| \$50.5 billion                 | EPF assets                        | \$33.47 billion                         |
| 53.10%                         | EPF assets as % of GDP            | 7%                                      |
| \$4,886.60                     | Average balance per member        | \$1,242                                 |
| Twice a year                   | Account statement to members      | Once a year                             |
| Yes                            | Educating members on EPF benefits | No                                      |
| 1983–2001                      | Average annual rate of return     | 1986–2000                               |

|        |                 |        |
|--------|-----------------|--------|
| 77.62% | Nominal         | 11.80% |
| 2.94%  | Inflation (CPI) | 9.00%  |
| 4.66%  | Real            | 2.70%  |

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Source: New Pension Reforms Initiatives in India by Mukul Asher, National University of Singapore, and BW calculations

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9. The ratio of India's GDP to Malaysia's GDP is closest to:
  - (a) 6:1
  - (b) 5:1
  - (c) 4:1
  - (d) Cannot be determined
10. Assuming that there is an equal amount of service period put in by all members of the EPF, nearly which of these will represent the ratio of Salary income in US\$ in Malaysia to that in India?
  - (a)  $(4886.6 \times 0.24)/(1242 \times 0.23)$
  - (b)  $(4886.6 \times 0.23)/(1242 \times 0.24)$
  - (c)  $4886.6/1242$
  - (d) Cannot be determined
11. Based on the value of the EPF assets and the average balance per member, what can be concluded about the number of EPF members in Malaysia to the number of EPF members in India?
  - (a) It is greater
  - (b) It is smaller
  - (c) Both are equal
  - (d) No conclusion can be made
12. Which of the following statements is/are not true?
  - (i) The real value of 1\$ invested in Malaysia is 1983 will be greater than the real value of 1\$ invested in India in 1986 by the year 2000.
  - (ii) The inflation in India is over 300% more than the inflation in Malaysia
  - (iii) The real rate of return for the period shown for India is over 50% of the real rate of return for the period shown for Malaysia

- (a) All of these
- (b) (i) and (iii)
- (c) Only (ii)
- (d) (ii) and (iii)

**Directions for Questions 13 to 16:** *Table 7.3 below shows the tax incidents and TDS calculations. Mrs. Vinay Shrivastava works for AMS Inc. and is paid ₹ 240,000 p.a out of which he saves ₹ 60,000 in tax saving instruments u/s 88.*

**Table 7.3** Tax Incidents and TDS Calculations of Mrs Vinay Shrivastava

| <i>How TDS is Calculated</i>                                |            |
|---|------------|
| Estimated salary for financial year ending 31 March 2004    | ₹ 2,40,000 |
| including all perquisites after standard deduction          |            |
| Tax on the above is   | ₹ 46,000   |
| Less: Rebate under Section 88, say, 15% of ₹ 60,000(Saving) | ₹ 9,000    |
| Less: Rebate under Section 88c in case of women             | ₹ 5,000    |
| Total tax payable   | ₹ 32,000   |
| TDS deducted ever month (32,000/1b)                         | ₹ 2,667    |

*The following additional information is available:*

*Tax incidence is calculated as per the following slabs:*

- (1) Income between ₹50000–₹60000, Tax charged at the rate of 10%
- (2) Income between ₹60000–₹150000, Tax charged at the rate of 20%
- (3) Income ₹150000+, Tax charged at the rate of 30%
- (4) All perquisites are taxable

13. What component of the total tax incidence on Mrs Vinay Shrivastava's salary is charged under the highest tax slab: (Approximately)
- (a) 63%

- (b) 59%
  - (c) 53%
  - (d) Cannot be determined
14. What will be the TDS amount per month for a person earning ₹ 1,70,000 as take home salary and ₹ 30,000 as allowance for car & house rent?
- (a) 25000
  - (b) 2833.33
  - (c) 34000
  - (d) Cannot be determined
15. If due to a war between India & Pakistan, the government decides to add a 5% surcharge on the tax incidence on an income of above ₹ 60,000, what will be the TDS amount per month for Mrs Vinay Shrivastava (including the surcharge)?
- (a) 3270.833
  - (b) 2854.166
  - (c) 3054.66
  - (d) None of these
16. If disposable income is defined as the total salary including perquisites less the savings less the TDS amount, what would be the annual disposable income of Mrs Vinay Shrivastava?
- (a) ₹ 208000
  - (b) 203000
  - (c) 148000
  - (d) 143000

## 8

# Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the following tables [Tables 8.1(a) and (b)].

**Table 8.1 (a)** Production of Inorganic Chemicals

| <i>Description</i>           | <i>Production (tonnes)</i> |                |
|------------------------------|----------------------------|----------------|
|                              | <i>20013–14</i>            | <i>2012–13</i> |
| Bleaching Powder             | 60,043                     | 51,434         |
| Aluminium Chloride           | 31,908                     | 31,176         |
| Sodium Tripoly Phosphate     | 60,639                     | 60,041         |
| Sodium Bi-carbonate          | 61,615                     | 72,895         |
| Calcium Carbonate            | 143,980                    | 142,125        |
| Chlorine and Liquid Chlorine | 717,220                    | 718,530        |
| Calcium Carbide              | 83,445                     | 83,388         |
| Titanium Oxide               | 30,422                     | 19,624         |

**Table 8.1 (b)** Production of Organic Chemicals

| <i>Description</i> | <i>Production (tonnes)</i> |                |
|--------------------|----------------------------|----------------|
|                    | <i>2012–13</i>             | <i>2013–14</i> |
| Ethylene Glycol    | 327,387                    | 454,371        |

|                   |         |         |
|-------------------|---------|---------|
| Formaldehyde      | 140,384 | 145,590 |
| Fatty Acids       | 99,320  | 113,851 |
| Aniline           | 44,273  | 39,340  |
| Acetone           | 45,657  | 44,500  |
| Acetic Acid       | 208,921 | 212,319 |
| Pthalic Anhydride | 127,318 | 125,959 |
| Benzene           | 329,000 | 373,000 |
| Xylenes           | 147,288 | 156,000 |
| Phenol            | 69,281  | 66,210  |

1. The ratio of the number of organic chemicals for which the production has fallen to the number of inorganic chemicals for which production has fallen is:
  - (a) 6:5
  - (b) 3:2
  - (c) 2:3
  - (d) 2:1
2. Of all the chemicals shown, the highest percentage increase in production has been exhibited for:
  - (a) Fatty acids
  - (b) Ethylene glycol
  - (c) Aniline
  - (d) Sodium bicarbonate
3. If productive volatility is defined as the percentage change in production, and it is known that any chemical whose productive volatility is greater than 5% is classified as highly volatile, then how many chemicals are not highly volatile (amongst organic chemicals)
  - (a) 4
  - (b) 5
  - (c) 6
  - (d) None of these
4. The ratio of highly volatile organic chemicals to inorganic chemicals

which are not highly volatile is:

- (a) 1:1
- (b) 5:6
- (c) 6:5
- (d) None of these

**Directions for Questions 5 to 8:** Consider the additional information provided in the following table (Table 8.2) and answer the questions that follow.

**Table 8.2** User Industries

| <i>Description</i>      | <i>Production (tonnes)</i> |                |
|-------------------------|----------------------------|----------------|
|                         | <i>2012–13</i>             | <i>2013–14</i> |
| Dyes and Pigments       | 2,398                      | 2,236          |
| Perfumes                | 358                        | 379            |
| Paints and Varnishes    | 2,740                      | 3,081          |
| Printing Inks           | 432                        | 553            |
| Hair Oils               | 266                        | 287            |
| Dental Hygiene Products | 2,249                      | 2,853          |
| Industrial Explosives   | 1,100                      | 1,100          |
| Plastic Floor Covering  | 151                        | 121            |
| Pesticides              | 4,336                      | 4,801          |

5. What is the average price per tonne of chemical in 2012–13 (approximate):

(Assume that the production shown is fully consumed in the user industries shown, and the user industries use only organic and inorganic chemicals)

- (a) ₦ 48,000
- (b) ₦ 4800

- (c) ₹ 54,000  
(d) Cannot be determined
6. Assuming that there is an equivalent proportionate increase in the value of the total raw materials used for each of the user industries as for the chemicals used, then which user industry has the maximum percentage change in its quantity of raw materials used?
- (a) Printing inks  
(b) Dental hygiene products  
(c) Hair oils  
(d) Cannot be determined
7. For Question 6, the maximum change in the value of the raw materials used is for:
- (a) Pesticides  
(b) Printing inks  
(c) Dental hygiene products  
(d) Cannot be determined
8. The percentage change in the average price per tonne for chemical used in all the user industries shown was: (Assuming that the production shown has been fully consumed in the user industries shown).
- (a) 15%  
(b) 18%  
(c) 23 %  
(d) Cannot be determined

**Directions for Questions 9 to 11:** Refer [Table 8.3](#) and answer questions given below that:

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**Table 8.3** Term Life Insurance

| Policy/Insurer                       | Maximum age of entry | Tenures possible      | Maximum age at expiry | Minimum sum assured | For life cover of ₹ 10 lakh Premium in ₹ (Entry age/coverage period in yrs) |         |         |         |
|--------------------------------------|----------------------|-----------------------|-----------------------|---------------------|---|---------|---------|---------|
|                                      |                      |                       |                       |                     | (30/25)   | (40/20) | (50/10) | (55/10) |
| ICICI Prudential                     | 50 yrs               | 5 to 25 yrs           | 65 yrs                | ₹ 1 lakh            | 3,043   | 5,110   | 8,197   | N.A.    |
| HDFC                                 | 60 yrs               | 5 to 30 yrs           | 65 yrs                | ₹ 1 lakh            | 3,050   | 5,110   | 8,320   | 12,600  |
| Standard Life Level Term Insurance   |                      | yrs                   |                       |                     |   |         |         |         |
| Max New York Life Till Age 60 Policy | 55 yrs               | 5, 10, 15, 20, 25 yrs | 60 yrs                | ₹ 2.5lakh           | 3,220   | 5,650   | 10,000  | 12,150* |
| Birla Sunlife Stand Alone Term       | 55 yrs               | 5, 10, 15, 20, 25 yrs | 70 yrs                | ₹ 2 lakh            | 3,160   | 5,150   | 8,790   | 13,100  |
| LIC Anmol Jeevan                     | 50 yrs               | 5 to 25 yrs           | 60 yrs                | ₹ 5 lakh            | 3,8760  | 7,010   | 11,450  | N.A.    |

**Note:** Any critical illness detected after the policy has been taken will not have any impact on the premium Free look period of 15 days for all policies as per IRDA regulations.\*Cover is for a five-year period.

9. The maximum term that a 50 year old individual can hope to insure his life for is:
  - (a) 10 yrs
  - (b) 15 yrs
  - (c) 20 yrs
  - (d) Cannot be determined
10. From the table above, if a 50 year old individual wants to buy a life insurance cover of ₹ 10 lakh (for a coverage period of 10 years) than his best option is:
  - (a) ICICI Prudential
  - (b) HDFC Standard Life (Level Term Insurance)
  - (c) Max New York Life (Till Age 60 Policy)
  - (d) Cannot be determined
11. From the table, how many Life Insurance options are available for a 51 year old who wants 6 years of coverage?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) None of these

**Directions for Questions 12 to 16:**

**Table 8.4** Rental and Capital Values in Delhi and Mumbai

| Delhi Rental and Capital Values     |                                  |                              | Mumbai Rental and Capital Values  |                                  |                              |
|-------------------------------------|----------------------------------|------------------------------|-----------------------------------|----------------------------------|------------------------------|
| Location                            | Rental Value (apt)<br>(Rs/month) | Capital Value<br>(Rs/sq. ft) | Location                          | Rental Value (apt)<br>(Rs/month) | Capital Value<br>(Rs/sq. ft) |
| Vasant Vihar<br>(Grade A)           | 1 lakh–1.75 lakh                 | 7,000–10,000                 | Cuffe Parade,<br>Churchgate       | 60,000–1.25 lakh                 | 7,000–15,000                 |
| Jor Bagh, Sundar Nagar              | 1.25 lakh–2 lakh                 | 10,000–12,000                | Malabar Hill,<br>Breach Candy     | 80,000–1.5 lakh                  | 10,000–18,000                |
| Kalkaji                             | 10,000–15,000                    | 2,000–2,500                  | Bandra, Juhu                      | 45,000–1 lakh                    | 6,500–10,000                 |
| Gurgaon (Grade A)                   | 25,000–35,000                    | 2,200–3,000                  | Powai                             | 15,000–45,000                    | 2,750–4,500                  |
| Noida (Grade A)                     | 15,000–25,000                    | 1,400–2,000                  | Andheri                           | 18,000–45,000                    | 3,000–5,000                  |
| Bangalore Rental and Capital Values |                                  |                              | Chennai Rental and Capital Values |                                  |                              |
| Cunningham Road                     | 40,000–1 lakh                    | 2,200–3,800                  | Boat Club                         | 50,000–75,000                    | 3,100–2,350                  |
| Sadashivnagar                       | 50,000–80,000                    | 2,000–3,500                  | Poes Garden                       | 30,000–60,000                    | 3,100–3,250                  |
| Indiranagar                         | 25,000–80,000                    | 1,800–2,600                  | Wallace Garden                    | 25,000–50,000                    | 2,700–3,000                  |
| Koramangala                         | 25,000–70,000                    | 1,400–2,500                  |                                   |                                  |                              |
| Banasankari/Jaya nagar              | 20,000–60,000                    | 1,300–2,200                  |                                   |                                  |                              |

**Note:** Delhi rental rates are for 1,800–2,500 sq. ft apartments except for Kalkaji (for 1,200–1,800 sq. ft apartments). Chennai rates are for 1,200–1,800 sq. ft apartments and Mumbai rates are for 1,000–1,800 sq. ft apartments. Bangalore rates are for 1,500–1,800 sq. ft apartments.

12. How many areas amongst those shown, will Mr Vinay Shrivastava be able to purchase a 1000 sq. ft flat if he wants to invest between ₹ 20–25 lakh. [He has a saving of ₹ 25 lakh on retirement].
  - (a) 1
  - (b) 6
  - (c) 7
  - (d) None of these
13. For the above question, if Mr Vinay Shrivastava decides to take a loan of 75% of the value of the property apart from his personal investment of ₹ 25 lakh, in how many areas of Mumbai or Delhi will it still be possible that a 1000 sq ft. flat might cost above his budget?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
14. The ratio of the highest possible rent/sq.ft to the lowest possible

rent/sq. ft. from amongst the areas exhibited is:

- (a) 25
  - (b) 20
  - (c) 37.5
  - (d) Cannot be determined
15. The highest possible value of the rent/sqft is for:
- (a) Cuffe Parade, Churchgate
  - (b) Malabar Hill, Breach Candy
  - (c) Vasant Vihar
  - (d) Cannot be determined
16. Mr Vinay Shrivastava bought a 2000 sq. feet flat for ₹ 48 lacs. How many possible areas could he have bought the flat in?
- (a) 6
  - (b) 7
  - (c) 8
  - (d) 9

# 9

# Mock Test Paper

**Directions for Questions 1 to 5:** Refer to *Table 9.1* and answer Questions 1–5.

1. The highest percentage change in the value between 1999–2000 and 1994–95 was exhibited by which segment?
  - (a) Imports
  - (b) Exports
  - (c) Industrial Production
  - (d) GDP at factor cost
2. The maximum change in the trade deficit (defined as Imports–Exports) was shown for which year? [Assume that in 1993–94 imports were at ₹ 10,383 crore and exports were at 5,427 crore.]
  - (a) 1996–97
  - (b) 1998–99
  - (c) 1999–2000
  - (d) Cannot be determined
3. How many segments have shown a greater than 50% increase in their values in 1999–2000 over 1994–95?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
4. What would have been the answer for Question 3, if the figure shown in the graphs were all simple annual growth rates?
  - (a) 1
  - (b) 2

- (c) 3  
 (d) 4
5. If the ratio of imports to exports had been 1.8:1 in 1993–94, then what would be this ratio at the end of 1996–97?
- (a) 1.8:1  
 (b) 1.86:1  
 (c) 2.1:1  
 (d) 1.91:1

**Directions for Questions 6 to 9:** *Table 9.2* contains figures relating to trends in the jute industry.

6. The time period (ending) when the number of composite mills as a proportion of the total number of mills is the lowest is:
- (a) March 1998  
 (b) March 1999  
 (c) March 2000  
 (d) Dec 2000
7. Excluding incomplete years, for the time period ending which month is the percentage change in the number of spinning mills the least:
- (a) March 1999  
 (b) March 2000  
 (c) Dec 2000  
 (d) None of these

**Table 9.1** Growth Trends in Key Segments (All figures in percentage)

|                             | 1994–95 | 1995–96 | 1996–97 | 1997–98 | 1998–99 | 1999–2000 |
|-----------------------------|---------|---------|---------|---------|---------|-----------|
| GDP at factor cost          | 7.0     | 7.3     | 7.5     | 5.0     | 6.8     | 6.4       |
| Industrial Production Index | 8.9     | 13.1    | 6.1     | 6.6     | 3.8     | 8.1       |
| Agricultural Production     | 4.5     | -2.1    | 9.5     | -6.2    | 8.2     | -1.9      |
| Exports                     | 8.2     | 9.0     | 8.7     | 8.6     | 8.1     | 8.3       |
| Imports                     | 8.9     | 10.4    | 10.2    | 10.2    | 10.1    | 10.4      |

**Table 9.2** Growth in Capacity in the Organised Mill Sector—JUTE

| Year ending March | No. of Mills |           |       | Installed capacity |               |              |
|-------------------|--------------|-----------|-------|--------------------|---------------|--------------|
|                   | Spinning     | Composite | Total | Spindles (Mn.)     | Rotors ('000) | Looms ('000) |
| 1994              | 909          | 266       | 1175  | 28.60              | 139           | 150          |
| 1995              | 1148         | 268       | 1416  | 30.70              | 185           | 139          |
| 1996              | 1294         | 275       | 1569  | 31.75              | 226           | 132          |
| 1997              | 1438         | 281       | 1719  | 33.15              | 276           | 124          |
| 1998              | 1504         | 278       | 1782  | 33.88              | 313           | 124          |
| 1999              | 1543         | 281       | 1824  | 34.72              | 383           | 123          |
| 2000              | 1565         | 285       | 1850  | 35.10              | 392           | 123          |
| Dec. 2000         | 1561         | 281       | 1842  | 35.41              | 395           | 123          |

8. Based on the relative trends of movement in the number of mills and the installed capacity for various types of production machines, which of the following statements can be inferred?
- (i) The role of spindles in the production of jute has declined over the period
  - (ii) The role of looms in the production of jute has declined over the period
  - (iii) The role of rotors in the production of jute has declined over the period
  - (a) All of these
  - (b) (i) and (ii)
  - (c) (ii) only
  - (d) (ii) and (iii)
9. If the capacity of production of 1 million spindles is equivalent to the capacity of 1000 rotors, and the capacity of 1 rotor is equivalent to the capacity of 5 looms, then which year showed the highest percentage change in the installed capacity of jute?
- (a) 1995
  - (b) 1996
  - (c) 1997
  - (d) Can't be determined

**Directions for Questions 10 to 13:** When the crisis hit, the IMF led the rescue efforts, but it wanted the World Bank to provide \$ 6 billion of the rescue package. The total rescue package was for \$ 22.6 billion. The IMF would provide \$ 11.2 billion of this total. As I stated before; the World Bank

would lend \$ 6 billion, and the rest would be provided by the Japanese government. Based on the above information answer the questions that follow.

10. Which of the following is correct?
  - (i) The World Bank paid as much as 111.11% of what the Japanese did not pay of the total rescue package.
  - (ii) The IMF paid more than 50% of the total but less than 100% of what the World Bank and the Japanese together paid.
  - (iii) The Japanese paid less than the World Bank but more than the IMF.
    - (a) (i) only
    - (b) (i) and (ii)
    - (c) All three
    - (d) None of the three are true
11. If Japan had declined to pay 50% of what it actually paid, then how much more would World Bank have to pay? (Assume that the World Bank paid the entire deficit thus created)
  - (i) 45% of its commitment
  - (ii) Less than 25% of what IMF did not pay.
  - (iii) Less than 25% of what IMF did actually pay.
    - (a) (i) only
    - (b) (i) & (ii) only
    - (c) (i) & (iii) only
    - (d) All of these
12. How much did Japan not pay?
  - (a) More than 300 but less than 320 percent of what it actually paid.
  - (b) More than 200 but less than 250 percent of World Bank actually paid.
  - (c) 76 percent of what IMF and World Bank together paid.
  - (d) Either (b) or (c)
13. If both the World Bank and Japan were to pay equal amounts, with no change in IMF's contribution, then which of the following option is valid?
  - (a) The World Bank would have to pay only 5% less than what it

actually paid.

- (b) Japan will have to pay 5% more than what it actually paid.
- (c) The percentage drop in World Bank's contribution will be greater than the percentage rise in Japan's contribution.
- (d) None of these.

### ***Directions for Questions 14 to 17:***

**Table 9.3**

| Market    | Jan. 1984<br>(Kshs/kg) | Nov. 1984<br>(Kshs/kg) | Province   |
|-----------|------------------------|------------------------|------------|
| Kalandu   | 2.50                   | 9.31                   | Eastern    |
| Mwingi    | 2.50                   | 9.00                   | Eastern    |
| Kiambu    | 2.14                   | 5.30                   | Central    |
| Machakos  | 2.40                   | 5.76                   | Eastern    |
| Iciara    | 2.53                   | 5.94                   | Eastern    |
| Limuru    | 2.02                   | 4.19                   | Central    |
| Runyenjes | 2.57                   | 4.70                   | Eastern    |
| Thika     | 2.86                   | 4.91                   | Central    |
| Kandara   | 2.84                   | 4.76                   | Central    |
| Embu Town | 2.92                   | 4.89                   | Eastern    |
| Eldoret   | 2.00                   | 2.92                   | Riftvalley |
| Kitale    | 1.51                   | 2.11                   | Riftvalley |
| Bondo     | 2.50                   | 3.33                   | Nyanza     |
| Ahero     | 2.51                   | 3.19                   | Nyanza     |
| Sondu     | 2.31                   | 2.73                   | Nyanza     |
| Mumais    | 2.35                   | 2.69                   | Western    |
| Luanda    | 2.71                   | 2.57                   | Western    |

- 14.** Which of the following provinces witnessed both positive and negative percentage change in the price between Jan. & Nov.?
  - (a) Eastern
  - (b) Western
  - (c) Central
  - (d) None of these
- 15.** Which of the following provinces witnessed the maximum percentage change in price in any one market? Each province has a number of markets within it, each market witnessing percentage change in the price.
  - (a) Eastern

- (b) Central
  - (c) Riftvalley
  - (d) Western
16. Only one market witnessed a negative percentage change in its price. What was the magnitude of that change? (approximately)
- (a) 20
  - (b) 15
  - (c) 10
  - (d) 5
17. How many markets whose name starts with ‘K’ witnessed two digit percentage increase in the price?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4

# 10 Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the following table (Table 10.1).

**Table 10.1** Figures Relating to Select Items from Synthetic Industry

|      | In '000 tonnes                   | 1997–98 |         | 1998–99 |      | 1999–2000 |      |
|------|----------------------------------|---------|---------|---------|------|-----------|------|
|      |                                  | C       | P       | C       | P    | C         | P    |
| I.   | Polymers                         |         |         |         |      |           |      |
|      | LDPE                             | 200     | 187.29  | 200     | 185  | 200       | 190  |
|      | LLDPE/HDPE                       | 540     | 528.10  | 860     | 550  | 1445      | 1000 |
|      | PP                               | 550     | 501.13  | 550     | 540  | 760       | 625  |
|      | PS                               | @144    | 120.06  | @144    | 125  | @144      | 130  |
|      | PVC                              | 780     | 679.90  | 780     | 700  | 780       | 750  |
|      | Total                            | 2214    | 2016.47 | 2454    | 2100 | 3328      | 2695 |
| II.  | Synthetic fibre                  |         |         |         |      |           |      |
|      | Acrylic Fibre (AF)               | 105     | 79.51   | 105     | 80   | 105       | 80   |
|      | Nylon Filament Yarn (NFY)        | *22     | 29.98   | *22     | 30   | *22       | 30   |
|      | Tyre Cord (TY)                   | *44     | 46.58   | *44     | 50   | *44       | 55   |
|      | Polyester Filament Yarn (PSY)    | \$832   | 659.73  | \$848   | 700  | \$848     | 770  |
|      | Polyester Staple Fibre (PSF)     | 575     | 430.65  | 591     | 500  | 591       | 530  |
|      | Total                            | 1578    | 1246.45 | 1610    | 1360 | 1610      | 1458 |
| III. | Elastomer                        |         |         |         |      |           |      |
|      | SBR                              | 45      | 27.52   | 84      | 30   | 84        | 30   |
|      | PBR                              | 50      | 33.88   | 50      | 35   | 50        | 40   |
|      | Total                            | 95      | 61.40   | 134     | 65   | 134       | 70   |
| IV.  | Synthetic detergent intermediate |         |         |         |      |           |      |
|      | LAB                              | 274     | 250.85  | 274     | 260  | 274       | 270  |

\* Independent Capacities; \$ include 101 kt broad banded capacity.

@ Includes 20 kt broad banding with ABS; C: Capacity; P: Production.

**Note:** Capacity utilisation is defined as the production as a percentage of the total capacity.

- How many specific instances of over 100% capacity utilisation are visible from the table?

(a) 4

- (b) 5
  - (c) 6
  - (d) None of these
2. The number of products which have continuously shown a capacity utilisation greater than 80% is
- (a) 7
  - (b) 8
  - (c) 9
  - (d) 10
3. The total addition to installed capacity over the entire time period is:
- (a) 1185 kt
  - (b) 118,500 tonnes
  - (c) 2370 k
  - (d) 237,000 tonnes
4. How many product categories have exhibited a consistent yearly growth in capacity as well as a consistent yearly growth in production?
- (a) 4
  - (b) 3
  - (c) 2
  - (d) None of these

**Directions for Questions 5 to 8:** Refer to the following table ([Table 10.2](#)) and answer Questions 1–4.

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**Table 10.2** Pan Indian Railways

| Description                              | Unit       | Year 1     | Year 2     |
|--|------------|------------|------------|
| <b>Plant &amp; Equipment:</b>            |            |            |            |
| Capital-at-charge                        | ₹ in crore | *36,829.34 | @39,772.06 |
| Total investment                         | "          | 53,657.55  | 58,353.66  |
| Route length                             | km.        | 62,809     | 62,759     |
| Locomotives                              | Nos.       | 7,429      | 7,517      |
| Passenger services vehicles              | "          | 35,650     | 36,510     |
| Other coaching vehicles                  | "          | 5,338      | 4,838      |
| Wagons                                   | "          | 252,944    | 244,419    |
| Railway stations                         | "          | 6,896      | 6,867      |
|  | "          |            |            |
| <b>Operations:</b>                       |            |            |            |
| Passenger: Train kms.                    | Millions   | 434.1      | 445.7      |
| Vehicle kms                              | "          | 11,022     | 11,699     |
| Freight Train kms                        | "          | 246        | 261        |
| Wagon kms.                               | "          | 25,240     | 27,003     |
| <b>Volume of traffic:</b>                |            |            |            |
| Passenger originating                    | Millions   | 4,411      | 4585       |
| Passenger kms                            | "          | 403,884    | 430,666    |
| Tonnes origination                       | "          | 441.58     | 478.18     |
| Tonne kms                                | "          | 284,270    | 303,039    |
| <b>Employment and wages:</b>             |            |            |            |
| Regular employees                        | Thousand   | 1,578.4    | 1,577.2    |
| Wage bill of regular employees           | ₹ in crore | 1,5610.6   | 16,288.7   |
| Average annual wage per regular employee | Rupee      | 54387.3    | 61211.8    |
| <b>Financial results:</b>                |            |            |            |
| Revenues                                 | ₹ in crore | 29,619.46  | 32,938.81  |
| Expenses                                 | "          | 27,834.60  | 30,843.99  |
| Misc. transactions                       | "          | 356.30     | 64.85      |
| Net revenue (before dividend)            | "          | 2,141.16   | 2,735.67   |
| Rate of return on capital                | Percentage | 5.81       | 6.88       |
| Dividend on capital                      | ₹ in crore | 1,742.08   | 1,889.78   |
| Shortfall (-) / Excess (+)               | "          | (+) 399.08 | (+) 845.89 |

\* Includes investment (₹ 9,516.50 crore) from Capital Fund.

@ Includes investment (₹ 10,116.75 crore) from Capital Fund.

5. The ratio of the number of specific items that have shown an increase to the number of specific items that have shown a decrease between year 1 to year 2 is:
- 18: 8
  - 21:5
  - 20:6
  - 19:7

6. The highest percentage decrease has been shown by:
  - (a) Route length
  - (b) Other coaching vehicles
  - (c) Misc. transactions
  - (d) None of these
7. The highest percentage increase has been shown by:
  - (a) Net Revenue (before dividend)
  - (b) Excess
  - (c) Vehicle kms
  - (d) None of these
8. On an average, in year 2, how many kms did one passenger who boarded the train travel for?
  - (a) 93.9
  - (b) 98.1
  - (c) 95.7
  - (d) Can't be determined

**Directions for Questions 9 to 12:** The following table provides certain information about surpluses and deficits of SEBs in 1990. Answer Questions 5–8 based on the information provided in [Table 10.3](#).

**Table 10.3** Surplus/Deficit of SEBs

| Period  | Surplus/Deficit (with subsidy) | Revenue subsidies and grants as in accounts | Surplus/Deficit (without subsidy) |
|---------|--------------------------------|---|-----------------------------------|
| 1991–92 | 153.65                         | 3293.64                                     | -3139.99                          |
| 1992–93 | 766.27                         | 3709.69                                     | -2943.42                          |
| 1993–94 | 1117.48                        | 4136.93                                     | -3018.91                          |
| 1994–95 | 1125.36                        | 5486.64                                     | -4360.80                          |
| 1995–96 | 1382.59                        | 8140.57                                     | -6757.98                          |
| 1996–97 | 833.03                         | 8419.11                                     | -7586.08                          |
| 1997–98 | 1434.76                        | 9871.42                                     | -8436.66                          |
| 1998–99 | 887.23                         | 11793.82                                    | -10906.59                         |

9. The highest percentage increase in deficit without subsidy is:
  - (a) 60%
  - (b) 55%
  - (c) 11%
  - (d) 6%

- 10.** Which year can be said to be an improvement in overall fiscal performance of SEBs over the previous year?
- 1992–93
  - 1993–94
  - 1995–96
  - Cannot be determined
- 11.** The greatest percentage change in subsidy is approximately:
- 48.5%
  - 50%
  - 52.3%
  - 46.2%
- 12.** What percentage of the total subsidies granted over the period shown, pertains to the last four years
- 69.4%
  - 69.7%
  - 70%
  - 70.3%

**Directions for Questions 13 to 16:** Study the data given in Table 6.3 and answer questions 13–16.

**Table 10.4** Key Financials of Select Private Sector Banks

|             | Dep     | Adv     | Res   | Eq    | NP    | EPS    | CMP  |
|-------------|---------|---------|-------|-------|-------|--------|------|
| HDFC Bank   | 579.41  | 257.68  | 39.13 | 3.20  | 5.22  | 26.10  | 840  |
| Stanchart   | 425.78  | 203.72  | 11.72 | 2.13  | 3.30  | 13.58  | 445  |
| Citi bank   | 2568.57 | 1444.85 | 23.15 | 2.80  | 20.24 | 112.44 | 1620 |
| ICICI Bank  | 741.24  | 386.16  | 19.09 | 3.25  | 2.55  | 11.33  | 470  |
| UTI Bank    | 2533.08 | 1297.34 | 58.51 | 12.09 | 17.86 | 16.10  | 280  |
| Canara Bank | 283.40  | 131.94  | 4.72  | 4.40  | 0.11  | 0.32   | 77   |

**Note:** ICICI Bank figures relate to 2023–24. All other figures relate to 2022–23.

Dep — Deposit (₹ crore)

EPS — Earnings per share ₹

Eq — Equity (₹ crore)

NP — Net Profit (₹ crore)

Res — Reserve (₹ crore)

P/E — Price earnings ratio

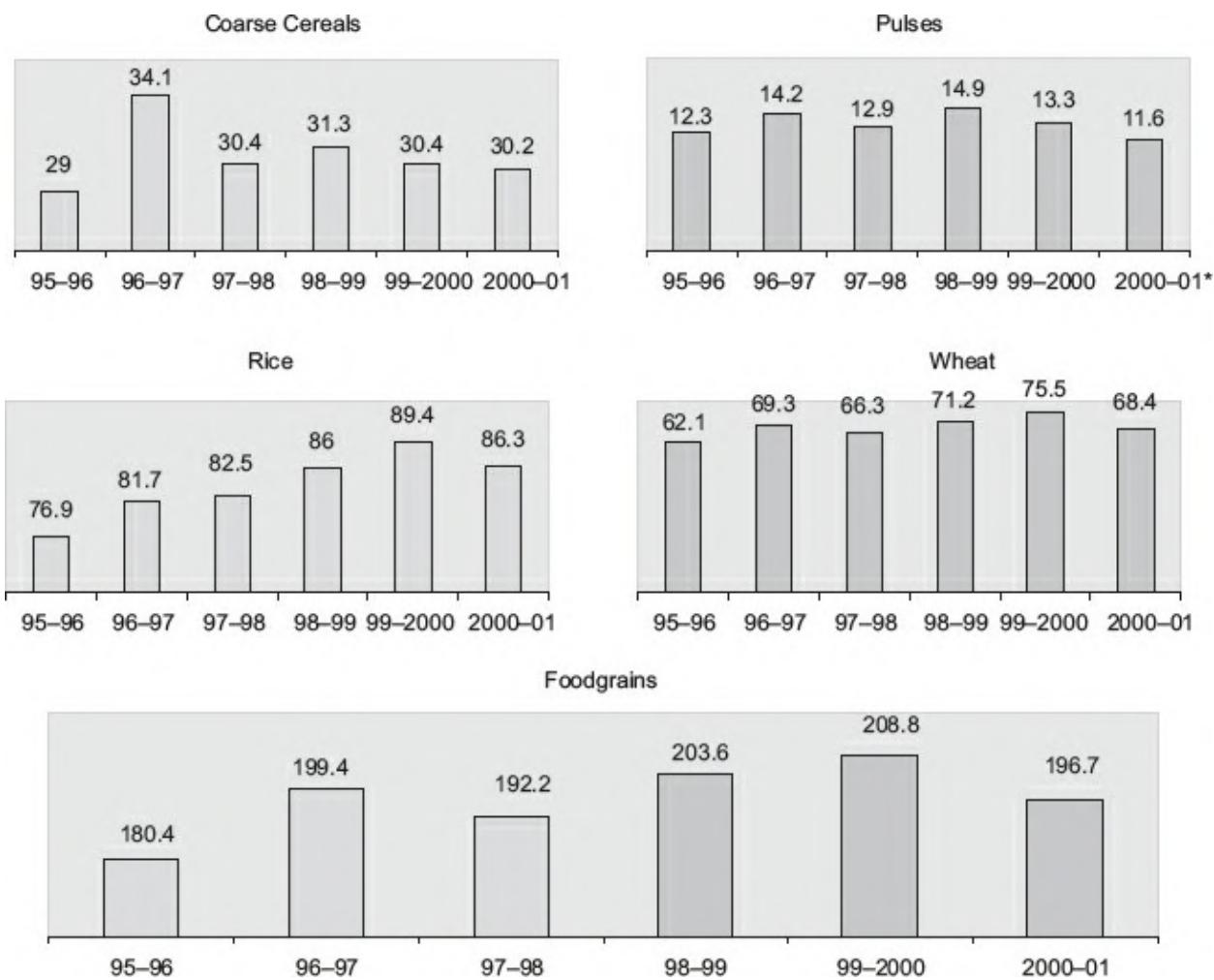
Adv — Advance (₹ crore)

CMP — Current market price ₹

13. Which bank has the highest reserves to net profit ratio?
  - (a) ICICI Bank
  - (b) UTI Bank
  - (c) Canara Bank
  - (d) Stanchart
14. What is the share of deposits accrued by ICICI Bank in the net deposits of all banks in the year 2022–23?
  - (a) 15%
  - (b) 35%
  - (c) 10%
  - (d) Cannot be determined
15. What is the premium on each share of HDFC Bank? (Premium = Current Market Price – Base Price) [(Base Price = Equity/(No. of shares)] (No. of shares = Net Profit/EPS)
  - (a) 600
  - (b) 1790
  - (c) 200
  - (d) None of these
16. Which bank has the highest Current Market Price (CMP) to EPS ratio?
  - (a) ICICI Bank
  - (b) UTI Bank
  - (c) Canara Bank
  - (d) Stanchart

# 11 Mock Test Paper

**Directions for Questions 1 to 4:** The following figures (Figure 11.1) gives the information about the production for different varieties of foodgrains: (Rice + Pulses + Wheat + Coarse Cereals = Foodgrains). Refer to them for answering Questions 5–8.



**Figure 11.1** Information Pertaining to Select Foodgrain Items

1. Which foodgrain can be said to have displayed an identical trend in its production as the total foodgrain production over the entire period?
  - (a) Rice
  - (b) Coarse cereals
  - (c) Pulses
  - (d) Wheat
2. For which year was the percentage contribution of wheat to the total food grain production the highest?
  - (a) 1997–98
  - (b) 1998–99
  - (c) 1999–2000
  - (d) 2000–01
3. Which of the following statements is/are true?
  - (i) Except 1997–98, rice and wheat production have followed identical trends
  - (ii) Pulses production can be expected to increase in 2001–02
  - (iii) The highest percentage increase in coarse cereals production between two successive years over the period was higher than the same figure for pulses.
  - (iv) Production of coarse cereals has remained the least volatile over the period except for 96–97.
    - (a) (i) and (iii)
    - (b) All except (ii)
    - (c) (iii) and (iv) only
    - (d) All 4.
4. 1996–97 was the best year in terms of percentage growth of production for which of these.
  - (a) Rice and pulses
  - (b) Wheat
  - (c) Coarse cereals, rice, and pulses
  - (d) All food grains

**Directions for Questions 5 to 8:** Refer to the following table (Table 7.2) and answer the questions that follow:

**Table 11.2** Percentage of Population in Poverty

|                  | 1983   | 1987–88 | 1993–94 | 1999–2000 |
|------------------|--------|---------|---------|-----------|
| 1 Bihar          | 52.22  | 52.13   | 54.96   | 42.60     |
| 2 Rajasthan      | 34.461 | 35.15   | 27.41   | 15.28     |
| 3 Uttar Pradesh  | 47.07  | 41.46   | 40.85   | 31.15     |
| 4 Orissa         | 65.29  | 55.58   | 48.56   | 47.15     |
| 5 Madhya Pradesh | 49.78  | 43.07   | 42.52   | 37.43     |
| 6 Andhra Pradesh | 28.91  | 25.86   | 22.19   | 15.77     |
| 7 Tamil Nadu     | 51.66  | 43.39   | 35.03   | 21.12     |
| 8 Kerala         | 40.42  | 31.79   | 25.43   | 12.72     |
| 9 Karnataka      | 38.24  | 37.53   | 33.16   | 20.04     |
| 10 West Bengal   | 54.85  | 44.72   | 35.66   | 27.02     |
| 11 Gujarat       | 32.79  | 31.54   | 24.21   | 14.07     |
| 12 Haryana       | 21.37  | 16.64   | 25.05   | 8.74      |
| 13 Maharashtra   | 43.44  | 40.41   | 36.86   | 25.02     |
| 14 Punjab        | 16.18  | 13.20   | 11.77   | 6.16      |
| All 14 states    | 43.8   | 39.92   | 36.25   | 26.43     |
| All India        | 44.48  | 38.86   | 35.97   | 26.10     |

**Note:** Rankings are to be done in reverse order, i.e., the lower the poverty percentage, the higher the rank. (e.g., Haryana will be ranked 8th in 1983).

5. If states are ranked on the basis of least poverty levels and the best state is ranked at No. 1, while the worst state is ranked at No. 14; which state will rank at No. 7 in the year 1993–94?
  - (a) Karnataka
  - (b) UP
  - (c) Haryana
  - (d) Tamil Nadu
6. Cumulative poverty rating is defined as the sum of the ranks of a state over the four time periods shown. Which state shows the highest cumulative poverty rating over the period?
  - (a) Bihar
  - (b) MP
  - (c) Punjab
  - (d) Orissa

7. The state which has the best poverty alleviation record in terms of percentage change in the number of poor people in the state in 1983 to 1999–2000 is:
- Punjab
  - Haryana
  - Tamil Nadu
  - Can't be determined
8. State A is said to dominate state B, if it has a better percentage of population in poverty as compared to state B. By how many states is Bihar dominated for all the four years shown in the table?
- 11
  - 12
  - 0
  - 1

**Directions for Questions 9 to 12:** Refer to the following tables ([Tables 11.3\(a\)](#) and [\(b\)](#)) and answer the questions that follow:

**Table 11.3 (a)** Rate of Growth of Gross State Domestic Product

|                  | 1980–81 to 1990–91 (per cent per year) | 1991–92 to 1998–99 (per cent per year) |
|------------------|--|--|
| 1 Bihar          | 4.66                                   | 2.88                                   |
| 2 Rajasthan      | 6.60                                   | 5.85                                   |
| 3 Uttar Pradesh  | 4.95                                   | 3.58                                   |
| 4 Orissa         | 4.29                                   | 3.56                                   |
| 5 Madhya Pradesh | 4.56                                   | 5.89                                   |
| 6 Andhra Pradesh | 5.65                                   | 5.20                                   |
| 7 Tamil Nadu     | 5.38                                   | 6.02                                   |
| 8 Kerala         | 3.57                                   | 5.61                                   |
| 9 Karnataka      | 5.29                                   | 5.87                                   |
| 10 West Bengal   | 4.71                                   | 6.97                                   |
| 11 Gujarat       | 5.08                                   | 8.15                                   |
| 12 Haryana       | 6.43                                   | 5.13                                   |
| 13 Maharashtra   | 6.02                                   | 8.01                                   |

|                            |      |      |
|----------------------------|------|------|
| 14 Punjab                  | 5.32 | 4.77 |
| Combined GSDP of 14 states | 5.24 | 5.90 |
| GDP (National Accounts)    | 5.47 | 6.50 |

**Table 11.3 (b)** Growth Rates of Per Capita Gross State Domestic Product

|                            | 1980–81 to 1990–91 (per cent<br>per year) | 1990–92 to 1998–99 (percent<br>per year) |
|----------------------------|---|--|
| 1 Bihar                    | 2.45                                      | 1.27                                     |
| 2 Rajasthan                | 3.96                                      | 3.48                                     |
| 3 Uttar Pradesh            | 2.60                                      | 1.28                                     |
| 4 Orissa                   | 2.38                                      | 2.08                                     |
| 5 Madhya Pradesh           | 2.08                                      | 3.67                                     |
| 6 Andhra Pradesh           | 3.34                                      | 3.67                                     |
| 7 Tamil Nadu               | 3.87                                      | 4.78                                     |
| 8 Kerala                   | 2.19                                      | 4.35                                     |
| 9 Karnataka                | 3.28                                      | 4.08                                     |
| 10 West Bengal             | 2.39                                      | 5.14                                     |
| 11 Gujarat                 | 3.08                                      | 6.73                                     |
| 12 Haryana                 | 3.86                                      | 2.85                                     |
| 13 Maharashtra             | 3.58                                      | 6.19                                     |
| 14 Punjab                  | 3.33                                      | 2.93                                     |
| Combined GSDP of 14 states | 3.03                                      | 4.02                                     |

9. How many states had an increase in their rate of growth of gross state domestic product, as well as an increase in the growth rates of per capita gross state domestic product?
  - (a) 4
  - (b) 5
  - (c) 6
  - (d) 7
10. Performance of the 14 states shown, with respect to the performance of the national economy, it can be said that these states have
  - (a) Out performed
  - (b) Under performed
  - (c) Performed at par

- (d) Nothing can be said
11. Which state has shown the lowest growth rate of population between 1980–81 to 90–91?
- Orissa
  - Tamil Nadu
  - West Bengal
  - None of these
12. The population growth rate over the entire period for the 14 states combined is nearly
- 2.8%
  - 3.6%
  - 5.1%
  - None of these

**Directions for Questions 13 to 16:** Refer to [Table 11.4](#) below and answer the questions that follow.

**Table 11.4** Reduced Holding Dilution of Equity Stakes by Promoters in the Financial Year 2001–02

| Companies                 | Holding on<br>31/03/01 | Holding on<br>31/03/02 | Company               | Holding on<br>31/03/01 | Holding on<br>31/03/02 |
|---------------------------|------------------------|------------------------|-----------------------|------------------------|------------------------|
| Vital communication       | 91.96                  | 8.04                   | Aditya International  | 68.8                   | 55.31                  |
| Rajesh Strips             | 89                     | 20.8                   | Best & Crompton Engg  | 89.98                  | 77.13                  |
| Gleitlager (India)        | 76                     | 24                     | Welspun Syntex        | 34.06                  | 21.26                  |
| ICICI Bank                | 46.99                  | 0                      | Neocure Therapeutics  | 24.78                  | 12.21                  |
| Ruby Mills                | 73.8                   | 30.37                  | KPIT Infosystems      | 52.79                  | 40.35                  |
| Design Auto Systems       | 41.33                  | 1.28                   | Prime Securities      | 27.64                  | 15.7                   |
| Aryan Pesticides          | 68.76                  | 29.49                  | Murudesh Ceramics     | 55.84                  | 44.07                  |
| Global Capital            | 52.36                  | 15.26                  | Balaji Distilleries   | 69.4                   | 57.99                  |
| Belsund Sugar             | 59.83                  | 22.83                  | Flex Industries       | 41.28                  | 29.9                   |
| IndusInd Bank             | 56.62                  | 49.86                  | MP Glychem Industries | 30.34                  | 24.41                  |
| Himachal Futuristic Comm. | 26.9                   | 20.22                  | S S Organics          | 59.18                  | 53.51                  |
| Nav Bharat Refineries     | 72.54                  | 66.11                  | Ganesh Benzoplast     | 37.69                  | 32.15                  |
| Cybermate Infotek         | 27.14                  | 20.73                  | Softpro Systems       | 62.47                  | 56.95                  |
| Wellwin Industries        | 9.76                   | 3.53                   |                       |                        |                        |

13. The highest percentage dilution of stake has been for
- Vital Communications
  - Gleitlager (India)
  - Design Auto Systems

- (d) None of these
14. The number of companies in which the promoters have diluted over 50% of their initial stake is:
- (a) 10
  - (b) 9
  - (c) 11
  - (d) 1
15. In terms of the absolute value of the dilution of equity stake, rank the following in ascending order.
- (i) IndusInd Bank
  - (ii) S.S Organics
  - (iii) Prime Securities
  - (iv) Murudesh Ceramics
  - (v) Flex Industries
- (a) (ii), (i), (iv), (v), (iii)
  - (b) (i), (ii), (v), (iv), (iii)
  - (c) (ii), (i), (iii), (iv), (v)
  - (d) (ii), (i), (v), (iv), (iii)
16. From the data provided, it is clear that the highest monetary benefits of the dilution of equity stakes has occurred for the promoters of:
- (a) Vital Communications
  - (b) ICICI Bank
  - (c) Rajesh Strips
  - (d) Can't be determined

## 12 Mock Test Paper

**Directions for Questions 1 to 3:** Refer to the following table (Table 12.1) and answer the questions that follow.

The table shows Mr Cheekoo's estimation of probabilities of how the stock market will behave, and his fund manager Mr Kaku's projections about the returns that will be generated in three mutual funds A, B and C based on what happens in the stock markets.

**Table 12.1** Returns Probability

| Event        | Probability | Returns |      |      |
|--------------|-------------|---------|------|------|
|              |             | A       | B    | C    |
| 5% decline   | 20%         | -5%     | 0%   | 5%   |
| Flat         | 30%         | +10%    | +10% | +10% |
| 5% increase  | 40%         | +25%    | +20% | +15% |
| 10% increase | 10%         | +35%    | +30% | +25% |

1. If Mr Cheekoo wants to maximise his actual expectation what should he do? (Assume he has ₹ 100 crore to invest and he has only these three options.)
  - (a) Invest in A
  - (b) Invest in B
  - (c) Invest in C
  - (d) Can't be determined
2. If Mr Cheekoo invests all his amount in Fund B, then his expected return will be to the tune of (Assume ₹ 100 crore invested):
  - (a) 30 crore
  - (b) 20 crore

- (c) 11 crore
  - (d) 14 crore
3. If Mr Cheekoo has invested 50% in Fund A, 30% in Fund B, and 20% of his money in Fund C, then his expected return is?
- (a) 14.45%
  - (b) Better than his expected return from Fund B and C invested 1:1
  - (c) Both a and b
  - (d) None of these

**Directions for Questions 4 to 7:** If Mr Kaku's market research suggests that the respective probabilities for each of the four events are:

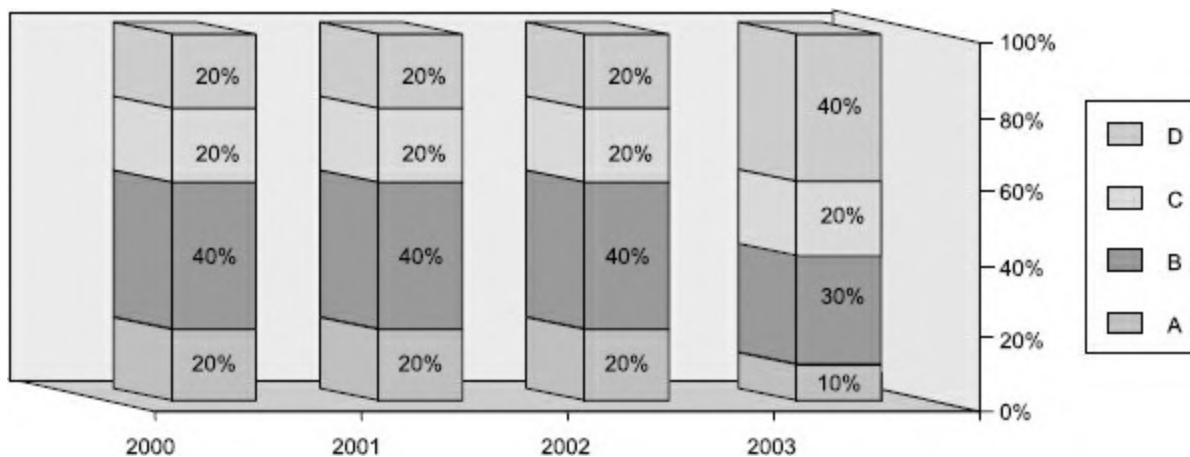
|              |     |
|--------------|-----|
| 5% decline   | 25% |
| Flat         | 25% |
| 5% increase  | 30% |
| 10% increase | 20% |

4. The percentage difference in the maximum expectations of Mr Kaku with respect to the maximum expectations of Mr Cheekoo is nearly:
- (a) 1.4%
  - (b) 1.5%
  - (c) 1.6%
  - (d) 1.7%
5. The highest percentage difference between Mr Cheekoo's expectation and Mr Kaku's expectations will be for:
- (a) Fund A
  - (b) Fund B
  - (c) Fund C
  - (d) Can't be determined
6. Based on the event probabilities assigned by Mr Kaku and Mr Cheekoo, which of the following conclusions can be made:
- (i) Kaku is more optimistic than Cheekoo
  - (ii) Kaku is more pessimistic than Cheekoo
  - (iii) Kaku's expected returns are higher than Cheekoo's expected

returns

- (iv) Kaku expects more volatility in the stock market than Cheekoo
- (a) (i), (iii) and (iv)
  - (b) (ii), (iii) and (iv)
  - (c) (iii) only
  - (d) (iii) and (iv)
7. If the investment pattern is 50% in Fund A, 30% in Fund B and 20% in Fund C, then the absolute difference between expectations of Kaku and Cheekoo (on an investment of ₹ 100 crore) is:
- (a) ₹ 45 million
  - (b) ₹ 4.25 million
  - (c) ₹ 52.5 million
  - (d) None of these

**Directions for Questions 8 to 11:** The cumulative bar chart ([Fig. 12.1](#)) below gives us the production of four products A, B, C & D for four years. It is known that the total production increases @ 20% over its value in the previous year. The difference between C's production in 2003 & A's production in 2001 is 2640 units.



**Figure 12.1** Production of A,B,C and D

8. If the price of B in 2001 is ₹ 125 per unit, what is the sales revenue in the same year due to sale of B (in Rupees lakhs)?
- (a) 15

- (b) 12.5  
(c) 20  
(d) None of these
9. Assuming no pile up of inventory at the beginning or the end of the year, what is the ratio of the number of units of C produced in these four years?
- (a) 120:175:260:228  
(b) 125:135:240:224  
(c) 125:165:270:216  
(d) None of these
10. If the price of the four products is in the ratio of 3:5:7:8, what is the ratio of the revenue generated by these products in 2002?
- (a) 6:15:21:16  
(b) 4:10:14:9  
(c) 9:16:24:20  
(d) 3:10:7:8
11. Which of the following is Not true?
- (a) In the given period, the maximum number of units produced was that of B.  
(b) In 2003, the number of units of C produced was the second highest for C in the given period.  
(c) The only product that does not show an increasing trend is A.  
(d) None of these.

**Directions for Questions 12 to 14:** Refer to the following table (Table 11.1) and answer the questions that follow.

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**Table 12.2** Model Investment Chart for Vinay Srivastava

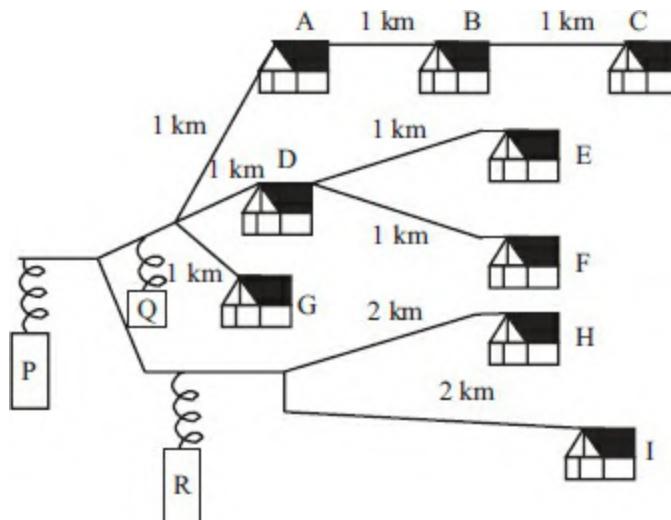
| Holding In Debt-based Mutual Funds |  |                          |                  | Equity Holding                    |   |                          |                                   |
|------------------------------------|--|--------------------------|------------------|-----------------------------------|---|--------------------------|-----------------------------------|
| Year                               | Value at the beginning of the yr. (Rs) | Return for the year (Rs) | Withdrawals (Rs) | Value at the end of the year (Rs) | Value at the beginning of the year (Rs) | Return for the year (Rs) | Value at the end of the year (Rs) |
| 2014                               | 1,000,000                              | 70,000                   | 180,000          | 890,000                           | 600,000                                 | 84,000                   | 684,000                           |
| 2015                               | 890,000                                | 62,300                   | 180,000          | 772,300                           | 684,000                                 | 95,760                   | 779,760                           |
| 2016                               | 2,572,300                              | 180,061                  | 180,000          | 2,572,361                         | 779,760                                 | 109,166                  | 888,926                           |
| 2017                               | 2,772,361                              | 194,065                  | 180,000          | 2,786,426                         | 8,88,926                                | 124,450                  | 1,013,376                         |
| 2018                               | 2,986,426                              | 209,050                  | 180,000          | 3,015,476                         | 1,013,376                               | 141,873                  | 1,155,249                         |

12. What is the percentage of the initial funds in debt- based mutual funds that has been invested at the end of year 2015 by the investor in debt-based mutual funds?
- (a) 140%
  - (b) 180%
  - (c) 133.16%
  - (d) None of these
13. Of the total amount invested by Vinay Srivastava, what is the percentage amount invested at the start of 2014 in debt-based mutual funds?
- (a) 23.41%
  - (b) 28.43%
  - (c) 26.31%
  - (d) 33.31%
14. The highest percentage growth in the value of the portfolio at the beginning of the year is shown for:
- (a) 2015
  - (b) 2016
  - (c) 2017
  - (d) 2018

**Directions for Questions 15 to 18:** Power Plant P produces certain amount of electricity, which it distributes equally to substations Q and R. They further distribute the obtained electricity equally to the different mini stations A, B, C, D, E, F, G, H and I. It is assumed that after the sub-stations, the wire loses 10% of the original electricity it is carrying for every

kilometer, i.e., if 10 A is sent through a wire, after 1 km it will have 9 A and after 2 kms it will have 8 A and so on.

Further it is known that every mini-station retains 50% of the electricity that it receives (after the losses) and passes on the remainder 50% of the electricity that it receives to the stations down the line.



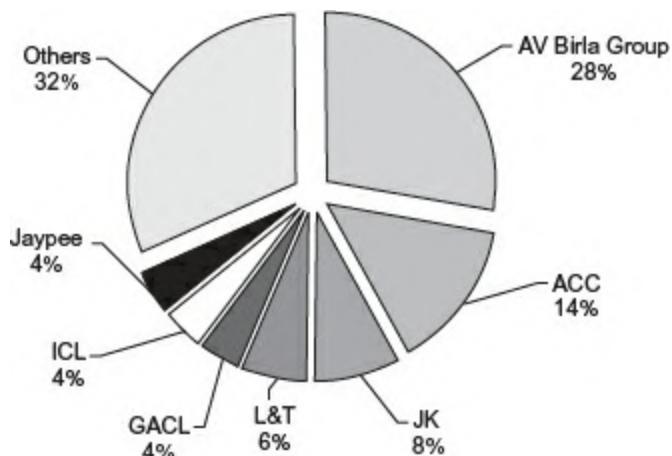
**Figure 12.2** Power Distribution from a Power Plant

15. If mini-station I is receiving 10 A, then how much is mini-station 'A' receiving?
  - (a) 7.5 A
  - (b) 8.2 A
  - (c) 10.5 A
  - (d) None of these
16. Approximately how much should P produce so that C can get 10 A of current?
  - (a) 230 A
  - (b) 300 A
  - (c) 330 A
  - (d) 360 A
17. Mini-station H is using a device which decreases the current losses on the transmission route directly connected to it to 75%. If H is receiving 34 A, then how much is G receiving?
  - (a) 80 A

- (b) 26.66 A
  - (c) 24 A
  - (d) None of these
18. If E is using the same device that H is (for Question 15), then the ratio of current used by E and G is. (Assume that E receives 37.)
- (a) 160:37
  - (b) 37:160
  - (c) 80:37
  - (d) 37:80

# 13 Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the following chart ([Figure 13.1](#)) and table ([Table 13.1](#))



**Figure 13.1** Market Shares of Indian Cement Companies (2018–19)

1. Which of these companies had the maximum profit before tax in the year 2018-19?
  - (a) ACC
  - (b) GACL
  - (c) ICL
  - (d) Birla
2. Which of these companies spent the maximum in advertising in the year 2018–19?
  - (a) ICL
  - (b) GACL
  - (c) ACC

- (d) Birla
3. If in the future, ICL merges with L & T, what profit before tax does this union generate if ₹ 100 worth of cement is being bought in the year. (Assume that the market shares remain constant)
- (a) 0.46275
  - (b) 0.76275
  - (c) 0.9178
  - (d) 0.36275
4. With every passing year, cement companies are generating more profits per rupee of sale. This is occurring due to improved efficiencies of working. ICL follows this trend in 2019–20 and increases its profit before tax per rupee of sale by 10% over the previous year. Part of the reason for this profit figure is since its fixed expenses dropped to 10% of the sales value in 2019–20. But there is also some simultaneous change in the variable expenses. Identify the change.
- (a) Increases by around 24%
  - (b) Decreases by around 24%
  - (c) Increases by around 20%
  - (d) Decreases by around 20%

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**Table 13.1** Costs per Rupee of Sale in Cement Companies

|                       | ACC   | Birla | GACL  | ICL   | L&T   | Others |
|-----------------------|-------|-------|-------|-------|-------|--------|
| Fixed Expenses        | 22.25 | 21.14 | 27.07 | 24.57 | 22.40 | 24.10  |
| Wages & Salaries      | 6.43  | 9.91  | 2.79  | 6.83  | 7.07  | 5.04   |
| Repairs & Maintenance | 4.82  | 1.93  | 1.53  | 3.09  | 2.13  | 1.56   |
| Other Expenses        | 3.14  | 2.48  | 5.41  | 3.54  | 6.58  | 2.51   |
| Interest              | 4.70  | 4.19  | 8.86  | 5.81  | 3.61  | 7.61   |
| Depreciation          | 3.15  | 2.64  | 8.47  | 5.29  | 3.22  | 7.39   |
| Variable Expenses     | 74.27 | 78.08 | 58.82 | 65.49 | 68.92 | 57.54  |
| Raw Materials         | 19.05 | 26.34 | 10.07 | 12.54 | 32.33 | 18.92  |
| Energy                | 22.14 | 23.21 | 24.62 | 25.41 | 6.67  | 22.27  |
| Other Mfg. Expenses   | 1.07  | 1.61  | 1.27  | 3.06  | 16.01 | 0.00   |
| Indirect Taxes        | 14.85 | 13.61 | 13.25 | 12.49 | 6.45  | 1.94   |
| Excise                | 13.52 | 13.44 | 13.16 | 10.62 | 5.91  | 0.00   |
| Advertising           | 0.77  | 0.38  | 1.13  | 0.63  | 0.49  | 1.21   |
| Marketing             | 2.08  | 0.68  | 0.48  | 4.89  | 0.37  | 0.37   |
| Distribution          | 14.31 | 12.24 | 8.00  | 6.47  | 6.60  | 12.84  |
| Profit Before Tax     | 3.48  | 0.77  | 14.12 | 9.94  | 8.67  | 18.36  |

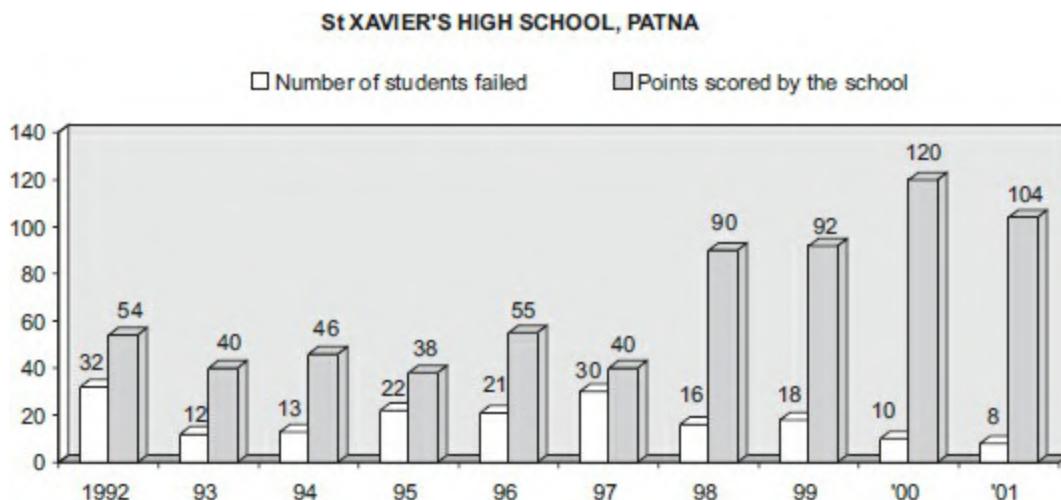
**Directions for Questions 5 to 8:** The following chart ([Figure 13.2](#)) shows the performance of the students of St. Xaviers High School Patna in the Tenth standard board examinations. Refer to it and answer the following questions. It is assumed that St-Xavier's High School, Patna, has 799 students in total and the number remained constant over the period.

Points scored = No. of students passed–No. of students failed.

Assume that a student is allowed to attempt the board examination under the school's name only once. If he fails he is no longer allowed to take the exam under the school's banner.

5. SXAA stands for St. Xavier's Alumni Association. Find the students (in %) who could not become a member of SXAA in the years 1992 to 2001?
  - (a) 11%
  - (b) 9%
  - (c) 7%
  - (d) 21%
6. If pass percentage is the best indication of the school's performance, in which year did the school have its best performance?
  - (a) 1999

- (b) 2000  
 (c) 2001  
 (d) Cannot say
7. Suppose that in the year 1995, the students who failed were allowed to take their exams again the next year (against the normal trend of the school) and 50% of the students who repeated the exam in 1996 failed again, then what would have been the percentage of students passing in 1996 if no repeaters had been allowed?  
 (a) 86.66%  
 (b) 80%  
 (c) 85%  
 (d) Data insufficient
8. In 1994, the principal of the school decided not to throw out the failed students but to give them one more chance. It was then decided that the performance of those students would not be counted for the score of the school. If all those students passed next year, then what would have been the score of the school if their results had been included in the final tally?  
 (a) 22  
 (b) 16  
 (c) 12  
 (d) None of these



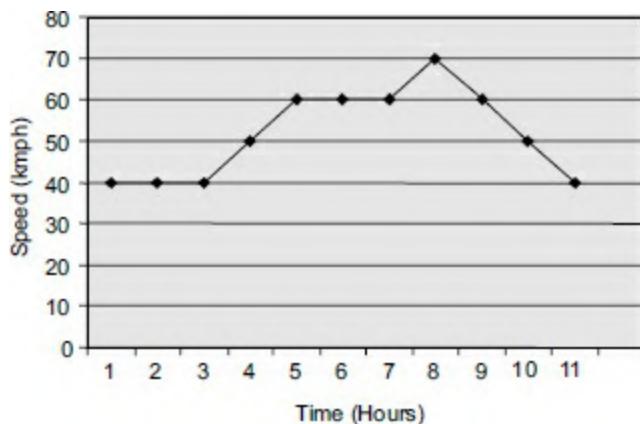
**Figure 13.2** Performance of Students of St-Xaviers High School

**Directions for Questions 9 to 13:** Gomzi has recently acquired shares of four companies, namely Arizona (AZ), BMZ, Chae Woo (CW) and Dindli Tech (DT). The financial results of these companies for the financial year ended 2019–20 revealed these interesting facts. Profits of Arizona were 10% of its sales, while the profits of BMZ were 20% of its sales. While the profits of Chae Woo and Dindli Tech were the same, the sales of Chae Woo were the same as those of BMZ. The total expenses of Chae Woo were 400% more than its profits, whereas, the sales of Dindli Tech were 200% more than its profits. The total expenses of Chae Woo were ₦ 50 million and the total expenses of Chae Woo were 11.11% more than those of Arizona.

9. Which company had the highest total expenses?
  - (a) AZ
  - (b) BMZ
  - (c) CW
  - (d) DT
10. Which company had the highest profits?
  - (a) AZ
  - (b) BMZ
  - (c) CW
  - (d) DT
11. If in the following year, the profits of AZ were to equal CW's current profit, then, with the increase of 12.5% in sales, what would be the profit of AZ expressed as a percentage of sales in the following year?
  - (a) 16.58%
  - (b) 15.56%
  - (c) 17.78%
  - (d) 14.46%
12. If the profits of BMZ and DT were to be exchanged, what would be the ratio of the profit percent (expressed as a percentage of sales) for these two companies?
  - (a) 7:13
  - (b) 5:12
  - (c) 7:11

- (d) 5:13
13. What is the ratio of the highest and the lowest profit?
- 12:5
  - 18:7
  - 11:7
  - 23:12

**Directions for Questions 14 to 16:** The following graph (Figure 13.3) shows the speed at which a motorist drove from Indore to Jhansi and beyond, on his way to an unknown destination. Answer the questions below, after going through the line chart. Note that he starts from rest at time  $t = 0$ .



**Figure 13.3** Speed Time Graph

14. If he were to ride at speeds shown in the reverse direction(riding in the first hour at speed attained after the 11<sup>th</sup> hour, in the second hour at speed attained in the 10<sup>th</sup> hour, and so on...), how much time would he have taken to reach Jhansi?(You may use the answer in the previous question.)
- 6.27 hrs
  - 5.67 hrs
  - 4.83 hrs
  - None of these
15. What is the difference between the average speed in the first five hours and that in the last five hours?

- (a) 12.5 kmph
  - (b) 13 kmph
  - (c) 14.5 kmph
  - (d) 15.5 kmph
16. What is the ratio of the distance covered in the first four hours to the distance covered in the next six hours? (approximately)
- (a) 0.41:1
  - (b) 0.37:1
  - (c) 0.39:1
  - (d) 0.42:1

## 14 Mock Test Paper

**Directions for Questions 1 to 5:** Mr. Praveen, an intelligent farmer, is facing a dilemma. He has three enterprises in which he can invest his money—dairy, poultry and crops. Apart from this he can either put the money in the bank or simply keep the money in his hand. The investment in any enterprise should be in multiples of \$10,000. He collected the data about returns (revenue) from the different enterprises at different level of investments given in the following table ([Table 14.2](#)). After getting all these data he is puzzled—where should he put his money? Any money that he does not invest in an enterprise he keeps in the bank (whose returns are defined in the table). Further, he can invest in a single enterprise only once, i.e., if he invests \$20,000 in poultry he cannot invest \$10,000 twice and his return will get limited to \$27,500, and not  $15,000 \times 2$ .]

**Table 14.1** Returns from Various Investments

| Amount of capital used | Crop   | Dairy  | Poultry | Bank   |
|------------------------|--------|--------|---------|--------|
| 10,000                 | 13,000 | 14,000 | 15,000  | 11,000 |
| 20,000                 | 26,000 | 26,000 | 27,500  | 22,000 |
| 30,000                 | 38,000 | 37,000 | 38,500  | 33,000 |
| 40,000                 | 50,000 | 46,000 | 48,500  | 44,000 |
| 50,000                 | 61,000 | 54,000 | 57,500  | 55,000 |

1. If Mr Praveen wants to invest \$50,000 in any alternative or a combination of alternatives, then what will be the maximum percentage return that he will be able to generate on the amount invested?
  - (a) 22%
  - (b) 35%

- (c) 30%
  - (d) None of these
2. What is the highest possible profit percentage that can be achieved?
- (a) 35%
  - (b) 22%
  - (c) 50%
  - (d) Can't say
3. If he has just \$ 30,000 available to him, where should he invest the money?
- (a) All in poultry
  - (b) \$20,000 in poultry and rest in dairy
  - (c) \$20,000 in poultry and rest in crop
  - (d) Equal amounts in crop, dairy and poultry
4. After which level of investment in crop, dairy and poultry taken together, bank deposit is an equally good alternative?
- (a) 80,000
  - (b) 90,000
  - (c) 110,000
  - (d) Never
5. After what investment level would putting more money in dairy not be a good business decision?
- (a) 30,000
  - (b) 40,000
  - (c) 20,000
  - (d) 50,000

**Directions for Questions 6 to 11:** Answer the questions on the basis of the information provided below.

Mr Sanjay Singh, a prosperous businessman is contemplating on setting up a religious television channel. He has tentatively called it Somvaar. He estimates that with a small investment of ₹3 crore he would be able to set up the channel. His consultants, Mr Pradeep Varma and Miss Reena Singh, tell him that he would require about ₹7 lakh per month as satellite rentals, ₹5

*lakh per month in running a transmitting station in Singapore and 15 lakh a month for manpower, offices, studios and other day-to-day costs. The only other cost is interest paid to the bank @ 12% per annum on the initial investment of ₹ 3 crore. Tax paid to the government is 30% of the profit before tax (PBT).*

*Unlike the rest of the television business (where the channels pay for the content), on religious channels the religious gurus pay for the content (pravachans), because the religious television channels offer them a faster way to maximise the reach and so gain in terms of donations, etc. On weekdays (Monday to Saturday) the channel charges ₹10,000 for a 30-minute slot between 7:00 – 9:00 (prime time) in the morning and in the evening.*

*For 9:00 AM–7:00 PM the charges are half of the charges of prime time and for all other time slots the charges are one fourth of the charges of the prime time. On weekends (Sunday) the charges are double of the normal charges in the weekdays for each category.*

*The only other source of revenue is advertisement. Of the 30-minutes slot sold to the religious gurus, the channel actually gives only 25 minutes to the gurus and it uses the rest for advertisement. Its rate is very low as compared to the regular channels like Star Plus and Zee TV. For every 30-second advertisement slot in prime time on weekdays the channel charges ₹1000 and the ratio of charges in different time slots in weekdays and weekends are same as content charges from the gurus. (Note: 5<sup>th</sup> January of 2003 was a Sunday.) Help him with the estimates for the year 2003.*

6. What is the total yearly cost of running Somvaar?
  - (a) ₹ 324 lakh
  - (b) ₹ 360 lakh
  - (c) ₹ 624 lakh
  - (d) ₹ 660 lakh
7. What will be the estimated total revenue generated by the channel in 2003?
  - (a) ₹ 19.18 crore
  - (b) ₹ 16.79 crore
  - (c) ₹ 8.39 crore
  - (d) Data insufficient

8. In which month of 2003 can the profit achieve its maximum level?
- (a) March
  - (b) June
  - (c) August
  - (d) Both (a) and (c)
9. What will be the margin percentage for the month of April 2003 achieved by the channel if it got the advertisements and *pravachans* for the period 7:00 AM–9:00 PM only?
- (a) 66
  - (b) 75
  - (c) 104
  - (d) 308
10. What will be the ratio of revenue from the slot 7:00 AM–9:00 AM, 9:00 AM–7:00 PM, 7:00 PM–9:00 PM and 9:00 PM–7:00 AM if every slot runs at 100% efficiency?
- (a) 4:10:4:5
  - (b) 4:5:4:5
  - (c) 4:10:2:5
  - (d) 5:10:5:5
11. What is the ratio of the effective rate of advertisement per minute and the effective rate of *pravachans* per minute on the channel in the 9:00 AM–2:00 PM slot?
- (a) 4:1
  - (b) 5:1
  - (c) 6:1
  - (d) 9:2

**Directions for Questions 12 to 15:** Answer the following questions on the basis of the information given in [Table 14.2](#) below. This distance between X & Y is 288 km and a, b, c & d are the intermediate stations. (arr) stands for arrival, (dep) stands for departure

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**Table 14.2** Timetable of Two Trains Running between Stations X and Y

| Section | X     | A(arr) | A(dep) | B(arr) | B(dep) | C(arr) | C(dep) | D(arr) | D(dep) | Y     |
|---------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Train1  | 08:30 | 08:40  | 08:42  | 09:30  | 09:35  | 10:18  | 10:22  | 11:12  | 11:15  | 12:35 |
| Train2  | 13:30 | 13:40  | 13:42  | 14:20  | 14:27  | 15:18  | 15:20  | 16:07  | 16:12  | 17:40 |

12. By how much is the faster train faster than the slower train?
- (a) 0.94 kmph
  - (b) 0.92 kmph
  - (c) 0.96 kmph
  - (d) None of these
13. Between which stretch is the ratio of the speeds of Train 1 & Train 2 1:1?
- (a)  $d$  to Y
  - (b)  $a$  to  $b$
  - (c)  $b$  to  $c$
  - (d) X to a
14. What is the percentage difference between the maximum speed of Train 1 and minimum speed of Train 2?
- (a) 29%
  - (b) 39%
  - (c) 49%
  - (d) Cannot be determined
15. In which stretch of the journey is the difference between the speeds of the two trains the minimum?
- (a) X to A
  - (b) A to B
  - (c) B to C
  - (d) D to Y

# 15 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions based on the following information.

Mr. Hulla Bulla has collected the following details ([Table 16.2](#)) about the rental values and purchasing prices in different areas of the city of Hoola Boola. The rental values are given for the apartment and the purchasing price is given in terms of ₹/sq. ft for the finished apartment ready to rent. The area of apartments of grade A is 2500 sq. ft and that of grade B is 1800 sq. ft for all the locations mentioned in the table. The only cost involved in the purchase of the property is the purchase price cost and if it is an investment, then the depreciation in the value of the property can be assumed to be equal to the rise in the price of the property, i.e., loss due to depreciation is zero and the only gain from the investment is from the rental value of the property. Rent is paid monthly which is kept in the bank giving interest at the rate of 5% any additional cash in hand is also kept in the bank.

1. Which of the following locations in the Grade A category gives the maximum return per rupee invested?
  - (a) West End
  - (b) Khar
  - (c) Vashi I
  - (d) Goregaon I
2. If Mr. Hulla Bulla has ₹ 1 crore with him, then in how many locations can he purchase an apartment?
  - (a) 4
  - (b) 10
  - (c) 5

- (d) None of these
3. Mr. Hulla Bulla invested 1 crore in buying an A category apartment in Colaba by taking a loan from the bank (for the balance amount). The bank charges him 10% per annum interest rate. What is his annual profit or loss from the investment? (Ignore interest on rent)
- ₹ 600,000 gain
  - ₹ 100,000 gain
  - ₹ 400,000 loss
  - None of these

**Table 15.1** Rental and Capital Values for Delhi and Mumbai

| Location      | Rental values (apartments) Rs/month |         | Purchase price Rs/sq. ft |       |
|---------------|-------------------------------------|---------|--------------------------|-------|
|               | A                                   | B       | A                        | B     |
| West End      | 175,000                             | 100,000 | 10,000                   | 7,000 |
| Nariman Point | 80,000                              | 60,000  | 5,000                    | 4,000 |
| Colaba        | 175,000                             | 100,000 | 10,000                   | 7,000 |
| Khar          | 80,000                              | 60,000  | 5,000                    | 4,000 |
| Kalkaji       | 15,000                              | 10,000  | 2,500                    | 2,000 |
| CR Park       | 21,000                              | 15,000  | 2,500                    | 2,000 |
| Goregaon I    | 35,000                              | 25,000  | 3,000                    | 2,200 |
| Goregaon II   | 20,000                              | 10,000  | 1,800                    | 1,400 |
| Vashi I       | 25,000                              | 15,000  | 2,000                    | 1,400 |

4. If Hulla Bulla treats each grade in a location as a different zone, then how many zones will give him a monthly percentage return of more than 1.25%?
- 6
  - 4
  - 2
  - None

**Directions for Questions 5 to 9:** Answer the questions based on the following information. The following table (Table 16.2) shows the capacity to do a work in different work centres of Dataman Infosys Private Limited at different times of the day.

It is given that:

- A product passes through work centres A-B-C-D-E in sequence and when it comes out of department E it is said to be the Final Product or Output and it is transferred to the warehouse.
- Transfers of semi-processed parts occurs at the end of every 30-minute shifts and it takes no time.
- The unprocessed parts at the work centres are called inventories.
- The work is done normally on the ‘first come first serve’ basis.
- Every time work centre A has raw material equal to its capacity to be processed in the next half hour.

*The other work centres work according to the availability of raw materials based on the completion of work in previous work centres.*

At 9:00 work centres A, B, C, D and E had 2, 6, 4, 1 and 1 unit respectively to process.

5. What is the total output of the day?
  - (a) 46
  - (b) 40
  - (c) 50
  - (d) 48
6. Which work centre will show any inventory first?
  - (a) A
  - (b) B
  - (c) D
  - (d) E
7. If at 10:00 the company got an urgent order of processing 10 units of special material for mathapacchi. com Limited, when will the company be able to deliver the material at the earliest? (It is given that the special material doesn’t take any extra time to process at any work centre.)
  - (a) 15:30
  - (b) 14:30
  - (c) 15:00
  - (d) 16:00
8. What will be the total output at 11:30?

- (a) 11  
 (b) 14  
 (c) 16  
 (d) None of these
9. Which work centre is running at minimum level of efficiency for the period 9:00–11:00?  
 (a) B  
 (b) C  
 (c) D  
 (d) E

**Directions for Questions 10 to 12:** Jaspy starts a stationary shop in the year 2000, his revenue in the first year of operations being ₹25000, which incidentally is also his cost in the following year. The amounts of profit, however, remain constant for both these years. In 2002, the revenue increased by ₹7500 over the previous year but the profit could increase by only 50% from the profit of last year. The revenue for the year 2003 could increase by only 20% over the previous year, the cost following the same pattern. The revenue for 2001 was ₹30000.

**Table 15.2** Work Capacity of Dataman Infosys Private Limited

| Time  | A | B | C | D | E | Output |
|-------|---|---|---|---|---|--------|
| 9:00  | 2 | 6 | 4 | 1 | 1 |        |
| 9:30  | 6 | 1 | 3 | 6 | 3 |        |
| 10:00 | 4 | 5 | 2 | 3 | 4 |        |
| 10:30 | 2 | 2 | 2 | 5 | 2 |        |
| 11:00 | 5 | 5 | 5 | 1 | 5 |        |
| 11:30 | 3 | 4 | 6 | 2 | 4 |        |
| 12:00 | 6 | 6 | 5 | 2 | 6 |        |
| 12:30 | 4 | 3 | 2 | 1 | 5 |        |
| 13:00 | 5 | 3 | 6 | 3 | 4 |        |
| 13:30 | 2 | 5 | 6 | 5 | 3 |        |
| 14:00 | 2 | 5 | 3 | 4 | 4 |        |
| 14:30 | 6 | 3 | 3 | 6 | 5 |        |
| 15:00 | 5 | 1 | 5 | 3 | 5 |        |
| 15:30 | 2 | 6 | 2 | 2 | 6 |        |
| 16:00 | 4 | 2 | 2 | 5 | 4 |        |
| 16:30 | 1 | 3 | 1 | 6 | 5 |        |
| 17:00 | 2 | 3 | 4 | 4 | 3 |        |

- 10.** In which year was the increase in profit percent the maximum?
- (a) 2001
  - (b) 2003
  - (c) 2002
  - (d) None of these
- 11.** The percentage cost was the highest in the year:
- (a) 2001
  - (b) 2003
  - (c) 2002
  - (d) 2001 & 2003
- 12.** Which of the following is True?
- (a) The highest profit earned is one and a half times the lowest profit earned.
  - (b) The second lowest cost is four times the lowest profit earned.
  - (c) The second highest revenue equals the third highest cost.
  - (d) The simple annual growth rate of the revenue and cost are in the ratio of 1:1.

**Directions for Questions 13 to 16:** Answer the questions based on the following information.

Ms. Vandana Surana, a farming consultant has been posed with a business decision problem by Mr. Dipak Jhunjhunwala. He has 5 acres of land suitable to grow rice or dal or both, 64 man days of human labour and ₹ 1600 as working capital. The alternative available to him is to invest in the production of rice or dal or a combination of the two crops. The labour requirement to produce rice and dal in an acre is 8 man days and 16 man days respectively while the cash requirements to grow the crop in an acre is ₹ 400 and ₹ 200 respectively. The price ratio of produce per acre of rice and dal is 1:2 and in the worst alternative to Mr. Dipak profit is zero. The cropping season is about to begin and Mr. Dipak is puzzled.

- 13.** Which of the following combination of production is possible?
- (a) Rice (4 acre) and dal (1 acre)
  - (b) Rice (1 acre) and dal (4 acre)

- (c) Rice (2.5 acre) and dal (2.5 acre)
  - (d) None of these.
14. Which of the following is the best alternative to Mr. Jhunjhunwala in terms of profit?
- (a) Rice (3 acre) and dal (2 acre)
  - (b) Rice (4 acre) and dal (0 acre)
  - (c) Rice (2 acre) and dal (3 acre)
  - (d) Data insufficient
15. What is the margin percentage in the rice (2 acre) and dal (3 acre) production alternative?
- (a) 75%
  - (b) 100%
  - (c) 50%
  - (d) Can't be determined
16. At dal (3 acre) and rice (2 acre) production alternative which resource(s) are idle?
- (a) Capital only
  - (b) Land and capital only
  - (c) Labour and capital
  - (d) Land and labour
17. Which of the following is definitely true?
- (a) There are exactly two points at which the positive profits are maximised.
  - (b) At the maximum profit levels for option A above, both labour and capital are being utilised fully.
  - (c) To maximise his returns Mr. Jhunjhunwala can put half of his working capital in bank without compromising the maximum possible profit from the production of the crops.
  - (d) None of these

# 16 Mock Test Paper

**Directions for Questions 1 to 3:** Answer the questions on the basis of the following line graph (Figure 16.1).

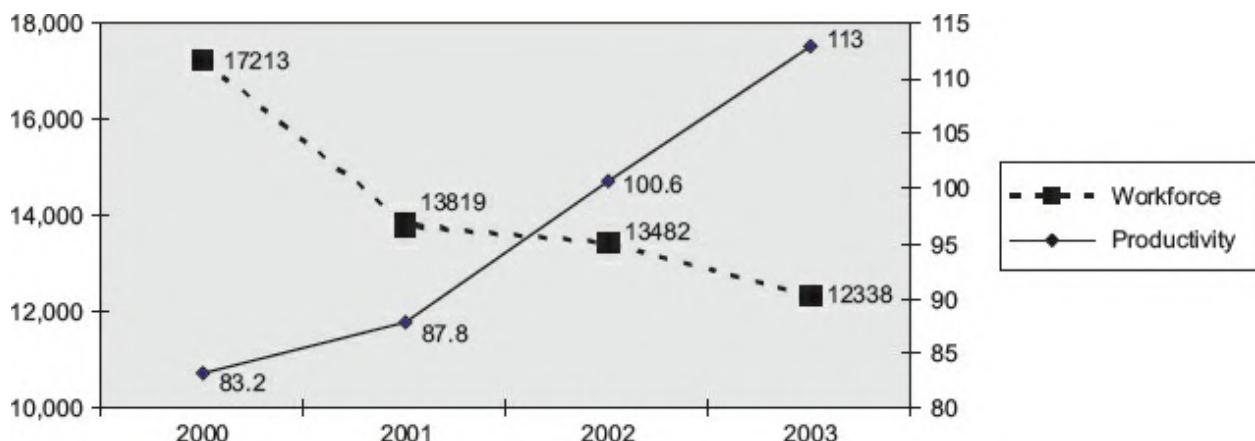


Figure 16.1 The Change in Workforce and Productivity of Bajaj Auto for the Period 2000–2003 (Vehicles Per Employee)

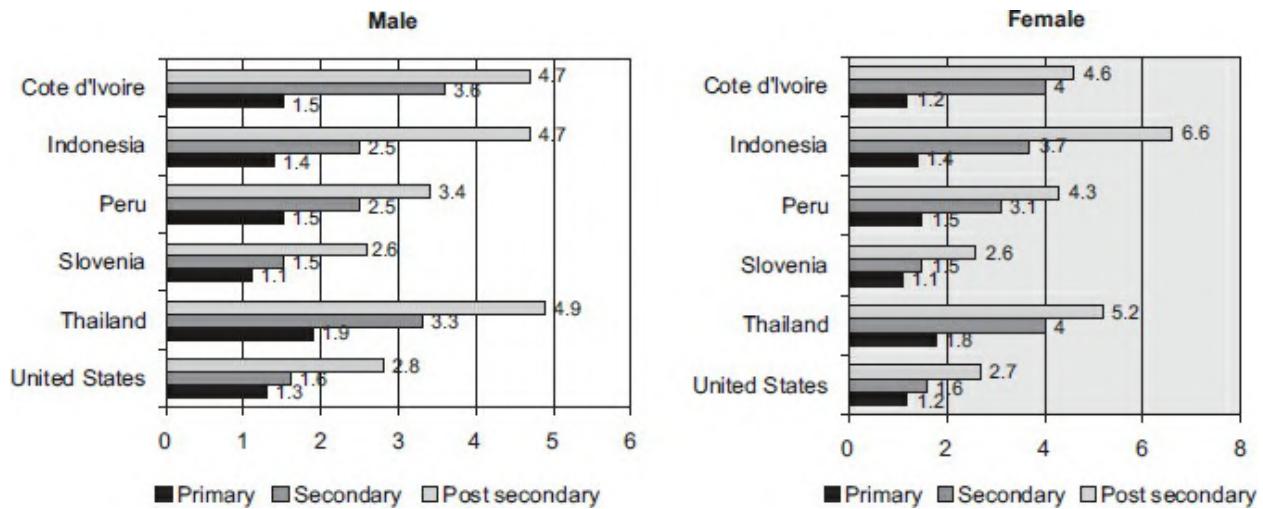
1. By how much percentage has production changed (approximately) in 2003 as compared to its value for 2000?
  - (a) -3 %
  - (b) +5%
  - (c) 0 %
  - (d) +7%
2. The percentage change in which of the mentioned areas is the highest over the period 2000–03?
  - (a) Workforce
  - (b) Productivity

- (c) Production
  - (d) (a) and (c) both
3. Which two variables have moved in the same direction in the mentioned period?
- (a) Workforce and productivity
  - (b) Workforce and production
  - (c) Production and productivity
  - (d) None of these

**Directions for Questions 4 to 7:** Refer to the following charts ([Figure 16.2](#)) and answer the questions that follow. The charts give us information about income levels on education for five countries:

- 4. In which of these countries can it be said that the rewards for education are the highest (amongst those shown)?
  - (a) United States
  - (b) Thailand
  - (c) Cote d'Ivoire
  - (d) Both (b) and (c)
- 5. A post-secondary male worker is likely to have the highest income in which country?
  - (a) Thailand
  - (b) Cote d'Ivoire
  - (c) United States
  - (d) Data inadequate
- 6. On an average (irrespective of sex) the highest percentage benefit of primary education would be available for which country?
  - (a) Thailand
  - (b) Slovenia
  - (c) The country could vary as per the sex of the worker
  - (d) Data insufficient
- 7. For the countries shown, the average wage ratio for male workers with post-secondary education with respect to male workers with no education is approximately equal to:

- (a) 3.4
- (b) 3.85
- (c) 4.1
- (d) Data insufficient



**Figure 16.2** Education-based Income Levels for Select Countries

**Directions for Questions 8 to 12:** The data given below in [Table 16.1](#) shows the money supply and interest rates in different countries on different types of bonds. Answer the questions that follow based on the information provided.

**Table 16.1** Money and Interest Rates in Different Countries

|               | Money supply*        |           | Interest rates % p.a. (May 19th 2004) |          |             |        |                    |      |                 |
|---------------|----------------------|-----------|---------------------------------------|----------|-------------|--------|--------------------|------|-----------------|
|               | % change on year ago |           | 3-months money market                 |          | 2-years     |        | 10-year govt bonds |      | corporate Bonds |
|               | Narrow               | Broad     | Latest                                | Year ago | Govt. bonds | Latest | Year ago           |      |                 |
| Australia     | +8.0                 | +13.9 Mar | 5.49                                  | 4.71     | 5.28        | 6.88   | 4.9                | 6.88 |                 |
| Britain       | +7.1                 | +7.7 Mar  | 4.5                                   | 3.56     | 4.82        | 5.14   | 4.03               | 5.92 |                 |
| Canada        | +11.6                | +8.9 Mar  | 2.02                                  | 3.20     | 3.11        | 5.14   | 4.62               | 6.32 |                 |
| Denmark       | +8.1                 | +10.6 Mar | 2.25                                  | 2.60     | 2.64        | 4.48   | 3.91               | 5.65 |                 |
| Japan         | +4.1                 | +1.9 Apr  | 0.02                                  | 0.02     | 0.13        | 1.5    | 0.58               | 1.58 |                 |
| Sweden        | +0.5                 | +2.2 Mar  | 1.95                                  | 3.16     | 2.97        | 4.69   | 4.16               | 3.13 |                 |
| Switzerland   | +9.9                 | +4.1 Apr  | 0.26                                  | 0.28     | 1.22        | 2.72   | 2.16               | 2.56 |                 |
| United States | +6.8                 | +4.9 Apr  | 1.09                                  | 1.20     | 2.58        | 4.78   | 3.38               | 6.16 |                 |
| Euro Area     | +11.4                | +6.3 Mar  | 2.09                                  | 2.37     | 2.55        | 4.28   | 3.687              | 4.14 |                 |

\*Narrow: M1 except Britain & Sweden MO, broad: M2 or M3 except Britain M4, Germany for bonds.  
Benchmarks: US 30-yrs. 5.48%, Japan No. 2591.49%. Central Bank rates: US fed funds 1.00%, ECB

refinancing 2.00%, BOJ overnight call 0.001%, BOE repo 4.25%. Sources: Commerzbank, Danske Bank, J.P. Morgan Chase, Royal Bank of Canada, Stockholmsbörsen, UBS, Global insite, Westpac, Thomson Datastream. Rates cannot be construed as banks' offers.

8. How many countries have shown a single direction in their interest rates over each of the two types of bonds (3 month money market) & 10 year govt. bonds?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
9. For the 9 countries shown above, what is the average % increase in the value of the money supply (narrow) from a year ago?
  - (a) 7.1
  - (b) 7.3
  - (c) 7.5
  - (d) Cannot be determined
10. The highest interest rates are available for which category?
  - (a) 10 yrs govt bond, latest
  - (b) 10 yrs govt bond, year ago
  - (c) Corporate bonds
  - (d) either a or c
11. The highest % change in the % rate of interest between 2 yrs. govt. bonds and the latest value of 10 yrs. govt. bonds is approximately:
  - (a) 123%
  - (b) 153%
  - (c) 1054%
  - (d) None of these
12. The country with the second lowest rate of interest across all categories is:
  - (a) Japan
  - (b) Sweden
  - (c) Switzerland
  - (d) There is no such country

**Directions for Questions 13 to 16:** Consider [Table 16.2](#) and answer the questions given below that.

**Table 16.2** Top Ten Law Firms

| Name/Country        | (By Number of Lawyers)      |                       |                |                              |                       |                |
|---------------------|-----------------------------|-----------------------|----------------|------------------------------|-----------------------|----------------|
|                     | 1995<br>Tot. No. of lawyers | No. of lawyers abroad | No. of offices | Today<br>Tot. No. of lawyers | No. of lawyers abroad | No. of Offices |
| Clifford Chance/UK  | 1382                        | 432                   | 23             | 3543                         | 2208                  | 29             |
| Baker & McKenzie/US | 1742                        | 1,319                 | 49             | 3019                         | 2442                  | 61             |
| Fresh fields/UK     | 780                         | 215                   | 16             | 2014                         | 1168                  | 30             |
| Allen & Overy/UK    | 640                         | 115                   | 15             | 1734                         | 838                   | 26             |
| Linklaters/UK       | 640                         | 136                   | 10             | 1600                         | 1300                  | 24             |
| SkaddenArps/US      | 1035                        | 80                    | 11             | 1565                         | 156                   | 11             |
| Jones Day/US        | 1100                        | 59                    | 19             | 1550                         | 325                   | 26             |
| White & Case/US     | 664                         | 239                   | 27             | 1423                         | 879                   | 38             |
| Eversheds/UK        | 715*                        | 403                   | 13             | 1310                         | 219                   | 20             |
| Lovells/UK          | 446                         | 81                    | 10             | 1302                         | 653                   | 26             |

13. The highest growth rate in terms of the number of lawyers has been shown by:
  - (a) Allen & Overy/UK
  - (b) Lovells/UK
  - (c) Fresh Field/UK
  - (d) None of these
14. Which law firm has exhibited the highest percentage increase in terms of number of offices between the two time periods?
  - (a) Baker & McKenzie
  - (b) Lovells/UK
  - (c) Fresh fields/UK
  - (d) None of these
15. How many firms consistently had less than 50% of their lawyers abroad (on both dates).
  - (a) 3
  - (b) 4
  - (c) 5
  - (d) 6
16. How many firms showed a higher percentage increase in the number

of offices as compared to the percentage increase in the number of offices of all firms put together?

- (a) 3
- (b) 4
- (c) 5
- (d) 6

## 17 Mock Test Paper

**Directions for Questions 1 to 10:** Mr Keshri, the CEO of Keshri Foods Inc. is facing a vital business decision. His company has two exciting new inventions of mango varieties. The company has the option to go in for further development of either of these two varieties—Alphonso Superior and Langda Inferior. He estimates that the development cost of Alphonso Superior would be \$750,000, while Langda Inferior would cost \$ 250,000. The salaries of scientists' a would constitute 28% of the cost while the research equipment and development facilities would account for 39%, irrespective of the variety of mango developed. Patenting cost would be \$30,000 each while the rest of the budget would be accounted for by overheads. Mr Keshri calculates that the country wise patent license fees for Alphonso Superior would be \$ 7500 per year per territory in developed countries and \$ 2500 per year per territory in an under developed country. The country wise patent license fees in developed and underdeveloped countries for Langda Inferior would be \$ 1250 per year per territory. The latest UN statistics showed that there were 150000 territories in the world, which could be classified as developed territories and 250000 territories were underdeveloped territories.

1. The scientist's salaries for Alphonso Superior & Langda Inferior would respectively be:
  - (a) \$150000 & \$70000
  - (b) \$100000 & \$45000
  - (c) \$210000 & \$70000
  - (d) 105000 & 36000
2. Patenting cost would constitute what percentage of the total cost for Alphonso Superior?

- (a) 12%
  - (b) 4%
  - (c) 6%
  - (d) 8%
3. What is the overhead cost for Alphonso Superior?
- (a) \$112450
  - (b) 108750
  - (c) 105000
  - (d) None of these
4. If the product was to be distributed in only 35% of the developed countries territories and 25% of the underdeveloped countries territories, then what would be the earnings (in\$'000) through the distribution of Alphonso Superior variety in two years?
- (a) 8800000
  - (b) 1200000
  - (c) 1000000
  - (d) None of these
5. The license fee of Langda Inferior if it were licensed to all the available territories for a period of one year would amount to (in \$'000):
- (a) 480000
  - (b) 550000
  - (c) 500000
  - (d) None of these
6. If the cost of developing the Alphonso Superior variety is actually 40% higher than the estimated cost due to a terrible miscalculation on Mr Keshri's part, then the scientist's fees in \$ 000 is (assume % share remains same):
- (a) 2940
  - (b) 29.4
  - (c) 294
  - (d) None of these
7. If the development blueprint of Alphonso Superior could be sold at \$ 20000 per territory, then what would be the revenue from such sales

(in'000) assuming that Mr Keshri is able to sell the development blueprints in only 130 territories of developed countries and 113 territories of underdeveloped countries?

- (a) 243000
  - (b) 2430
  - (c) 243
  - (d) 4860
8. If the license fee rates for Langda Inferior in the developed and underdeveloped countries were to go up by 20%, then the revenue earned in one year in all the available territories would be (in \$ '000)
- (a) 4,00,000
  - (b) 50,00,000
  - (c) 60,00,000
  - (d) 6,00,000
9. If the patenting cost for Langda Inferior decreases by 35%, then what would be the patenting cost as a percentage of the total cost for developing Langda Inferior? Assume that there is no change in the other components of the cost.
- (a) 6%
  - (b) 8.8%
  - (c) 7.8%
  - (d) 8.14%
10. If the cost of research equipment & development facilities for Alphonso Superior goes up by 25%, then the increase in the cost of developing & patenting Alphonso Superior would be:
- (a) \$365625
  - (b) \$37455.75
  - (c) \$34456.5
  - (d) None of these

**Directions for Questions 11 to 15:** *Table 19.1 presents data on percentage population covered by schools and colleges in selected underdeveloped countries of the world.*

**Table 19.1** Percentage of Population covered by Schools and Colleges in some Underdeveloped Countries

|           | Percentage Covered<br>Schools |       |       | Percentage Covered<br>Colleges |       |       |
|-----------|-------------------------------|-------|-------|--------------------------------|-------|-------|
|           | Urban                         | Rural | Total | Urban                          | Rural | Total |
| Nigeria   | 77                            | 61    | 64    | 52                             | 48    | 49    |
| India     | 98                            | 69    | 77    | 64                             | 62    | 63    |
| Pakistan  | 86                            | 46    | 63    | 67                             | 53    | 59    |
| Ghana     | 47                            | 38    | 41    | 43                             | 36    | 38    |
| Sri Lanka | 72                            | 52    | 57    | 70                             | 68    | 69    |
| Indonesia | 88                            | 59    | 68    | 50                             | 46    | 47    |
| Nepal     | 173                           | 68    | 69    | 48                             | 44    | 45    |

**Note:** A person is said to be covered by a school if there is a school within 10 kms of his place of normal residence and he is said to be covered by a college if he has a college in a radius of 100 kms from the place of residence.

- (1) *Country A is said to dominate country B ( $A>B$ ) if A has a higher percentage in total coverage for both schools and colleges.*
- (2) *Country A is said to dominate country B ( $A_U>B_U$ ) if A has a higher percentage in urban coverage for both schools and colleges.*
- (3) *Country A is said to dominate Country B ( $A_R>B_R$ ) if A has a higher percentage in rural coverage for both schools and colleges.*
- (4) *A country is said to be on the development frontier if no other country dominates it in total coverage.*
- (5) *A country is similarly said to be on the development frontier urban if no other country dominates it in urban coverage.*
- (6) *A country is similarly said to be on the development frontier rural if no other country dominates it in rural coverage.*

11. The countries on the Development Frontier are:

- (a) India and Ghana
- (b) Nigeria and Sri Lanka
- (c) India and Indonesia
- (d) None of these

12. Which of these countries are on the Development Frontier Urban?

- (a) India and Sri Lanka

- (b) India and Pakistan
  - (c) India, Pakistan and Sri Lanka
  - (d) None of these
13. Using the above data, and looking at only the college columns, it can be concluded that the urban population in Ghana as a percentage of its total population is:
- (a) 27.55%
  - (b) 31.22%
  - (c) 28.56%
  - (d) Cannot be determined
14. Which of these represents the correct sequence of ascending order of rural population as a percentage of urban population?
- (a) India, Nigeria, Ghana
  - (b) Ghana, India, Nigeria
  - (c) India, Ghana, and Nigeria
  - (d) Cannot be determined
15. Which of these countries are not on the Development Frontier Rural?
- (a) Nigeria, India and Nepal
  - (b) Nigeria, Pakistan, Ghana, Indonesia and Nepal
  - (c) Nigeria, Pakistan, Ghana Indonesia and Nepal
  - (d) Nigeria, Pakistan, Ghana and Nepal only

## 18 Mock Test Paper

**Directions for Questions 1 to 4: %** Refer the following table (Table 18.1) and answer the questions that follow.

1. Which product's market share did not deteriorate between 1993 and 1994 in any city?
  - (a) HD
  - (b) CO
  - (c) BN
  - (d) None of the products

**Table 18.1** Market Share in Metros

| Year    | Mumbai |      | Kolkata |      | Delhi |      | Chennai |      |
|---------|--------|------|---------|------|-------|------|---------|------|
|         | 1993   | 1994 | 1993    | 1994 | 1993  | 1994 | 1993    | 1994 |
| Product |        |      |         |      |       |      |         |      |
| HD      | 15     | 20   | 30      | 35   | 20    | 15   | 20      | 30   |
| CO      | 25     | 20   | 40      | 45   | 15    | 10   | 20      | 15   |
| BN      | 40     | 45   | 5       | 10   | 30    | 35   | 10      | 10   |
| MT      | 20     | 15   | 25      | 10   | 5     | 10   | 50      | 45   |

2. The number of products which doubled their market share in one or more cities between 1993 and 1994 was:
  - (a) None
  - (b) 1
  - (c) 2
  - (d) 3
3. The largest percentage drop in market share between 1993 and 1994 was:
  - (a) 60

- (b) 33.3  
 (c) 50  
 (d) 20
4. The city where the number of products losing market share between 1993 and 1994 was minimum was:  
 (a) Mumbai  
 (b) Kolkata  
 (c) Delhi  
 (d) Both (a) and (b)

**Directions for Questions 5 to 8:** Thandawala, the masala cold drink maker has a number of mixed masala cold drinks to offer to his customers. The details of these drinks are as follows. He makes a soda lime by mixing soda and lime in the ratio of 1:2, cola orange by mixing cola and orange in the ratio of 1:3, he makes orange soda by mixing soda and orange in the ratio 1:1, cola lime is made by mixing cola & lime in the ratio 11:1 and soda cola by mixing cola and soda in the ratio of 4:3.

Answer the following questions on the basis of the information provided in Table 18.2.

**Table 18.2** Various Flavours of Mixed Masala Cold Drinks Offered by Thandawala

| Flavour | Rs/bottle |
|---------|-----------|
| Cola    | 9.00      |
| Orange  | 7.00      |
| Lime    | 11.00     |
| Soda    | 8.00      |
| Mango   | 10.00     |

5. If he sells each drink at a profit of 20% of the cost, which drink gives the highest profit per bottle?

- (a) Mango
  - (b) Cola soda
  - (c) Cola orange
  - (d) Lime
6. Which of the following would be the cheapest to manufacture?
- (a) Orange soda
  - (b) Soda lime
  - (c) Cola soda
  - (d) Cola Lime
7. The cost of manufacturing of which of the following is equal?
- (a) 4 Mango and 3 Orange soda
  - (b) 3 soda cola and 2 Orange soda
  - (c) 2 Soda lime and 2 Cola orange
  - (d) None of these
8. Arrange the masala drinks in the descending order of their cost of manufacture.
- (1) Soda lime
  - (2) Orange soda
  - (3) Cola lime
  - (4) Soda cola
- (a) 1234
  - (b) 2341
  - (c) 2413
  - (d) 1342

**Directions for Questions 9 to 12** There are 16 boxes in a grid. Each of the 16 boxes has a number as shown below. The value of the box is the number on the box.

Four friends Amar, Biren, Chandan and Deepak are playing a game, where the objective is to make the maximum addition of the boxes. Each person has exactly 4 boxes with him at all points of time.

|          | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> |
|----------|----------|----------|----------|----------|
| <b>A</b> | 22       | 12       | 30       | 6        |
| <b>B</b> | 10       | 16       | 24       | 20       |
| <b>C</b> | 32       | 2        | 28       | 14       |
| <b>D</b> | 18       | 4        | 26       | 8        |

1. *Amar did not own any of the boxes in the A-row.*
  2. *Biren's highest number is A-3.*
  3. *B-2 & C-1 belong to someone other than Chandan.*
  4. *Chandan doesn't own any of the boxes in the 1-column.*
  5. *In the last round of the game, Amar traded B-4 for B-1.*
  6. *D-2, A-2 and D-3 all belong to the same player.*
  7. *C-1 B-3 and 4-D all belong to the same player.*
  8. *Deepak's score was 8 higher than Biren's who has three boxes in the A row.*
  9. *Amar has just one box in the B-row, which is B-1. Based on the information above answer the questions which follow:*
- 9.** Who has the lowest total?
- (a) Amar
  - (b) Biren
  - (c) Chandan
  - (d) Deepak
- 10.** To whom does C-4 belong at the end of the game?
- (a) Amar
  - (b) Biren
  - (c) Chandan
  - (d) Deepak
- 11.** What is the difference between the total of Deepak and Chandan?
- (a) 4
  - (b) 8
  - (c) 14
  - (d) 18
- 12.** Who has the highest total at the end of the game?
- (a) Amar

- (b) Biren
- (c) Chandan
- (d) Deepak

**Directions for Questions 13 to 16: %** Refer to [Table 18.3](#) and answer the questions that follow.

**Table 18.3** Data Pertaining to Fixed Assets

| Sl.<br>No. | Particulars   | ←Gross Block→    |                                  |                                   | ←Depreciation→   |                 |                                   | Net Block       |                 |                  |
|------------|---|------------------|----------------------------------|-----------------------------------|------------------|-----------------|-----------------------------------|-----------------|-----------------|------------------|
|            |   | As at<br>31.3.02 | Additions<br>and/or<br>transfers | Deductions<br>and/or<br>transfers | As at<br>31.3.03 | Upto<br>31.3.02 | Deductions<br>and/or<br>transfers | For the<br>year | Upto<br>31.3.03 | As at<br>31.3.03 |
| 1          | Freehold Land   | 64.12            | 5.78                             | 0.01                              | 69.89            | —               | —                                 | —               | —               | 69.89            |
| 2          | Leasehold Land  | 52.89            | 0.13                             | 2.72                              | 50.3             | 2.87            | 0.08                              | 1.3             | 4.09            | 46.21            |
| 3          | Buildings   | 441.97           | 25.47                            | 0.24                              | 467.2            | 74.87           | 0.03                              | 10.48           | 85.32           | 381.88           |
| 4          | Workers' Quarters<br><br>Under Government<br><br>Subsidised Schemes                   | 142.48           | 10.63                            | 4.42                              | 148.69           | 73.33           | 2.98                              | 11.45           | 81.8            | 69.15            |
| 5          | Railway Sidings   | 101.25           | 1.5                              | —                                 | 102.75           | 23.82           | —                                 | 4.97            | 28.79           | 73.96            |
| 6          | Plant and Machinery   | 4311.7           | 248.44                           | 21.49                             | 4538.7           | 1889            | 14.66                             | 219.5           | 2094            | 2444.64          |
| 7          | Ships   | 108.23           | —                                | 44.11                             | 64.12            | 32.16           | 13.83                             | 4.54            | 22.87           | 41.25            |
| 8          | Furniture, Fittings and<br><br>Office Equipment                                       | 5249.2           | 313.04                           | 76.13                             | 5486.1           | 2108            | 33.08                             | 255.1           | 2330.1          | 3156.01          |
| 9          | Livestock   | 0.01             | —                                | —                                 | 0.01             | —               | —                                 | —               | —               | 0.01             |
| 10         | Vehicles Etc.   | 25.99            | 21.09                            | 3.14                              | 43.94            | 11.31           | 1.5                               | 2.93            | 12.74           | 31.2             |
|            |   | 5246.2           | 236.71                           | 233.74                            | 5249.2           | 2009            | 153.78                            | 253             | 2108.1          | 89.02            |
|            | Capital Work-in-progress<br><br>(including Advances<br>and Pre-operative<br>Expenses) |                  |                                  |                                   |                  |                 |                                   |                 |                 | 3245.03          |
|            |   |                  |                                  |                                   |                  |                 |                                   |                 |                 | 3244.05          |

13. The asset category for which the maximum depreciation has been claimed (as a percentage of its purchase value) is:
  - (a) Furniture, fittings and office equipment
  - (b) Ships
  - (c) Plant and Machinery
  - (d) None of these
14. Approximately what % of the gross block has been depreciated (upto

31.03.02)?

- (a) 40.2%
- (b) 41.3%
- (c) 42.4%
- (d) None of these

15. The highest % increase in net block was for?

- (a) Freehold Land
- (b) Ships
- (c) Vehicles etc.
- (d) None of these

16. The highest % addition to the gross block was?

- (a) Buildings
- (b) Plant and machinery
- (c) Vehicles
- (d) None of these

# 19 Mock Test Paper

**Directions for Questions 1 to 7: %** A pond has three types of fishes—Big, Medium & Small. On the 31<sup>st</sup> of July there were 100 Big, 500 Medium and 4000 Small fishes.

Every day, the number of small fishes becomes double its value of the previous day. However, 3 small fishes are eaten by each Medium fish every day. Thus the doubled number of Small fishes is reduced by the number of small fishes eaten by medium fishes to get the tally at the end of the day. The day's end value is doubled the next day.

The medium fishes are incremented by 250 every day, and the incremented number of medium fishes eats three small fishes every day. However, the number of medium fishes are reduced after that due to big fishes eating up one medium fish every day.

The number of big fishes increased by 25 each day (by the birth of 25 big fishes daily). Big fishes have a life span of 10 days, little fishes have 20 days and medium fishes have a lifespan of 15 days.

The questions below are concerned with the goings on of the first week of August. Assume that on 31<sup>st</sup> July all fishes in the pond are 0 day's old.

1. What is the maximum value of the number of medium fishes during the period?
  - (a) 1100
  - (b) 1125
  - (c) 875
  - (d) 850
2. On which day will this maximum get achieved?

- (a) 6<sup>th</sup> August
  - (b) 7<sup>th</sup> August
  - (c) 5<sup>th</sup> august
  - (d) 5<sup>th</sup> and 6<sup>th</sup> August
3. What is the number of small fishes at the end of 7<sup>th</sup> August?
- (a) 192050
  - (b) 188675
  - (c) 96025
  - (d) 99400
4. What is the total number of small fishes eaten during the period?
- (a) 18000
  - (b) 19000
  - (c) 20000
  - (d) 21000
5. What will be the number of small fishes in the pond at the end of August?
- (a) 194250
  - (b) 208425
  - (c) 416850
  - (d) Infinite
6. What is the total number of fishes in the pond at the end of 4<sup>th</sup> August?
- (a) 27550
  - (b) 26500
  - (c) 27350
  - (d) None of these
7. What is the ratio of the number of medium fishes eaten to the number of small fishes eaten between 1<sup>st</sup> to 7<sup>th</sup> August?
- (a) 1: 18
  - (b) 1: 20
  - (c) 1:15
  - (d) 1:12

**Directions for Questions 8 to 12:** % Refer to the following table (Table 19.1).

8. How many areas amongst those shown, will Mr Vinay Srivastava be able to purchase a 1000 sq. ft flat if he wants to invest upto ₹ 25 lakh. (He has a saving of ₹ 25 lakh on retirement.)
  - (a) 1
  - (b) 6
  - (c) 7
  - (d) None of these
9. For Question 12, if Mr Vinay Srivastava decides to take a loan of 75% of the value of the property apart from his personal investment of ₹ 25 lakh, in how many areas of Mumbai or Delhi will it still be possible that a 1000 sq. ft. flat might cost above his budget?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
10. The ratio of the highest possible rent/sq ft to the lowest possible rent/sq ft from amongst the areas exhibited is:
  - (a) 25
  - (b) 20
  - (c) 15
  - (d) Cannot be determined
11. The highest possible value of the rent/sq. ft. is for:
  - (a) Cuffe Parade, Churchgate
  - (b) Malabar Hill, Breach Candy
  - (c) Vasant Vihar (Grade A)
  - (d) Cannot be determined
12. Mr Vijay Srivastava bought a 2000 sq. ft. flat for ₹ 4,800,000. How many possible areas could he have bought the flat in:
  - (a) 1
  - (b) 2
  - (c) 3

(d) 4

**Table 19.1** Real Estate Values

| Location               | Rental value (apt)<br>(₹/month) | Capital value<br>(₹/sq.ft.) | Location<br>(₹/month)      | Rental value (apt)<br>(₹/sq ft) | Capital value |
|------------------------|---------------------------------|-----------------------------|----------------------------|---------------------------------|---------------|
| Vasant Vihar (Grade A) | 1 lakh–1.75 lakh                | 7000–10,000                 | Cuffe Parade, Churchgate   | 60,000–1.25 lakh                | 7000–15,000   |
| Jor Bagh, Sunder Nagar | 1.25 lakh–2 lakh                | 10,000–12000                | Malabar Hill, Breach Candy | 80,000–1.5 lakh                 | 10,000–18,000 |
| Kalkaji                | 10000–15000                     | 2000–2500                   | Bandra, Juhu               | 45,000–1 lakh                   | 6500–10000    |
| Gurgaon (Grade A)      | 25,000–35,000                   | 2200–3000                   | Powai                      | 15,000–45000                    | 2750–4500     |
| Noida (Grade A)        | 15,000–25,000                   | 1400–2000                   | Andheri                    | 18,000–45000                    | 3000–5000     |

**Directions for Questions 13 to 15: %** Refer to the following table (Table 19.1).

**Table 19.1** Term Life Insurance

| Policy/Insurance   | Max. age<br>of entry | Tenures possible  | Max. age<br>at expiry | Min. sum<br>assured | For life cover of ₹ 10 lakh |         |         |         |
|--------------------|----------------------|-------------------|-----------------------|---------------------|-----------------------------|---------|---------|---------|
|                    |                      |                   |                       |                     | (30/25)                     | (40/20) | (50/10) | (55/10) |
| ICICI Prudential   | 50                   | 5 to 25 yrs       | 65                    | ₹ 1 lakh            | 3043                        | 5110    | 8197    | N.A.    |
| HDFC Standard Life | 60                   | 5 to 30 yrs       | 65                    | ₹ 1 lakh            | 3050                        | 5130    | 8320    | 12,600  |
| Max New York Life  | 55                   | 5,10,15,20,25 yrs | 60                    | ₹ 2.5 lakh          | 3220                        | 5650    | 10,000  | 12,150  |
| Birla Sunlife      | 55                   | 5,10,15,20,25 yrs | 70                    | ₹ 2 lakh            | 3160                        | 5150    | 8790    | 13,100  |
| LIC Anmol Jeevan   | 50                   | 5 to 25 yrs       | 60                    | ₹ 5 lakh            | 3860                        | 7010    | 11,450  | N.A.    |

13. The maximum that a 50-year-old individual can hope to insure his life for is:
  - (a) 10 yrs
  - (b) 15 yrs
  - (c) 20 yrs
  - (d) Cannot be determined
14. From the table above, if a 50-year-old individual wants to buy a life insurance cover of ₹ 10 lakh, (for a coverage period of 10 yrs) then his best option is:
  - (a) ICICI prudential
  - (b) HDFC Standard Life
  - (c) Max New York Life (till 60 yrs.)
  - (d) Cannot be determined
15. From the table, how many life insurance options are available for a 51-

year-old who wants 6 years of coverage:

- (a) 1
- (b) 2
- (c) 3
- (d) None of these

# 20 Mock Test Paper

**Directions for Questions 1 to 4:** % The following table ([Table 20.1](#)) shows the comparison between Malaysia and India on certain parameters. Study the table and answer questions 1–4.

**Table 20.1** India and Malaysia: Peer-to-Peer Evaluation on Select Parameters

| Epf Malaysia  | Parameter                         | Epf India  |
|---|-----------------------------------|--|
| 11% by employee, 12% by employer  | Contribution                      | 12% by both employee and employer                                |
| 3 accounts; 60% in Fund channelled into retirement, 30% in housing, 10% in healthcare | Fund channelled into              | 2 accounts; 65.3% into provident fund, 34.7% into pension scheme |
| \$50.5 billion  | EPF assets                        | \$33.47 billion  |
| 53.10%  | EPF assets as % of GDP            | 7%   |
| \$4886.60   | Average balance per member        | \$1242   |
| Twice a year  | Account statement to members      | Once a year  |
| Yes   | Educating members on EPF benefits | No   |
| 1983–2001   | Average annual rate of return     | 1986–2000  |
| 7.62%   | Nominal                           | 11.80%   |
| 2.94%   | Inflation (CPI)                   | 9.00%  |
| 4.66%   | Real                              | 2.70%  |

1. The ratio of India's GDP to Malaysia's GDP is closest to:
  - (a) 6:1
  - (b) 5:1

- (c) 4:1  
 (d) Cannot be determined
2. Assuming that there is an equal amount of service period put in by all members of the EPF, nearly which of these will represent the ratio of salary income in US\$ in Malaysia to that in India? (Assume equal withdrawals.)
- (a)  $\frac{4886.6 \times 0.24}{1242 \times 0.23}$   
 (b)  $\frac{4886.6 \times 0.23}{1242 \times 0.24}$   
 (c)  $\frac{4886.6}{1242}$   
 (d) Cannot be determined
3. Based on the value of EPF assets and the average balance per member, what can be concluded about the number of EPF members in Malaysia to the number of EPF members in India: (Assume that the value of the EPF assets is equal to the total balance of all members of the EPF.)
- (a) It is greater  
 (b) It is smaller  
 (c) Both are equal  
 (d) No conclusion can be made
4. Which of the following statements is/are not true?
- (i) The real value of 1\$ invested in Malaysia in 1983 will be greater than the real value of 1\$ invested in India in 1986 by the year 2000.  
 (ii) The inflation in India is over 300% more than the inflation in Malaysia.  
 (iii) The real rate of return for the period shown for India is over 50% of the real rate of return for the period shown for Malaysia.
- (a) All of these  
 (b) (i) and (iii)  
 (c) (ii) only  
 (d) (ii) and (iii) only

**Directions for Questions 5 to 9: %** The following table ([Table 20.2](#))

shows the tax incidence and TDS calculations. Ms Parul Jaiswal works for Mindworkzz and is paid ₹ 240,000 p.a. out of which she saves ₹ 6000 in tax saving instruments u/s 88.

The following additional information is available:

The tax incidence is calculated as per the following slabs:

- (a) Income between ₹ 50,000 – ₹ 60,000, tax charged at the rate of 10%
- (b) Income between ₹ 60,000 – ₹ 150,000, tax charged at the rate of 20%
- (c) Income ₹ 150,000 + tax charged at the rate of 30%
- (d) All perquisites are taxable

**Table 20.2** How TDS is Calculated for Ms Parul Jaiswal

|   |           |
|---|-----------|
| Estimated salary for financial year ending 31 March 2004 including all perquisites after subtracting standard deduction Tax on the above is | ₹ 240,000 |
| <b>Less:</b> Rebate under section 88, say, 15% of ₹ 60,000 (saving)   | ₹ 9,000   |
| <b>Less:</b> Rebate under section 88c in case of women  | ₹ 5,000   |
| <b>Total tax payable</b>  | ₹ 32,000  |
| TDS deducted every month (32,000/12)  | ₹ 2,667   |

5. What component of the total incidence on Ms Parul Jaiswal's salary is charged under the highest tax slab: (approximately)
  - (a) 63%
  - (b) 59%
  - (c) 53%
  - (d) Cannot be determined
6. What will be the TDS amount per month for a person earning ₹ 170,000 as take home salary and ₹ 30,000 as allowance for car and house rent?
  - (a) 25,000
  - (b) 2833.33
  - (c) 34,000
  - (d) Cannot be determined
7. If due to a war between India and Pakistan, the government decides to

add a 5% surcharge on tax incidence above ₹ 60,000, what will be the TDS amount per month for Ms Parul Jaiswal (including the surcharge)?

- (a) 3270.833
  - (b) 2854.166
  - (c) 3054.66
  - (d) None of these
8. If disposable income is defined as the total salary including perquisites less the standard deduction less the savings u/s 88 less the TDS amount, what would be the annual disposable income of Ms. Parul Jaiswal?
- (a) ₹ 208,000
  - (b) ₹ 203,000
  - (c) ₹ 148,000
  - (d) ₹ 143,000
9. What would be the TDS per month on Ms. Parul Jaiswal, if her annual income is ₹ 200,000 and she saves ₹ 40,000 u/s 88 (assume no surcharge)?
- (a) 2333.33
  - (b) 2833.33
  - (c) 3333.33
  - (d) Cannot be determined

**Directions for Questions 10 to 13:** The rate of taxation has the following slabs in India:

| <b>Taxable Income</b> | <b>Tax Rate</b> |
|-----------------------|-----------------|
| 0–50,000              | Exempt          |
| 50,000–60,000         | 10%             |
| 60,000–150,000        | 20%             |
| 150,000 +             | 30%             |

For salaried employees having salaries below 150,000 p.a., a standard deduction of ₹ 30,000 is available to salaried employees, which is reduced

*from the total income. Besides, a rebate is available on investments in various saving schemes like Provident Fund, Infrastructure Bonds, Post office savings, etc. The rebate is calculated at 20% of the total investment in these savings instruments. Thus, if a person has invested ₹ 10,000 in some saving instruments, he gets ₹ 2,000 rebate on his net tax liability.*

*However, if the salary increases above ₹ 150,000 p.a., the standard deduction is reduced to ₹ 25,000 and the rebate on investments is calculated at the rate of 15% of the total investment. Thus, a person saving ₹ 20,000 will get a rebate of ₹ 3,000 on his liability. Besides, a tax surcharge of 10% is added on the total tax liability for all tax payers. Also, working women have a further rebate of ₹ 5,000 available to them on their total tax liability.*

*Based on the above information, answer questions 5 to 8.*

10. What will be the total tax liability of Mr Rajiv Srivastava, who has a salary of ₹ 150,000 p.a. [assume he saved ₹ 40,000 in the year].
  - (a) ₹ 5,000
  - (b) ₹ 5,500
  - (c) ₹ 1,000
  - (d) Data insufficient
11. For the question above, if Mr Srivastava's salary increases by ₹ 5,000 p.a., what will be the change in his net income after tax [assuming that he again saves ₹ 40,000 in the year]
  - (a) Increase of ₹ 1,000
  - (b) Decrease of ₹ 800
  - (c) Increase of ₹ 600
  - (d) Increase of ₹ 5,000
12. Mrs Shruti Srivastava who works in the same firm, earns a salary of ₹ 150,000 p.a. How much must she save to pay no tax for the year?
  - (a) ₹ 41,000
  - (b) ₹ 40,000
  - (c) ₹ 30,000
  - (d) ₹ 60,000
13. Prakash Purti has a salary income of ₹ 144,000. Besides he has earned ₹ 35,000 as consultancy income. He has saved ₹ 70,000 for the year in tax savings instruments. How much tax will he have to pay?

- (a) ₹ 18,800
- (b) ₹ 14,800
- (c) ₹ 4,800
- (d) None of these

**Directions for Questions 14 to 17:** Refer to the following tables (Tables 20.3(a), (b) and (c)):

**Table 20.3 (a)** Manpower Costs for a Building Project in Narhi (All costs in ₹)

| Project Phase        | Managers | Engineers | Skilled Workers | Unskilled Workers | Supervisors |
|----------------------|----------|-----------|-----------------|-------------------|-------------|
| Design               | 1        | 3         | —               | —                 | —           |
| Foundation           | 1        | 2         | 5               | 23                | 2           |
| Construction         | 1        | 2         | 12              | 43                | 4           |
| Finishing (internal) | 1        | 3         | 15              | 31                | 6           |
| Painting             | 1        | 0         | 5               | 23                | 3           |

**Table 20.3 (b)** Cost per Month for Select Category of Workers

| Manpower          | Cost (in ₹) |
|-------------------|-------------|
| Managers          | ₹ 10,000    |
| Engineers         | ₹ 8,000     |
| Supervisors       | ₹ 5,000     |
| Skilled workers   | ₹ 3,000     |
| Unskilled workers | ₹ 1,800     |

**Table 20.3 (c)** Estimated Time and the Actual Time Required for Each Phase of the Project (in months)

|           | Design | Foundation | Construction | Finishing | Painting |
|-----------|--------|------------|--------------|-----------|----------|
| Actual    | 5      | 3          | 8            | 4         | 2        |
| Estimated | 3      | 2          | 6            | 3         | 2        |

14. What was the phase in which there was the highest absolute increase between the estimated and the actual cost?
- (a) Foundation
  - (b) Design

- (c) Construction
  - (d) Cannot be determined
15. For which phase of the project was there the highest percentage increase in cost (as compared to the estimated cost).
- (a) Foundation
  - (b) Design
  - (c) Construction
  - (d) Cannot be determined
16. What is the value of the percentage overflow in costs during construction? (approximately)
- (a) 50%
  - (b) 33.33%
  - (c) 66.66%
  - (d) None of these
17. If internal finishing and painting can be started simultaneously at the end of construction, then what is the overflow of the project as a percentage of the estimated total time of completion of the project?
- (a) 27.27%
  - (b) 33.33%
  - (c) 42.85%
  - (d) Cannot be determined

# 21 Mock Test Paper

**Directions for Questions 1 to 4:** Prof. Qazi gives Maths test once a week. There are five students in his class whose names start with the letter A, viz. Arun, Amit, Ankur, Amritesh and Arjit. Unfortunately, he forgets to record some of the scores of these students. All scores are out of 100. Find the missing numbers in the table, and answer the questions that follow. Besides, we also know that Prof. Qazi grades his students according to their score as under:

| <b>Grade</b> | <b>Score</b> |
|--------------|--------------|
| A            | 60% plus     |
| B            | 56–60%       |
| C            | 50–55%       |
| D            | Below 50%    |

---

**Table 21.1** Student score

|          | 1  | 2  | 3  | 4  | 5   | 6  | 7  | 8  | 9   |
|----------|----|----|----|----|-----|----|----|----|-----|
| Arun     | 46 | 55 | 87 | 33 | 74  | 38 | 40 |    | 95  |
| Amit     | 48 | 60 |    | 51 | 85  | 46 | 37 | 19 | 85  |
| Ankur    | 38 | 70 | 90 |    | 100 | 48 | 38 | 20 | 97  |
| Amritesh | 38 |    | 93 | 49 | 93  | 50 | 46 | 20 | 100 |
| Arjit    | 42 | 66 | 84 | 44 | 84  |    | 38 | 20 | 98  |

- (1) Amit's missing score is equal to the average score of the topper. (who is not Ankur)
- (2) The total of all the scores is 2626.
- (3) Ankur got 70% in test 2. Amritesh got 1% less.

(4) The missing score on test 8 is 27. On test 6 it is 55.

1. Who is the topper amongst these students?
  - (a) Arun
  - (b) Amit
  - (c) Arjit
  - (d) Amritesh
2. If an A grade gets 4 points and a B grade gets 3 points, a C gets 2 and a D gets 1 point, what is the grade point average of the class? (approximately)
  - (a) 2.6
  - (b) 1.5
  - (c) 1.2
  - (d) 2.3
3. The least difference between any two missing scores is:
  - (a) 7
  - (b) 6
  - (c) 5
  - (d) None of these
4. Who is ranked in the middle amongst these students?
  - (a) Arun
  - (b) Amit
  - (c) Arjit
  - (d) Amritesh

**Directions for Questions 5 to 8:** The famous Pack & Chew Restaurant in Interlaken Switzerland, increased its sales of samosas by 20% in 2006. This increase in sales was exactly equal (in terms of increase in units) as that in 2008. However, 2007 having been an unusually poor year, the value of the decrease in the sales of samosas in 2007 was equal to half the value of the increase in 2008 (or for that matter in 2006).

Due to an anticipated increase in the salaries of his cooks, the proprietor Monsieur Jean Nitin Francard had increased the sales price of the samosas by 1 Euro in 2006. However, the increase occurred only in 2007, and the

*value of this increase was double the value of the increase in sales price in 2008 (on a per samosa basis).*

*The cost of making a samosa prior to the increase in wages was 6 Euros, while the profit saw an increase of 80% in 2006 (when it became 14400 Euros).*

*The selling price was consistently incremented by 1 Euro every year from 2006 to 2008.*

5. What is the total cost of the restaurant in 2005? (in Euros)
  - (a) 23000
  - (b) 24000
  - (c) 25000
  - (d) 26000
6. How many samosas were sold in 2008?
  - (a) 4900
  - (b) 4800
  - (c) 5000
  - (d) None of these
7. The sales value in 2007 is (in Euros):
  - (a) 43200
  - (b) 32000
  - (c) 44000
  - (d) 57200
8. Which of the following statements is/are true?
  - (i) The margin has always improved (margin = S.P. – Cost).
  - (ii) The profits have increased every year.
  - (iii) The number of years in which sales exceeded the average sales in the 4 year period, bears to the number of years in which sales was less than the average sales for the 4 year period, a ratio of 1:1.
    - (a) (i) only
    - (b) (i) & (iii) only
    - (c) (ii) only
    - (d) (iii) only

**Directions for Questions 9 to 12:** Maruti Udyog Ltd. produces two models of cars—Maruti 800 and Maruti Zen. The factory employs three spray painters, six assemblers and two quality control executives, each of them working for exactly 10 hours a day. Whereas each Maruti 800 car requires 20 mins for spray painting, 1 hour for assembling and 15 minutes for quality checking, the Maruti Zen model requires 30 mins. 1 hour & 30 mins, respectively for these activities.

9. What is the maximum number of Maruti Zen cars that can be produced in a day?
  - (a) 20
  - (b) 30
  - (c) 40
  - (d) 50
10. What is the maximum number of Maruti 800 cars that can be produced in a day?
  - (a) 90
  - (b) 60
  - (c) 80
  - (d) 70
11. If on 1<sup>st</sup> of January, the factory has produced 30 Maruti 800s, what is the maximum number of Maruti Zens that can be produced?
  - (a) 25
  - (b) 6
  - (c) 10
  - (d) None of these
12. If Maruti Udyog decides to hire one more employee of any of the three categories, what is the maximum number of Maruti 800s that can be produced in a day?
  - (a) 90
  - (b) 60
  - (c) 80
  - (d) 70

**Directions for Questions 13 to 16:** Ravan on his death bed gave 4 trunks full of gold coins to his four sons—Raman, Shaleen, Tarun and Ujjwal. He then told them, “Each of the trunks has a few lakh gold coins. In all, there are 20 lakh gold coins and Raman being the eldest, has got the maximum number of gold coins while Ujjwal being the youngest, has the least number of gold coins. Also, Shaleen has got one lakh more gold coins than Tarun”. He dies at this juncture. His brother Kumbhakaran awakes at this very instant and tells Shaleen— “I know for a fact that no one has got less than 3 lakh gold coins. Can you open your trunk and count the number of gold coins you have and tell me the number of gold coins each of you has got”? Shaleen does so, counts the number of gold coins in his trunk and answers, “Yes”. Kumbhakaran then asks Raman the following questions as a test for becoming the new king. Raman being logically sound, answers all questions correctly without anybody else opening their trunks. Can you identify the answers Raman gave to secure his right to the throne?

13. The number of coins received by Raman is:

- (a) 7 lakh
- (b) 8 lakh
- (c) 9 lakh
- (d) 10 lakh

14. The number of coins received by Shaleen is:

- (a) 6 lakh
- (b) 5 lakh
- (c) 4 lakh
- (d) None of these

15. The number of coins received by Tarun is:

- (a) 5 lakh
- (b) 4 lakh
- (c) 3 lakh
- (d) None of these

16. The number of coins received by Ujjwal is:

- (a) 3 lakh
- (b) 2 lakh
- (c) 4 lakh

(d) None of these

## 22 Mock Test Paper

**Directions for Questions 1 to 4:** The following table (Table 30.3) gives the average number of passengers per day in various trains during the month of August 2005 run by the Indian Railways. Refer to the information provided and answer Questions 1–4. Mumbai, Kolkata, Chennai and New Delhi are the four metros, while the A grade is the best and C the worst.

1. If the RM decides to increase the ratings of all trains originating and/or ending in Metros by 1 grade (i.e., C to B & B to A), then how many trains will see their grading improved?
  - (a) 9
  - (b) 11
  - (c) 10
  - (d) 6
2. If the A grade carries 3 points, B carries 2 and C carries 1 point, then what is the average point for the trains listed above?
  - (a) 2.1
  - (b) 2.133
  - (c) 2.166
  - (d) None of these
3. If due to festival rush during October, the average number of passengers increased by 400 in grade A trains, by 250 in Grade B trains and by 200 in Grade C trains, then out of the trains above, whose names start with S or M, which train has the highest number of passengers per day?
  - (a) Shatabdi Express from Mumbai to Surat
  - (b) Shramjeevi Express from New Delhi to Patna

- (c) Shatabdi Express from New Delhi to Dehradun  
 (d) None of these

**Table 22.1** Average Number of Passengers (per day) in Various Trains during August 2005

| Train name & No.    | Grade given by RM | Origin station | Desti-nation | No. of passengers/days |
|---------------------|-------------------|----------------|--------------|------------------------|
| Shramjeevi Express  | C                 | New Delhi      | Patna        | 723                    |
| Janshatabdi Express | A                 | Lucknow        | Allahabad    | 418                    |
| Maharashtra Express | C                 | Nagpur         | Pune         | 847                    |
| Coromandal Express  | B                 | Chennai        | Kolkata      | 981                    |
| Bangalore Mail      | B                 | New Delhi      | Banga-lore   | 493                    |
| Shatabdi Express    | A                 | New Delhi      | Dehradun     | 483                    |
| Rajdhani Express    | A                 | Mumbai         | New Delhi    | 1123                   |
| Rajdhani Express    | A                 | New Delhi      | Guwahati     | 746                    |
| Magadh Express      | C                 | New Delhi      | Patna        | 387                    |
| Madras Mail         | B                 | Kolkata        | Chennai      | 761                    |
| Geetanjali Express  | A                 | Kolkata        | Mumbai       | 842                    |
| Sabarmati Express   | C                 | Surat          | Lucknow      | 481                    |
| Shatabdi Express    | A                 | Mumbai         | Surat        | 628                    |
| Akal Takth Express  | B                 | Kolkata        | Amritsar     | 896                    |
| Jhelum Express      | B                 | Pune           | Jammu Tawi   | 841                    |

4. If the increases for the question above were:  
 400 for grade C  
 250 for grade B  
 200 for grade A train, the answer to the question above would be:  
 (a) Shatabdi Express from Mumbai to Surat  
 (b) Shramjeevi Express from New Delhi to Patna

- (c) Shatabdi Express from New Delhi to Dehradun
- (d) None of these

**Directions for Questions 5 to 7:** The following table (Table 22.2) gives the data about the models of shoes produced in various factories of the Nike Shoe Company.

**Table 22.2** Models of Shoes

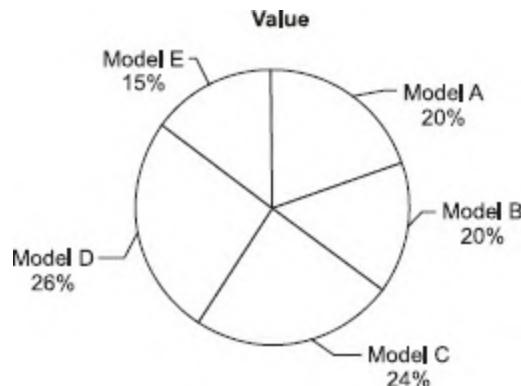
|         |          |                    |
|---------|----------|--------------------|
| Model-1 | Men      | F1, F2, F3, F4, F5 |
|         | Women    | F6, F7, F8         |
|         | Children | F9, F10, F11       |
| Model-2 | Men      | F5, F8, F12        |
|         | Women    | F9, F13            |
|         | Children | F6                 |
| Model-3 | Men      | F2,F6,F7,F13       |
|         | Women    | F3, F9, F11        |
|         | Children | F1, F4             |
| Model-4 | Men      | F3, F10, F11       |
|         | Women    | F1, F2,F4          |
|         | Children | F9, F5             |

**Note:** F1 to F13 represent 13 factories of the Nike Shoe Company which produce shoes.

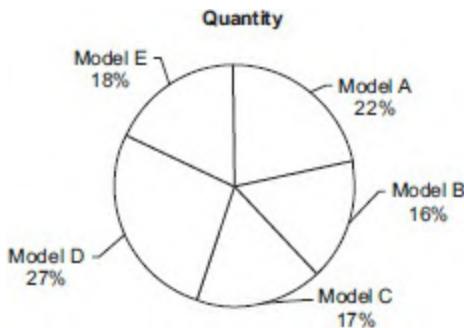
5. How many factories produce model-1 or model-2 for women and model-3 for children?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
6. Which of the following is true?

- (a) All women's model-2 producing factories also produce men's model-3 shoes.
  - (b) All men's model-1 producing factories also produce women's and children's model-4 shoes.
  - (c) There are exactly four model-3 producing factories, which also produce model-4 but not model-2.
  - (d) Some model-3 producing factories produce model-1, but not men's model-2.
7. How many factories producing children's model-1 shoes either produce men's model-4 shoes or women's model-3 shoes?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 0

**Directions for Questions 8 to 9:** The pie charts [Figure 22.1 (a) and (b)] give the data about a motorcycle manufacturing unit producing five different models of motorcycles. The total sales value is ₹3860 crore and the total number of units sold is 0.1023 crore.



**Figure 22.1 (a)** Value



**Figure 22.1 (b)**      Quantity

8. Which of the models of motorcycles sold by the company is sold at the highest price?
  - (a) Model C
  - (b) Model A
  - (c) Model B
  - (d) Model D
9. What is the price in thousands of ₹ for Model C?
  - (a) 53.2
  - (b) 37.4
  - (c) 45.5
  - (d) None of these

**Directions for Questions 10 to 15:** *The Bhartiya Petrol Company produces two varieties of petrol, viz., Normal and Premium. It refines its petrol at six refineries. The refined petrol is sent from the refinery to any one of seven depots and then onwards onto any one of eight districts. The refineries are XA, XB, XC, XD, XE and XF. The depots are DA, DB, DC, DD, DE, DF and DG. The districts are ZA, ZB, ZC, ZD, ZE, ZF, ZG and ZH. Table 22.3 gives the cost of transporting 1000 litres of petrol from the refinery to the depots, while Table 22.4 gives the cost of transportation of 1000 litres of petrol from a depot to a district.*

10. What is the least cost to transport one litre of petrol from any refinery to any district?
  - (a) 95.2
  - (b) 0

- (c) 205.7  
(d) 284.5
11. What is the minimum cost of transportation of one litre of petrol from any refinery to district ZB?  
(a) 0  
(b) 284.5  
(c) 98.1  
(d) None of these
12. What is the minimum cost of transportation of one litre of petrol from refinery XB to district ZA?  
(a) 324.5  
(b) 843.2  
(c) 1154.3  
(d) None of these
13. What is the maximum cost of transportation of one litre of petrol from any refinery to any district?  
(a) 2172.6  
(b) 2193.0  
(c) 2208.9  
(d) None of these
14. In how many ways can you transfer the petrol from any of the refinery to any of the district?  
(a) 56  
(b) 63  
(c) 72  
(d) None of these
15. What is the minimum cost of transportation from refinery XD to district ZC?

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**Table 22.3** Cost of Transporting Petrol from Refinery to Depot

|    | (All figures in 000s of rupees) |       |       |        |        |        |
|----|---------------------------------|-------|-------|--------|--------|--------|
|    | XA                              | XB    | XC    | XD     | XE     | XF     |
| DA | 928.2                           | 537.2 | 567.8 | 589.9  | 589.9  | 800.1  |
| DB | 311.1                           | 0.0   | 885.7 | 759.9  | 759.9  | 793.9  |
| DC | 451.1                           | 602.3 | 320.1 | 780.1  | 720.7  | 1000.1 |
| DD | 371.1                           | 211.1 | 350.1 | 750.1  | 650.4  | 980.1  |
| DE | 1137.3                          | 324.5 | 5.0   | 1157.7 | 1173.6 | 1023.4 |
| DF | 617.1                           | 506.4 | 756.5 | 1065.9 | 1065.9 | 406.3  |
| DG | 644.3                           | 303.2 | 537.2 | 1093.1 | 1093.1 | 623.9  |

**Table 22.4** Cost of Transporting Petrol from Depot to District

|    | (All figures in 000s of rupees) |       |       |       |        |       |       |
|----|---------------------------------|-------|-------|-------|--------|-------|-------|
|    | DA                              | DB    | DC    | DD    | DE     | DF    | DG    |
| ZA | 562.7                           | 843.2 | 314.5 | 889.1 | 0.0    | 754.8 | 537.2 |
| ZB | 532.7                           | 803.2 | 284.5 | 790.5 | 93.1   | 659.6 | 442.0 |
| ZC | 500.7                           | 780.2 | 0.0   | 457.3 | 205.7  | 549.1 | 331.5 |
| ZD | 232.9                           | 362.1 | 286.2 | 275.4 | 523.6  | 525.3 | 673.2 |
| ZE | 345.1                           | 268.6 | 316.2 | 163.2 | 555.9  | 413.1 | 227.8 |
| ZF | 450.1                           | 644.3 | 346.2 | 372.3 | 933.3  | 402.9 | 379.1 |
| ZG | 654.5                           | 0.0   | 596.7 | 222.7 | 885.7  | 387.6 | 348.5 |
| ZH | 804.1                           | 149.6 | 627.2 | 360.4 | 1035.3 | 537.2 | 498.1 |

- (a) 527.3
- (b) 780.1
- (c) 750.1
- (d) None of these

## 23 Mock Test Paper

**Directions for Questions 1 to 7:** The following table (*Table 23.1*) shows the revenue and expenses in millions of dollars associated with Shell Oil Company's operations in different parts of the world for the years 2002–04. Answer Questions 15–21 on the basis of the information provided in the table.

1. How many operations of the company accounted for more than 4% of the total revenue earned in the year 2003?
  - (a) 3
  - (b) 4
  - (c) 2
  - (d) None of these
2. How many operations of the company witnessed more than 200% growth from the year 2003 to 2004?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) None of these
3. How many operations did not register a sustained yearly increase in income before tax and charges from 2002–04?
  - (a) 4
  - (b) 5
  - (c) 3
  - (d) None of these

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**Table 23.1** Revenue and Expenses of Shell Oil Company

| Item                                   | Year | Total World | Spain | North Africa & Middle East | Argentina | Rest of Latin America | Far East | North Sea | Rest of World |
|--|------|-------------|-------|----------------------------|-----------|-----------------------|----------|-----------|---------------|
| 1. Income                              | 2002 | 891         | 48    | 364                        | 278       | 44                    | 86       | 66        | 5             |
|  | 2003 | 3235        | 34    | 643                        | 1889      | 99                    | 306      | 142       | 122           |
|  | 2004 | 8091        | 334   | 1277                       | 5143      | 663                   | 554      | 0         | 120           |
| 2. Expenses                            | 2002 | 620         | 37    | 244                        | 164       | 57                    | 51       | 45        | 22            |
|  | 2003 | 1931        | 54    | 325                        | 1098      | 133                   | 223      | 45        | 53            |
|  | 2004 | 3900        | 55    | 458                        | 2734      | 313                   | 302      | 0         | 38            |
| 3. Income before tax & charges(1–2)    | 2002 | 271         | 11    | 120                        | 114       | –13                   | 35       | 21        | –17           |
|  | 2003 | 1304        | –20   | 318                        | 791       | –34                   | 83       | 97        | 69            |
|  | 2004 | 4191        | 279   | 819                        | 2409      | 350                   | 252      | 0         | 82            |
| 4. Tax & Charges                       | 2002 | 154         | 4     | 94                         | 44        | –3                    | 11       | 7         | –3            |
|  | 2003 | 539         | –2    | 149                        | 320       | –6                    | 44       | 19        | 12            |
|  | 2004 | 1747        | 112   | 384                        | 1054      | 63                    | 112      | 0         | 22            |
| 5. Net income after Tax & Charges(3–4) | 2002 | 117         | 7     | 26                         | 70        | –10                   | 24       | 14        | –14           |
|  | 2003 | 765         | –18   | 169                        | 471       | –28                   | 39       | 78        | 57            |
|  | 2004 | 2444        | 167   | 435                        | 1355      | 287                   | 140      | 0         | 60            |

4. If income to expenses ratio is defined as efficiency, which operation has the least efficiency for the year 2004?
  - (a) Spain
  - (b) Africa
  - (c) Far East
  - (d) None of these
5. Ignoring the loss making operations of the company in 2002, for how many operations was the percentage increase in net income before taxes and charges higher than the average from 2002–03?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) None of these
6. If profitability is defined as the ratio of net income after taxes and charges to expenses, which of the following statement is true?
  - (a) The far-east operation witnessed its highest profitability in 2002.
  - (b) The north sea operations increased its profitability from 2002 to 2003.
  - (c) The operation in Argentina witnessed an increase in profitability from 2002 to 2003.
  - (d) All three are true.
7. In 2003 which among the following regions has the best profitability?

- (a) North Africa & Middle East
- (b) North Sea
- (c) Argentina
- (d) Far East

**Directions for Questions 8 to 12:** The following table ([Table 23.2](#)) gives details regarding the total earning of 15 employees and the number of days they have worked on complex, medium and simple operations in the month of June 2024. Note that payments are made on the basis of achievement of a minimum level of efficiency. In case that level of output is not met there is no payment to the employee.

- 8. How many employees are getting more than \$25 per day in complex work?
  - (a) 8
  - (b) 9
  - (c) 10
  - (d) 11
- 9. How many specific instances of employees not meeting their required level of output (minimum) can be seen in the table?
  - (a) 8
  - (b) 7
  - (c) 9
  - (d) 10
- 10. Which employee has received the maximum salary per day in complex operation?
  - (a) EC22180
  - (b) EC22164
  - (c) EC22158
  - (d) None of these
- 11. How many employees have 75% attendance and earn more than \$800 in the month of June which consists of 25 working days (some might be coming on overtime too)?
  - (a) 5
  - (b) 7

- (c) 4  
 (d) 6
12. Among the employees who were engaged in complex and medium operation, the number of employees whose average earning per day in medium operation is more than the average earning per day in complex operation is?
- (a) 7  
 (b) 2  
 (c) 5  
 (d) 3

**Directions for Questions 13 to 16:** The following table (Table 32.3) describes garments manufactured based upon the colour and size for each lay. There are four sizes : S-Small, M-Medium, L-Large and XL-Extra Large. There are three colours: brown, blue and green.

13. How many lays are used to produce blue fabrics?
- (a) 10  
 (b) 11  
 (c) 15  
 (d) 16

**Table 23.2\*** Total Earnings and Work Days of Employees in a Firm

| Employee Code | Total Earning (In \$) |         |        |         | Total Days |        |        |       |
|---------------|-----------------------|---------|--------|---------|------------|--------|--------|-------|
|               | Complex               | Medium  | Simple | Total   | Complex    | Medium | Simple | Total |
| EC22147       | 82.98                 |         | 636.53 | 719.51  | 3          | 0      | 23     | 26    |
| EC22148       | 51.53                 |         | 461.73 | 513.26  | 3.5        | 1.67   | 16     | 21    |
| EC22149       | 171.71                |         | 79.10  | 250.81  | 5.5        | 4      | 8.5    | 18    |
| EC22150       | 100.47                |         | 497.47 | 597.95  | 6          | 4.67   | 7.33   | 18    |
| EC22151       | 594.43                | 159.64  |        | 754.06  | 9.67       | 13.33  | 0      | 23    |
| EC22156       | 89.70                 |         |        | 89.70   | 8          | 0      | 1      | 9     |
| EC22158       | 472.31                | 109.73  | 213.67 | 582.04  | 1.39       | 9.61   | 1      | 12    |
| EC22164       | 402.25                | 735.22  |        | 1351.14 | 5.27       | 12.07  | 0.67   | 18    |
| EC22170       | 576.57                |         |        | 576.57  | 21         | 0      | 0      | 21    |
| EC22171       | 286.48                | 6.10    |        | 292.57  | 8.38       | 4.25   | 0.38   | 13    |
| EC22172       | 512.10                | 117.46  |        | 629.56  | 10         | 8.5    | 3.5    | 22    |
| EC22173       | 1303.88               |         |        | 1303.88 | 25.5       | 0      | .5     | 26    |
| EC22174       | 1017.94               |         |        | 1017.94 | 26         | 0      | 0      | 26    |
| EC22179       | 46.56                 | 776.19  |        | 822.75  | 2          | 19     | 0      | 21    |
| EC22180       | 116.40                | 1262.79 |        | 1379.19 | 5          | 19     | 0      | 24    |

\* You are likely to find errors of rounding off in the table.

- 14.** How many lays are used to produce small fabrics?
- (a) 15
  - (b) 16
  - (c) 17
  - (d) None Of these
- 15.** How many lays are used to produce medium blue or small green fabrics?
- (a) 8
  - (b) 9
  - (c) 10
  - (d) None of these
- 16.** For how many varieties of fabrics, has the order been exactly matched?
- (a) 9
  - (b) 8
  - (c) 7
  - (d) 6

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**Table 23.3** Select Data Pertaining to a Garment Unit

| Lay        |       |     |     | Number of Garments |      |     |    |    |       |     |     |     |    |
|------------|-------|-----|-----|--------------------|------|-----|----|----|-------|-----|-----|-----|----|
| Lay No.    | Brown |     |     |                    | Blue |     |    |    | Green |     |     |     |    |
|            | S     | M   | L   | XL                 | S    | M   | L  | XL | S     | M   | L   | XL  |    |
| 1          | 14    | 14  | 7   | 0                  | 0    | 0   | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 2          | 0     | 0   | 0   | 0                  | 0    | 0   | 0  | 0  | 42    | 42  | 21  | 0   | 0  |
| 3          | 20    | 20  | 10  | 0                  | 18   | 18  | 9  | 0  | 0     | 0   | 0   | 0   | 0  |
| 4          | 20    | 20  | 10  | 0                  | 0    | 0   | 0  | 0  | 30    | 30  | 15  | 0   | 0  |
| 5          | 0     | 0   | 0   | 0                  | 24   | 24  | 12 | 0  | 30    | 30  | 15  | 0   | 0  |
| 6          | 22    | 22  | 11  | 0                  | 24   | 24  | 12 | 0  | 32    | 32  | 16  | 0   | 0  |
| 7          | 0     | 24  | 24  | 12                 | 0    | 0   | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 8          | 0     | 20  | 20  | 10                 | 0    | 2   | 2  | 1  | 0     | 0   | 0   | 0   | 0  |
| 9          | 0     | 20  | 20  | 10                 | 0    | 0   | 0  | 0  | 0     | 22  | 22  | 11  | 0  |
| 10         | 0     | 0   | 0   | 0                  | 0    | 26  | 26 | 13 | 0     | 20  | 20  | 10  | 0  |
| 11         | 0     | 22  | 22  | 11                 | 0    | 26  | 26 | 13 | 0     | 22  | 22  | 11  | 0  |
| 12         | 0     | 0   | 2   | 2                  | 0    | 0   | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 13         | 0     | 0   | 0   | 0                  | 0    | 0   | 0  | 0  | 0     | 0   | 20  | 20  | 0  |
| 14         | 0     | 0   | 0   | 0                  | 0    | 0   | 0  | 0  | 0     | 0   | 22  | 22  | 0  |
| 15         | 0     | 0   | 10  | 10                 | 0    | 0   | 2  | 2  | 0     | 0   | 22  | 22  | 0  |
| 16         | 0     | 0   | 0   | 0                  | 1    | 0   | 0  | 0  | 1     | 0   | 0   | 0   | 0  |
| 17         | 0     | 0   | 0   | 0                  | 0    | 5   | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 18         | 0     | 0   | 0   | 0                  | 0    | 32  | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 19         | 0     | 0   | 0   | 0                  | 0    | 32  | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 20         | 0     | 0   | 0   | 0                  | 0    | 5   | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 21         | 0     | 0   | 0   | 18                 | 0    | 0   | 0  | 0  | 0     | 0   | 0   | 0   | 0  |
| 22         | 0     | 0   | 0   | 0                  | 0    | 0   | 0  | 26 | 0     | 0   | 0   | 0   | 0  |
| 23         | 0     | 0   | 0   | 0                  | 0    | 0   | 0  | 0  | 0     | 0   | 0   | 0   | 22 |
| 24         | 0     | 0   | 0   | 8                  | 0    | 0   | 0  | 1  | 0     | 0   | 0   | 0   | 0  |
| 25         | 0     | 0   | 0   | 8                  | 0    | 0   | 0  | 0  | 0     | 0   | 0   | 0   | 12 |
| 26         | 0     | 0   | 0   | 0                  | 0    | 0   | 0  | 1  | 0     | 0   | 0   | 0   | 14 |
| 27         | 0     | 0   | 0   | 8                  | 0    | 0   | 0  | 2  | 0     | 0   | 0   | 0   | 12 |
| Production | 76    | 162 | 136 | 97                 | 67   | 194 | 89 | 59 | 135   | 198 | 195 | 156 |    |
| Order      | 75    | 162 | 135 | 97                 | 67   | 194 | 89 | 59 | 135   | 197 | 195 | 155 |    |
| Surplus    | 1     | 0   | 1   | 0                  | 0    | 0   | 0  | 0  | 0     | 1   | 0   | 1   |    |

## 24 Mock Test Paper

**Directions for Questions 1 to 3:** *Figure 24.1 shows the distribution of twelve million tonnes of crude oil transported through different modes over a specific period of time. Figure 24.2 shows the distribution of the cost of transporting this crude oil. The total cost was ₹30 million.*

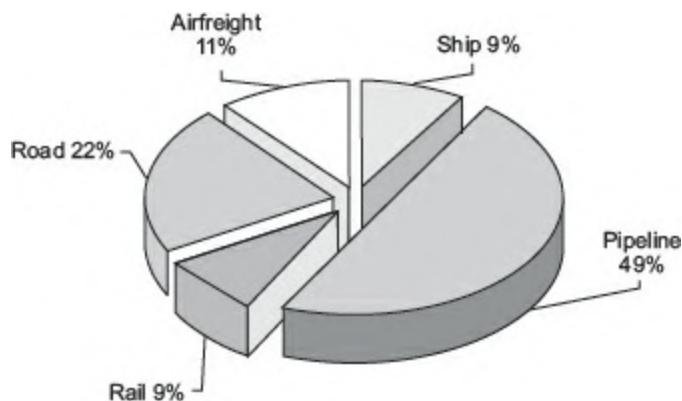
1. The cost in rupees per tonne of oil moved by airfreight and ship happens to be roughly:
  - (a) 3
  - (b) 2.125
  - (c) 2.23
  - (d) Cannot be determined
2. From the charts given, it appears that the costliest mode of transport is:
  - (a) road
  - (b) rail
  - (c) pipeline
  - (d) ship
3. If the costs per tonne of transport by pipeline, air and rail are represented by P, Q and R respectively, which of the following is true?
  - (a) R>Q>P
  - (b) P>R>Q
  - (c) P>Q>R
  - (d) R>P>Q

**Directions for Questions 4 to 6:** *Study the following table (Table 24.1) and answer the questions that follow:*

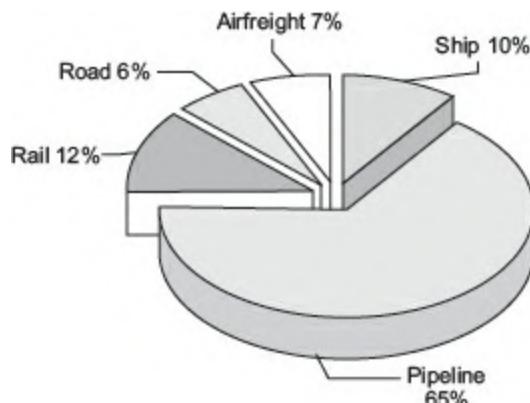
4. The total annual exports lay between 30 and 40 per cent to the total

annual business of the IT industry. In the years:

- (a) 1994–95 and 1997–98
  - (b) 1994–95, 1996–97 and 1997–98
  - (c) 1996–97 and 1998–99
  - (d) None of these
5. The lowest percentage growth in the total IT business, relative to the previous year was achieved in:



**Figure 24.1** Volume of Crude Oil Transported Over a Specific Period



**Figure 24.2** Distribution of cost of Transported Crude Oil

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**Table 24.1** Information Technology Industry in India

(Figures are in million US dollars)

|                       |          | 1994–95 | 1995–96 | 1996–97 | 1997–98 | 1998–99 |
|-----------------------|----------|---------|---------|---------|---------|---------|
| Software              | Domestic | 350     | 490     | 670     | 950     | 1250    |
|                       | Exports  | 485     | 734     | 1083    | 1750    | 2650    |
| Hardware              | Domestic | 590     | 1037    | 1050    | 1205    | 1026    |
|                       | Exports  | 177     | 35      | 286     | 201     | 4       |
| Peripherals           | Domestic | 148     | 196     | 181     | 229     | 329     |
|                       | Exports  | 6       | 6       | 14      | 19      | 18      |
| Training              |          | 107     | 143     | 185     | 263     | 302     |
| Maintenance           |          | 142     | 172     | 182     | 221     | 236     |
| Networking and others |          | 36      | 73      | 156     | 193     | 237     |
| Total                 |          | 2041    | 2886    | 3807    | 5031    | 6052    |

- (a) 1995–96  
 (b) 1996–97  
 (c) 1997–98  
 (d) 1998–99
6. Which one of the following statements is correct?
- (a) The annual software exports and the annual hardware exports steadily increased during 1994–99.  
 (b) The annual peripheral domestic business steadily increased during 1994–99.  
 (c) The IT business in maintenance during 1994–99 was higher than the total IT business in training during the same period.  
 (d) None of the above.

**Directions for Questions 7 to 8:** For any activity A, year X dominates year Y if the IT business in activity A, in the year X, is greater than the IT business, in activity A, in the year Y. For any two IT business activities, A and B, year X dominates year Y if:

- I. the IT business in activity A, in the year X, is greater than or equal to the IT business, in activity A in the year Y,  
 II. the IT business in activity B, in the year X, is greater than or equal to the IT business in activity B in the year Y, and  
 III. there should be strict inequality in the case of at least one activity.
7. For the IT software business activity, which one of the following is not true?
- (a) 1997–98 dominates 1996–97

- (b) 1997–98 dominates 1995–96
  - (c) 1995–96 dominates 1998–99
  - (d) 1998–99 dominates 1996–97
8. For the two IT business activities, software and peripherals, which one of the following is true?
- (a) 1996–97 dominates 1995–96
  - (b) 1998–99 dominates 1995–96
  - (c) 1997–98 dominates 1998–99
  - (d) None of these

**Directions for Questions 9 to 13:** Study [Table 24.2](#) and answer the questions given below that.

9. Suppose the average employment level is 80 per factory. The average employment in public factories is approximately:
- (a) 244
  - (b) 316
  - (c) 324
  - (d) 310
10. Among the firms in different sectors, the gross output per employee is highest in:
- (a) central government
  - (b) central and state/local governments
  - (c) joint sector
  - (d) wholly private

**Table 24.2** Factory Sector by Type of Ownership

(All figures in the table are in percent of the total for the corresponding column)

| Sector                             | Factories | Employment | Fixed Capital | Gross output | Value added |
|------------------------------------|-----------|------------|---------------|--------------|-------------|
| Public:                            | 7         | 27.7       | 43.2          | 25.8         | 30.8        |
| Central Government                 | 1         | 10.5       | 17.5          | 12.7         | 14.1        |
| State Local Government             | 5.2       | 16.2       | 24.3          | 11.6         | 14.9        |
| Central and State Local Government | 0.8       | 1.0        | 1.4           | 1.5          | 1.8         |
| Joint:                             | 1.8       | 5.1        | 6.8           | 8.4          | 8.1         |
| Wholly Private                     | 90.3      | 64.6       | 46.8          | 63.8         | 58.7        |
| Others                             | 0.9       | 2.6        | 3.2           | 2.0          | 2.4         |
| Total                              | 100       | 100        | 100           | 100          | 100         |

11. Capital productivity is defined as the gross output value per rupee of fixed capital. The three sectors with the lowest capital productivity, arranged in ascending order are:
- others, central government and state local government.
  - state local government, others and central government.
  - state local government, central government and others.
  - joint, wholly private, central.
12. The efficiency of a sector is considered on the basis of its value added per employee and its value added per rupee of fixed capital. The higher these values the better the rank of the sector. Further, it is known that if there is a tie between the two sectors, it is resolved on the basis of superiority in value added per employee. Based on the table data, the most efficient sector is:
- wholly private
  - joint
  - central and state/local
  - none of these
13. The total value added in all sectors is estimated at ₹ 225,000 crore. Suppose the number of factories in the joint sector is 3000. The average value added per factory, in ₹ crore, in the central government is:
- 20.11
  - 201.1
  - 19.11
  - 191.1

## 25 Mock Test Paper

**Directions for Questions 1 to 4:** The table ([Table 25.1](#)) shows trends in external transactions of the Indian corporate sector during the period 2003–04 to 2007–08. In addition, the following definitions hold good:

$Sales_i$ ,  $Imports_i$  and  $Exports_i$  respectively denote the Sales, imports and exports in year  $i$ .

Deficit for year  $i$ , is denoted by  $Deficit_i$ .

**Table 25.1** Trends in External Transactions of Indian Corporate Sector

| Year   | (All figures in percent) |             |             |             |             |
|--|--------------------------|-------------|-------------|-------------|-------------|
|  | 2007<br>—08              | 2006<br>—07 | 2005<br>—06 | 2004<br>—05 | 2003<br>—04 |
| Export intensity *                               | 7.2                      | 6.2         | 5.9         | 5.6         | 5.4         |
| Import Intensity *                               | 12.2                     | 14.2        | 13.3        | 11.6        | 10.2        |
| Imported raw material/total cost of raw material | 17.2                     | 16.2        | 14.5        | 13.4        | 14.0        |
| Imported capital goods/gross fixed assets        | 15.6                     | 7.8         | 9.7         | 14.3        | 17.3        |

\* Ratio of Exports (or imports) to sales.

1. The highest growth rate in deficit intensity was recorded in:
  - (a) 2004–05
  - (b) 2005–06
  - (c) 2006–07
  - (d) 2007–08
2. The value of the highest growth rate in deficit intensity is:
  - (a) 20%

- (b) 22.5%
  - (c) 33.33%
  - (d) 25%
3. In 2005–06, the total cost of raw materials is estimated as 50% of sales of that year. The turnover of gross fixed assets, defined as the ratio of sales to gross fixed assets, in 2005–06, is approximately:
- (a) 0.62
  - (b) 1.6
  - (c) 0.33
  - (d) Not possible to determine
4. Which of the following statements can be inferred to be true from the given data?
- (a) During the 5-year period between 2003–04 and 2007–08 exports have increased every year.
  - (b) During the 5-Year period between 2003–04 and 2007–08, imports have decreased every year.
  - (c) Deficit in 2007–08 was lower than that in 2004–05 and 2006–07.
  - (d) Deficit intensity has increased every year between 2003–04 and 2006–07.

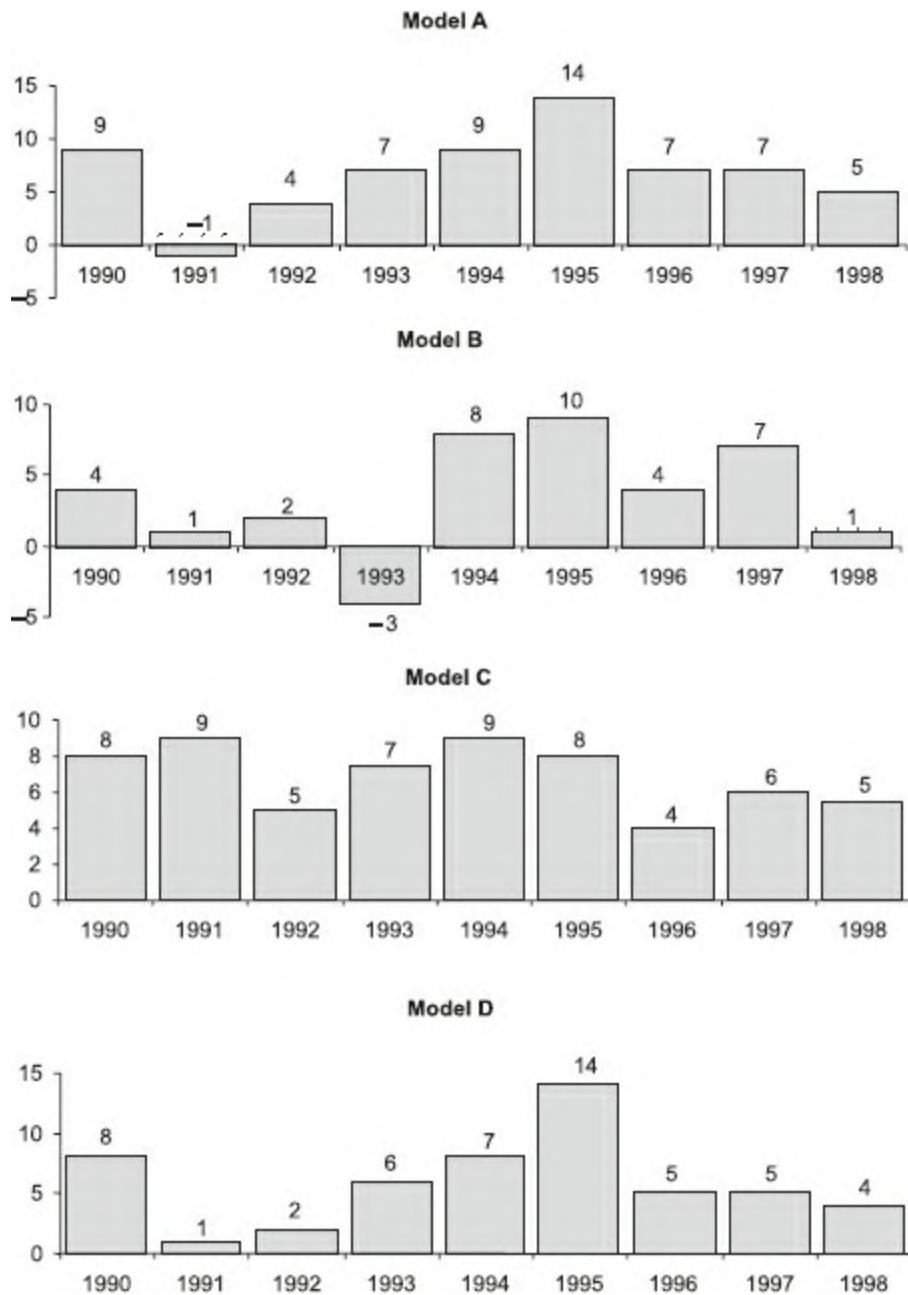
**Directions for Questions 5 to 10:** The following figures (Figure 25.1) represent the annual growth rates, expressed as the percentage change relative to the previous year, in the sales of four two-wheeler models of the Balal scooter works. The figures are for the years during the 9-year period from 1990 to 1998. Assume that the index of the sale of the two-wheeler model for each of the four models is set at 100 in 1989. Further, the four models namely: Model A, Model B, Model C and Model D, respectively, constituted 20%, 15%, 10% and 15% of total sales for 1989.

5. Which is the model with the highest growth during the period 1989 to 1998?
- (a) Model A
  - (b) Model B
  - (c) Model C
  - (d) Model D

6. The overall growth rate in 1991 of the four models together is approximately:

  - (a) 10%
  - (b) 1%
  - (c) 2.5%
  - (d) 1.5%
7. When was the highest level of production achieved for Model C during the 9-year period 1990–98?

  - (a) 1998
  - (b) 1995
  - (c) 1990
  - (d) Cannot be determined
8. When was the lowest level of production of the Model A achieved during the nine-year period 1990–98?

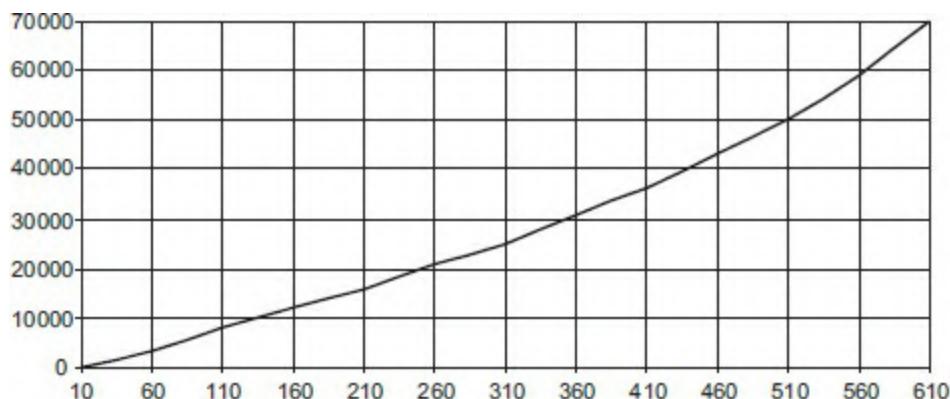


**Figure 25.1** Annual Growth Rate of Four Two-Wheeler Models

- (a) 1996
  - (b) 1991
  - (c) 1990
  - (d) Cannot be determined
9. The percentage increase of production in the four models, taken together in 1994 relative to 1989 is approximately:

- (a) 25  
 (b) 20  
 (c) 50  
 (d) 40
10. It is known that the total production in 1994 was 50% more than in 1989. Then, the percentage increase in production between 1989 and 1994 in models other than the four listed above is:
- (a) 57.5  
 (b) 87.5  
 (c) 127.5  
 (d) 47.5

**Directions for Questions 11 to 16:** Mindworkzz produces mobile phones. They have a revolutionary new technology due to which the demand for the product is unlimited, i.e., they are in a position to sell all of their production. The graph ([Figure 25.2](#)) below describes the monthly variable cost incurred by the company as a function of the quantity produced. In addition to this, operating the plant for one shift results in a fixed monthly cost of ₹8000. Fixed monthly cost for second shift operation are estimated at ₹12000. Each shift of operation provides capacity for producing 300 mobile phones per month.



**Figure 25.2** Monthly Variable Cost Incurred by a Mobile Phone Company

**Note:** Average unit cost,  $AC = \text{Total monthly cost}/\text{monthly production}$  and Marginal Cost (MC) is the rate of change in total cost for unit change in

quantity produced.

11. The total production in June 2017 was 400 units. What was the approximate average unit cost for the month?
  - (a) 130
  - (b) 120
  - (c) 140
  - (d) 150
12. Mindworkzz is considering increasing the production level. What is the approximate marginal cost of increasing production from its June level of 400 Units?
  - (a) 110
  - (b) 130
  - (c) 150
  - (d) 160
13. From the data provided it can be inferred that, for production levels in the range of 0 to 300 Units:
  - (a) MC increases as the production quantity increases.
  - (b) MC decreases as the production quantity decreases.
  - (c) Initially MC is decreases with increase in the production quantity, attains a minimum and then it increases with the increase of production quantity.
  - (d) None of these.
14. Suppose that each mobile phone sells for ₦ 200. What is the profit earned by Mindworkzz in June for production of 400 units?
  - (a) 25,000
  - (b) 16,000
  - (c) 4000
  - (d) None of these
15. Assume that the unit price is further dropped to ₦ 160 and profit is defined as the excess of sales revenue over total costs. What is the monthly production level of Mindworkzz at which the profit is highest?
  - (a) 310

- (b) 510
  - (c) 610
  - (d) 410
16. For monthly production level in the range of 0 to 300 units:
- (a) AC is always higher than MC.
  - (b) AC is always lower than MC.
  - (c) AC is lower than MC up to a certain level and then is higher than MC.
  - (d) None of the above.

## 26 Mock Test Paper

**Directions for Questions 1 to 5:** Answer the questions based on the following information (Table 26.1), which gives data about certain packaged atta products in India.

**Table 26.1** Data on Packaged Atta Products

|                          | Production<br>('000 tonnes) | Capacity utilisation<br>(%) | Sales ('000 tonnes) | Total Sales Value<br>(₹ in crore) |
|--------------------------|-----------------------------|-----------------------------|---------------------|-----------------------------------|
| Annapoorna               | 3.01                        | 77.50                       | 2.65                | 32.15                             |
| Basuri                   | 2.52                        | 72.20                       | 2.13                | 27.75                             |
| Chetakar                 | 1.68                        | 65.80                       | 1.36                | 16.25                             |
| Dhanpura                 | 1.58                        | 60.35                       | 1.57                | 18.45                             |
| Total (including others) | 11.80                       | 62.30                       | 11.17               | 137.80                            |

1. What is the maximum production capacity (in '000 tonnes) of Chetakar for packaged atta?
  - (a) 3.03
  - (b) 2.65
  - (c) 2.34
  - (d) 2.53
2. Which company out of the four companies mentioned above has the maximum unutilised capacity ('000 tonnes)?
  - (a) Chetakar
  - (b) Basuri
  - (c) Annapoorna
  - (d) Dhanpura
3. What is the approximate total production capacity (in '000 tonnes) of packaged atta in India?

- (a) 18
  - (b) 20
  - (c) 18.9
  - (d) Data insufficient
4. The lowest price for atta per kilogram is for:
- (a) Basuri
  - (b) Dhanpura
  - (c) Chetakar
  - (d) Data insufficient
5. What percentage of the total market share (by sales value) is controlled by ‘others’?
- (a) 60%
  - (b) 31%
  - (c) 67%
  - (d) Data insufficient

**Directions for Questions 6 to 10:** Dataman Infosys, before selling a package to its clients, follows the given schedule ([Table 26.2](#)).

**Table 26.2** Schedule followed by Dataman Infosys

| Month | Stage         | Cost (₹ '000 per man/month) |
|-------|---------------|-----------------------------|
| 1–2   | Specification | 20.0                        |
| 3–4   | Design        | 10.0                        |
| 5–8   | Coding        | 5.0                         |
| 9–10  | Testing       | 7.5                         |
| 11–15 | Maintenance   | 5.0                         |

The number of people employed in each month is:

**Table 26.3** Number of People Employed by Dataman Infosys

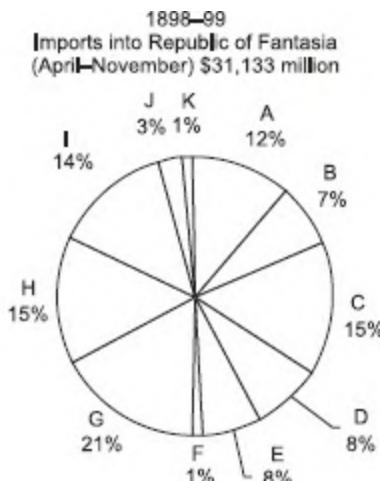
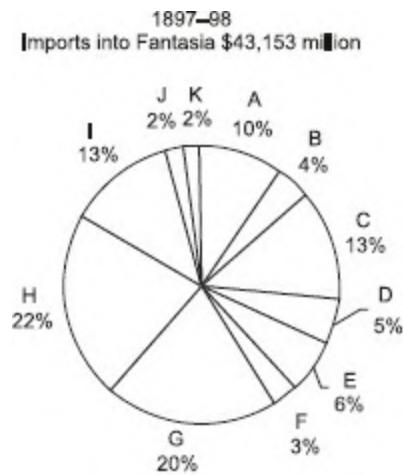
| Month                     | 1 | 2 | 3 | 4 | 5 | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---------------------------|---|---|---|---|---|----|----|---|---|----|----|----|----|----|----|
| Number of people employed | 4 | 6 | 8 | 6 | 8 | 10 | 10 | 8 | 8 | 2  | 6  | 6  | 2  | 2  | 2  |

6. Due to an overrun in design, the design stage took three months, i.e. months 3, 4, and 5 instead of only two months. The number of people working on design in the fifth month was 5. Calculate the percentage change in the cost incurred in the fifth month. (Due to improvement in coding technique, this stage was completed in months 6–8 only.)
- (a) 20%
  - (b) 30%
  - (c) 25%
  - (d) 10%
7. With reference to the above question, what is the cost incurred in the new coding stage? (under the new technique 4 people work in the sixth month and 5 in the eighth.)
- (a) ₦ 95,000
  - (b) ₦ 90,000
  - (c) ₦ 1,40,000
  - (d) ₦ 1,10,000
8. What is the difference in cost between the old and the new techniques?
- (a) ₦ 60,000
  - (b) ₦ 25,000
  - (c) ₦ 70,000
  - (d) None of these
9. Under the new technique, which stage of software development is most expensive for Dataman Infosys?
- (a) Testing
  - (b) Specification
  - (c) Coding
  - (d) Design
10. Which five consecutive months have the lowest average cost per man / month under the old technique?
- (a) 1–5
  - (b) 9–13
  - (c) 11–15
  - (d) None of these

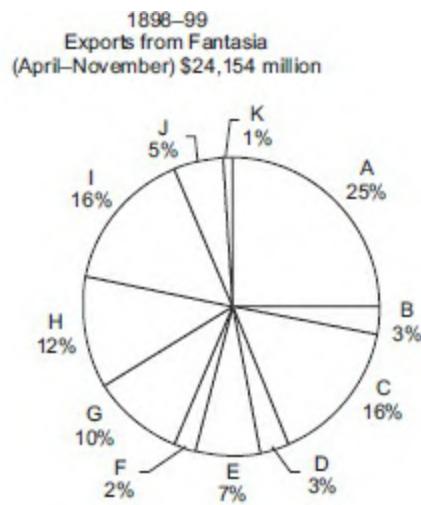
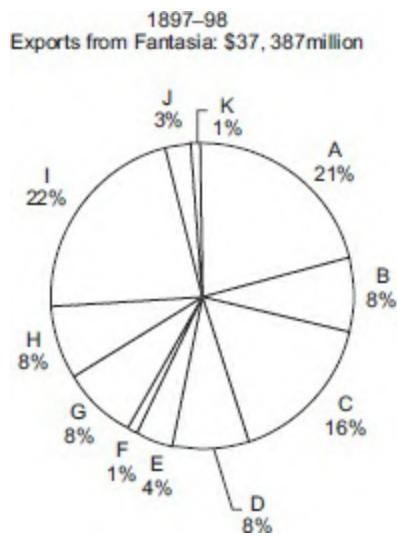
**Directions for Questions 11 to 14:** Consider the information provided in Figures 26.1 and 26.2 below relating to the Republic of Fantasia's foreign trade in 1897–98 and the first eight months of financial year 1898–99. Total trade with a region is defined as the sum of exports and imports from that region. Trade deficit is defined as the excess of imports over exports. Trade deficit may be negative.

Refer to the nomenclature below for the name of the countries:

- A. USA
- B. Germany
- C. Other EU
- D. UK
- E. Japan
- F. Russia
- G. Other East Europe
- H. OPEC
- I. Asia
- J. Australia
- K. Others



**Figure 26.1** Destination of Imports



**Figure 26.2** Destination of Exports

11. What is the region with which Fantasia had the highest total trade in 1897–98?
  - (a) USA
  - (b) Other EU
  - (c) OPEC
  - (d) Asia
12. In 1897–98, the amount of exports from Fantasia in millions of dollars, to the region with which Fantasia had the lowest total trade, is approximately:
  - (a) 750
  - (b) 373
  - (c) 220
  - (d) 440
13. In 1897–98, the trade deficit with respect to Fantasia in billion of US dollars, for the region with the highest trade deficit with respect to Fantasia, is approximately equal to:
  - (a) 6.0
  - (b) 3.5
  - (c) 4.5
  - (d) 7.5
14. Amongst the region having a trade deficit with respect to Fantasia, the

region with the lowest trade deficit with respect to Fantasia in 1897–98 is:

- (a) USA
- (b) Asia
- (c) Others
- (d) Australia

**Directions for Questions 15 to 16:** Assume that the average monthly exports from Fantasia and imports to Fantasia during the remaining four months of 1898–99 financial year would be the same as that for the first eight months of the year.

15. What is the region to which Fantasia's exports registered the highest percentage growth between 1897–98 and 1898–99?
- (a) Japan
  - (b) Australia
  - (c) Asia
  - (d) Russia
16. What is the percentage growth rate in Fantasia's total trade deficit between 1897–98 and 1898–99?
- (a) 22%
  - (b) 44%
  - (c) 82%
  - (d) 66%

## 27 Mock Test Paper

**Directions for Questions 1 to 5:** Ghosh Babu surveyed his companies and obtained the following data ([Table 27.1](#)). Income tax is paid on profit before tax and the remaining amount is apportioned to dividend and retained earnings. The retained earnings were accumulated into reserves. The reserves at the beginning of 2001 were ₹80 lakh.

**Table 27.1** Select Data Pertaining to Ghosh Babu's Firms

| Figure            | 2004 | 2003 | 2002 | 2001 |
|-------------------|------|------|------|------|
| Sales             | 6730 | 5130 | 2810 | 3370 |
| Profit before tax | 840  | 730  | 230  | 330  |
| Dividends         | 150  | 80   | 40   | 40   |
| Retained earnings | 450  | 320  | 80   | 155  |

1. In which year was the tax per rupee of profit before tax highest?
  - (a) 2001
  - (b) 2002
  - (c) 2003
  - (d) 2004
2. In which year was the sales per rupee of share capital least?
  - (a) 2001
  - (b) 2002
  - (c) 2003
  - (d) Cannot be determined
3. In which year the profit before tax per rupee of sales was the least?
  - (a) 2001
  - (b) 2002

- (c) 2003  
 (d) 2004
4. In which year was the percentage addition to reserves over previous year reserves the highest?
- (a) 2001  
 (b) 2002  
 (c) 2003  
 (d) 2004
5. Amount of the reserves at the end of 2004 is:
- (a) ₹ 885 lakh  
 (b) ₹ 1085 lakh  
 (c) ₹ 1125 lakh  
 (d) None of these

**Directions for Questions 6 to 10:** Study table (Table 38.2) below and answer the questions that follow:

**Table 27.2** Market Share of Mosquito Repellent in Four Metropolitan Cities

| Period/<br>Product | Mumbai<br>2003–04 | Kolkata<br>2003–04 | Delhi<br>2003–04 | Chennai<br>2003–04 |
|--------------------|-------------------|--------------------|------------------|--------------------|
| Baygon             | 20–15             | 35–30              | 20–15            | 20–30              |
| Finit              | 20–25             | 30–15              | 15–10            | 20–20              |
| Hit                | 45–40             | 25–35              | 35–35            | 10–10              |
| Mortein            | 15–20             | 10–20              | 10–10            | 50–40              |

6. The maximum percentage increase in market share is:
- (a) 60%  
 (b) 50%  
 (c) 80%  
 (d) 100%
7. The city in which minimum number of products decreased their market shares in 2003–04 is:
- (a) Mumbai

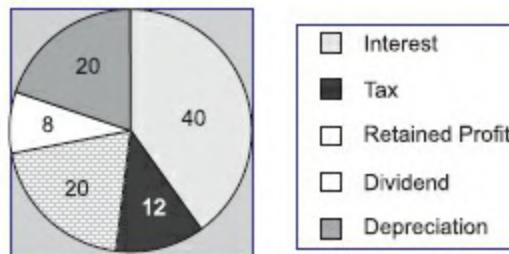
- (a) Delhi
  - (c) Kolkata
  - (d) Chennai
8. The market shares of which product did not increase in any city between the years 2003 to 2004?
- (a) Baygon
  - (b) Finit
  - (c) Hit
  - (d) None of these
9. The number of cities where the four brands taken together did not account for 100 % market share for any of the two given years is:
- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
10. The number of products which had constant market shares in one or more cities is:
- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3

**Directions for Questions 11 to 15:** Study [Figures 27.1\(a\)](#) and [27.1\(b\)](#) and answer the questions following that.

11. The interest in 2002–03 increased over that in 2001–02 by:
- (a) 68%
  - (b) 58%
  - (c) 44%
  - (d) 64%
12. The interest burden in 2002–03 was higher than that in 2001–02 by:
- (a) ₹ 50 lakh
  - (b) ₹ 25 lakh
  - (c) ₹ 80 lakh

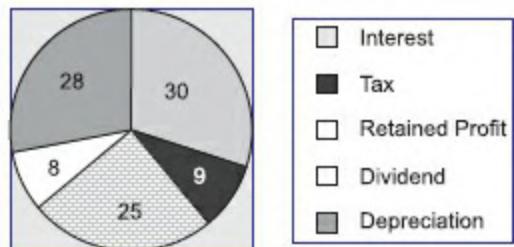
- (d) None of these
13. If on an average, 10 per cent rate of interest was charged on borrowed funds, then the total borrowed funds used by this company in the given two years amounted to:
- ₹ 1220 lakh
  - ₹ 2060 lakh
  - ₹ 880 lakh
  - none of these
14. The dividend in 2002–03, as compared to that in 2001–02 was:
- Higher by 23%
  - Higher by 12 lakh
  - Higher by 32%
  - None of these
15. The equity base of these companies remained unchanged. Then the total dividend earning by the share holders in 2001–02 is:
- ₹ 104 lakh
  - ₹ 10.4 lakh
  - ₹ 20.8 lakh
  - None of these

Operating Profit ₹ 320 lakh in 2002–03



**Figure 27.1 (a)** Data Pertaining to a Select Industrial Firm

Operating profit 2001–02 (₹ 260 lakh)



**Figure 27.1 (b)** Data Pertaining to a Select Industrial Firm

## 28 Mock Test Paper

**Directions for Questions 1 to 4:** Study [Table 28.1](#) and answer the questions given below that.

**Table 28.1** Projected Food Grain Requirements—Global and US

|        | (Demand in billion kilogram) |         |       |         |       |         |
|--------|------------------------------|---------|-------|---------|-------|---------|
|        | 2005                         |         | 2015  |         | 2025  |         |
|        | World                        | America | World | America | World | America |
| Wheat  | 100.0                        | 8       | 140   | 20      | 160   | 30      |
| Rice   | 60.0                         | 1       | 80    | 5       | 100   | 10      |
| Gram   | 100.0                        | 8       | 120   | 10      | 150   | 20      |
| Corn   | 20.0                         | 1       | 40    | 2       | 50    | 2.6     |
| Pulses | 20.0                         | 2       | 20    | 3       | 40    | 4.0     |
| Total  | 300.0                        | 20      | 400   | 40      | 500   | 66.6    |

1. The proportion of which food grain in total food demand has decreased continuously over the period 2005 to 2025?
  - (a) Rice
  - (b) Gram
  - (c) Corn
  - (d) None of these
2. Which is the grain whose proportion in the total food demand remained constant over the period 2005–2025, but whose proportion increased in the total food demand of America?
  - (a) Gram
  - (b) Corn
  - (c) Pulses
  - (d) Rice
3. Which two grains meet more than 60% of the total food demand of the

both world and America in 2005 to 2025?

- (a) Wheat and Rice
  - (b) Wheat and Gram
  - (c) Rice and Pulses
  - (d) None of the above
4. The proportion of which grains demand increased over the period 2005 and 2015 and decreased over the period 2015 to 2025 for both the world and America?
- (a) Wheat
  - (b) Rice
  - (c) Gram
  - (d) None of these

**Directions for Questions 5 to 9:** *Table 28.2 below presents data on the percentage of population covered by electricity and roads in selected third world countries.*

---

**Table 28.2** Population Covered by Electricity and Roads

(Percentage coverage)

|          | Electricity |       |       | Roads |       |       |
|----------|-------------|-------|-------|-------|-------|-------|
|          | Urban       | Rural | Total | Urban | Rural | Total |
| India    | 42.5        | 39.5  | 40.5  | 35.0  | 7.0   | 14.0  |
| Myanmar  | 49.5        | 48.0  | 48.5  | 39.5  | 22.0  | 24.0  |
| Malaysia | 48.5        | 28.0  | 33.5  | 37.0  | 3.5   | 12.0  |
| Thailand | 41.0        | 34.5  | 37.0  | 38.5  | 17.0  | 23.5  |
| Pakistan | 46.0        | 40.0  | 43.0  | 44.0  | 33.0  | 38.5  |
| Iran     | 39.5        | 27.0  | 31.0  | 36.5  | 20.0  | 25.5  |
| UAE      | 44.0        | 26.0  | 28.5  | 34.0  | 31.0  | 31.5  |
| Nepal    | 44.0        | 30.0  | 31.5  | 29.0  | 6.0   | 9.0   |

**Note:** Country A is said to dominate B or  $A > B$ , if A has a higher percentage in total coverage for both electricity and roads. In such a case Country B is said to be dominated by A, or  $B < A$ .

A country is said to be on the coverage frontier if no other country dominates it. Similarly, a country is not on the coverage frontier if it is dominated by at least one other country.

5. Which are the countries on the coverage frontier?

- (a) India and Malaysia
  - (b) UAE and Iran
  - (c) Myanmar and Pakistan
  - (d) Thailand and Nepal
6. Which of the following statements is/are true?
- A. India > Thailand and India > Iran
  - B. India > Malaysia and India > Nepal
  - C. UAE > Malaysia
  - D. Malaysia > Nepal
- (a) A and D
  - (b) B and D
  - (c) A, B and D
  - (d) B and C
7. Analysing the data presented under road facilities, it can be concluded that rural population in India as a percentage of its total population is approximately:
- (a) 75
  - (b) 70
  - (c) 67
  - (d) Cannot be determined
8. Putting to use the data under the roads columns sequence India, Myanmar and Pakistan in the ascending order of their rural population as percentage of their respective total population. The correct order is:
- (a) India, Pakistan, Myanmar
  - (b) India, Myanmar, Pakistan
  - (c) Myanmar, India, Pakistan
  - (d) Pakistan, India, Myanmar
9. India is not on the coverage frontier because:
- A. India is lower than Myanmar in terms of coverage of electricity facilities.
  - B. It is lower than UAE in terms of coverage of roads.
  - C. It is lower than Thailand in terms of coverage of roads.
  - D. It is dominated by Pakistan.

- (a) A and B
- (b) A and C
- (c) D
- (d) None of these

**Directions for Questions 10 to 11:** These relate to Table 39.2 with the additional provision that the gap between the percentage of population covered by roads and electricity in any sector (viz: urban or rural) is a measure of the disparity of coverage of roads versus electricity for the sector.

- 10. The country with the least disparity in the coverage of the rural sector is:
  - (a) India
  - (b) Myanmar
  - (c) Nepal
  - (d) None of these
- 11. The country with the most disparity in the coverage of the urban sector is:
  - (a) India
  - (b) Thailand
  - (c) Pakistan
  - (d) None of these

**Directions for Questions 12 to 17:** Table 28.3 gives the quantity of apples (in tonnes) arriving at New Delhi market from various states in a particular year. The month, in which demand was more than supply, the additional demand was met by the stock from cold storage.

---

**Table 28.3** Select Data Pertaining to Apple Trade in Delhi

| Month     | State  |     |        | Cold storage Total |        |
|-----------|--------|-----|--------|--------------------|--------|
|           | HP     | UP  | J & K  |                    |        |
| April     | 13     | 0   | 7      | 63                 | 83     |
| May       | 18     | 1   | 0      | 0                  | 19     |
| June      | 8,765  | 267 | 8,123  | 0                  | 17155  |
| July      | 71,559 | 0   | 19,560 | 0                  | 91119  |
| August    | 78,135 | 0   | 19,887 | 0                  | 98022  |
| September | 54,935 | 0   | 58,445 | 0                  | 113380 |
| October   | 13,986 | 0   | 81,213 | 28                 | 95227  |
| November  | 3,590  | 0   | 42,872 | 46                 | 46508  |
| December  | 1,843  | 0   | 14,631 | 20                 | 16494  |
| January   | 319    | 0   | 10,934 | 205                | 11458  |
| February  | 41     | 0   | 11,638 | 80                 | 11759  |
| March     | 0      | 0   | 723    | 89                 | 812    |

12. What was the maximum percentage of apples supplied by any state in any of the months?
- (a) 99%
  - (b) 95%
  - (c) 88%
  - (d) 100%
13. Which state supplied the maximum apples over the first half of the financial year? (April to September)
- (a) UP
  - (b) HP
  - (c) J&K
  - (d) Cold storage
14. Which state supplied the second highest percentage of apples from the total apples supplied?
- (a) UP
  - (b) HP
  - (c) J&K
  - (d) Cannot be determined
15. In which of the following months was the supply greater than the demand?
- (a) October, November, January, March
  - (b) June–October
  - (c) May–September

- (d) Cold storage
16. If the yield per tree was 40 kg, then from approximately how many trees were the apples supplied to New Delhi (in million) during the year? (approximately)
- (a) 11.5  
(b) 12.5  
(c) 13.5  
(d) Cannot be determined
17. Using the data in the question above, if there were 250 trees per hectare, then how many hectares of land was used? (approximately)
- (a) 9,400  
(b) 48,000  
(c) 50,000  
(d) 60,000

# 29 Mock Test Paper

**Directions for Questions 1 to 4:** A statistician has been provided with the following information ([Table 29.1](#)) and by virtue of that has been asked the following questions. Help him answer the questions that follow.

**Table 29.1**

| Children | Height |       |      | Total |
|----------|--------|-------|------|-------|
|          | Medium | Short | Tall |       |
| Boys     |        |       | 20   |       |
| Girls    |        |       |      | 64    |
| Total    |        | 60    |      |       |

- Note:**
- Half the children were either tall or short.
  - 40% of the students were girls.
  - One-third of the boys were of medium height.

1. Amongst the children how many were tall girls?
  - 0
  - 10
  - 20
  - Cannot be determined
2. What proportion of the medium students are boys?
  - 0.6
  - 0.57
  - 0.4
  - 0.3
3. What percentage of girl students are short?

- (a) 0  
 (b) 25%  
 (c) 50%  
 (d) 10%
4. The ratio of short boys to medium girls is?  
 (a) 11:12  
 (b) 12:11  
 (c) 13:12  
 (d) None of these

**Directions for Questions 5 to 6:** Subhash Poorti works  $x$  hours a day and rests  $y$  hours a day. This pattern continues for 1 week, with an exactly opposite pattern next week, and so on for four weeks. Every fifth week he adopts a new pattern which then continues for the next four weeks. When he works longer than he rests, his wage per hour is three times what he earns per hour when he rests longer than he works.

The following ([Table 29.2](#)) are his daily working hours for the weeks numbered 1 to 13

**Table 29.2**

|      | 1 <sup>st</sup> week | 5 <sup>th</sup> week | 9 <sup>th</sup> week | 13 <sup>th</sup> week |
|------|----------------------|----------------------|----------------------|-----------------------|
| Rest | 3                    | 4                    | 5                    | –                     |
| Work | 6                    | 8                    | 9                    | 8                     |

5. A week consists of six days and a month consists of four weeks. If Subhash Poorti is paid ₹ 30 per working hour in the 1<sup>st</sup> week, what is his salary for the 1<sup>st</sup> month? (Assume that he is paid half his wages for his resting hours on duty)  
 (a) 3420  
 (b) 5700  
 (c) 5400  
 (d) None of these
6. According to the data given in Question 11, Subhash's average monthly salary at the end of the first four months will be:

- (a) 4450
- (b) ₹ 4035
- (c) ₹ 3895
- (d) None of these

**Directions for Questions 7 to 11:** Karuna sold 10 acres of land to Kaku and Chikoo who paid him the total amount in the ratio 2:3. Kaku invested a further ₹ 3 lakh in the land for the purpose of planting coconut and lemon trees in the ratio 4:1. These trees were planted on equal areas of land. There were a total of 200 lemon trees. The sale price of one coconut was ₹ 10 in 2033. The crop took 7 years to mature and when the crop was reaped in 2033, the total revenue generated was 50% of the total initial amount put in by Kaku and Chikoo together. The revenue generated from the coconut and lemon trees was in the ratio 5:4 and it was shared equally by Kaku and Chikoo as the initial amount spent by them were equal.

7. How many coconuts were reaped?
  - (a) 24,000
  - (b) 50,000
  - (c) 25,000
  - (d) None of these
8. What was the value of output per acre of lemon trees planted?
  - (a) 0.8 Lakh per/acre
  - (b) 4 Lakh per/acre
  - (c) 2.4 Lakh per/acre
  - (d) Cannot be determined
9. What was the amount received by Kaku in 2033?
  - (a) ₹ 3 Lakh
  - (b) ₹ 4.5 Lakh
  - (c) ₹ 6 Lakh
  - (d) None of these
10. What was the value of output per tree for coconuts?
  - (a) ₹ 360
  - (b) ₹ 625

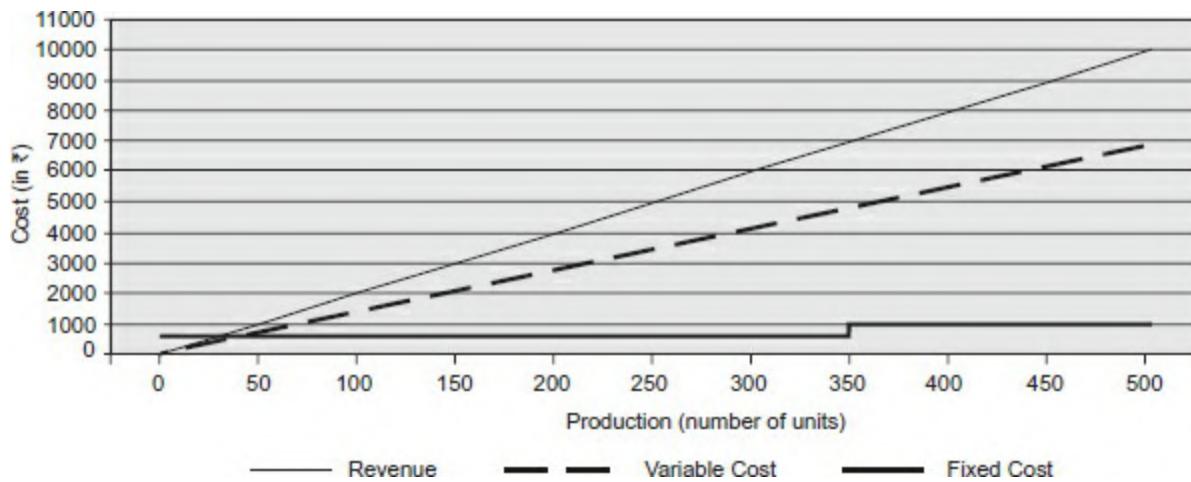
- (c) ₹ 650
  - (d) None of these
11. What was the ratio of yield per acre of land for coconuts and lemons (in terms of number of lemons and coconuts)?
- (a) 3:2
  - (b) 2:3
  - (c) 1:1
  - (d) Cannot be determined

**Directions for Questions 12 to 16:** Ghosh Babu has a manufacturing unit. The following graph ([Figure 29.1](#)) gives the cost for various numbers of units. Given that profit = revenue – variable cost. The fixed cost remains constant up to 349 units after which additional investment is to be done on fixed assets. In any case, production cannot exceed 500 units.

**Note:** The fixed cost was ₹ 600 for upto 349 units and it changed to ₹ 1000 for values above and equal to 350.

12. What is the minimum number of units that need to be produced to make sure that there was no loss?
- (a) 50
  - (b) 100
  - (c) 250
  - (d) Cannot be determined
13. How many units should be manufactured such that profit was at least ₹ 600?
- (a) 200
  - (b) 340
  - (c) 450
  - (d) 300
14. If at the most 400 units can be manufactured, then what is the number of units that can maximise profit per unit?
- (a) 400
  - (b) 349
  - (c) 350

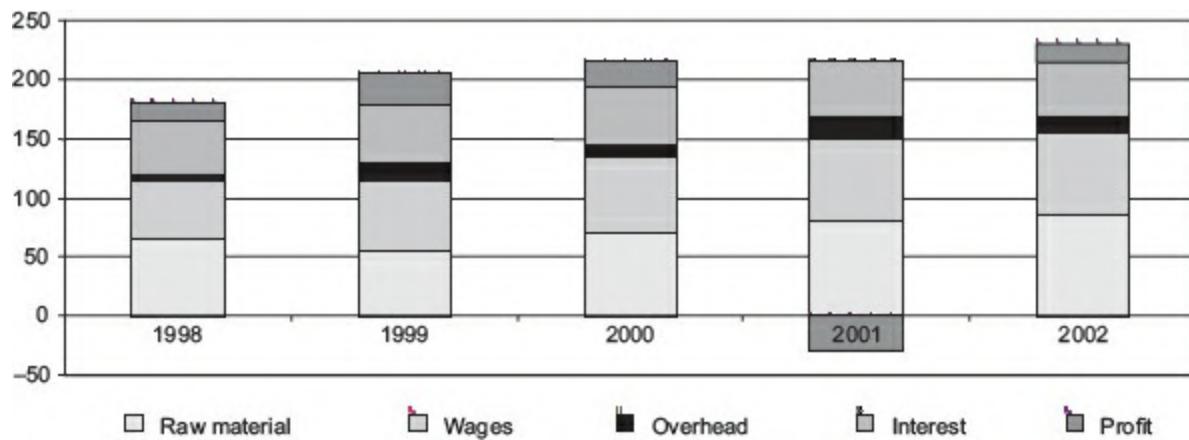
- (d) 250
15. If the production cannot exceed 450 units, then what is the number of units that can maximise profit per unit?
- (a) 400
  - (b) 349
  - (c) 450
  - (d) 350
16. If the fixed cost of production goes up by ₹ 400, then what is the minimum number of units that need to be manufactured to make sure that there is no loss? (approximately to the closest 10)
- (a) 180
  - (b) 190
  - (c) 150
  - (d) 170



**Figure 29.1** Individual Cost of Various Units in a Manufacturing Firm

## 30 Mock Test Paper

**Directions for Questions 1 to 6:** Answer the questions based on the graph ([Figure 30.1](#)).



**Figure 30.1** Break-up of Costs of a Select Manufacturing Firm

1. In which year was the percentage increase in the raw material maximum?
  - (a) 1999
  - (b) 2000
  - (c) 2001
  - (d) 2002
2. In which of the following time periods was the change in the level of profit the maximum?
  - (a) 1998–2000
  - (b) 1999–2000
  - (c) 1999–2001

- (d) 2001–2002
3. Which component of the cost of production has remained more or less constant over the period?
- Interest
  - Overheads
  - Wages
  - Raw material
4. In which year were the overheads, as a percentage of the raw material, maximum?
- 2002
  - 2001
  - 1999
  - 2000
5. Approximately what percent of the costs did the profits form over the period?
- 3%
  - 5%
  - 8%
  - 11%
6. If the interest component is not included in the total cost calculation, which year would show the minimum profit per unit costs (excluding interest)?
- 1998
  - 1999
  - 2000
  - 2002

**Directions for Questions 7 to 11:** Machine M1 as well as machine M2 can independently produce either LG or Samsung air conditioners. The time taken by machines M1 and M2 (in minutes) to produce one unit of LG and Samsung are given in the table in minutes (Each machine works 10 hours per day).

7. What is the maximum number of units that can be manufactured in one day?

---

**Table 30.1** Data

| System  | M1 | M2 |
|---------|----|----|
| LG      | 12 | 10 |
| Samsung | 8  | 8  |

- (a) 150  
(b) 160  
(c) 130  
(d) 135
8. If M2 works at half its normal efficiency, what is the maximum number of units produced, if at least one unit of each must be produced?
- (a) 105  
(b) 110  
(c) 111  
(d) 112
9. What is the least number of machine hours required for producing 30 LG and 25 Samsung A/c's respectively?
- (a) 6hr. 40 min  
(b) 7hr. 30min.  
(c) 6 hr. 50 min.  
(d) None of these
10. If for every three units of LG one unit of Samsung is produced, what is the maximum idle time that can remain unutilised to maximise the total units manufactured?
- (a) 0 min.  
(b) 30 min.  
(c) 45 min  
(d) None of these
11. If equal quantities of both are to be produced, then out of the four choices given below, the least efficient way would be:
- (a) 48 of each with 4 min idle

- (b) 64 of each with 40 min idle
- (c) 54 of each with 60 min idle
- (d) 75 of each with 12 min idle

**Directions for Questions 12 to 16:** Namaste Exports produces five types of trousers—A,B,C,D and E, using cloth of three qualities—high, medium and low, and dyes of three qualities—high, medium and low. One trousers require 3 m of cloth. The following table (Table 44.2) gives specific information about the production in Quarter 3 of 2005. It gives information about:

1. The number of trousers (of each category) produced, in thousands.
  2. The percentage distribution of cloth quality in each type of trousers, and
  3. The percentage distribution of dye quality in each type of trousers.
12. What is the total requirement of cloth?
- (a) 300,000 m
  - (b) 450,000 m
  - (c) 600,000 m
  - (d) None of these
13. How many metres of medium quality cloth is consumed?
- (a) 264,000 m
  - (b) 288,000 m
  - (c) 312,000 m
  - (d) None of these
14. How many metres of low-quality cloth is consumed by C-type trousers?
- (a) 24,000 m
  - (b) 48,000 m
  - (c) 60,000 m
  - (d) None of these
15. What is the ratio of the three qualities of dyes in high-quality cloth?

- (a) 2:3:4  
 (b) 1:3:6  
 (c) 7:8:12  
 (d) Cannot be determined
16. What is the ratio of low-quality dye used for A-type to that used for B-type trousers?
- (a) 1:3  
 (b) 3:8  
 (c) 1:2  
 (d) 4:9
- 

**Table 30.2** Namaste Exports: Q3 Cloth Production

| Trousers type | Number in thousand | Distribution of cloth (%) |      |        | Low | Trousers type | Distribution of dye (%) |        |     |
|---------------|--------------------|---------------------------|------|--------|-----|---------------|-------------------------|--------|-----|
|               |                    | Trousers type             | High | Medium |     |               | High                    | Medium | Low |
| A             | 40                 | A                         | 70   | 30     | —   | A             | 60                      | 20     | 20  |
| B             | 60                 | B                         | 20   | 50     | 30  | B             | 30                      | 40     | 30  |
| C             | 60                 | C                         | —    | 60     | 40  | C             | —                       | 70     | 30  |
| D             | 20                 | D                         | —    | 70     | 30  | D             | —                       | 30     | 70  |
| E             | 20                 | E                         | —    | 20     | 80  | E             | —                       | 10     | 90  |

---

## ANSWER KEY

---

### **Mock Test Paper 1**

1. (b)
2. (a)
3. (a)
4. (c)
5. (b)
6. (c)
7. (d)
8. (d)
9. (c)
10. (b)
11. (c)
12. (a)
13. (d)
14. (d)
15. (c)
16. (a)
17. (a)

### **Mock Test Paper 2**

1. (c)
2. (b)
3. (d)
4. (d)
5. (a)
6. (a)
7. (c)
8. (c)
9. (d)

10. (c)
11. (a)
12. (a)
13. (b)
14. (b)
15. (b)
16. (d)
17. (a)

### **Mock Test Paper 3**

1. (e)
2. (e)
3. (a)
4. (d)
5. (c)
6. (e)
7. (a)
8. (d)
9. (b)
10. (c)
11. (e)
12. (a)
13. (a)
14. This question was wrong.
15. (a)
16. (e)

### **Mock Test Paper 4**

1. (a)
2. (d)
3. (c)
4. (a)
5. (c)

- 6. (d)
- 7. (e)
- 8. (a)
- 9. (c)
- 10. (a)
- 11. (d)
- 12. (b)
- 13. (c)
- 14. (b)
- 15. (c)
- 16. (b)

## **Mock Test Paper 5**

- 1. (c)
- 2. (b)
- 3. (d)
- 4. (c)
- 5. (d)
- 6. (d)
- 7. (c)
- 8. (a)
- 9. (b)
- 10. (d)
- 11. (c)
- 12. (c)
- 13. (a)
- 14. (a)
- 15. (c)
- 16. (c)
- 17. (c)
- 18. (c)

## **Mock Test Paper 6**

1. (c)
2. (c)
3. (c)
4. (c)
5. (c)
6. (c)
7. (b)
8. (d)
9. (b)
10. (a)
11. (b)
12. (d)
13. (a)
14. (d)
15. (b)
16. (c)
17. (b)

## **Mock Test Paper 7**

1. (d)
2. (a)
3. (b)
4. (b)
5. (c)
6. (b)
7. (b)
8. (d)
9. (b)
10. (d)
11. (b)
12. (c)
13. (b)
14. (d)

15. (b)
16. (c)

## **Mock Test Paper 8**

1. (d)
2. (d)
3. (b)
4. (a)
5. (d)
6. (a)
7. (d)
8. (d)
9. (c)
10. (a)
11. (a)
12. (d)
13. (c)
14. (c)
15. (b)
16. (a)

## **Mock Test Paper 9**

1. (a)
2. (c)
3. (b)
4. (b)
5. (b)
6. (d)
7. (b)
8. (c)
9. (a)
10. (d)
11. (c)

- 12. (a)
- 13. (a)
- 14. (b)
- 15. (a)
- 16. (d)
- 17. (d)

## **Mock Test Paper 10**

- 1. (c)
- 2. (a)
- 3. (a)
- 4. (d)
- 5. (c)
- 6. (c)
- 7. (b)
- 8. (a)
- 9. (b)
- 10. (a)
- 11. (a)
- 12. (b)
- 13. (c)
- 14. (d)
- 15. (d)
- 16. (c)

## **Mock Test Paper 11**

- 1. (d)
- 2. (c)
- 3. (a)
- 4. (d)
- 5. (a)
- 6. (d)
- 7. (d)

8. (a)
9. (d)
10. (b)
11. (b)
12. (d)
13. (d)
14. (c)
15. (d)
16. (d)

### **Mock Test Paper 12**

1. (a)
2. (d)
3. (c)
4. (c)
5. (c)
6. (d)
7. (b)
8. (a)
9. (d)
10. (d)
11. (c)
12. (b)
13. (c)
14. (b)
15. (a)
16. (c)
17. (c)
18. (b)

### **Mock Test Paper 13**

1. (b)
2. (c)

- 3. (c)
- 4. (c)
- 5. (d)
- 6. (c)
- 7. (a)
- 8. (d)
- 9. (c)
- 10. (b)
- 11. (c)
- 12. (b)
- 13. (a)
- 14. (d)
- 15. (b)
- 16. (d)

### **Mock Test Paper 14**

- 1. (b)
- 2. (c)
- 3. (d)
- 4. (a)
- 5. (c)
- 6. (b)
- 7. (d)
- 8. (d)
- 9. (d)
- 10. (a)
- 11. (b)
- 12. (c)
- 13. (d)
- 14. (d)
- 15. (a)

### **Mock Test Paper 15**

1. (c)
2. (d)
3. (b)
4. (d)
5. (d)
6. (b)
7. (b)
8. (a)
9. (c)
10. (c)
11. (a)
12. (d)
13. (c)
14. (d)
15. (d)
16. (a)
17. (d)

## **Mock Test Paper 16**

1. (a)
2. (b)
3. (b)
4. (d)
5. (d)
6. (a)
7. (d)
8. (b)
9. (d)
10. (d)
11. (c)
12. (c)
13. (b)
14. (b)

15. (b)
16. (c)

## **Mock Test Paper 17**

1. (c)
2. (b)
3. (d)
4. (d)
5. (c)
6. (c)
7. (d)
8. (d)
9. (d)
10. (d)
11. (d)
12. (c)
13. (c)
14. (d)
15. (c)

## **Mock Test Paper 18**

1. (c)
2. (c)
3. (a)
4. (b)
5. (d)
6. (a)
7. (d)
8. (d)
9. (a)
10. (b)
11. (d)
12. (d)

- 13. (d)
- 14. (a)
- 15. (c)
- 16. (c)

## **Mock Test Paper 19**

- 1. (c)
- 2. (d)
- 3. (b)
- 4. (d)
- 5. (d)
- 6. (a)
- 7. (c)
- 8. (d)
- 9. (c)
- 10. (d)
- 11. (d)
- 12. (b)
- 13. (c)
- 14. (a)
- 15. (c)

## **Mock Test Paper 20**

- 1. (b)
- 2. (a)
- 3. (b)
- 4. (b)
- 5. (b)
- 6. (d)
- 7. (d)
- 8. (c)
- 9. (d)
- 10. (b)

- 11. (c)
- 12. (b)
- 13. (d)
- 14. (c)
- 15. (a)
- 16. (b)
- 17. (c)

## **Mock Test Paper 21**

- 1. (d)
- 2. (d)
- 3. (a)
- 4. (c)
- 5. (b)
- 6. (d)
- 7. (c)
- 8. (d)
- 9. (c)
- 10. (b)
- 11. (a)
- 12. (d)
- 13. (b)
- 14. (b)
- 15. (b)
- 16. (a)

## **Mock Test Paper 22**

- 1. (d)
- 2. (b)
- 3. (d)
- 4. (d)
- 5. (a)
- 6. (d)

7. (c)
8. (a)
9. (a)
10. (b)
11. (c)
12. (a)
13. (c)
14. (a)
15. (b)

### **Mock Test Paper 23**

1. (b)
2. (b)
3. (c)
4. (c)
5. (b)
6. (d)
7. (b)
8. (c)
9. (a)
10. (c)
11. (c)
12. (b)
13. (d)
14. (d)
15. (d)
16. (b)

### **Mock Test Paper 24**

1. (b)
2. (b)
3. (d)
4. (b)

5. (d)
6. (d)
7. (c)
8. (b)
9. (b)
10. (c)
11. (b)
12. (c)
13. (c)

## **Mock Test Paper 25**

1. (a)
2. (d)
3. (b)
4. (d)
5. (c)
6. (c)
7. (a)
8. (b)
9. (a)
10. (b)
11. (c)
12. (a)
13. (a)
14. (a)
15. (b)
16. (d)

## **Mock Test Paper 26**

1. (d)
2. (d)
3. (c)
4. (b)

- 5. (b)
- 6. (c)
- 7. (a)
- 8. (b)
- 9. (b)
- 10. (c)
- 11. (d)
- 12. (b)
- 13. (a)
- 14. (b)
- 15. (d)
- 16. (c)

### **Mock Test Paper 27**

- 1. (b)
- 2. (d)
- 3. (b)
- 4. (a)
- 5. (b)
- 6. (d)
- 7. (d)
- 8. (d)
- 9. (b)
- 10. (d)
- 11. (d)
- 12. (a)
- 13. (b)
- 14. (a)
- 15. (c)

### **Mock Test Paper 28**

- 1. (d)
- 2. (d)

- 3. (b)
- 4. (a)
- 5. (c)
- 6. (b)
- 7. (a)
- 8. (d)
- 9. (c)
- 10. (d)
- 11. (d)
- 12. (a)
- 13. (b)
- 14. (b)
- 15. (c)
- 16. (b)
- 17. (c)

## **Mock Test Paper 29**

- 1. (a)
- 2. (c)
- 3. (b)
- 4. (a)
- 5. (a)
- 6. (d)
- 7. (b)
- 8. (a)
- 9. (b)
- 10. (b)
- 11. (d)
- 12. (b)
- 13. (a)
- 14. (b)
- 15. (b)
- 16. (d)

## **Mock Test Paper 30**

1. (b)
2. (c)
3. (a)
4. (b)
5. (b)
6. (d)
7. (a)
8. (d)
9. (d)
10. (a)
11. (b)
12. (c)
13. (b)
14. (d)
15. (d)
16. (d)

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## SOLUTIONS

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### Mock Test Paper 1

1. Comparing the four ratios in the option,  $209/587$  (1997) is the correct answer.
2. The values to be compared based on availability per capita are:  
 $(421 - 207)/487$  for 1995 i.e.  $214/487$ .  
 $372/464$  for 1996  
 $378/510$  for 1997  
and  $440/566$  for 1999.

Looking at these four ratios it is quite clear that the ratio is below  $1/2$  only for one year i.e. 1995. This year would account for the lowest population amongst the given years. Hence, option (a) is correct.

3. Obviously 1999. Hence Option (a). [Since area has continuously decreased and production has continuously increased.]

- 4–5.** The answers to these questions can be seen visually.
4. We can see that each of the first three options is false. Hence, option (d) is correct.
  5. Option (b).
  6. Except Edible Oil and Dal, all other commodities have shown an increase. Hence, option (c) is correct.
  7. Except for edible oil all other commodities have exhibited this. Hence, the correct answer is 5. Option (d) is correct.
  8. There is only one such instance exhibited by the commodities Egg and Onion. Hence, option (d) is correct.

- 9–11.** are also solvable visually. The answers are:

9. Option (c) is the correct option as we can see that between 1971, 1981, 1991 and 2001, for four consecutive censuses, the number of states where females outnumber men was 1. Hence, option (c) is correct.
10. Himachal Pradesh has grown from 884 to 970 - a growth of 86 and this can be seen as the highest growth. Kerala, with a growth of 54, has the second highest growth amongst the states. Hence, option (b) is correct.

11. ‘Sharpest decline’ can be understood as the highest percentage decline. Bihar has dropped from 1061 to 921 - a drop of close to 13-14% and this is the highest percentage decline of the sex ratio amongst all the five states that had a 1000+ sex ratio in 1901.

**12–13.**

The BJP procession has to be allowed on Friday - as it involves the route BD. This means that the Congress and SP processions have to be allowed on Thursday (as their routes have common elements with BJP). Then BSP should be allowed on Friday (as it’s route clashes with SP) and CPM also on Friday (as it’s route clashes with Congress). Based on this, the correct answers are:

12. Option (a)
13. Option (d)
14. The data is insufficient since we cannot find out how many catches Akash and Biplab took. Hence Option (d).
15. From statement A, we get that C was second (as B is not second and A and D are also not second according to statement A).

From Statement B alone, we see that B, C or D could not have finished fourth. Hence, A finished fourth. Then, D finished third and B finished first. So, using both the statements, we can work out who finished in which position exactly. Hence, option (c) is correct.

16. From A alone, we can work out that there must have been 20 people paying 30 each initially, and when 5 people left, there were 15 people paying 40 each. There is no other possibility that matches this condition. Hence, option (a) is correct.
17. From Statement A alone, we can see that their ages after ‘n’ years have to be 10, 30 and 40 respectively - this is the only way in which the given conditions match the constraint given in statement A. Thus, statement A alone gives us a unique solution and hence option (a) is correct.

## **Mock Test Paper 2**

1. The approach to such questions is based on minimising the interference between the various sets. In order to do so think of the

people as numbered 1 to 100. Assume 1 to 70 have VCDs, then 71 to 100 and 1 to 45 can be given microwave ovens - and in such a case, the number of people with both microwave ovens and VCD players is 45. Next, avoid giving the ACs to these 45 people, as much as possible. In order to do so, let 46 to 100 have ACs. Then, from 1 to 45, you would need to give ACs to a minimum of 25 people (to complete the 80 for ACs). Let these people be 1 to 25. At this stage, we have people 1 to 25 having VCD, Microwave ovens and ACs. Next, we move to allocating washing machines amongst the 100 people. Again, if we want to minimise the percentage of people with all four gadgets, we would need to avoid people 1 to 25 having a washing machine. In order to do so, we should first allocate washing machines to 26 to 100. This would account for 75 washing machines. However, since the number of washing machines is 85 - we need to add 10 more to the washing machines - this can get done by people 1 to 10 having washing machines. In this case 10 people (viz:1 to 10) have all the four gadgets. Hence, the required answer is 10%. Option (c) is correct.

## 2-5.

You need to understand the meaning of the variable: level of dissimilarity (lod) the highest difference in the ranks allotted to any of the 5 traits by the two countries.

2. India – China (lod 2 due to Ranking of N)  
India – Japan (lod 4 due to D)  
Lod cannot exceed 4, Hence answer is Option (b).
3. The lod's are:  
China – Japan 3(due to ranking of D)  
Thailand – Japan 4(due to ranking of D)  
Hence answer is Option (d).
4. Malaysia–China, China–Thailand and Thailand–Japan have lod 4.  
Hence answer is Option (d).
5. China—2, Japan—4, Malaysia and Thailand lod 3 each. Hence answer is Option (a).
6. A is sufficient by itself since 21 is an odd number and he can only reach the blue mark in an odd number of tosses. Hence Option (a) is the correct option.

7. Both statements are required.

From the first statement:

$$P + G + P < P + G + G$$

Hence  $P < G$ .

Further, from the second statement

$$P + O + O = O + G + G$$

i.e.  $P + O = 2G$ .

Since  $P < G$ ,  $O$  must be greater than  $G$ . Hence,  $O$  is costliest.

Hence, answer is Option (c).

8. From both statements together, we see that the topper gets 2 votes ( $2^{\text{nd}}$  highest and  $3^{\text{rd}}$  highest vote for him) while the  $2^{\text{nd}}$  placed candidate also gets 2 votes (highest and lowest vote for him.) The tie is resolved by the rule given. Hence answer is Option (c).

9. Both statements together are not sufficient since they don't give a unique solution.

10.   
From A,  $20\% \text{ of } Z > 25\% \text{ of } S - (1)$   
From B,  $10\% \text{ of } Z < 13\% \text{ of } S - (2)$   
i.e.  $20\% \text{ of } Z < 26\% \text{ of } S - (3)$

From 1 and 3 you can conclude that the ratio of  $Z$  to  $S$  is between 1.25 and 1.3. At both extremes of this range, Supriyo will spend more than Zakib. Hence Option (c) is the correct option.

11. A alone is not sufficient, since it gives us that Kumar was in the top 4 boys. If he was  $4^{\text{th}}$ , he will be above Rashmi, while if he was  $1^{\text{st}}$  or  $2^{\text{nd}}$  or  $3^{\text{rd}}$  he would be below Rashmi as there would be at least 3 girls above him in that case.

B alone is sufficient since we know from B, that the top two girls were in the top 5 and we also know that Kumar was 6th. This means that his sister cannot be ranked 6th or above. Thus, Statement B alone answers the question. Hence, the correct answer is option (a).

12. Only Lavanya, Rahul and Yamini are eligible to attend the workshop on communication skills. Hence, Option (a) is correct.

For doing this, eliminate the people who are not interested in CS and the people who are committed to internal projects in January.

13. There are a total 6 executives, out of which three can attend up to 2 workshops (Parul, Kalindi and Dinesh.) Hence, the required answer is 3. Hence, Option (b) is correct.

14. While solving the previous question, you would have identified that Gayatri and Urvashi cannot attend a single workshop. Hence, Option (b) is correct.
15. The required states are Haryana, Punjab, Maharashtra and Andhra Pradesh. Hence, the answer is 4, i.e. Option (b).
16. 400000 tonnes means 0.4 million tonnes. Hence, we are looking for a ratio of production to population greater than 0.4 in order to identify the states that need to be counted. As we move down the table, starting from Haryana, then excluding West Bengal all the other 7 states that are after West Bengal in the table have a ratio greater than 0.4. Hence, the correct answer is 8. Option (d) is correct.
17. Haryana and Punjab both show a productivity of 4.8 ( $19.2/4$  for Haryana and  $24/5$  for Punjab). Hence, option (a) is correct.

## Mock Test Paper 3

### 1–4.

For solving this question first of all you should write down all the costs (of each ingredient alongside the table)

1. Solve by options:

Option (a) gives us the carbohydrate percentage as—  $(\times 80 + 1 \times 10 + 3 \times 45)/6 = 305/6 < 60\%$ . Hence, this is not a valid mixture.

Similarly,

Option (b) gives us  $420/7 = 60\%$ , while Option (e) gives us a concentration of

$$(4 \times 80 + 1 \times 10 + 1 \times 45)/6 > 60\%.$$

Options (c) and (d) do not satisfy the 60% condition.

Also between the mixture created in Option (b) and the one created in Option (e), the mixture used in Option (e) is clearly cheaper since the proportion of P (which is the cheapest ingredient) is maximized and the other two are minimized. Hence, Option (e) is correct.

2. Option (a): O and P do not give us 30% of protein.

Option (b): R and S mixed 1:1 will not give us 30% carbohydrates.

Option (c): P and S mixed 1:1 will not give us 5% minerals

Option (d): Q and R mixed 1:1 will not give us 30% carbohydrates.

Option (e) satisfies all conditions and hence is the answer.

3. To ensure 10% minerals, we just have one possibility i.e. O and Q. Hence, option (a) is correct.
4. With Option (a) (P and Q) we cannot create 30% protein. With Option (b) (P and S) we cannot create 10% fat.

With Option (c) (P and R) we need a mixing ratio of 3 : 1 to get exactly 10% fat as required by the question. The cost per unit would become  $1550/4 = 387.5$ . With Option (d) (Q and S) the mixing ratio required is 1 : 4 to get exactly 10% fat as required by the question. The cost per unit would become  $600/5 = 120$ .

With Option (e) (R and S) the mixing ratio required is 1 : 3 to get exactly 10% fat as required by the question. The cost per unit would become  $800/4 = 200$ .

Hence, option (d) being the cheapest is the correct answer.

#### 5–8.

5. From the basic information we have that if 30% are males, 70% are females and 7% are female engineers. From Statement A we get (25–7) 18% are male engineers which gives us a unique answer to the question asked. Hence, A alone is sufficient. Similarly from Statement B too, we get a unique percentage for the number of male employees who have an engineering background.
6. Both statements together are also insufficient to answer the question because we cannot find for sure whether the match ends in a draw or Mahindra and Mahindra win.
7. Statement A is sufficient while B is not. Hence the answer is Option (a).
8. From Statement A and B as well as the information contained in the question itself, we get that the ranks in increasing order were: A,C,B,E,D. Hence, D gets the highest rank is a unique answer when we use both statements.

Hence, the answer is Option (d).

#### 9–12.

By observing the table we can make out that the following costs are variable: Material, Labour and Operating cost of Machines.

At the same time, the following costs are fixed:

Consumables, Rent of Building, Rates and Taxes, Repair and Maintenance expenses

And Selling and Marketing expenses.

Based on this we can make the following deductions:

9. Total cost for 1400 units =  $70000 + 28000 + 1400 \times 1200 + 400 \times 800 + 42000 \times 5800 = 149600$ .

Hence, the per unit cost =  $149600/14 = 107$ .

10. The total fixed costs for the company are:

$1400 \times 1200 + 400 \times 800 + 5800 = 9600$ , the selling price is 125 and the variable cost per unit is – 50 (for materials) + 20 (for labour) + 30 (for Operating cost of machines) = 100.

Hence, the margin per unit is Rs.25. Thus the number of units for avoiding any loss (i.e. Break Even Point) =  $9600/25 = 384$ . Hence, option (c) is correct.

11. In order to maximize profit it would have to produce and sell 2000 units.

12. Profit at 1400 units  $\rightarrow 125 \times 1400 - 107 \times 1400 = 18 \times 25200$  (an approximate value).

Profit at 1700 units will depend on fixed cost per unit at 1700 units. This would be 100 (variable cost per unit) +  $8600/1700$  (fixed cost per unit) = 105.06 (approximately). Hence, the profit at 1700 units would be  $120 \times 1700 - 105.06 \times 1700 = 14.94 \times 1700 = 25400$ .

Hence, Option (a) is correct.

## 13–16.

You will be able to make the following deductions.

|                   | Males (%)-<br>(Numbers) | Females-(%)-<br>(Numbers) | Vegetarians (%)-<br>(Numbers) | Non-vegetarians (% of that class)-<br>(Numbers) | Overall — (% of<br>total)-<br>(Numbers) |
|-------------------|-------------------------|---------------------------|-------------------------------|---|---|
| Class 12          | 60% – 48                | 40% – 32                  | 40% – 32                      | 60% – 48  | 10% – 80                                |
| Class 11          | 55% – 44                | 45% – 36                  | 50% – 40                      | 50% – 40  | 10% – 80                                |
| Secondary Section | 45% – 288               | 55% – 352                 | 55% – 352                     | 45% – 288                                       | 80% – 640                               |
| Total             | 47.5% – 380             | 52.5% – 420               | 53% – 424                     | 47% – 376                                       | 100% – 800                              |

**Note:** In the above table the values given in bold are calculated Figures while the ones in normal fonts are given directly.

Hence, the answers are.

13. (a)
14. This question was wrong since, 50% of the students cannot be male vegetarians as there are only 45% males in the secondary section.
15. (a)
16. If 25% of the vegetarians are male, it means that out of 32 vegetarians there are 8 male vegetarians and 24 female vegetarians. Also, there are 40 male non vegetarians in class 12. Hence, the correct answer is  $16(40 - 24)$ . Option (e).

## Mock Test Paper 4

**1–4.**

1. In 2003,

60 men + 40 women

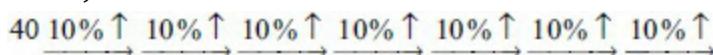
In 2010, men would go up by:



An increase of approximately 24.

**Note:** For a detailed description of how to handle this calculation quickly, please go through compound interest in my book Quantitative Aptitude for the CAT.

Also, 40 women would become



An increase of approximately 38.

Thus, net percentage increase would be 62 per cent approximately.

2. Visually this can be seen for 2008–09.

3. Growth rate in 2007 →

380 to 500 gives  $(120/500) \times 100 = 31\%$  approx.

Growth rate in 2005 →

180 to 270 gives  $(90/180) \times 100 = 50\%$

Percentage change from 50 to 31 =  $(19/50) \times 100 = 35$  per cent approx.

The closest value of the percentage change is 35 per cent.

4. The growth rate in 2007 (as seen for the previous question) is around 31 per cent

With this growth rate, the value of European subscription would be

approximately 650.

The actual prediction for 2008 is 600.

Thus, the closest option would be 50.

Option (a)

5–7.

5. According to data given in question, following conclusions can be made:
  - (a) Volume of data transfer in India = Volume of data transfer in Sweden.
  - (b) Revenue from data transfer as a percentage of total revenue of India is triple and double for Sweden.
  - (c) Total revenue of India is twice that of Sweden.

To calculate percentage change in ARDT of India as compared to Sweden, we have to equate per unit volume of data transfer for both countries which is equal.

Hence, let revenue of Sweden be  $x$  then revenue of India will be  $2x$ .

Now ARDT for Sweden from figure can be approximated to \$6,

$$\Rightarrow \text{revenue of data transfer} = (2 \times 18\% \text{ of } x)$$

$$\Rightarrow \text{volume} = (2 \times 18\% \text{ of } x) / 6$$

Similarly,

Now ARDT for India be  $y$ ,

$$\Rightarrow \text{revenue of data transfer} = (3 \times 9\% \text{ of } 2x)$$

$$\Rightarrow \text{volume} = (3 \times 9\% \text{ of } 2x) / y$$

Equating we get,

$$\Rightarrow (3 \times 9\% \text{ of } 2x) / y = (2 \times 18\% \text{ of } x) / 6$$

$$\Rightarrow y = \$9$$

$\Rightarrow$  Percentage change =  $((9 - 1)/1) \times 100\% = 800\%$ . Hence option (c) is correct.

6. For this question check the volume of data transfer for all pairs. For example,

For Austria,

- revenue from data transfer as a percentage of total revenue = 18%
- revenue from data transfer =  $(18 / 100) \times \text{Total revenue ARDT} = \$8$

- Revenue from data transfer =  $(18 / 100) \times (\text{Total revenue}/\$8)$   
Similarly check for Philippines.  
The only pair that will have equal volume will be UK and Spain.
7. The questions can be solved by calculating the ratio of total revenue of Singapore and India. This will give the result as Singapore's total revenue as four times the total revenue of India.

### 8–11.

- The respective values of consumption are approximately: 70, 90, 110, 110 and 125. The highest percentage growth can be seen between 70 to 90 which means that it is for the year 2007.  
Option (a) is correct.
- Taking approximate values for 2008, we have production = 240, consumption = 130 and per capita consumption = 40. Thus,  $110/40 = 2.75$  million. But there are two options close to 2.75 one on either side. So we need to take a call about thinking more closely about the numbers for production, consumption and per capita consumption. It can be seen that the bar for per capita consumption is lower than the 40 mark and hence the value of the ratio would be higher than 2.75. Thus, we select option (c) as the correct answer.
- The ratios are:  $110/70$ ,  $110/90$ ,  $130/110$  and  $120/100$ . The highest ratio is for 2006 – the first year. Option (a) is correct.
- Visual inspection shows us that the ratio of consumption/per capita consumption is highest for the year 2010 (it is around 3 for that year) and hence, the population would be the highest in that year. Option (d) is thus correct.

### 12–16.

- The percentage of time spent in school would be given by the percentage value of the ratio  $105/360$  which is closest to 30%. Hence, option (b) is correct.
- Games ( $30^\circ$ ) is exactly 25% of sleeping ( $120^\circ$ ). Thus, option (c) is correct.
- He would spend an extra  $15^\circ$  of his time in games and hence cut his sleeping time by  $15^\circ$  from  $120^\circ$ . This would mean a reduction of 12.5% of his time of sleep. Option (b) is correct.

- The difference is represented by  $60^\circ$  on the pie chart which means
- 15. effectively  $1/6^{\text{th}}$  of his total daily time. Since there are 24 hours in a day, this would mean a difference of 4 hours. Option (c) is correct.
  - 16. If he spends  $1/3$ rd of his home work time in mathematics it means an angle of  $15^\circ$  out of the  $45^\circ$  which represents his time spent on home work. Thus, time equivalent to  $30^\circ$  would be the answer to this question. This would be  $1/12^{\text{th}}$  of the daily time which would be 2 hours. Option (b) is correct.

## Mock Test Paper 5

### 1–3.

- 1. In 2003 the wheat production is 1.2 times the rice production and hence the wheat production would be  $4 \times 1.2 = 4.8$  lakh. Option (c) is correct.
- 2. The ratio wheat production to rice production is more than 1 in three years. Hence, Option (b) is correct i.e. Wheat production was greater than rice production in 3 years over the period.
- 3. The wheat production in 2001 would be  $0.4 \times 3$  lakh = 1.2 lakh tons and hence the total grain availability would be 4.2 lakh tons. The remaining would have to be imported. Thus, the import requirement is 0.8 lakh tons.

### 4–6.

- 4. The speed of the train at the start of the 3 hour period was 40 kmph and it was 70 kmph at the end of the 3 hour period. This means that there was a growth of 75% in the speed of the train in the 3 hour period. Option (c) is correct.
- 5. Looking at the values it is evident that they obey the expression  $40 + t/6$  where  $t$  is in minutes. Option (d) is correct.
- 6. After  $2\frac{1}{2}$  hours, the train's speed can be seen to be 65 kmph. Option (d) is correct.

### 7–10.

- 7. Option (c) is correct because both the statements X and Y can be seen to be true.

In the case of X, we can see that while managerial registrations have

increased from 19000 to 45000, technical registrations have grown from 61000 to 63000. Clearly, registrations of managerial candidates have grown more than that for technical candidates.

Similarly Y is also true because the overall growth in registrations is from 80000 to 108000 (we have taken approximate values here) which is clearly over 25%.

8. Statement X is true as the percentage of drop-outs in 2004 can be estimated as the % reduction from 192 to 153—a reduction of 39 on a base value of 192 which means approximately 20%. In 2005, this drop is only from 452 to 407—approximately 10%. Thus, the percentage drop-outs have reduced in 2005 from 2004.

Statement Y is not true because the percentage of drop-outs was only about 5% for technical candidates while it was seen as around 10% for managerial candidates. Thus, the percentage drop-out for technical candidates was lower and not higher than the percentage drop-out for managerial candidates in 2005.

Hence, since only Statement X is true, we choose option (a).

9. Statement X is false as 399 out of 40763 is lower than 637 out of 60133.

Statement Y is true as 399 out of 40763 is a higher rate of success than 138 out of 15389.

Thus, option (b) is the correct answer.

10. 181 out of 59981 is lower than 48 out of 15389. Thus, statement X is false.

Similarly Statement Y is also false as 181 out of 684 is a lower success rate than 48 out of 138.

## 11–13.

11. Clearly Wipro on NQE has shown the highest percentage increase. Option (c) is correct.
12. If he buys Wipro on BSE @ ₹ 60 and sells Wipro on NQE, he would be selling effectively at  $6.5 \times 11 = 71.5$ , a profit percentage of close to 20%. Option (c) is correct.
13. The total purchase would be 1.5 lakh shares and hence the purchase

would be 75000 shares at 232 and 75000 shares at 247. Total cost would be  $75000 \times 232 + 75000 \times 247$ , which in million terms can be taken as:  $7.5 \times 2.32 + 7.5 \times 2.47$  which is close to 36 million.

#### 14–17.

14. The total monthly salary expense for Administration would be given by  $0.22 \times 18000 \times 12000 = 3960 \times 12000 = 4.7$  crore. Thus, the annual cost would be  $4.7 \times 12 = 57$  crore. Option (a) is correct.
15. The number of employees in Sales and Marketing was 18% of 18000 = 3240 in 2005 while it was 20% of 20000 which is equal to 4000. From 3240 to 4000 it represents a 23.45% increase. Option (c) is correct.
16. For Administration, the variation is from 3960 to 4800.  
For Operations the variation is from 4140 to 5200  
For Sales and Marketing the variation is from 3240 to 4000  
For Finance and Accounts the variation is from 5220 to 4000  
For Corporate HQ the variation is from 1440 to 2000.  
The maximum variation in strength is for Finance and Accounts. Hence, Option (c) is correct.
17. The number of joinees would be given by:  $5200 - (4140 - 300) = 1360$ . Option (c) is correct.
18. The two totals are not matching because they need not be equal. Option (c) is correct.

## Mock Test Paper 6

#### 1–2.

1. Monitoring Engineering (31%), Materials (21%), CIS (19%) and Services (10%) would account for over 80% of the group sales while using the minimum number of sectors.  
Option (c) is correct.
2. Using the technique of alligation, we know that the average profit for CIS and engineering would be 15.04% based on the thought given below:

|             |       |            |
|-------------|-------|------------|
| 12% profit  |       | 20% profit |
| Engineering | 31:19 | CIS        |

$$\text{weighted average} = 12 + 19 \times 8/50 = 15.04\%$$

Further, since CIS and Engineering account for exactly 50% of the sales, the remaining 50% sales comes from the other sectors. Thus the required answer would be got by using the alligation process to the situation below:

| Weighted average  |     |            |
|-------------------|-----|------------|
| ??                | 10% | 15.04%     |
| Remaining sectors |     | CIS & Engg |
|                   | 1:1 |            |

The profit margin in the remaining sectors should be 4.96% using a 1:1 ratio.

### 3-8.

3. From the last column of the first table we can clearly see that Marine products @ 23.2% are the single largest contributor to India's agricultural exports. Thus, out of a total export of 6 billion @ 23.2% they would account for an export value of 1.39 billion \$. Option (c) is correct.
4. The strongest growth in exports is for processed fruits and vegetables which has shown the highest percentage growth of the export value. Option (c) is correct.
5. From the last column of the second table we can see that cashew nuts account for 11.3% of the total imports and are hence the dominant import commodity after vegetable oils in 2000–2001. Hence, Option (c) is correct.
6. It is evident that the import requirements for these two commodities have gone down. However, we cannot say whether this has occurred due to an increase in production or due to a decrease in internal demand. Thus, we can reject options (a) and (b)— as these conclusions cannot be drawn.

The only valid conclusion is the one given in option (c)— i.e. the gap between India's production and requirement of these commodities has gone down.

Hence, option (c) is correct.

7. Clearly, since the overall agricultural imports have declined over the given period we can conclude that the concerns were not justified. Option (b) is correct.
8. The statements in Options (a), (b) and (c) make no practical sense. The only valid suggestion is for the country to work on enhancing exports and reducing imports— because in general such a strategy would help the trade balance of the country.

### 9–12.

9. Since 2400 represents the number of viewers who watched 1 or more than 1 movie a week in City C, we can say that this value would be equal to 15% of the City C viewers (as 85% of the viewers in this city watch less than a movie a week— as seen from the second column in the table).

Thus, the number of viewers in City C who watched less than a movie a week would be given by:

$$2400 \times 85/15 = 13600.$$

9. Since 2400 represents the number of viewers who watched 1 or more than 1 movie a week in City C, we can say that this value would be equal to 15% of the City C viewers (as 85% of the viewers in this city watch less than a movie a week— as seen from the second column in the table).
10. Using calculation similar to the previous question, (we get the table given below). It can be seen that the highest number of viewers who watched less than 1 movie a week were from City E— and this value would be 24000. Option (a) is correct.

### 11.

| City | % of Viewers Who Watch Less than 1 Movie a Week | % of Viewers Who Watch 1 or >1 Movie per Week | Number of Viewers Who Watch 1 or >1 Movie per Week | Number of Viewers Who Watch Less than 1 Movie a Week | Total Number of Movie Goers |
|------|---|---|--|--|-----------------------------|
| A    | 60  | 40  | 2400   | 3600   | 6000                        |
| B    | 20  | 80  | 3000   | 750  | 3750                        |
| C    | 85  | 15  | 2400   | 13600  | 16000                       |
| D    | 55  | 45  | 2700   | 3300   | 6000                        |
| E    | 75  | 25  | 8000   | 24000  | 32000                       |

In the above table the third column (% of Viewers Who Watch 1 or >1 Movie Per Week) is derived by 100—the value from the second column. Also, the calculation for the 5th column (Number of Viewers Who Watch Less than 1 Movie a Week) is based on unitary method as follows:

$$\text{For city A: } 60 \times 2400/40 = 3600.$$

It can be seen from the above table, that the second lowest value of the

total number of movie goers is for City D. Option (b) is correct.

12. The sum of the 5<sup>th</sup> column in the table for the previous question would give us the answer for this question. This sum =  $3600 + 750 + 13600 + 3300 + 24000 = 45250$ . Option (d) is correct.
13. A mixture as sweet as maltose should have a sweetness of 0.32. Mixing lactose (0.16) and glucose (0.74) in the ratio 21 : 8 would give us a mixture containing sweetness of 0.32.  
Option (a) is correct.

#### 14–17.

14. Option (d) is the correct option and it can be directly inferred from the bar chart in the figure that Hybrid Micro circuits would have the least reliability.
15. Since signal devices have a failure rate of 16%, we are looking for something which has a failure rate of 25% more than signal devices. In other words we are looking at the component which has a failure rate of 20%. It can be seen from the bar chart that Capacitors is the correct answer. Hence, we choose Option (b).
16. The lowest priority in fresh investment plans should be for the most reliable components. Since picture tubes and signal devices have the most reliability, they should be placed on the lowest priority for fresh investment. Option (c) is correct.
17. Integrated circuit boards have a failure rate of 30 per thousand which translates to 3%. Thus, for an equipment using 400 of these, we need to keep 3% spare.  $3\% \text{ of } 400 = 12$ . Thus, we should keep a total of 12 integrated circuit boards as spare.  
By the same logic, for capacitors we need 2% spares, for 240 we need a back-up of 4.8 capacitors, which gets rounded off to 5 capacitors. Option (b) can be selected at this point as the correct answer.

### Mock Test Paper 7

1. The lowest ratio is for Chola Freedom Inc ST (approximately 100/16 → 6. No other fund comes close for minimum. Hence, option (d) is correct.
2. Obviously, the comparison is between HDFC STP and Pru ICICI STP.

Amongst them, HDFC STP is  $1335/10.5$ , which would be between 120 to 130, while for Pru ICICI STP it would be above 130.

3.  $100.04 \text{ crore}/16.64 = 6 \text{ crore}$  (approx). Hence, option (b) is correct.
4.  $\frac{\text{Fund size}}{\text{NAV}} > 80$ . Check the ratio for each fund.

**Note:** Take the number from the NAV, multiply it roughly by 80 and check if the outcome is below the fund size. If so, then that fund has to be counted. We can see 4 funds satisfying this in the table. Hence, option (b) is correct.

5.  $850/1400 = 61\%$  (approximately). Notice here that the values of the options are so far away from the answer that you do not need to estimate an exact value for the numerator here.
6.  $250/660$ . Again note that no other option is in contention for being the correct answer apart from option (b).
7. The proportion of high income economies in the industrial workforce is seen to be less than 20%. Hence, (iii) is not true. The other statements can be seen to be true. Hence, option (b) is correct.
8. Both (b) and (c) are true.
9. India's GDP =  $(33.47 \times 100)/7 = 478.14$  billion  
Malaysia's GDP =  $(50.5 \times 100)/53.10 = 95.10$  billion  
Hence, 5:1.
10. Data insufficient to determine salary income.
11. No. of EPF members:  
Malaysia =  $50.5/4886.60$  billion  
India =  $33.47/1242$  billion  
Hence, Malaysia is lower.
12. Only (ii) is true. Statement (i) is not true since the real inflation rate is higher in Malaysia.  
Statement (iii) is not true since the time periods shown are different and hence no comparison can be made.
13. The total tax incidence would be: 10% of amount between 50000 to 60000 = 1000; 20% of amount between 60000 to 150000 = 18000 and 30% of amount between 150000 to 240000 = 27000. Required percentage =  $27000/46000 = 59\%$  (approx). Hence, option (b) is correct.

14. Net income =  $170000 + 30000 = 200000$ .

$$\text{Tax} = 1000 + 18000 + 15000 = 34000$$

However, data about savings & sex is unavailable.

Hence cannot be answered.

15.  $\frac{(45000 \times 1.05 + 1000 - 9000 - 5000)}{12} = 2854.166$

16.  $240000 - 60000 - 32000 = 148000$ .

**Note:** Her total tax is  $46000 - 9000 - 5000 = 32000$ , which will also be her TDS amount during the year.

## Mock Test Paper 8

1. There are exactly four organic and two inorganic chemicals for which the production has fallen. So, the required answer is 2:1.
2. The percentage increase in Ethylene Glycol is from 327 to 454 (considering only the first three digits of the numbers) - a growth of close to 40%. None of the other chemicals in the options is close to this percentage growth. Hence, the correct answer is Ethylene Glycol. Option (b) is correct.
3. Formaldehyde, acetone, acetic acid, phthalic anhydride and phenol are not highly volatile.
4. There are five organic chemicals whose percentage change in production is greater than 5%. There are also five inorganic chemicals whose percentage change in production is less than 5%. Hence, the answer is 5:5 = 1:1. Option (a) is correct.
5. We cannot determine the answer to this question, as we do not have any idea of the value of the chemicals.
6. The highest percentage change in value of raw materials used is shown either in printing inks or in dental hygiene products. The comparison is  $(553-432)/432$  against  $(2853-2249)/2249$  i.e.,  $121/432$  against  $604/2249$ . It can be seen that for Printing inks, the percentage is higher. Hence, option (a) is correct.
7. Since we don't know the composition of the relative usage of different raw materials in the user industries we cannot comment on the total use of raw materials nor can we make any conclusion about the

absolute change of the value of the total raw materials consumed.

8. Again in this question, we have no idea of the price per tonne of any chemical and hence we cannot determine the answer.
9. Birla Sunlife stand alone Term insures life upto 70 years. Hence, 20 years.
10. ICICI Prudential charges the least premium. Hence, is the best.
11. There are 3 insurers who allow 6 year terms. However, out of these, only one option allows entry after 50 years viz: HDFC. Hence, option (a) is correct.
12. There are 8 possible areas:  
Kalakaji, Gurgaon (A), Noida (A), and all 5 areas in Bangalore where a flat of 20–25 lacs can be bought.
13. His budget would become ₹ 1 crore.  
Jor Bagh, Cuffe Parade and Malabar Hill might still cost above the budget.
14. The highest possible rent per square feet would be for Malabar Hill, where a 1000 sq ft apartment could rent for 150000, which means the per square feet rate is 150. The lowest possible rate is 4 Rs/sq ft in Kalkaji. Hence, the required answer is  $150/4 = 37.5$ . Hence, option (c) is correct.
15. Malabar Hill, Breach Candy at 150 per sq ft. has the highest rate.
16. The per sq. ft rate was ₹ 2400. There are 6 areas where this is possible.

## Mock Test Paper 9

1. The highest percentage change is for Imports. Hence, option (a) is correct.
2. As the CAGR is successfully applied, the values of both imports and exports keep increasing. The higher the value, the higher will be the effect of the CAGR. Further, the value of the deficit increase also depends on the relative values of the percentage increase in imports and exports for the year being considered. The higher the positive difference in between import percentage change and export percentage change, the higher will be the change in the deficit. In this case, both these factors favour 1999–2000 to be the maximum change in trade

deficit. Hence, 1999–2000 is the answer.

3. Imports and exports both have a greater than 50% growth even if simple annual growth rate was considered. You will need to check closely for GDP at factor cost and industrial production index. Of these industrial production index has grown by over 50%, while GDP at factor cost has not. Hence, option (b) is correct.
4. Obviously, only imports and exports would have grown by 50% +.
5. The answer will be given by:

$$\frac{1.8 \times 1.089 \times 1.104 \times 1.102}{1 \times 1.082 \times 1.09 \times 1.087} = 1.86$$

6. Visual inspection shows that the comparison is between December 2000 and March 2000, i.e. 285/1850 vs 281/1842. December 2000 is lower.
7. For least percentage change we look for least change and highest base value. Note here that December 2000 has to be ignored since it is an incomplete year. March 2000 is the correct answer as it's percentage change is least.
8. The number of spindles per mill as well as number of looms per mill has gradually declined over the period. Hence both (i) and (ii) are correct.
9. The percentage change will have the highest weightage when it comes from a change in number of spindles and the number of rotors. For both of these, the percentage change is the highest during the period ended March 1995.

### 10–13. Respective Contribution.

IMF \$ 11.2 Billion

WB \$ 6 Billion.

Japanese govt. \$ 5.4 Billion.

10. None of the three statements is true.
11. WB would have to pay \$ 2.7 Billion more. This amounts to 45% of it's commitment. Both (i) and (iii) are true.
12. Japan paid 5.4 billion out of 22.6 billion. So it did not pay 17.2 billion. Since, 17.2/5.4 is between 3 and 3.2, option (a) is correct.
13. In such a situation, the World Bank and Japan would each pay 5.7

billion. This would reduce the World Bank's payment by 5%. Option (a) is correct.

14. Visual inspection shows western province.
15. The highest percentage change is seen in Eastern province in Kalandu.
16. Luanda  $14/271 = 5\%$  approx.
17. Visual inspection show us 4 markets viz: Kalandu, Kiambu, Kandara and Kitale.

## Mock Test Paper 10

1. Nylon filament yarn and tyre cord for the entire period.
2. Do not confuse products with product categories. Hence, although polymers and synthetic fibres both show a greater than 80% capacity utilisation, they are not to be counted. There are seven such products, that have shown 80% plus value of capacity utilisation for the entire preiod.
3. Look at the following values to be added: 1114 for polymers, 32 for synthetic fibres and 39 for elastomers (All capacities are in kt).
4. The only product category that exhibits this amongst the four is polymers.
5. Six items out of 26 have shown a decrease in value.
6. Misc. Transactions shows the highest percentage decrease. Option (c) is correct.
7. Excess has grown by over 100% and no other category shows such a high percentage increase. Hence, option (b) is correct.
8.  $430666/4585$ , i.e., Passenger kms/Passengers = 95.7 (approx.)
9. Visual inspection will show that it occurs between 1994–95 and 1995–96. The value will be given by:  $\frac{(675 - 436) \times 100}{436}$   
i.e., the percentage equivalent of  $239/436$ .

**Note:** Negative surplus means deficit.

10. The overall fiscal performance is measured through surplus/deficit without subsidy. 1992–93 is the only year when there is a drop in deficit.
11. Visual inspection will show that this occurs between 1994–95 and

1995–96.

Calculate:  $\frac{(814 - 548) \times 100}{548}$

i.e., the percentage equivalent of the ratio  $266/548 = 48.5\%$  (approximately)

12.  $\frac{\text{Subsidy for last four years}}{\text{Total subsidy over the period}} = 38223/54847 = 69.7\%$  (approximately)
13. It can be seen to be occurring for Canara Bank. Hence, option (c) is correct.
14. We cannot determine this since the values are given for different years for ICICI Bank and the other banks. Hence, option (d) is correct.
15. Base Price =  $3.2/n$   
 $n = 5.22/26.1 = 0.2$  crores.  
 $\therefore$  Base price = 16 ₹.  
 $\therefore$  Premium =  $840 - 16 = 824$ .
16. Compare:  $470/11.33$ ,  $280/16.1$ ,  $77/0.32$  and  $445/13.58$ . Canara Bank's  $77/0.32$  is the highest ratio. Hence, option (c) is correct.

## Mock Test Paper 11

1. Visual inspection gives us wheat as the correct option. Option (d) is correct.
2. The highest percentage is around 37% in 1999–2000. Hence, option (c) is correct.
3. Statements (i), (iii) and (iv) can be verified to be true.
4. It can be verified visually that 1996–97 is the best year in terms of growth for all the four food grain categories.
5. No. 7 rank in 1993–94 will go to Karnataka as it has the 7th lowest poverty percentage (or 8th highest).

**Note:** Lower the poverty percentage, the better it is.

6. Orissa has the highest overall cumulative poverty rating,  $14 + 14 + 13 + 14$  if you have ranked from lowest to highest. On the other hand if you have ranked highest poverty as 1, you can do:  $(15 - 1) + (15 - 1) + (15 - 2) + (15 - 1)$ . Understand this clearly as it is used very often.
7. The populations of the states are unknown. Hence, cannot be

determined.

8. Bihar is dominated by all except Orissa, West Bengal and of course itself. Hence, 11 states and the answer is option (a).
9. There are 7 such states. Option (d) is correct.
10. The overall growth of GDP (national accounts) is greater than the growth of GSDP of 14 states. Hence, option (b) is correct.
11. The above ratio for years 1980–81 to 1990–91 is the least for Tamil Nadu.

**Note:** Develop the skill for visual comparison.

12. Assume GSDP of 14 states to be 100 in 1980. Increase it using compounded growth rate of 5.24% for 11 years. Then increase it consecutively by using 5.90% for 8 years (compounded). Repeat the same process by using 3.03% and 4.02% over 11 years and 8 years respectively. Then divide the final value of GSDP and per capita GSDP to get the total population growth over 19 years. Now, estimate the compound annual growth rate (CAGR) value that can be substituted for the percentage growth over 19 years. This will give the answer.

Needless to say, such a question cannot be and should not be attempted in the exam.

13. The highest percentage dilution is for ICICI Bank (100%).
14. There are 11 such companies. Option (c) is correct.
15. The correct order is (ii), (i), (v), (iv), (iii). Option (d) is correct.
16. The market value/the value at which the equity stake was divested is not available. Neither is the data about the number of shares divested by each company available. Hence, it cannot be determined.

## Mock Test Paper 12

- 1–3.** Expectation is given by the summation of (return  $\times$  probability of return).

Thus, expectation from fund A is:

$$0.2 \times (-5) + 0.3 \times 10 + 0.4 \times 25 + 0.1 \times 35 = 15.5\%$$

Similarly, Expectation from Fund B = 14%

Expectation from Fund C = 12.5%

1. Hence, invest in A.
2. 100 crore invested in B will yield 14%, i.e., 14 crore
3.  $0.5 \times 15.5 + 0.3 \times 14 + 0.2 \times 12.5 = 14.45$   
Also  $14.45\% > 0.5 \times 14 + 0.5 \times 12.5$   
Hence both (a) and (b)
4. Maximum expectation of Kaku will be from fund A =  $0.25 \times (-5) + 0.25 \times 10 + 0.3 \times 25 + 0.2 \times 35 = 15.75\%$   
Hence, the required answer will be given by the percentage equivalent of the ratio  $\frac{15.75 - 15.5}{15.5} = 1.6\%$  (approx)
5. Fund C has the highest percentage difference
6. (iii) and (iv) are true while nothing can be said about either (i) or (ii).
7. The resultant answer will be:  
$$\begin{aligned} &\text{₹}(14.875 - 14.45) \text{ crore} \\ &= 0.425 \text{ crore} = \text{₹} 4.25 \text{ million.} \end{aligned}$$

**Note:** For this answer, you need to calculate the expected return for Kaku, in exactly the same way as was calculated for Cheeku.

- 8–11.** Assume the total production of the first year as 10000, second year becomes 12000, third year 14400 and fourth year 17280. Then  $0.2 \times 17280 - 0.2 \times 12000 = 1056$ . But this difference is given as 2640. Hence, the values of production will be; 25000, 30000, 36000 and 43200 respectively for the 4 years.
8.  $125 \times 0.4 \times 30000 = 15$  Lakhs. Hence, option (a) is correct.
  9.  $0.2 \times 25000 : 0.2 \times 30000 : 0.2 \times 36000 : 0.2 \times 43200$ . None of the ratios in the first three options matches this. Hence, option (d) is correct.
  10.  $2 \times 3 : 4 \times 5 : 2 \times 7 : 2 \times 8 = 6 : 20 : 14 : 16 = 3 : 10 : 7 : 8$ . Hence, option (d) is correct.
  11. Statement (c) is not true, since both A and B have not shown an increasing trend.
  12. The closing value of the debt based mutual funds at the end of the year 2015 will be given by: Starting value + Return for the year – Withdrawal for the year. This value comes to 772,300 at the end of the

year 2015. However, the starting value of 2016 is 2,572,300. This means that there must be an increment of 1,800,000 at the end of the year 2015. This represents a 180% value of the initial investment. Hence, Option (b) is correct.

13. The total amount invested is  $1,000,000 + 600,000$  (Start of 2014 in debt based + equity based funds) +  $1,800,000$  (start of 2016 in debt based funds) +  $200,000 + 200,000$  (start of 2017 and 2018 respectively in debt based mutual funds). Hence, the required answer will be the percentage equivalent of the ratio  $10/38 = 26.31\%$ .
14. Portfolio means the net value of the debt based mutual funds + the value of the equity holdings. The maximum percentage growth in this value is clearly for 2016 from 2015.
15. If I is receiving 10 A then H will also receive 10 A. Hence, substation R will receive 25A and substation Q will also receive 25 A. The 25 A that Q receives will be distributed equally into A, D and G—8.33 A each. With a 10% loss for 1 km, A would receive 7.5 A.
16. For C to receive 10 A, B should send 11.11 A to C. If C receives 10 A, B will have received 22.22 A (since B will retain half and send forward half the electricity it receives). That means A should send 24.7 A to B (approx.). Thus A receives  $(24.7 \times 2) = 49.4$  A. Thus Sub station Q sends 55 A to A. So Q must have received  $55 \times 3 = 165$  A. Hence, P must have produced 330 A.
17. R must be sending 40 A to H. Thus, R receives 80 A and so will Q. Q will send forward towards G  $80 A/3 = 26.66A$ . 10% of this will be lost on the way and G will receive 24 A.
18. If E receives 37, D must be sending 40 A each to E and F. Since D will retain half the current it gets, this means that D must be getting 160 A. Since D and G are identical, G must be receiving 160 A. Hence, the ratio E to G will be 37:160.

## Mock Test Paper 13

1. The profit will be got by: percentage profit  $\times$  sales.

Since sales have been given as a percentage (in terms of market share) and since we do not need to find out the individual values we need to make no adjustments and can directly multiply the profit before tax

(given as a percentage of the sale value) by the market share. The highest multiplication for the options given will give the answer.

GACL is clearly the highest profit value.

2. Look for maximum value of the multiplication of advertising by market share. ACC has the highest value.
3. If sales is worth Rs100, 1/6 will go to L&T of which the profits will be worth 8.67%. Similarly for ICL. Hence, the calculation  $8.67\% \text{ of } 6 + 9.94\% \text{ of } 4$  will yield the answer. The value is 0.9178.
4. Profit before tax per rupee of sale has risen by 10%. Thus, this value will become:  $9.94 \times 1.1 = 10.93$ .

Thus, the total cost would be:  $89.07 = \text{Fixed expenses} + \text{Variable expenses}$ .

Also, fixed expenses have become 10%, hence variable expenses should be 79.07%  $\rightarrow$  a rise of 13.58 on 65.49 = 20.73% increase

5. The answer will be given by the ratio of the number of students failed to the number of students passed =  $182/861 = 21\%$  (approximately). Hence, option (d) is correct.
6. The best performance is visibly in 2001.
7. Out of 22 students who retook the exam, 11 must have failed and 11 passed. Hence, without these repeaters, the ratio would have been 65:10, i.e., 86.66% would have passed.
8. 13 students failed in 1994. These students passed in 1995 but they were not counted amongst the successful students of the school. If they had been, the number of successful students would have gone up by 13 —hence, the score of the school would have been  $38 + 13 = 51$ . Hence, option (d) is correct.

**9–13.** Create the following table:

|     | Sales | Expenses | Profits. |
|-----|-------|----------|----------|
| AZ  | 50    | 45       | 5        |
| BMZ | 60    | 48       | 12       |
| CW  | 60    | 50       | 10       |
| DT  | 30    | 20       | 10       |

9. CW. Option (c) is correct.
10. BMZ. Option (b) is correct.
11. The profits of AZ would be equal to 10, while its sales would go up to

- 56.25 (after a 12.5% increase). Hence, the percentage profit would be  $10/56.25 = 17.77\%$ . Option (c) is correct.
12. The profit percent of BMZ would be given as  $10/60=16.66\%$ , while for DT it would be given by  $12/30 = 40\%$ .  
The required ratio =  $16.66:40 = 5:12$ . Option (b) is correct.
13. 12:5 can be seen from the table. Option (a) is correct.
14. His travel would have been:  
 $20 + 45 + 55 + 65 + 65 + 60 + 60 = 370$ . Hence the time taken will be over 7 hours. Hence (d)
15.  $\frac{[\text{Distance travelled in first 5 hours} - \text{Distance in last 5 hours}]}{5}$
16. Solve the question in a way which is similar to the previous 3 questions.

## Mock Test Paper 14

1. The maximum return structure on investing \$50,000 will be if he breaks up the investment into 20,000,10,000 and 20,000 respectively on each of crops, dairy and poultry. The return will be 26,000,14,000 and 27,500 respectively and equal 67,500\$ a return of 35% on 50,000.
2. The highest possible profit percentage will be for an investment of \$10,000 in poultry which will give him a return of 50%.
3. Compare the four alternatives given. Obviously, equal amounts in each of the three ventures will give him the maximum returns.
4. He should invest \$40,000 in crops + \$20,000 in dairy + \$20,000 in poultry. After this in each of these categories the return is 10% or \$11,000 on an investment of \$ 10,000.
5. The return on investment on poultry after 20,000 is 11,000 for the next 10,000.
6. The monthly costs are: 7 lakh + 5 lakh + 15 lakh + 3 lakh (monthly interest) = 30 lakh.
7. The data is insufficient since we do not know how many slots will be sold and how many will remain unsold.
8. Obviously, since monthly costs are constant, the maximum revenues will be in months with the maximum number of days and the

maximum Sundays. Both March and August have 31 days and 5 Sundays.

9. The total revenues for April will be 122.4 lakh against an investment of 30 lakh. Hence profit percentage will be  $92.4/30 = 308\%$ .
10. 4:10:4:5. Options (b) and (c) cannot be the answer since the two basic relationships are that the two 7–9 slots would give equal revenues and the ratio of 9–7 day to 9–7 night will be 2:1. Investigate the relationship between the value of 7–9 and 9–7 periods and get (a) as the answer.
11. The rate for *pravachan* is 200 ₹ per minute (₹ 5000 for 25 minutes) while the rate for advertisements is ₹ 1000 per minute in the time slot 9 –2 (off prime time). Hence, the required ratio is 5:1. Option (b) is correct.
12. The faster train takes 4 hours to travel 288 km, while the slower train takes 4 hours and 5 minutes.
13. Visual inspection shows X to A.
14. Data is not available to answer this question.
15. Obviously X to A

## Mock Test Paper 15

1. Look at the ratio of the rental values to the purchase price. This can be done since the investment is directly proportional to the purchase price and the annual return is directly proportional to the rental values per month.
2. Calculations will show that there is a possibility for purchasing property in seven locations.
3. The costs will be: 5 lakh interest loss (for not keeping 1 crore in bank) + 15 lakh interest cost for loan = 20 lakh.  
Revenues =  $175,000 \times 12 = 21$  lakh. Hence, profit is ₹ 100,000.
4. The monthly percentage return of 1.25% means a return of 15% per annum. Calculate the investment in each location and each category and find the percentage return of each category.  
For example, the investment in West End A is 2.5 crore. The required return of 15% per annum means a rent value of 37.5 lakh. However,

the rental value is only 21 lakh per year. Hence, West End A is not to be counted. Similarly calculate for all other locations.

**5–10.** You will have to follow the completion of materials in each work centre in each half hour. Based on the completion of the units in A, the availability of the raw material in B will be defined. Similarly, for other work centres.

Thus from 9 to 9:30, A will complete 2 units but will only transfer 1 unit to B since there is only 1 unit capacity available in B.

Complete the following table to get all answers.

| Time  | A                |               | B   |          | C   |          | D   |          | E   |           | Output |
|-------|------------------|---------------|-----|----------|-----|----------|-----|----------|-----|-----------|--------|
|       | Capacity & comp. | Retained In A | Cap | Ret in B | Cap | Ret in C | Cap | Ret in B | Cap | To Output |        |
| 9     | 2                | 2             | 6   |          |     |          |     |          |     |           |        |
| 9:30  | 6                | 6             | 1   | 1        |     |          |     |          |     |           |        |
| 10:00 | 4                | 4             | 2   | 5        |     |          |     |          |     |           |        |
| 10:30 | 2                | 2             | 4   | 2        |     |          |     |          |     |           |        |
| 11:00 | 5                | 5             | 1   | 5        |     |          |     |          |     |           |        |
| 11:30 | 3                | 3             | 2   | 4        |     |          |     |          |     |           |        |
| 12:00 | 6                | 6             | 0   | 6        |     |          |     |          |     |           |        |
| 12:30 | 4                | 4             | 3   | 3        |     |          |     |          |     |           |        |
| 13:00 | 5                | 5             | 4   | 3        |     |          |     |          |     |           |        |
| 13:30 | 2                | 2             | 4   | 5        |     |          |     |          |     |           |        |
| 14:00 | 2                |               | 5   |          |     |          |     |          |     |           |        |
| 14:30 | 6                |               | 3   |          |     |          |     |          |     |           |        |
| 15:00 | 5                |               | 1   |          |     |          |     |          |     |           |        |
| 15:30 | 2                |               | 6   |          |     |          |     |          |     |           |        |
| 16:00 | 4                |               | 2   |          |     |          |     |          |     |           |        |
| 16:30 | 1                |               | 2   |          |     |          |     |          |     |           |        |
| 17:00 | 2                |               | 3   |          |     |          |     |          |     |           |        |

5. Total number of units completed by work centre E.
6. (6)
7. The first ten units that are started after 10 will get completed by 14:30.
8. Add the total output by 11:30 ( $1 + 1 + 4 + 2 + 3$ ).
9. On completing the above table you will see that there is a lack of complete supply to D between the time periods mentioned.
13. No data is available for 1999. Hence, cannot be answered.

#### **14–16.**

We can make the following table from the given information.

| Year | Revenues | Cost  | Profit |
|------|----------|-------|--------|
| 2000 | 25000    | 20000 | 5000   |
| 2001 | 30000    | 25000 | 5000   |
| 2002 | 37500    | 30000 | 7500   |
| 2003 | 45000    | 37500 | 7500   |

The answers can be read off the table:

14. The increase in profit is maximum for 2002. Option (c) is correct.
15. We can see that the cost is 5/6th of revenues or 83.33% for both 2001 and 2003. Hence, option (d) is correct.
16. Option (a) can be seen to be true and is the correct answer.
17. No comments can be made about the profits. Hence, (d) is the correct option.

## Mock Test Paper 16

1. The percentage drop is approximately three per cent.
2. Productivity has grown by over 30% while the other mentioned variables have shown a less than 30% change.
3. Both workforce and production have dropped.
4. The rewards of education have to be judged in each of the three given levels of education for each of the sexes. The maximum rewards vary between (b) and (c). Hence, the answer is (d).
5. Cannot be determined since we have no information of values of earnings for any category for any country.
6. Thailand's workers have the highest percentage increment due to primary education for both the sexes. Hence, the required answer is Thailand.
7. The required average would be a weighted average. We only know the ratio, hence we cannot answer the question.
8. Australia and Britain are the only countries exhibiting the same trend.
9. The answer will be the weighted average of the percentage increase. Since, original values are unknown, this cannot be solved.
10. Either corporate bonds or 10 year govt. bonds give the highest interest rates.
11. This is visible in the case of Japan.

12. Visually, Switzerland.
13. Lovells UK and Allen & Overy UK are very close to each other in this respect—Lovells being marginally higher than Allen & Overy (1% calculation range needed).
14. Clearly Lovells UK from 10 to 26.
15. Allen& Overy, Skadden, Jones Day and Lovells meet the condition.
16. There is approximately a 51% growth in the number of offices over all. This is exceeded by five law firms.

## Mock Test Paper 17

**1–10.** The following table details the data:

|          | <i>Development cost</i> | <i>Salaries</i> | <i>Research</i> | <i>Patent</i> | <i>Overheads</i> |
|----------|-------------------------|-----------------|-----------------|---------------|------------------|
| Alphonso | 750000                  | 210000          | 292500          | 30000         | 217500           |
| Superior |                         |                 |                 |               |                  |
| Langda   | 250000                  | 70000           | 97500           | 30000         | 52500            |
| Inferior |                         |                 |                 |               |                  |

1. Read directly from the table.
2.  $30000/750000 = 4\%$
3. 217500 from the table.
4.  $0.35 \times 150000 \times 7500 + 0.25 \times 250000 \times 2500$   
 $= 393750000 + 156250000 = 550000000 = 5.50000 = 5.5$  lakh (\$000s)
5.  $4$  lakh  $\times 1.25 = 5$  lakh
6.  $2.1$  lakh  $\times 1.4 = 2.94$  lakh  $= 294$  (\$000s)
7.  $243 \times 20 = 4860$  thousand.
8.  $4$  lakh  $\times 1.5 = 6$  lakh
9. 
$$\frac{0.65 \times 30000 \times 100}{(250000 - 0.35 \times 30000)} = 8.14\%$$
10.  $0.25 \times 292500 = 73125$
11. India and Sri Lanka are on the development frontier.
12. India, Pakistan and Sri Lanka.
13. Alligation usage will give us a ratio of 2:5. Hence, 28.56%. This is because, if we look at the colleges coverage, we see that the percentage of population covered is 43% for rural, while it is 36% for urban. At the same time the overall country's college coverage is 38%

for Ghana. 36 & 43 giving a weighted average of 38, would mean a 2:5 ratio between rural and urban populations.

14. This cannot be answered since whether the calculation has to be done on the basis of College or Schools is not defined.
15. Option (c) is correct as it can be seen that India and Sri Lanka are the only countries that are on the development frontier rural. Hence, all other countries: Pakistan, Ghana, Nigeria, Indonesia and Nepal are not on the development frontier rural.

## Mock Test Paper 18

1. Visual scanning gives us BN as the answer.
2. Doubling of market shares has been exhibited by BN & MT.
3. 60% drop for MT in Kolkata is the highest drop.
4. Kolkata shows only one product losing market share.
- 5–8. Calculate the cost of making each drink. Organise your data in the form of a table to get all answers directly. The per bottle cost of manufacturing would be: Soda Lime = 10; Cola orange = orange soda = 7.5; Cola Lime = 9.166 and Soda Cola =  $59/7 = 8.4285$ .
5. Lime would give the maximum profit amongst the options listed since lime is the costliest variety. Option (d) is correct.
6. Orange soda would cost the least at 7.5 per bottle.
7. The cost is not the same for any of these. Option (d) is correct.
8. 1342 is the order required. Option (d) is correct.

- 9–12. Go through a comprehensive analysis of the 16 possibilities for each of the 4, using direct and indirect clues. The following table will emerge:

|         | Amar | B1 | B2 | C1 | C2 | C3 | C4 | Total |
|---------|------|----|----|----|----|----|----|-------|
|         | 10   | 18 | 2  | 28 |    |    |    | 58    |
| Biren   | 30   | 22 | 6  | 14 |    |    |    | 72    |
|         | A3   | A1 | A4 | C4 |    |    |    |       |
| Chandan | 12   | 4  | 26 | 20 |    |    |    | 62    |
|         | A2   | D2 | D3 | B4 |    |    |    |       |
| Deepak  | 16   | 24 | 32 | 8  |    |    |    | 80    |
|         | B2   | B3 | C1 | D4 |    |    |    |       |

13. The answer is workers' quarters under government subsidies schemes.
14.  $2108/5249$  which is approximately  $210/524=40.2\%$

15. There is over 100% increase in net block for vehicles.  
The percentage increase for all other categories is much lower.
16. Again visual inspection will yield that the answer is vehicles.

## Mock Test Paper 19

- 1–7.** Create a table based on the following formulae for the number of each type of fishes:

Number of big fish = Number of big fish at the end of the previous day + 25 – number of big fishes that die each day (Note that the number of big fishes that would die on 10th of August – when they become 10 days old would be 100, while the number of big fishes that would die subsequently would be 25 every day. Also, since the number of big fishes being added is 25 per day too, from the 11th of August the number of big fishes would be constant. Thus, the pattern for the number of big fishes would be:

| 1st Aug | 2nd Aug | 3rd Aug | 4th Aug | 5th Aug | 6th Aug | 7th Aug | 8th Aug | 9th Aug | 10th Aug | 11th Aug | 12th Aug |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|
| 125     | 150     | 175     | 200     | 225     | 250     | 275     | 300     | 325     | 250      | 250      | 250      |

Create similar number strings for the other fishes to solve the question.

So on any particular day, the number of medium fishes = Number of medium fishes on the previous day +250 – number of big fishes on that day  $\times$  1.

Likewise, the number for the smaller fishes =

Number of small fishes on the previous day  $\times$  2 – Number of medium fishes after incrementing the medium fishes for that day  $\times$  3.

The answers can be worked out once you form tables for the medium and small fishes too.

8. Kalkaji, Gurgaon Grade A and Noida Grade A are the three options possible.
9. His budget will now become  $\text{₹} 1$  crore. With this budget it is possible that he might not be able to buy a flat at Malabar Hill, Cuffe Parade or Jor Bagh. Hence, the required answer is 3.
- 10–11.** There is no information about the rent value per square feet. Hence, these questions cannot be answered.

12. Kalkaji or Gurgaon since the rate per square feet is ₹ 2400.
13. The maximum age at expiry is 70 years (Birla Sunlife). Hence a 50-year-old can insure his life for a maximum of 20 years.
14. ICICI Prudential offers the least premium for the required profile. Hence, it is the correct option.
15. ICICI, HDFC and LIC are three options offering a 6 year tenure. However, only HDFC Standard Life allows entry age above 50 years. Hence, there is only one option possible. Option (a) is correct.

## Mock Test Paper 20

1. The value of EPF assets and the EPF assets as a percentage of GDP are provided.

$$\text{Malaysia's GDP} = \frac{50.5 \times 100}{53.1}$$

$$\text{India's GDP} = \frac{33.47 \times 100}{7}$$

The required ratio is approximately 5:1.

2. The PF in Malaysia represents 23% of the salary while in India it is 24% of the salary. Assuming equal service periods and equal withdrawals we can directly correlate the average balance per member to the salary per member.

The answer will be (a).

3. The number of members =  $\frac{\text{Value of EPF assets}}{\text{Average balance per member}}$

Malaysia's ratio is smaller than India's. Hence, (b) is the correct answer.

4. (i) and (iii) are both true.
5.  $27,000/46,000 = 59\% \text{ (approx.)}$
6. Cannot be determined since the value of the standard deduction available is not provided.
7. Ms Parul Jaiswal has a tax incidence below 60,000. Hence, no surcharge will be applicable. Hence, her TDS will be at the rate of ₹ 2667 per month.
8.  $240,000 - 60,000 - 32,000 = 148,000$

9. Standard deduction value is not available. Hence, the answer is (d).
10. Rajiv Shrivastava's tax liability  
 $10\% \text{ of } 10000 + 20\% \text{ of } 60000 = 13000$   
 $13000 - 8000 \text{ (Rebate on savings)} = 5000$   
Hence, total tax liability =  $5000 \times 1.1 = 5500$ .
11. At ₹ 155000, his standard deduction becomes ₹ 25000.  
Hence, total taxable income = 130000  
Tax =  $10\% \text{ of } 10000 + 20\% \text{ of } 70000 = 15000$ .  
Rebate =  $15\% \text{ of } 40000 = 6000$   
Total tax =  $1.1 \times 9000 = 9900$   
Net income =  $155000 - 9900 = 145100$ .  
Hence, increase of ₹ 600. (as his previous net income was 144500)
12. Being a woman she gets a rebate of ₹ 5000 on the total tax liability.  
Hence if she follows Rajiv Shrivastava's saving pattern (₹ 40000), of she will pay no tax.
13. His total taxable income would be  $144000 + 35000 - 25000$  (standard deduction) = 154000.  
His tax liability would be  $1000 + 18000 + 1200 = 20200$ . He will get a tax rebate of 14000 due to savings. So net tax payable =  $6200 + 10\% \text{ surcharge} = 6820$ . Option (d) is correct.
14. The cost overflow depends on two things - time overflow and the per day cost of running that phase. We can easily see that a time overflow of 2 days occurs in design and construction both. However construction obviously has a much higher cost of running it per day - hence the biggest cost increase would be in construction. Option (c) is correct.
15. Since the cost per day is the same, the highest percentage increase would occur for the phase that had the highest percentage change in the number of days. Design moves from an estimated 3 days to an actual 5 days - a percentage increase of 66.66% and this represents the highest value of the percentage increase. Hence, option (b) is correct.
16. Construction goes from 6 days to 8 days - a growth of 33.33%. This would also be the percentage change in the cost, since the per day costs of running a phase is constant for all phases.

17. Estimated total time would be  $3 + 2 + 6 + 3 = 14$  days. Actual time would be:  $5 + 3 + 8 + 4 = 20$ .  
 Percentage growth in time =  $6/14 = 42.85\%$ .

## Mock Test Paper 21

- 1–4.** Complete the table based on the information in statements (1) to (4)  
 Arun's missing score is 27, Arjit's is 55, while Amritesh's is 69.  
 Identify the topper between Arun, Arjit and Amritesh to find Amit's missing score.  
 Then Ankur's missing score will be got by:  
 2626–Sum of all other scores.  
 All questions from 1 to 4 are routine calculation-based questions once you have the table.
5. You will get the following table:

|               | 2005 | 2006  | 2007 | 2008 |
|---------------|------|-------|------|------|
| Sales         | X    | 1.2X  | 1.1X | 1.3X |
| Selling Price | 8    | 9     | 10   | 11   |
| Cost Price    | 6    | 6     | 8    | 8    |
| Profit        | 8000 | 14400 |      |      |

Use the equation  $S.P. \times Sales - Sales \times Cost price = Profit$

Assume the initial SP as Y. Profit in Year 2005:  $(Y - 6)X = 8000$

Profit in Year 2006:  $(Y + 1 - 6)1.2X = 14400$ .

You would get  $X = 4000$  and  $Y = 8$ .

5. Total cost in 2005 = 24000. Hence, option (b) is correct.  
 6.  $1.3X = 5200$ . Hence, option (d) is correct.  
 7. 44000. Hence, option (c) is correct.  
 8. Only the third statement is true. Hence, option (d) is correct.  
 9. The no. of Maruti Zen that can be:  
 Spray painted =  $30/0.5 = 60$   
 Assembled =  $60/1 = 60$   
 Quality checked =  $20/0.5 = 40$   
 $\therefore$  Quality checking is the bottleneck resource.  
 10. Solve as above for Maruti 800.  
 11. Since 30 Maruti 800 cars have been produced, capacity left is 20 hours

of spray painting, 30 hours of assembly and 12.5 hours of Quality checking. Where only 25 cars can be completed.

12. Hiring 1 assembler will raise Maruti 800 capacity from 1 car to 70 cars.

**13–16.** Solve all 4 questions simultaneously through the options to meet the constraints, i.e. everybody should have more than or equal to 3 lakh gold coins, Shaleen should get 1 lakh more than Tarun, while Raman + Shaleen + Tarun + Ujjwal = 20 lakhs.

The only set of answers that fit all these constraints together is: (8 + 5 + 4 + 3)

## Mock Test Paper 22

- 1–4.** All visual and calculation based questions.

- There are 11 trains from/to a metro. Out of these 5 already have an A grade and their grade cannot be improved.

Hence, option (d) is correct,

- The average would be  $32/15=2.133$ . Hence, option (b) is correct.
- The highest number of passengers would be in Maharashtra Express from Nagpur to Pune.

Hence, option (d) is correct.

- It would still be Maharashtra Express. Hence, option (d) is correct.

## 5–7.

|          | Model 1                   | Model 2            | Model 3                 | Model 4               |
|----------|---------------------------|--------------------|-------------------------|-----------------------|
| Men      | $F_1, F_2, F_3, F_4, F_5$ | $F_5, F_8, F_{12}$ | $F_2, F_6, F_7, F_{13}$ | $F_3, F_{10}, F_{11}$ |
| Women    | $F_6, F_7, F_8$           | $F_9, F_{13}$      | $F_3, F_9, F_{11}$      | $F_1, F_2, F_4$       |
| Children | $F_9, F_{10}, F_{11}$     | $F_6$              | $F_1, F_4$              | $F_9, F_5$            |

5. (a) Let Model 1 or Model 2 for women include

Factories –  $F_6, F_7, F_8, F_9, F_{13} = A$

And Model 3 for children –  $F_1, F_4 = B$

$\Rightarrow A$  and  $B = 0$ .

6. (d) Some Model 3 producing factories produce

Model 1  $\Rightarrow$  Model 3  $\cap$  Model 1

$= F_2, F_6, F_7, F_3, F_9, F_{11}, F_1, F_4$

and none is common with men's Model 2 producing. Men's Model 2 producing factories, which are –  $F_5, F_8, F_{12}$

So (d) is true.

7. (c) 3

$\therefore$  Children's Model 1 producing factories included =  $F_9, F_{10}, F_{11}$ ,

And factories either producing men's Model 4 shoes or women's Model 3 shoes include:

=  $F_3, F_{10}, F_{11}, F_9$

So common factories are:-

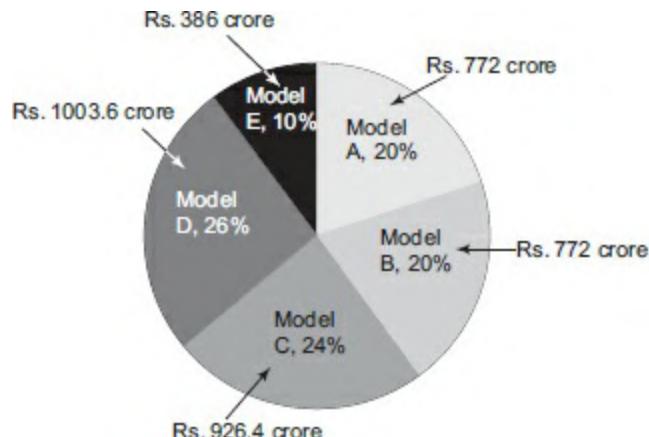
$F_{10}, F_9, F_{11} = 3$ .

## 8-9.

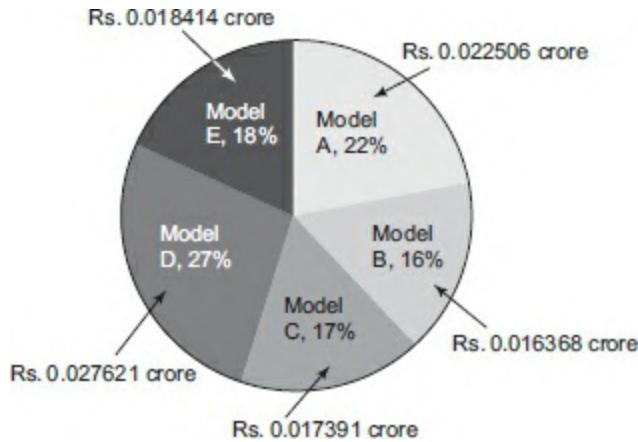
Total sales value = ₹ 3860 crore

Total number of units sold = 0.1023 crore

**Figure 22.1 (a)** Value



**Figure 22.1 (b)** Quantity



Costs per bike are :- (approx)

$$\text{Model A} = \text{Rs. } 34,301$$

$$\text{Model B} = \text{Rs. } 47,615$$

$$\text{Model C} = \text{Rs. } 53,269$$

$$\text{Model D} = \text{Rs. } 36,334$$

$$\text{Model E} = \text{Rs. } 20,962$$

8. (a) Model C = Rs. 53,269. Note, C being the highest is also calculable by taking the ratio of % of value divided by % of volume. This ratio is the highest or Model C.
9. (a) Rs. 53.2

## 10–15.

10. (b) Least cost is from

$XB \rightarrow DB \rightarrow ZG$  which is 0.

11. (c) If we move from

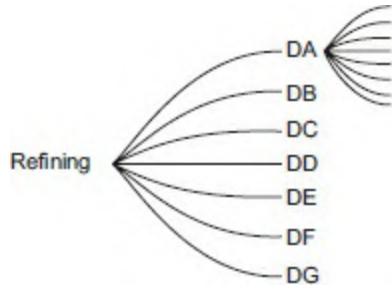
$XC \rightarrow DE \rightarrow ZB \rightarrow$ , minimum cost comes out as 98.1

12. (a) Moving as  $XB \rightarrow DE \rightarrow ZA$

Minimum cost = Rs. 324.5

13. (c) Maximum cost is on the way from  $XE \rightarrow DE \rightarrow ZH = 2208.9$

14. (a)  $\therefore$  From one refinery we can go in 7 ways to the depots and from 7 depots we can go to 8 districts/depots. Forming a tree we will get 56 ways of transporting the petrol.



15. (b) Moving as XD → DC → ZC

We come to minimum cost of transportation = ₹ 780.1

### Mock Test Paper 23

#### 1–7.

1. (b) ∵ Only in North Africa and Middle East, Argentina, Far East and North Sea, the ratio of individual incomes to total income for 2003, is greater than 4%.
2. (b) Only Spain and rest of Latin America.
3. (c) 3–Spain, rest of Latin America and North Sea
4. (c) For Far East the ratio is the least = 554:302 = 1.83
5. (b) Average = 4.81 which is only for Argentina so 1 is the answer
6. (d) All three are true, because for Far-East, profitability in 2002 was 47.1% was highest, also North Sea increased its profitability from 2002–03 as 31.11% to 173.33% and, operation in Argentina witnessed increase in profitability from 2002–03 as 42.7% to 42.9%, so Option (d) holds correct.
7. (b) North Sea, for which profitability was 173.33% and is highest.

#### 8–12.

8. (c) Number of employees getting more than \$25 per day in complex work = 10.
9. (a) 8 → EC22148, EC22149, EC22150, EC22156, EC22164, EC22171, EC22172, and EC22173
10. (c)  $EC22158 = 472.31/1.39 = 339.8$
11. (c) 4 – EC22173, EC22174, EC22179 and EC22180.

12. (b) 2 – EC22179 & EC22180

**13–16.**

13. (d) Lay No. : 3, 5, 6, 8, 10, 11, 15, 16, 17, 18, 19, 20, 22, 24, 26, 27  
So 16.

14. (d) None of these → 7

15. (d) None of these → 13

16. (b) Brown - (M)(XL)

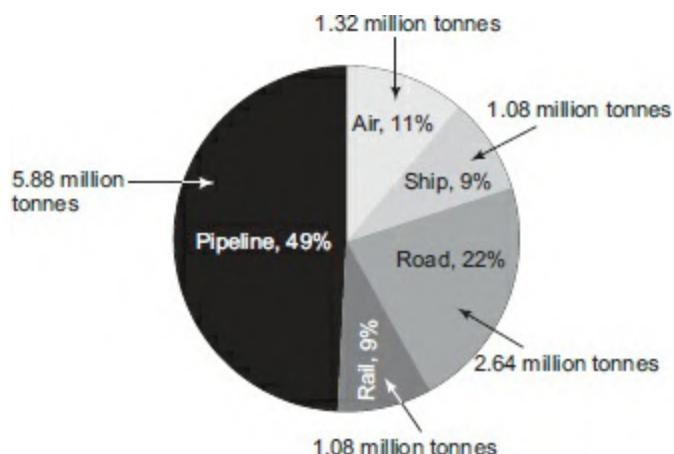
Blue – S, M, L, XL

Green – S, L. A total of 8 fabrics

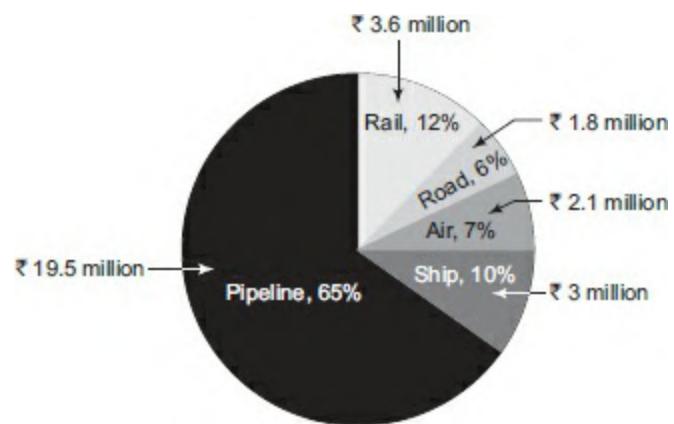
## Mock Test Paper 24

**1–3.**

**Figure 24.1** Volume



**Figure 24.2** Distribution Cost



1. (b) 2.125

$$\therefore \text{cost/tonne} = \frac{2.1+3}{1.32+1.08} \\ = 2.125$$

2. (b) Looking at the percentage ratios we see that for rail 12/9 is the greatest ratio. (Pipeline's cost per tonne would be lower than that of rail since  $65/49 < 12/9$ .)

3. (d) Cost/tonne is

(P) Pipeline =  $19.5/5.88 = 3.31$

(Q) Air =  $2.1/1.32 = 1.59$

(R) Rail =  $3.6/1.08 = 3.33$

$\Rightarrow R > P > Q$  (d)

#### 4–6.

4. (b)

| Total Export In     | Total Figure | %    |
|---------------------|--------------|------|
| 1994 – 95 =<br>668  | 2041         | 32.7 |
| 1995 – 96 =<br>775  | 2886         | 26.8 |
| 1996 – 97 =<br>1383 | 3807         | 36.3 |
| 1997 – 98 =<br>1970 | 5031         | 39.2 |
| 1998 – 99 =<br>2672 | 6052         | 44.2 |

5. (d) 1998 – 99

Lowest percent growth = 20.3%

6. (d) None of these

Because in (a) – Hardware exports decreased

In (b) – Business decreased in 1996–97

In (c) – IT Business in maintenance = 945

In training = 1000

#### 7–8.

7. (c)  $\therefore$  in 1995 – 96, software business is lower than that of 1998–99

8. (b) ∵ software business and IT peripherals is greater in 1998–99 than 1995–96.

### 9–13.

9. (b) Average employment level in public factories

$$= \frac{\left(80 \times 100 \times \frac{27.7}{100}\right)}{7} = 316$$

10. (c) Ratio of gross output to employment is maximum in joint sector which is  $8.4/5.1 = 1.63$

11. (b) Capital Productivity for

$$\text{Other} = 2/3.2 = 0.625$$

$$\text{State} = 11.6/24.3 = 0.477$$

$$\text{Central} = 12.7/17.5 = 0.726$$

$$\text{Joint} = 8.4/6.8 = 1.235$$

$$\text{Wholly} = 63.8/46.8 = 1.36$$

⇒ State is less than other which is less than central.

12. (c) Among all options, value of central and state/local is highest, i.e. 1.8

So option (c)

13. (c) Total value added = ₹ 225,000 crore

So value added in central government is  $= 225,000 \text{ crore} \times 0.141 = 31725 \text{ crore}$

and average value added / factory

$$= \frac{\frac{31725}{3000 \times 100}}{1.8} \times 0.01 = 19.11$$

## Mock Test Paper 25

### 1–4.

1. (a) The deficit intensity can be calculated as the difference between Import Intensity and Export Intensity. The values for the deficit intensity are as follows:

| Year              | 2003–04 | 2004–05 | 2005–06 | 2006–07 | 2007–08 |
|-------------------|---------|---------|---------|---------|---------|
| Deficit Intensity | 4.8     | 6       | 7.4     | 8       | 5       |

The growth in Deficit Intensity is 25%, which is highest in 2004–05.

2. (d) From the solution to the above question we can see that this growth percentage is 25% (from 4.8 to 6).
3. (b) We need the ratio of sales to gross fixed assets. Let the total cost of raw material be 100 for the year 2005–06. This means that the value of Imported raw material is 14.5.

Then, the total sales for the year is 200 (since the problem says that the total cost of raw materials is 50% of sales for the year).

The total imports would be given by:

$$13.3\% \text{ of } 200 = 26.6 \text{ (since import intensity is 13.3)}$$

$$\begin{aligned} \text{Total Imports} &= \text{Imported raw materials} + \text{Imported Capital goods} \rightarrow \\ 26.6 &= 14.5 + \text{Imported Capital Goods} \rightarrow \text{Imported Capital Goods} = \\ 12.1 \end{aligned}$$

We also know that the Imported Capital Goods represents 9.7% of the gross fixed assets. Thus:

$$12.1 \times 100 \div 9.7 = 124.74 \approx 125.$$

$$\text{The ratio of sales to gross fixed assets } \approx 200 \div 125 = 1.6.$$

Hence, Option (b) is correct.

4. (d) Statement (d) is true since the deficit intensity has always grown between 2003–04 and 2006–07. This can be seen from the table in the solution to Question 21.

## 5–10.

5. (c) If we add the individual growth percentages of each of the models, the total addition is equal for Model A and Model C. However, this being a compounded growth construct, we need to see which of the products has a higher growth: Model A  $1.09 \times 0.99 \times 1.04 \times 1.07 \times 1.09 \times 1.14 \times 1.07 \times 1.07 \times 1.05$  Model C:  $1.08 \times 1.09 \times 1.05 \times 1.07 \times 1.09 \times 1.08 \times 1.04 \times 1.06 \times 1.05$
6. (c) Overall growth will be the weighted average of -1 (weight 20), +1 (weight 15), +1 (weight 10) & +9 (weight 15).

Assume the initial values for the four models to be 20, 15, 10 and 15 respectively in the year 1990. (These would be approximately correct weightages since we know the weights to be 20:15:10:15 for the year

1989 and the four models have approximately grown by similar percentages in 1990.)

After the changes for the year 1991 are incorporated into these values, the total value of the sales of the four models would be:

$$19.8 + 15.15 + 10.1 + 16.35 = 61.4.$$

The percentage growth is  $(61.4 - 60) \times 100 \div 60 \approx 2.5\%$

Option (c) is correct.

7. (a) 1998, since C has always shown a positive growth trend.

8. (b) 1991,  $\therefore$  Sales for A dipped during that year.

9&10 have to be solved using the combination of options, which fits the information.

The only combination that fits for the overall growth to be 50% is

9. (a) 25%.

10. (b) 87.5%

## 11–16.

11. (c) From the graph, at 400 units the variable cost

$$= \text{Rs } 35,000$$

$$\Rightarrow \text{Total cost} = \text{Rs } 55,000$$

$$\text{So average unit cost} = 55000/400 = \text{Rs } 137.5$$

The closest option is 140.

12. (a) Cost of providing 300 units = Rs 24000

Cost of producing 400 units = Rs 35000

$$\text{So MC} = \frac{\text{Rs } 35000 - \text{Rs } 24000}{100} = 110$$

13. (a) Graph shows that with increase in number of units, variable cost increases, so rate of change also increases, hence MC will increase with increase in production quantity.

14. (a) Total cost increased = Rs 55000

$$\text{Total sales revenue} = \text{Rs } 200 \times 400 = \text{Rs } 80,000$$

$$\Rightarrow \text{Profit} = \text{Rs } 25,000$$

15. (b) At 310, total sales =  $310 \times 160 = 49600$

$$\text{Cost of production} = 44000$$

Profit = ₹ 5600

At 410, sales =  $410 \times 160 = 81600$

Production cost = 70,000

$\Rightarrow$  Profit = ₹ 10,600

At 510, sales =  $510 \times 160 = 81600$

Production cost = 70,000

$\Rightarrow$  Profit = ₹ 11,600

At 610, sales =  $610 \times 160 = 97600$

Production cost = 90000

Profit = ₹ 7600.

16. (d) They are at same level  $\therefore$  graph is a straight line and change is same.

## Mock Test Paper 26

### 1–5.

1. (d) With 65.8% utilisation, production = 1.63

So with 100% utilisation, product =  $\frac{1.68 \times 100}{65.8} = 2.53$

2. (d) Dhanpura has a production of 1.58 and with a capacity utilisation of 60.35%, it would have a total capacity of 2.61 approximately. The unutilised capacity would be 1.03 which is higher than of the other companies.

3. (c) With 62.3% use, production = 11.8

So with 100% use, production =  $\frac{11.8 \times 100}{62.3}$

4. (b) Price = total sales/sales which is lowest for Dhanpura at 11.75

5. (b) Total sales including others is given = 137.80 crore

Total sales for packaged atta of the given companies =  $32.15 + 27.75 + 16.25 + 18.45 = 94.6$

$\Rightarrow$  Percentage of market share with others =  $\frac{137.80 - 94.6}{137.8} \times 100 = 31\%$

### 6–10.

6. (c) In normal case in 5th month, cost increased

= ₹ 5000  $\times$  8 = ₹ 40,000

Here, 5 people are working for designing

⇒ So cost increased to = ₹ 50000

⇒ Percentage change = 25%

7. (a) In new technique cost incurred in new coding stage will be

$$= 4 \times 5000 + 10 \times 5000 + 5 \times 5000$$

$$= 95000$$

8. (b) The difference in cost under the old technique and the new technique would be essentially due to the difference in the costs during months 5 to 8. So to solve this question we can just look at the difference in costs for these 4 months.

Under the old technique the total cost during these months =  $(8 + 10 + 10 + 6) \times 5000 = ₹ 170000$

In the new technique, cost incurred during this phase =  $5 \times 10000 + 4 \times 5000 + 10 \times 5000 + 5 \times 5000 = ₹ 145000$

⇒ Change = ₹ 25000

9. (b) Most expensive stage will be the specification phase that costs =  $4 \times 20000 + 6 \times 20000 = 200000$ .

10. (c) Average cost for months 11–15 is ₹ 5000 as only the maintenance phase is running during this time – and maintenance has the least cost per man month. Hence, the correct answer is Option (c).

## 11–14.

11. (d) In 1897–98, imports with

Asia = 13% of \$ 43,153 mn

\$ 5609.89 mn

Exports = 22% of \$ 37,387 mn

= \$ 8225.14 mn

Total trade = \$ 13,835.03 mn which is highest among all.

12. (b) K – Others have the lowest total trade. In terms of exports the exports from Fantasia to Others is = 1% of \$ 37,387 mn  
= \$ 373 mn

13. (a) In 1897 – 98, Fantasia has highest trade deficit with OPEC nations (H), which is

22% of \$ 43,153 mn – 8% of \$ 37,387 mn  $\approx$  \$6 billion

14. (b) We can check the four options to check which of the four have the least trade deficit. Trade deficit for any region with respect to Fantasia = Trade Surplus for Fantasia with respect to that region. We can begin by writing down the trade surplus of Fantasia with the regions in each of the four options as follows:

USA – 10% of 43153 – 21% of 37387  $\rightarrow$  Trade-deficit for Fantasia, which means that USA has a trade surplus with Fantasia and hence cannot be the region with the lowest trade deficit for Fantasia.

Asia – 13% of 43153 – 14% of 37387  $\rightarrow$  Fantasia's trade surplus = 375.71

Others – 2% of 43153 – 1% of 37387  $\rightarrow$  Fantasia's trade surplus = 489.19

Australia – 2% of 43153 – 3% of 37387  $\rightarrow$  Fantasia has a trade deficit and hence Australia would have a trade surplus with respect to Fantasia.

The least trade deficit is for Asia

## 15–16.

For these questions the value of imports and exports in 1898–99 can be calculated for the full year by multiplying the given values for 8 months by 1.5 (to get the pro-rata values for 12 months).

15. (d) Growth of Fantasia's exports to Russia is the highest as it can be seen to have almost doubled from 1% of 37387 = 373 to 2% of  $24154 \times 1.5 = 724$ . No other region has shown this kind of percentage growth. Hence, Option (d) is the correct answer.

16. (c) Trade deficit is Imports – Exports.

In 1897–88 is

$$= \$ 43153 \text{ mn} - \$ 37387 \text{ mn}$$

$$= \$ 5766 \text{ mn}$$

Trade deficit in 1898–99 is

$$= \$ 46699.5 \text{ mn} - \$ 36231 \text{ mn}$$

$$= \$ 10,468.5 \text{ mn}$$

$$\Rightarrow \text{Percent increase} = \frac{10468.5 - 5766}{5766} \times 100 = 82\%$$

## Mock Test Paper 27

**1–5.**

|                      | 2004 | 2003 | 2002 | 2001 |
|----------------------|------|------|------|------|
| Profit before tax    | 840  | 730  | 230  | 330  |
| Dividends + Earnings | 600  | 400  | 120  | 195  |
| So, tax              | 240  | 270  | 110  | 135  |

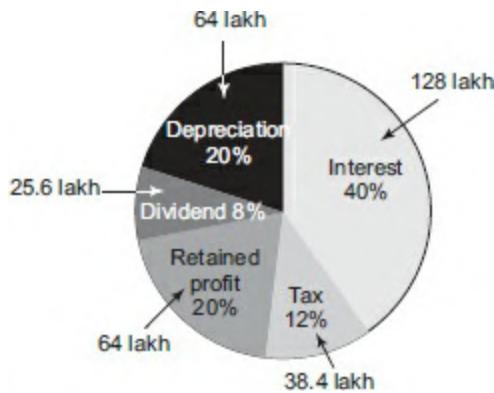
1. (b) In 2002 tax per rupee of profit is highest which is  $= \frac{230 - 120}{230} \times 100 \approx 48\%$
2. (d) It cannot be determined because the value of share capital is not known.
3. (b) In 2002, it is the least which is  $= \frac{230}{2810} \times 100 \approx 8\%$
4. (a) It is maximum for the year 2001, which is  $= \frac{155}{80} \times 100 \approx 194\%$
5. (b) Amount in reserves after 2004 will be  $= 80 + 155 + 80 + 3202 + 450 = 1085$  lakh.

**6–10.**

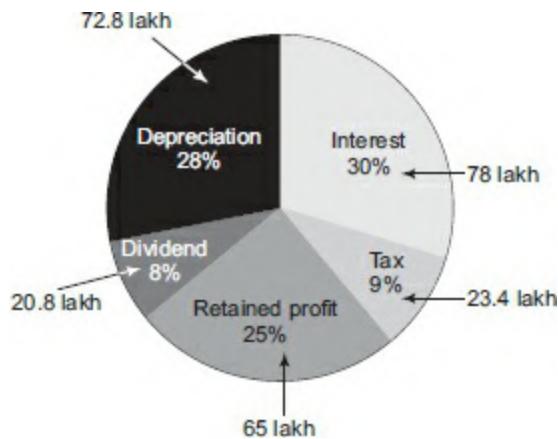
6. (d) 100% increase for Mortein in Kolkata from 2003 to 2004, i.e. from 10% to 20%
7. (d) In Chennai only Mortein decreased its market share by 10%
8. (d) Shares of all companies have either increased or decreased from 2003 to 2004 in some city.
9. (b) 1 – only in Delhi
10. (c) 3 – Finit in Chennai, Hit in Chennai, Mortein in Delhi

**11–15.**

Operating profit in 2002–03 (320 lakh)



Operating Profit in 2001–02 (260 lakh)



11. (d) Increase =  $\frac{128 - 78}{78} \times 100 = 64\%$

12. (b) Difference =  $128 - 78 = 50$  lakh

13. (b) For 2001, let borrowed fund = x

$$\Rightarrow 16\% \text{ of } x = 78 \Rightarrow x = 780$$

$$\text{For 2002, let borrowed funds} = y$$

$$\Rightarrow 10\% \text{ of } y = 128 \Rightarrow y = 1280$$

$$\Rightarrow \text{Total borrowed funds} = 2060 \text{ lakh}$$

14. (a) In 2001, dividend = 20.8 lakh

$$\text{In 2002, dividend} = 25.6 \text{ lakh}$$

$$\Rightarrow \text{Dividend is higher by } \frac{25.6 - 20.8}{20.8} \times 100 = 23\%$$

15. (c) Dividend = 20.8 lakh

## Mock Test Paper 28

1. (d) For rice the percentage has remained constant while for gram the percentage has decreased and then remained constant. For corn from 2005 to 2015, the percentage has actually gone up. Hence, Option (d) is correct.
2. (d) Among all the given options, it is only for rice that the proportion in the total food demand of the world has remained constant, while its proportion of the total demand in America has gone up.
3. (b) For wheat and gram it can be seen clearly from the data in the table that the portion is more than 60% for both the years.
4. (a) It can be seen to be for Wheat.

## 5–9.

5. (c) From all countries, given in the options, Myanmar and Pakistan form a coverage frontier.
6. (b) B and D

India clearly does not dominate Thailand—hence statement A is not true. At the same time UAE also does not dominate Malaysia and hence Statement C is also not true.

Hence, Option (b) is correct.

7. (a) This can be solved using alligation for weighted average of rural and urban coverage. For 35% urban and 7% rural coverage, the average of 14% requires a 1:3 ratio between urban and rural population. This means that the percentage of rural population is 75% for India.
8. (d) For India percentage of rural = 75%

For Pakistan, the average of 33 and 44 being 38.5, the ratio of urban to rural population comes out as 1:1. Thus, Pakistan's rural population is 50%. For Myanmar, similarly, the rural population percentage is 87%. Hence,

⇒ Rank = Pakistan, India, Myanmar.

9. (c) It is dominated by Pakistan in terms of both electricity and road facilities.

## 10–11.

10. (d) UAE has the least disparity.
11. (d) Nepal has the highest disparity.

## **12–17.**

12. (a) In February, J&K supplies 11,638 tonnes out of 11759 tonnes  $\approx$  99%, which is highest.
13. (b) From April–September, HP provided the maximum amount of apples as seen from the table.
14. (b) Amount supplied by HP = 233204  
Amount supplied by J&K = 268033.
15. (c) Months with ‘0’ in cold storage value indicates the supply was more than demand. So May–September
16. (b) Amount by HP = 233204  
J&K = 268033  
UP = 268  
 $\Rightarrow$  Total apples supplied = 501505 tonnes  
501505000 kgs  
 $\Rightarrow$  Number of trees = 501505000/40  
= 12.5 million
17. (c) Land used = 12.5 million / 250  
= 50,000

## **Mock Test Paper 29**

### **1–4.**

| Children | Height |       |      | Total |
|----------|--------|-------|------|-------|
|          | Medium | Short | Tall |       |
| Boys     | 32     | 44    | 20   | 96    |
| Girls    | 48     | 16    | -    | 64    |
| Total    | 80     | 60    | 20   | 160   |

Note: 40% of x = 64 (x = total students)

$$\Rightarrow x = 160$$

1. (a) = 0
2. (c) 0.4
3. (b) 25%
4. (a) 44:48 = 11:12

## 5–6.

5. (a) We can make the following table to showcase the work and rest patterns of Subhash Poorti:

| Week  | 1  | 2 | 3  | 4 | 5  | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-------|----|---|----|---|----|---|---|---|---|----|----|----|----|----|----|
| Rest  | 3  | 6 | 3  | 6 | 4  | 8 | 4 | 8 | 5 | 9  | 5  | 9  | 0  | 8  | 0  |
| Work  | 6  | 3 | 6  | 3 | 8  | 4 | 8 | 4 | 9 | 5  | 9  | 5  | 8  | 0  | 8  |
| Wages | 3x | x | 3x | x | 3x | x |   |   |   |    |    |    |    |    |    |

His salary for the first month would be based on what he earns in the first and third weeks + what he earns for the 2nd and 4th week.

$$(6 \times 30 + 3 \times 15) \times 6 \times 2 = 2700 \text{ for weeks 1 and 3} + (3 \times 10 + 6 \times 5) \times 6 \times 2 = 720 \text{ for weeks 2 and 4.}$$

$$\text{The total earning he gets} = 2700 + 720 = 3420.$$

6. (d) Total salary for 16 weeks =

$$(6 \times 30 + 3 \times 15) \times 6 \times 2 + (3 \times 10 + 6 \times 5) \times 6 \times 2 + (8 \times 30 + 4 \times 15) \times 6 \times 2 + (4 \times 10 + 8 \times 5) \times 6 \times 2 + (9 \times 30 + 5 \times 15) \times 6 \times 2 + (5 \times 10 + 9 \times 5) \times 6 \times 2 + (8 \times 30 + 0 \times 15) \times 6 \times 2 + (0 \times 10 + 8 \times 5) \times 6 \times 2 \\ 2700 + 720 + 3600 + 960 + 4140 + 1140 + 2880 + 480 = 16620 \text{ for 4 months.}$$

Hence, his average monthly salary would be  $16620/4 = 4155$ . Option (d) is the correct answer.

## 7–11.

Let amount spent by Kaku and Chikoo =  $2x$  and  $3x$

Kaku spends further 3 lakhs and amount invested by both is equal

$$\Rightarrow 2x + 300000 = 3x \Rightarrow 300000$$

$\Rightarrow$  Kaku and Chikoo invested 9 lacs each

Revenue = 50% of amount invested = 9 lacs

Revenue share among lemon tree and coconut tree = 4:5 = 4 lacs and 5 lacs.

7. (b)  $\therefore$  Revenue = 5 lacs, cost of one coconut = ₹ 10  $\Rightarrow$  Number of coconuts reaped = 50,000

8. (a) In 5 acre 200 lemon trees are planted that generated a revenue of 4 lacs  $\Rightarrow$  output/acre =  $4/5 = 0.8$

9. (b) Amount received = 50% of revenue (i.e., 50% of 9 lacs)  
= 4.5 lacs

10. (b) Number of coconut trees = 800

Revenue = 5 lacs

$\Rightarrow$  Revenue output per tree =  $500000/800 = \text{₹} 625$

11. We cannot determine the answer to this question, as we do not know the exact number of lemons yielded.

## 12–16.

**Note:** For these questions you need to understand that the per unit variable cost is Rs.14 per unit (since the variable cost at 0 units is 0 and at 500 units is 7000 and it moves in a straight line); Also, the revenue per additional unit is ₹ 20.

12. (b) At 100 units, we have no profit, no loss. Cost = ₹ 2000 and revenue = ₹ 2000 as seen from graph.
13. (a) At 200 units fixed cost = ₹ 600 and variable cost = ₹ 2800 as seen from graph, so profit = ₹ 600
14. (b) After 349 units, we get a profit of 1500 which gives us a per unit profit of  $1494/349 = 4.28$ . The profit at 400 units is 1700, but the profit per unit is lower as the number of units is higher.
15. (b) The profit per unit at 349 units =  $1494/349 = 4.28$ . Profit per unit at 450 units =  $1700/450 = 3.777$ . Hence, the maximum profit per unit is got at 349 units. Option (b) is the correct answer.
16. (d) At 180 units total cost =  $2520 + 1000 = 3520$ , total revenue is 3600.  
So we have a profit.  
At 170 units, total cost is  $2380 + 1000 = 3380$ , total revenue is 3400.  
So we again have a profit.  
The correct answer is 170, since the question asks us for the minimum.

## Mock Test Paper 30

### 1–6.

1. (b) In 2000, increase is from 52 to 61, so percentage increase = 17.30% which is maximum.
2. (c) This question can be solved visually. In 1999– 2001, it is maximum as

seen from the bar graph—profit goes from + ve in 1999 to–ve in 2001—so you can just add the two chunks of the bar chart which shows profit in 1999 and loss in 2001. For none of the other years pairs given in the problem do we get the difference between profits higher than the year 1999–2001.

3. (a) Interest is almost constant throughout.
4. (b) In 2001, percent =  $\frac{20}{60} \times 100$  for overheads = 33.33% which is maximum.
5. (b) The profits total around 45 (approximately) while the costs total between 900 to 950 for the 5 years.  
Hence, the answer would be closest to 5%. Option (b) is correct.
6. (d) It can be observed for 2002, since the (raw material + wages) for that year is highest. At the same time for that year, the profit is at a minimum. Hence, Option (d) is correct.

## 7–11.

7. (a) The maximum number of units would get produced if we produce only Samsung on both machines (as Samsung takes less time to manufacture). Hence, the required answer =  $600/8 + 600/8 = 150$  units.
8. (d) In order to meet the constraint of at least 1 unit of each, produce only units of Samsung on Machine 1 and produce 1 unit of LG on Machine 2. The rest of the time available on Machine 2, can be used for additional Samsung units. The number of units produced =  $[600/8] + [580/16] + 1 = 75 + 36 + 1 = 112$ .
9. (d) The least time would be given by:  $30 \times 10 + 25 \times 8 = 500$  minutes = 8 hours 20 minutes. Option (d) is correct.
10. (a) A 3:1 ratio can be maintained by making 60 units of LG on M2, followed by 20 units of Samsung on M1. This will leave us with 440 minutes on M1. This can be used to make exactly 30 units of LG and 10 units of Samsung, leaving us with no idle time. Option (a) is correct.
11. (b) It is possible to make 64 units of each with 40 minutes idle. The pattern would be: 64 units of Samsung on M1 with 4 units of LG on

M1 and 60 units of LG on M2. This would utilise 560 minutes on M1 and 600 minutes on M2, leaving 40 minutes idle on M1

None of the other options is possible to be achieved with the exact idle time as specified in the options.

## 12–16.

12. (c) Total trousers = 200000

$$\begin{aligned} \text{So cloth required} &= 200000 \times 3 \\ &= 600000 \end{aligned}$$

13. (b) Total medium quality cloth that is required

$$\begin{aligned} &= [40(0.3) + 60(0.5) + 60(0.6) + 20(0.7) + 20(0.2)] \times 3 \\ &= 96000 \text{ mts} \times 3 \\ &= 288000 \text{ m} \end{aligned}$$

14. (d) Low quality cloth required in type C =  $6000 \times 3 \times 0.4$  mts  
= 72,000 mts

15. (d) No relationship among quality and dye is provided.

16. (d) ratio and low quality dye in A and B type  
=  $40000(0.20):60000(0.3)$   
= 80:180 = 4:9

**SECTION - II**

**LOGICAL DATA**

**INTERPRETATION**

## PART 1

# How to Think in Logical Data Interpretation

### **Chapter 1**

*Introduction to  
Logical Data  
Interpretation*

### **Chapter 2**

*How to Think in  
Logical Data  
Interpretation*

### **In This Part You will Learn:**

- **To identify the Mathematical Structures on which DI questions are framed**
- **To improve your ability to read, understand and anticipate DI questions in DI sets of various parts**
- **To improve your line by line understanding of various kinds of DI sets.**
- **To get an understanding of Logical Data Interpretation**

- To improve your thought processes and solving abilities while solving Logical Data Interpretation

**1**

# **Introduction to Logical Data Interpretation**

## INTRODUCTION TO LOGICAL DATA INTERPRETATION

We have already seen in the Section One of this book various mathematical constructs on Data Interpretation and also learnt ‘How to think in Traditional Data Interpretation’. As you know, this book is divided into two sections:

**Section I:** Traditional Data Interpretation (dominant theme calculations);

**Section II:** Logical Data Interpretation (dominant theme – reasoning, logic and analysis).

This distinction between different kinds of data interpretation questions is not something that is explicitly defined by examinations or exam conducting bodies. However, as a trainer helping students prepare for the CAT and other aptitude exams, I have always felt the need to look at problem solving from a functional point of view. By that I mean, that for all aptitude areas, preparation processes become more robust, if you start looking at a question from the perspective of ‘what it got your mind to do’ rather than from the plain theoretical perspective of which chapter to slot a question into. It is in this context, that over the past 15 years I could clearly sense that the CAT was moving its Data Interpretation questions away from what I now call as ‘Traditional Data Interpretation’ to questions that tested your logical thinking, your reasoning abilities and your analytical skills. The trend started off from the CAT 2003 paper with the introduction of one or two sets that would test these skills. As the years rolled by, however the Data Interpretation questions being asked started becoming increasingly logical and reasoning based, so much so that if you were to look at the papers of the last few years, you would find no calculation oriented sets – and the Data Interpretation questions are completely logical and reasoning oriented in nature. In fact, this trend has reached such an extreme over the past few years, that sometimes while solving a data interpretation question, it is difficult to understand whether you are solving a DI or a reasoning question! (In fact, even the XAT exam has moved in the same direction- though you still see the DI questions in the XAT as a mixture of traditional and logical DI).

Clearly, the skills you need to learn and equip yourself with for such

questions are very different than those that were required to master traditional Data Interpretation. However, most aspirants I see struggle to solve these questions, since they have not developed the clarity and analytical ability to handle the challenges posted by this section. Students and aspirants across the country are at a loss to understand how to prepare for this make or break section of the exam. Thus, was born the need to train on and write content related to Logical Data Interpretation.

It is in this context, that I clearly felt the need to divide Data Interpretation questions and in fact this whole book into two separate sections – where we segregate questions and question sets based on the need to cater to these dual mind development requirements. In Section One of this book, you have seen traditional Data Interpretation and its' thought structures extensively. In this Section of the book, we shift our focus to Logical Data Interpretation. All the question sets in this section of the book, would have a dominant theme of reasoning, analysis and logic. The design of this section is to take you through a learning process that equips your mind to tackle the CAT in the current avatar. In fact, I have a strong belief that if you were to get to know and understand each question set in this section, you would be adequately prepared for whatever the CAT throws at you. This is because, even though initially while solving the first few sets in this section, you might feel that every set of questions is different and hence required distinct skills – the actual fact is that you would start to see and experience a sameness to the logic across the sets, once you are done with solving and learning through a significant number of logical DI question sets.

This section of the book is divided into:

- Introduction to Logical Data Interpretation (including: the write up that follows- ‘How to think in Logical Data Interpretation’)
- 12 minute test papers
- Mock Test Papers on based on Logical Data Interpretation

Together these contain a gamut of varied questions and situations that would help you learn the skills required to master this question type during your CAT Prep journey.

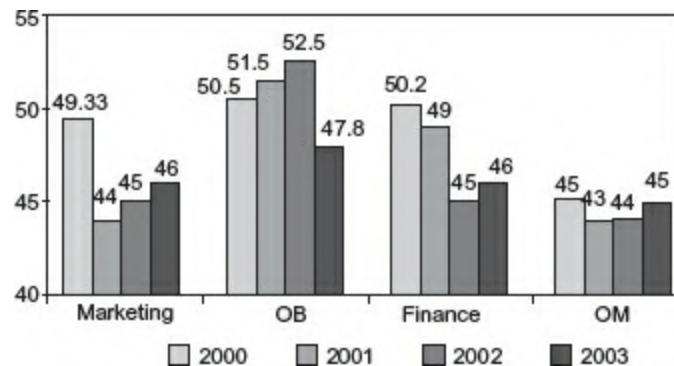
What you would need to do would be to get to first solve and learn on your own from each and every set across this section – followed by looking at the solutions (if required).

You should now move on to ‘How to think in Logical Data Interpretation’ but before you do that I may suggest that you go back to the Traditional DI part of this book and review the Mathematical constructs in Data Introduction.

## How to Think in Logical Data Interpretation

**Directions for Questions 1 to 4:** On the basis of the information given below SET BASED ON AVERAGES

A management institute was established on January 1, 2000 with 3, 4, 5, and 6 faculty members in the Marketing, Organisational Behaviour (OB), Finance and Operations Management (OM) areas respectively, to start with. No faculty member retired or joined the institute in the first three months of the year 2000. In the next four years, the institute recruited one faculty member in each of the four areas. All these new faculty members, who joined the institute subsequently over the years, were 25 years old at the time of their joining the institute. All of them joined the institute on April 1. During these four years, one of the faculty members retired at the age of 60. (*All this is preliminary information that has to be understood only in the context of the bar chart that follows. Once we move to the bar chart we would need to interpret each of these*) The following diagram gives the area-wise average age (in terms of number of completed years) of faculty members as on April 1 of 2000, 2001, 2002 and 2003.



When you reach the bar chart and start to look at the individual values of

the bars, you can start connecting to the information provided in the textual form at the start of the question. For instance when we look at the bars for Marketing, we can analyse that initially marketing had 3 faculty members with an average age of 49.33. Next year, the average age dropped to 44. If the faculty team were constant between 2000 and 2001, the expected average age would have just increased by 1 year from the previous year. However, a drop in the average age could mean one of two things would have happened. An inclusion of a new 25-year old faculty in the team, or the retirement of a 60-year old faculty from the team. In both the events, there would be a drop of the average age of the group (and you can see that since the starting average age is below 60 and above 25 for all the departments, the recruitment of a new faculty or the retirement of an older faculty would have the effect of reducing the average age of the departments' faculty team). A look through the bar chart after gaining this understanding, shows us that the areas of Marketing, OB and OM all have one drop in the average age, while the department of finance is exhibiting a drop in the average age on two occasions. Since, the starting text of this data set has told us that there is 1 recruitment in each department during the period shown, and there is also 1 retirement during this time from one of the four departments, we can correlate that the drops in Marketing, OB and OM must be due to the recruitments in those departments, while the two drops in the finance area means that there must be 1 recruitment and 1 retirement in the finance area. The other thing to note is that the ages are always counted in whole number of years and the average age calculations are with reference to the date of 1<sup>st</sup> April for each year. With this analysis we are ready to move into the questions of the set.)

1. From which area did the faculty member retire?
  - (a) Finance
  - (b) Marketing
  - (c) OB
  - (d) OM

*This is something that we have already analyzed while looking at the bar chart. It is clearly evident that the retirement must have been from the finance department.*

2. Professors Naresh and Devesh, two faculty members in the Marketing

area, who have been with the Institute since its inception, share a birthday, which falls on 20<sup>th</sup> November. One was born in 1947 and the other one in 1950. (*Reaction: Naresh would be 52 years old on 1<sup>st</sup> April 2000, Devesh would be 49 years old on that day. Since the average of the three faculty members in Marketing is 49.33, on 1<sup>st</sup> April 2000, it means that the sum of the three ages would be  $49.33 \times 3 = 148$  years. So, the third faculty members age would be  $148 - 52 - 49 = 47$  years on 1<sup>st</sup> April 2000*) On April 1 2005, what was the age of the third faculty member, who has been in the same area since inception (5 years later he would be  $47 + 5 = 52$  years old)?

- (a) 47
- (b) 50
- (c) 51
- (d) 52

*(You got an answer to this question through your reactions to the information provided in the question.)*

3. In which year did the new faculty member join the Finance area?
  - (a) 2000
  - (b) 2001
  - (c) 2002
  - (d) 2003

There are two alternate possible scenarios to analyse here. Since the finance department is witnessing two years where the average age of the finance department is reducing, we have already concluded that the finance department has had one recruitment and 1 retirement. Scenario 1 is that the retirement occurred in 2001 and the recruitment occurred in 2002. Scenario 2 is the opposite of this. The only way to identify correctly as to which of these scenarios is true, would be to work out the numbers and see which scenario fits the given numbers in the bar chart.

*Analysing scenario 1: The retirement occurred in 2001 and the recruitment occurred in 2002: Finance initially has 5 members with an average age of 50.2 on 1<sup>st</sup> April 2000. Total age of the finance department faculties on 1<sup>st</sup> April 2000 =  $50.2 \times 5 = 256$ . Their total age on 1<sup>st</sup> April 2001 =  $251 + 5 = 256$ . If there was a retirement from one of these five*

faculties, it would mean that the total age of 4 members remaining on 1<sup>st</sup> April 2001 would be  $256 - 60 = 196$ . The average age of the 4 members would be 49. This number confirms with what is given in the bar chart and hence we can conclude that the retirement occurred in 2001 and the new faculty member joined the finance area in 2002.

**Note:** If you try to reverse this, you would find that the numbers do not match for recruitment in 2001. The following working would give you that it is not working: Finance initially has 5 members with an average age of 50.2 on 1<sup>st</sup> April 2000. Total age of the finance department faculties on 1<sup>st</sup> April 2000 =  $50.2 \times 5 = 256$ . Their total age on 1<sup>st</sup> April 2001 =  $251 + 5 = 256$ . If there is a recruitment in 2001, the total age of 6 people would be  $256 + 25 = 281$ . Average age of 6 people with total age as 281 =  $281/6 = 46.833 \neq 49$ . Hence, we can conclude that the recruitment did not occur in 2001 and must have occurred in 2002.

4. What was the age of the new faculty member, who joined the OM area, as on April 1, 2003?
  - (a) 25
  - (b) 26
  - (c) 27
  - (d) 28

The recruitment has happened in OM in 2001, on 1<sup>st</sup> April 2001 to be precise. Naturally, the new faculty member would have been 25 years old on that day. 2 years later on 1<sup>st</sup> April 2003, he would be 27 years old. Option (c) is the correct answer.

#### **Directions for Questions 5 to 7: (Set based on Averages)**

Answer the questions on the basis of the information given below. Fifty four employees of a company called MJF are spread across four different offices, with each employee working in exactly one office. The table given below shows the office-wise distribution of employees, their average age, their average salary and their average login hours.

| Office | Number of Employees | Average Age (years) | Average Salary (in ₹ thousands) | Average login hours |
|--------|---------------------|---------------------|---------------------------------|---------------------|
| A      | 13                  |                     | 40                              | 100                 |
| B      |                     | 42                  |                                 | 46                  |
| C      |                     | 30                  | 36                              | 80                  |
| D      |                     | 28                  | 42                              | 60                  |

### Additional Information:

- The average age of the employees working in Office B and Office D is 29. (*This means that the ratio of the number of employees in B and D is 1:13—using the concept of alligation. This in effect means that the number of employees in Office B and Office D are 1 and 13 or 2 and 26 respectively. It obviously cannot be 3 and 39 because in that case the total number of employees would cross 54.*)
- The average salary of the fifty four employees is ₹39200. (*This would help us calculate the average salary for Office B – once we can sort out how many people are there in each department.*)
- At least 2 employees work in each office of the company. (*This fixes the number of employees in each of the offices as: A = 13, (given); B = 2; D = 26 and C = 54 – 13 – 2 – 26 = 13.*)
- The average age of the employees working in each office is an integer.
- Out of the total employees in Office A, ‘x’ are transferred to Office B and the remaining to Office D. The average age of the employees working in Office B and Office D increases by 3 and 10 respectively. What is the average age of the employees working in Office A?
  - 58
  - 59
  - 60
  - Data Insufficient

*The information we have is that the average of B has gone up to 45 years, while the average age of Office D has gone up to 38. The possible scenarios of what has actually occurred would depend on the value of x as given in the question—which is a variable.*

*We can build the following tabular structure to understand what is happening:*

| If $x$ is:  | 1                  | 2                             | 3              | 4              | 5              |
|---|--------------------|-------------------------------|----------------|----------------|----------------|
| Total age of Office B   | $3 \times 45$      | $4 \times 45$                 | $5 \times 45$  | $6 \times 45$  | $7 \times 45$  |
| Total age of Office D   | $38 \times 38$     | $37 \times 38$                | $36 \times 38$ | $35 \times 38$ | $34 \times 38$ |
| Addition of age to the total age of Office B (original total $2 \times 42 = 84$ )     | 51                 | 96                            | 141            | 186            | 231            |
| Addition of age to the total age of Office D (Original total = $26 \times 28 = 728$ ) | 716                | 678                           | 640            | 602            | 564            |
| Total age addition to Offices B and D = Total age originally of 13 Office A employees | 767                | 774                           | 781            | 788            | 795            |
| Average age of Office A   | = $767/13$<br>= 59 | = $774/13$<br>is not integral | Not integral   | Not integral   | Not integral   |

As we can observe from the above, the values of  $x$  from 2 to 5 give us an average age of Office A that is not an integer. This contravenes the conditions of the problem and hence is not possible. For  $x = 6$  to  $x = 13$ , we will get  $802/13$ ,  $809/13$ ,  $816/13$ ,  $823/13$ ,  $830/13$ ,  $837/13$ ,  $844/13$  and  $851/13$  respectively. Each of these values is not integral in nature. Hence, the average age of Office A has only one possibility = 59. Option (b) is correct.

6. What is the average salary of the employees working in Office B?
- (a) ₦44600
  - (b) ₦30200
  - (c) ₦18400
  - (d) ₦24400

This is a calculation intensive question on the surface. But if you look closely at the numbers and use alligation to solve this, it might not be such. The information we have to start with can be seen in the table below:

| Office | Number of Employees | Average Salary (in thousands) |
|--------|---------------------|-------------------------------|
|--------|---------------------|-------------------------------|

|   |    |    |
|---|----|----|
| A | 13 | 40 |
| B | 2  |    |
| C | 13 | 36 |
| D | 26 | 42 |

The average salary of Offices A and C would be 38000 (since the number of employees in both the offices are the same). This 38000 would be the average salary for 26 employees of Offices A and C. Now, if we incorporate the employees of Office D into this average, we again face a situation of 26 people with average 42000 being added to 26 people with an average of 38000. The average salary for these 52 employees of departments A, C and D would be equal to 40000. Since the average salary of the 54 employees is 39200, we will get the average salary of the 2 employees from Office B using alligation as follows:



Solving this, we will get the value of 18400 as the average of Office B. Option (c) is correct.

Note: This was a case of a situation where if you were not able to recognize the use of alligation, it would hurt you badly in terms of the time and effort required to solve a question of this type. The only alternate calculation there would have involved solving the equation:

$$54 \times 39200 = 13 \times 40000 + 2 \times \text{Average of } B + 13 \times 36000 + 26 \times 42000.$$

You can yourself imagine the calculation effort required in solving this, in order to find the average of B.

7. How many employees work in Office C?

- (a) 13
- (b) 14
- (c) 26
- (d) Cannot be determined

We worked this out while analysing the basic information of the question – there are 13 employees in Office C. Option (a) is correct.

**Directions for Questions 8 to 10:** (Set based on Averages and Alligation)

Answer the following questions on the basis of the information given below. A retailer has some chocolates in five different boxes T1, T2, T3, T4 and T5. **Table 1** provides the data about the number of chocolates (N), the average weight per chocolate in grams (AWG) and the average selling price per chocolate in Rs (SPR) for each of the five boxes. **Table 2** shows the relationship between AWG and the customer satisfaction index (CSI).

---

Table 1

| Box | N  | AWG | SPR |
|-----|----|-----|-----|
| T1  | 8  | 90  | 15  |
| T2  | 24 | 45  | 12  |
| T3  | 16 | 70  | 11  |
| T4  | 32 | 65  | 18  |
| T5  | 20 | 85  | 17  |

---

Table 2

| AWG                       | CSI |
|---------------------------|-----|
| $\text{AWG} \leq 50$      | 60  |
| $50 < \text{AWG} \leq 60$ | 70  |
| $60 < \text{AWG} \leq 70$ | 80  |
| $70 < \text{AWG} \leq 80$ | 90  |
| $80 < \text{AWG}$         | 100 |

On reading the information in the tables, we notice that the variables provided in the first table have the following relationships:  $\text{AWG} \times N = \text{total weight of the chocolates in the box}$ ;  $N \times \text{SPR} = \text{total revenue from the box}$ . Looking through the second table we see that the CSI is increasing with an increase in the AWG. i.e. the higher the AWG, the higher the CSI.

8. All the chocolates of box T2 are to be mixed with all the chocolates of exactly one of the other four boxes. Which box should be chosen to

maximise the CSI of the mixture? (*We need to mix the chocolate boxes in such a way that the AWG for the mixed boxes is highest—since higher the AWG, higher the CSI.*)

- (a) T5
- (b) T3
- (c) T1
- (d) T4

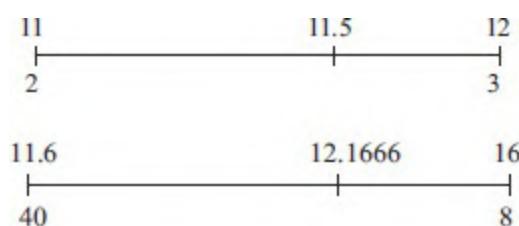
*The AWG of the mixture would be the weighted average of the AWG of Box T2 and the AWG of the Box being mixed with T2. On the surface, Box T1 having the highest AWG would seem to be the best bet, but if you look at the value of N for box T1, you realize that there would be a lower AWG for the mixture, than if you were to mix T2 with T5. A mixture of T2 and T5 would give us an average AWG of over 60, while T2 and T1 would lead to an AWG of below 60. These calculations can be visualized through alligation.*

9. If the retailer wants to keep the CSI of the mixture at least 70 and the SPR between 13 and 17, which of the following combinations should he make?

- (a) T1, T2 and T3
- (b) T2, T3 and T4
- (c) T3, T4 and T5
- (d) T1, T4 and T5

*You can again visualize utilizing multiple alligation structures here. For T1, T2 and T3, first the mixing of T2 and T3 would lead to an average SPR of 11.6 for 40 chocolates (Individual SPRs of 11 and 12 mixed in the ratio of 16:24 or 2:3). Next mixing 40 chocolates with average SPR of 11.6, and 8 chocolates of T1 with average SPR of 90 would give us an average SPR of 15, which is below 13. Hence, this mixture is not feasible.*

*The visualisations for the above would look as follows:*



*Looking at option (b) it is clear that the AWG for T2, T3 and T4 can never be above 70 since the AWGs of each of the three is below or equal to 70.*

*Option (d) is also rejected since the average SPR is coming out to be above 17 in the case of T1, T4 and T5. Option (c) would satisfy the given constraints and is hence the correct answer.*

10. If 4 chocolates of box T1 are mixed with 3 chocolates of box T2, then what is the CSI of the mixture?

- (a) 90
- (b) 80
- (c) 70
- (d) Cannot be determined

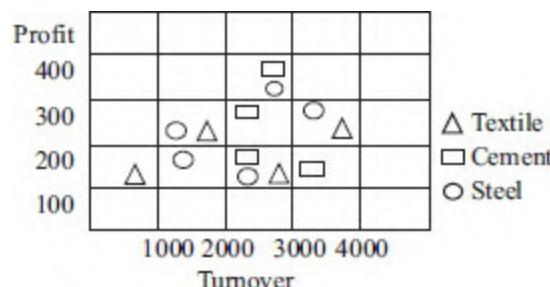
*The average AWG of the 7 chocolates would be over 70. Hence, the CSI of the mixture would be 90. Option (a) is correct.*

**Directions for Questions 11 to 13:** (Set based on Percentages)

Answer the questions on the basis of the information given below.

Each point in the graph below shows the profit and turnover data for a company.

Each company belongs to one of the three industries: textile, cement and steel.



11. For how many companies does the profit exceed 10% of turnover?

- (a) 8
- (b) 7
- (c) 6
- (d) 5

*This is a question that needs to be solved visually. For profit to exceed*

*10% of turnover, if the turnover is above 3000, the profit should be above 300. Looking at the chart, we see that there are no companies that exhibit this trend. For turnover between 2000 and 3000, the profit above 300, would definitely be greater than 10%. The company that has a profit of just below 300 and turnover above 2000 and below 3000 can also be seen to have a profit exceeding 10% of turnover—since the turnover of that company is just above 2000, while the profit is just below 300. Thus, there are 3 companies with turnover between 2000 and 3000, which exhibit a profit of over 10%. Next, there are 2 companies with turnover between 1000 to 2000 and profit above 200. These companies too would have profit exceeding 10%. The company that has a profit of just below 200 and turnover above 1000 and below 2000 can also be seen to have a profit exceeding 10% of turnover—since the turnover of that company is just above 1000, while the profit is just below 200. Thus, there are 3 companies with turnover between 1000 and 2000, which exhibit a profit of over 10%. Finally, there is one company more that needs to be counted—the company that has a turnover less than 1000, but whose profit exceeds 100. Thus, there are 7 companies that satisfy the profit exceeds 10% of turnover criterion. Option (b) is correct.*

12. An investor wants to buy stock of only steel or cement companies with a turnover more than 1000 and profit exceeding 10% of turnover. How many choices are available to the investor? (*Steel and Cement, means either the circles or the squares in the figure. This question is easy because, we have already identified the 7 companies that have a profit exceeding 10% of turnover. With turnover between 2000 and 3000, we had identified 3 companies having profit above 10%. On going back to the figure, we see that all these three are either squares or circles. Also, for turnover between 1000 to 2000, we see that of the three companies with over 10% profit, there are two circles and 1 triangle. The triangle is not a feasible option in this case – as we are looking at only circles and squares. Thus, the investor would have a total of 3 + 2 = 5 options.*)
- (a) 4
  - (b) 5
  - (b) 6
  - (d) 7

13. For how many steel companies (*circles on the graph*) with a turnover of more than 2000 is the profit less than 300? (*Visually you can see that there are 2 circles above 2000 on the x-axis and below 300 on the y-axis. Option (c) is correct.*)
- 0
  - 1
  - 2
  - 7

**Directions for Questions 14 to 17:** (Set based on Percentages)

Answer the questions on the basis of the following information.

The following is the wholesale price index (WPI) of a select list of items with the base year of 1993–94. In other words, all the item prices are made 100 in that year (1993–94). Prices in all other years for an item are measured with respect to its price in the base year. For instance, the price of cement went up by 1% in 1994–95 as compared to 1993–94. Similarly, the price of power went up by 3% in 1996–97 as compared to 1993–94. (*A quick glance at the table at this point of time would give you the logic. So if we first look at the legends down the first column we get that the first legend in the first column is the ‘All Items’ legend—whose growth essentially would be expected to be the weighted average of the growths of the individual items like cement, limestone etc. The other thing we notice is that the value for the year 1993–94 has been set as the base year for each of the items and the growth in the costs till the year 2002–03 has been given for each of the items).*

|           | 1993–94 | 1994–95 | 1995–96 | 1996–97 | 1997–98 | 1998–99 | 1999–00 | 2000–01 | 2001–02 | 2002–03 |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| All Items | 100     | 102.0   | 102.5   | 104.00  | 103.00  | 105.00  | 106.0   | 108.00  | 107.0   | 106.0   |
| Cement    | 100     | 101.0   | 100.5   | 103.00  | 102.50  | 103.50  | 103.1   | 103.80  | 103.7   | 104.0   |
| Limestone | 100     | 102.0   | 102.5   | 102.75  | 102.25  | 103.00  | 104.0   | 105.00  | 104.5   | 105.0   |
| Power     | 100     | 101.5   | 102.5   | 103.00  | 103.50  | 104.00  | 106.0   | 107.00  | 107.5   | 108.0   |
| Steel     | 100     | 101.5   | 101.0   | 103.50  | 104.00  | 104.25  | 105.0   | 105.50  | 106.0   | 105.5   |
| Timber    | 100     | 100.5   | 101.5   | 102.00  | 102.50  | 102.00  | 103.0   | 103.50  | 104.0   | 104.5   |
| Wages     | 100     | 101.5   | 103.0   | 103.50  | 104.00  | 104.25  | 104.0   | 104.75  | 104.9   | 105.3   |

14. Let us suppose that one bag of cement (50 kg) consumes 100 kg of

limestone and 10 units of power. The only other cost item in producing cement is in the form of wages. During 1993–94, limestone, power and wages contributed, respectively, 20%, 25%, and 15% to the cement price per bag. (*Your reaction at this point of time should be that a total of  $20 + 25 + 15 = 60\%$  of the price of the cement bag in 1993–94 comes from these three items—and that these are the only items used in producing cement, which in turn means that the operating profit for cement in 1993–94 is 40%.*) The average operating profit (% of price per cement bag) earned by a cement manufacturer during 2002–03 is closest to:

- (a) 40%
- (b) 39.5%
- (c) 38.5%
- (d) 37.5%

*The price of a cement bag would increase by 4% from 1993–94 to 2002–03. Thus a bag priced at 100 in 1993–94 would be priced at 104 in 2002–03. Further, the individual cost components of the cement bag would also increase. Checking the percentage increases on each of the items that are used in making cement and applying the percentage growth to them, we get that the cost of limestone would grow by 20 to 21—a 5% increase, cost of power would increase by 8%—so it would go from 25 to 27. Similarly wages would grow from 15 to 15.795—an increase of 5.3%. The total cost for a cement bag priced at 104 would be  $21 + 27 + 15.795 = 63.795$ . The profit per cent, i.e. % of price per bag would be given by the percentage value of the ratio  $40.2/104$ —which works out closest to 38.5%. Option (c) is correct.*

15. Steel manufacturing requires the use of iron ore, power and man power. The cost of iron ore has followed the All Items index. During 1993–94 power accounted for 30% of the selling price of steel, iron ore for 25%, and wages for 10% of the selling price of steel. Assuming the cost and price data for cement as given in the previous question, the operating profit (% of selling price) of an average steel manufacturer in 2002–03:
- (a) is more than that of a cement manufacturer.
  - (b) is less than that of a cement manufacturer.

- (c) is the same as that of a cement manufacturer.
- (d) can not be determined

*Steel's price has gone up by 5.5% during the period, from a base value of 100 to 105.5. In 1993–94 the base price had 30% cost for power, which has grown by 8% to 32.4 in 105.5. Similarly, the 25% component of the base price that was accounted for by iron ore, has grown by 6%. This would mean that it would have increased to 26.5. Similarly, wages would have increased from 10 to 10.53. Thus, the total cost component in the selling price of 105.5 for steel in 2002–03 would be 'Cost of Power + Cost of Iron Ore + Cost of Wages' = 32.4 + 26.5 + 10.53 = 69.43. This means a profit percent equal to the percentage value of the ratio  $(105.5 - 69.43)/105.5 = 36.07/105.5$ . Compared to the profit per cent of a cement manufacturer, this is obviously lower. Hence, the correct answer is option (c)*

16. Which item experienced continuous price rise during the ten-year period?
- 1. Power
  - 2. Cement
  - 3. Wages
  - 4. Limestone

*This is a visual question and the only thing you need to check for this is for a continuous increase in the WPI of the items given in the options. Clearly, power is the correct answer as it exhibits a continuous price increase over the given period – i.e. its' WPI numbers are always increasing.*

17. Which item(s) experienced only one decline in price during the ten-year period? (*This is again a visual question and can be easily seen that Steel shows two declines, so the first two options can be rejected forthwith. Looking at the third and fourth options, Timber is there in both. Hence, even without looking at the table we can easily understand that Timber must be exhibiting the required property. Checking for wages, we can see that wages has declined only once during the given period—the decline is seen between 1998–99 to 1999–00. Hence, option (d) is correct.*)
- (a) Steel and Limestone

- (b) Steel and Timber
- (c) Timber
- (d) Timber and Wages

**Directions for Questions 18 to 21:** (Set based on Averages)

Answer the following questions on the basis of the information given below.

The performance of six students of a class in five subjects is evaluated on a 9-point grading system. Each student is awarded a grade and grade points in each of the five subjects based on the marks obtained by him in that subject (See [Table 1](#)). [Table 2](#) shows the marks obtained by each student in the five subjects. A student's GPA (Grade Point Average) is the average of the grade points awarded to him in the five subjects.

Table 1

| Marks Range | Grade | Grade Points |
|-------------|-------|--------------|
| 91–100      | A1    | 10           |
| 81–90       | A2    | 9            |
| 71–80       | B1    | 8            |
| 61–70       | B2    | 7            |
| 51–60       | C1    | 6            |
| 41–50       | C2    | 5            |
| 31–40       | D     | 4            |
| 21–30       | E     | 3            |
| 0–20        | F     | 2            |

*(The reaction to the table giving us the grade points is that the Grade and the grade points are both directly dependent on the range of marks scored by a student. When you look at the table giving us the subject-wise marks scored, we see that there are some missing values, denoted by the letters X, Y and Z in the table. Obviously, the information provided after the table must be to help us work out those numbers.)*

Table 2

|          | Subject-wise Marks Scored |       |       |         |       |
|----------|---------------------------|-------|-------|---------|-------|
|          | English                   | Hindi | Maths | Science | S.Sc. |
| Abhishek | 56                        | 67    | 92    | 97      | 51    |
| Saral    | 88                        | 79    | 87    | Z       | 88    |
| Himanshu | X                         | 81    | 82    | 89      | 81    |
| Puneet   | 83                        | 93    | 91    | 78      | 79    |
| Vijay    | 74                        | 65    | Y     | 67      | 77    |
| Sanjay   | 73                        | 88    | 93    | 60      | 86    |

Additional Information: 363, 403 to 412; 333 + 91 to 100; 421; 283 + 81 to 90; 400

- The sum of the GPAs of Saral and Puneet is equal to the sum of the GPAs of Himanshu and Sanjay.
- The GPAs of Abhishek and Vijay are equal.
- Saral, Himanshu, Puneet and Sanjay get distinct GPAs.
- Though the total marks (the sum of the marks obtained in the five subjects) of Himanshu are not the highest, his GPA is the highest among the six students.
- The sum of the marks obtained by the six students in Science is more than the sum of the marks obtained by the six students in exactly three of the other four subjects.

*The first thing you should do is to change the subject-wise total and write down the grade points for every score in that table. This is how the grade-wise table would look:*

|          | English | Hindi | Maths | Science | S.Sc. | GPA         |
|----------|---------|-------|-------|---------|-------|-------------|
| Abhishek | 6       | 7     | 10    | 10      | 6     | 7.8         |
| Saral    | 9       | 8     | 9     | Z'      | 9     | (35 + Z')/5 |
| Himanshu | X'      | 9     | 9     | 9       | 9     | (36 + X')/5 |
| Puneet   | 9       | 10    | 10    | 8       | 8     | 9           |
| Vijay    | 8       | 7     | Y'    | 7       | 8     | (30 + Y')/5 |
| Sanjay   | 8       | 9     | 10    | 6       | 8     | 8.2         |

*From the information about GPAs of Abhishek and Vijay being equal we get that Y' must be 9. From the information that Himanshu has the highest GPA, we can conclude that his GPA must be above 9. This is only possible if*

$X'$  is 10. This information would change the solution table to:

|          | English | Hindi | Maths | Science | S.Sc. | GPA           |
|----------|---------|-------|-------|---------|-------|---------------|
| Abhishek | 6       | 7     | 10    | 10      | 6     | 7.8           |
| Saral    | 9       | 8     | 9     | $Z'$    | 9     | $(35 + Z')/5$ |
| Himanshu | 10      | 9     | 9     | 9       | 9     | 9.2           |
| Puneet   | 9       | 10    | 10    | 8       | 8     | 9             |
| Vijay    | 8       | 7     | 9     | 7       | 8     | 7.8           |
| Sanjay   | 8       | 9     | 10    | 6       | 8     | 8.2           |

Now using the information that the sum of the GPAs of Saral and Puneet is equal to the sum of the GPAs of Himanshu and Sanjay, we can work out that:

GPA of Saral + 9 = 9.2 + 8.2  $\rightarrow$  GPA of Saral = 8.4. This means that  $Z'$  must be 7. The final table would look as follows:

|          | English | Hindi | Maths | Science | S.Sc. | GPA |
|----------|---------|-------|-------|---------|-------|-----|
| Abhishek | 6       | 7     | 10    | 10      | 6     | 7.8 |
| Saral    | 9       | 8     | 9     | 7       | 9     | 8.4 |
| Himanshu | 10      | 9     | 9     | 9       | 9     | 9.2 |
| Puneet   | 9       | 10    | 10    | 8       | 8     | 9   |
| Vijay    | 8       | 7     | 9     | 7       | 8     | 7.8 |
| Sanjay   | 8       | 9     | 10    | 6       | 8     | 8.2 |

18. Which grade is awarded to Saral in Science?

- (a) A1
- (b) A2
- (c) B1
- (d) B2

The answer can be read off the final solution table. Since he got 7 grade points in Science, Saral should have got a grade of B2 in Science.

19. Who gets the second highest GPA among the six students?

- (a) Saral
- (b) Puneet
- (c) Vijay
- (d) Sanjay

The second highest GPA is for Puneet. Option (b) is the correct

*answer.*

20. What is the sum of the marks obtained by Saral in the five subjects?
- (a) 422
  - (b) 432
  - (c) 426
  - (d) Cannot be determined

*Saral's score in science is something we cannot work out exactly. He has got between 61 to 70 marks in Science but we cannot determine his exact score.*

21. How many values are possible for X?
- (a) 1
  - (b) 10
  - (c) 8
  - (d) None of these

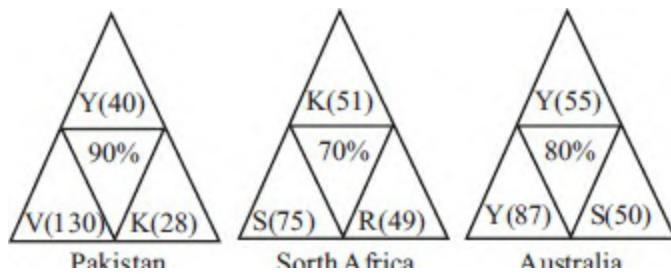
Since Himanshu cannot be getting the highest total marks his total must be less than 421. However, if we take a closer look at this, Himanshu's total is  $333 + X = 424$  to 433. The only total marks in that range are for Puneet, who has scored a total of 424. Since Himanshu's score cannot be greater than 424, he must have got 91 in English. X thus has only 1 value possible.

**Directions for Questions 22 to 25:** (*Set based on Numerical Logic and Percentages*)

Answer the questions on the basis of the information given below.

Coach John sat with the score cards of Indian players from the 3 games in a one-day cricket tournament where the same set of players played for India and all the major batsmen got out. John summarized the batting performance through three diagrams, one for each game. In each diagram, the three outer triangles communicate the number of runs scored by the three top scorers from India, where K, R, S, V and Y represent Kaif, Rahul, Saurav, Virender, and Yuvraj respectively. The middle triangle in each diagram denotes the percentage of total score that was scored by the top three Indian scorers in that game. (*At this point in the text, we have enough information to look at the charts given. It is clear that in the first game against Pakistan, Virender*

scored 130, while Kaif scored 28 and Yuvraj scored 40. Thus the top three scorers in the first game scored a total of 198 runs. From the middle triangle it is evident that the top three scored 90% of India's total score in that game. Naturally, India must have scored a total of 220 runs in that game. Similar working out can be done for the other two triangles too, but we will not do these at this point since we are not required to find out the values for all three games at this point of time. We would get to those when we reach a question necessitating the calculation. Note that the Pakistan calculation was for understanding the data and whether the equation used in the question is understood by us.) No two players score the same number of runs in the same game. John also calculated two batting indices for each player based on his scores in the tournament; the R-index of a batsman is the difference between his highest and lowest scores in the 3 games while the M-index is the middle number, if his scores are arranged in a non-increasing order. (Naturally the R-Index would be calculable exactly only for a batsman whose highest and least scores are known. Likewise, the M index would only be calculable for a batsman whose middle score would be available.)



22. Among the players mentioned, who can have the lowest R-index from the tournament?

1. Only Kaif, Rahul or Yuvraj
2. Only Kaif or Rahul
3. Only kaif or Yuvraj
4. Only Kaif

(This question requires us to look at the values of the individual scores of the five batsmen in the three matches. You should also realise that there are a total of  $5 \times 3 = 15$  scores, but the triangles only reveal 9 scores. Thus, for the remaining 6 scores we would need to make a possibility range in order to handle questions based on R-Index and M-Index of the batsmen. It might be good at this point to make a table

encapsulating the data for easier reading—since a quick glance at the upcoming questions shows that all the questions are about R-Index and M-Index only. Before we make the table for the individual batsmen we should take out the total runs made by the team in each match.

Match 1 against Pakistan (we have already worked this out during our initial understanding of the set): Total runs = 220,  $V + Y + K = 130 + 40 + 28 = 198$ . Remaining runs =  $220 - 198 = 22$

Match 2 against South Africa: Total runs = 250,  $S + K + R = 75 + 51 + 49 = 175$ . Remaining runs =  $250 - 175 = 75$

Match 3 against Australia: Total runs = 240,  $Y + R + S = 87 + 55 + 50 = 192$ . Remaining runs =  $240 - 192 = 48$ .

The following table can then be constructed:

| Name     | Match 1 | Match 2 | Match 3 | R- Index | M-Index |
|----------|---------|---------|---------|----------|---------|
| Virender | 130     | 0–48    | 0–48    | 82–130   | 0–48    |
| Yuvraj   | 40      | 0–48    | 87      | 47–87    | 40–48   |
| Kaif     | 28      | 51      | 0–48    | 23–51    | 28–48   |
| Rahul    | 0–22    | 49      | 55      | 33–55    | 49      |
| Saurav   | 0–22    | 75      | 50      | 53–75    | 50      |

(From the table it can be seen that the least R-Index can be for Kaif, Yuvraj or Rahul. Under no circumstance can Saurav or Virender claim the least R-Index.)

23. How many players among those listed definitely scored less than Yuvraj in the tournament?
- 0
  - 1
  - 2
  - More than 2

Taking the scores derived in the table for the first question we get:

| Name     | Match 1 | Match 2 | Match 3 | Total Runs |
|----------|---------|---------|---------|------------|
| Virender | 130     | 0–48    | 0–48    | 130–226    |
| Yuvraj   | 40      | 0–48    | 87      | 127–175    |
| Kaif     | 28      | 51      | 0–48    | 79–127     |
| Rahul    | 0–22    | 49      | 55      | 104–126    |
| Saurav   | 0–22    | 75      | 50      | 125–147    |

*Yuvraj has scored a minimum of 127 runs. Only Rahul has definitely scored less than Yuvraj. Hence, option (b) is correct.*

24. Which of the players had the best M-index from the tournament?

- (a) Rahul
- (b) Saurav
- (c) Virender
- (d) Yuvraj

*Going back to the table drawn while answering the first question, we get that the best M-index must be for Saurav. Option (b) is correct.*

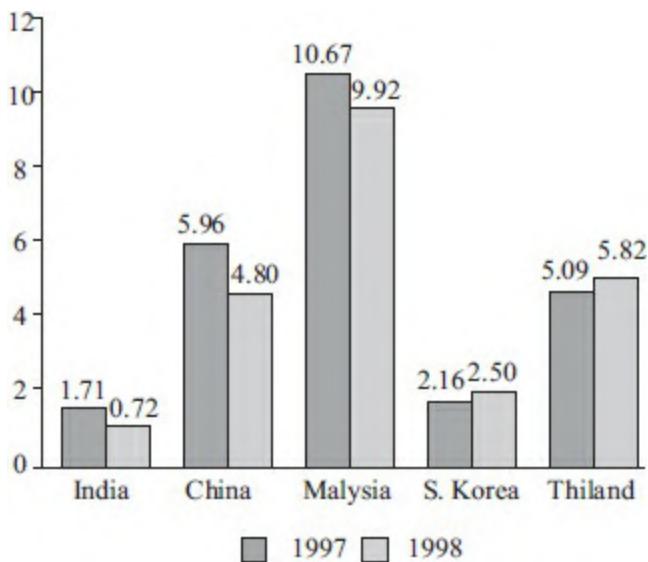
25. For how many Indian players is possible to calculate the exact M-index?

- (a) 0
- (b) 1
- (c) 2
- (d) More than 2

*Going back to the table drawn while answering the first question, we get that the best M-index can be calculated for Saurav and Rahul. i.e. for two players. Hence, option (c) is correct.*

**Directions for Questions 26 to 29:** Answer these questions based on the data provided in the figure below.

FEI for a country in a year, is the ratio (expressed as a percentage) of its foreign equity inflows to its GDP. The following figure displays the FEIs for selected Asian countries for the years 1997 and 1998.



26. The country with the largest change in FEI in 1998 relative to its FEI in 1997 is
- India
  - China
  - Malaysia
  - Thailand

*Sol. (a) The largest relative change (which should be interpreted as the largest percentage change here) can be seen visually to be for India—1.71 to 0.72 which is a change of over 50 per cent of its original value. No other country's percentage change (relative change) is as high as this.*

27. Based on the data provided it can be concluded that
- Absolute value of foreign equity inflows in 1998 was higher than that in 1997 for both Thailand and South Korea.
  - Absolute value of foreign equity inflows was higher in 1998 for Thailand and lower for China than corresponding values in 1997.
  - Absolute value of foreign equity inflows was higher in 1998 for both Thailand and China than their corresponding values in 1997.
  - None of the above can be inferred.

*Sol. (d) Before you solve this question, you should realise that we are only given the values of the FEI ratios (Foreign Equity inflows/GDP) for each of these countries for 2 years. Hence, we are not in any position to comment on the absolute changes in the Foreign Equity Inflows for*

*any country. Since all the three options are talking about absolute value changes in the Foreign Equity Inflows—we cannot make any of those conclusions. Thus, option (d) is the correct answer.*

28. It is known that China's GDP in 1998 was 7 per cent higher than its value in 1997, while India's GDP grew by 2 per cent during the same period. The GDP of South Korea, on the other hand, fell by 5 per cent. Which of the following statements are true?
- I. Foreign equity inflows to China were higher in 1998 than in 1997.
  - II. Foreign equity inflows to China were lower in 1998 than in 1997.
  - III. Foreign equity inflows to India were higher in 1998 than in 1997.
  - IV. Foreign equity inflows to South Korea decreased in 1998 relative to 1997.
  - V. Foreign equity inflows to South Korea increased in 1998 relative to 1997.
- (a) I, III & IV
  - (b) II, III & IV
  - (c) I, III & V
  - (d) II & V

*Sol. (d) Since India's GDP has gone up by 2 per cent the effect on the FEI ratio for India would be that the denominator would grow by 2 per cent. A 2 per cent increase in the denominator would mean approximately 1.8 per cent decrease in the ratio. But the ratio for India has fallen from 1.71 to 0.72—a drop of almost 57–58 per cent approximately. This can only happen if the numerator has also gone down. i.e. India's Foreign Equity Inflows in 1998 were lower than the corresponding value in 1997. Thus, statement III is false.*

*A similar analysis for China shows that since the GDP of China has gone up by 7 per cent, we expect a 6.7 per cent (approx) decrease in its FEI ratio due to the denominator alone. However, looking at the FEI ratio values for China in 1997 and 1998 we see that the values have gone down from 5.96 to 4.80 a drop which is greater than a 6.7 per cent drop—this implies a drop in the numerator i.e. Foreign Equity inflows for China in 1998 were lower than the corresponding value in 1997. Thus, statement II is true and statement I is false.*

*At this stage we can conclude from the options that the correct answer to the question would be option (d).*

*For South Korea, you can check by a similar logic that the Foreign equity inflows for South Korea actually increased from 1997 to 1998.*

29. China's foreign equity inflows in 1998 were 10 times that into India. It can be concluded that:

- (a) China's GDP in 1998 was 40 per cent higher than that of India.
- (b) China's GDP in 1998 was 70 per cent higher than that of India.
- (c) China's GDP in 1998 was 50 per cent higher than that of India.
- (d) No inference can be drawn about relative magnitudes of China's and India's GDPs.

*Sol. (c) Let India's Foreign Equity Inflows =  $x$ , then China's Foreign Equity Inflows =  $10x$ .*

*Then:  $FEI_{1998(India)} = 0.72 = y/GDP_{1998(India)}$  and*

*$FEI_{1998(China)} = 4.8 = 10y/GDP_{1998(China)}$*

*$FEI_{1998(India)}/FEI_{1998(China)} = 0.72/4.8 = GDP_{1998(China)}/10 GDP_{India}$*

*$\rightarrow GDP_{1998(China)}/GDP_{1998(India)} = 7.2/4.8 = 1.5$*

*Thus, we can conclude that China's GDP in 1998 was 50 per cent higher than India's GDP in that year.*

**Directions for Questions 30 to 33:** Answer these questions based on the table below:

The table shows trends in external transactions of Indian corporate sector during the period 1993–94 to 1997–98. In addition, the following definitions hold good:

Sales, Imports and Exports, respectively denote the sales, imports and exports in year  $i$ .

Deficit in year  $i$ , Deficit = Imports - Exports

Deficit Intensity in year  $i$ ,  $DI_i = \text{Deficit}_i / \text{Sales}$

Growth rate of deficit intensity in year  $i$ ,  $GDI_i = (DI_i - D_{i-1}) / DI_{i-1}$

Further, note that all imports are classified as either raw material or capital goods.

## Trends in External Transactions of Indian Corporate Sector (All figures in %)

| Year   | 1997—<br>98 | 1996—<br>97 | 1995—<br>96 | 1994—<br>95 | 1993—<br>94 |
|--|-------------|-------------|-------------|-------------|-------------|
| Export Intensity*                                | 9.2         | 8.2         | 7.9         | 7.5         | 7.3         |
| Import Intensity*                                | 14.2        | 16.2        | 15.5        | 13.8        | 12.4        |
| Imported raw material/Total cost of raw material | 20.2        | 19.2        | 17.6        | 16.3        | 16.0        |
| Imported capital goods/ Gross fixed assets       | 17.6        | 9.8         | 11.8        | 16.3        | 19.5        |

\*Ratio of Exports (or Imports) to Sales

30. The highest growth rate in deficit intensity was recorded in:
- 1994–95
  - 1995–96
  - 1996–97
  - 1997–98

*Sol.(a) The Deficit Intensity would be (Import Intensity - Export Intensity).*

*The series of values for the same would be:*

*1993–94 = 5.1, 1994–95 = 6.3, 1995–96 = 7.6, 1996–97 = 8 and 1997–98 = 5.*

*The highest growth rate in the same is seen in the year 1994–95 (over 23 per cent) and is higher than 1995–96 (20–21 per cent). In the other two years the values are either too small or negative and hence, need not be calculated.*

31. The value of the highest growth rate in deficit intensity is approximately:
- 8.45%
  - 2.15%
  - 33.3%
  - 23.5%

*Sol. (d) We have already done this calculation in the previous question. 5.1 → 6.3 = growth rate of 23.5 per cent approx.*

32. In 1997–98 the total cost of raw materials is estimated as 50 per cent

of sales of that year. The turnover of gross fixed assets, defined as the ratio of sales to gross fixed assets, in 1997–98 is, approximately

- (a) 33
- (b) 4.3
- (c) 0.33
- (d) Not possible to determine

*Sol.* (b) For the year 1997–98, the following thought process would give the required answer:

$$\text{Imported Raw Material/Total Cost of Raw Materials} = \text{Imported Raw Material}/0.5 \text{ Sales} = 20.2 \rightarrow$$

$$\text{Imported raw material} = 10.1 \text{ Sales} \quad (1)$$

$$\text{The Import intensity} = \text{Import}/\text{Sales} = 14.2 \rightarrow \text{Import} = 14.2 \text{ Sales} \quad (2)$$

But we are given that Import = Imported Raw Material + Imported Capital Goods = 14.2% of Sales

$14.2 = 10.1 \text{ Sales} + \text{Imported Capital Goods} \rightarrow \text{Imported Capital Goods} = 4.1\% \text{ of Sales.}$

Then we are given that, Imported Capital Goods/Gross Fixed Assets = 17.6  $\rightarrow$  4.1 Sales/Gross Fixed Assets = 17.6  $\rightarrow$  Sales/Gross Fixed Assets =  $17.6/4.1 = 4.3$  (required answer)

33. Which of the following statements can be inferred to be true from the given data?

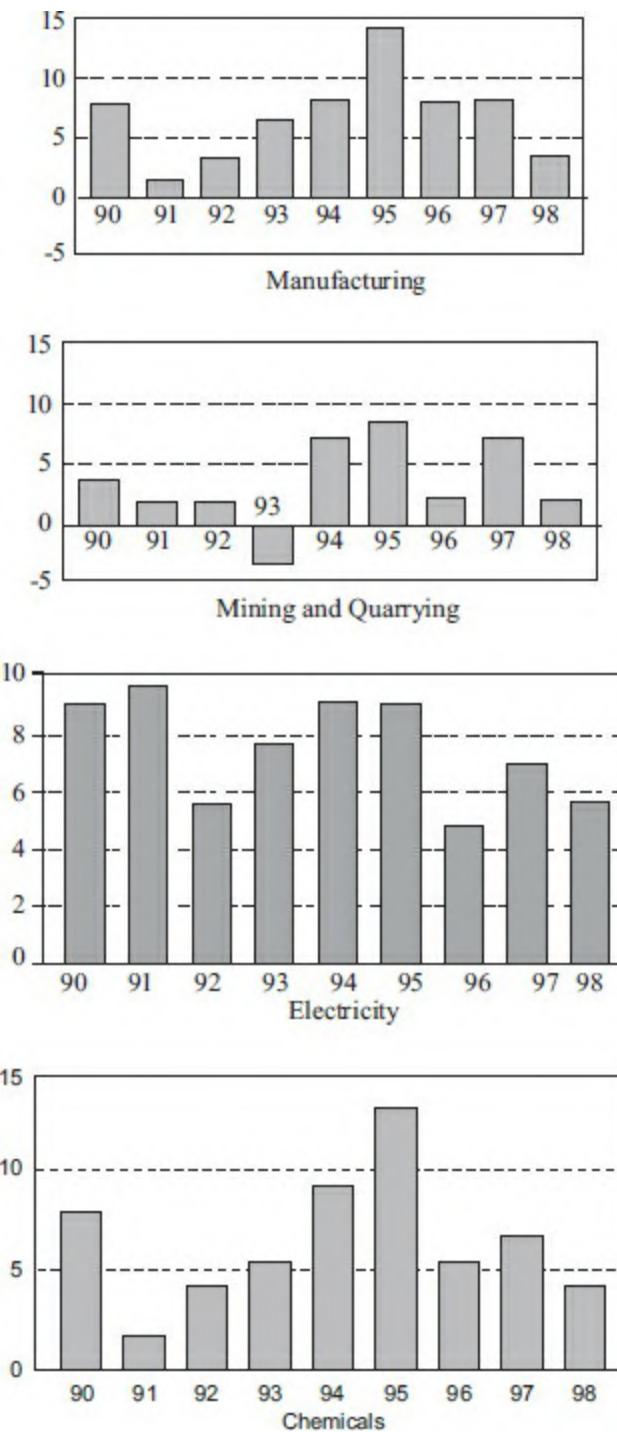
- (a) During the five year period between 1993–94 and 1997–98, exports have increased every year.
- (b) During the five year period between 1993–94 and 1997–98, imports have decreased every year.
- (c) Deficit in 1997–98 was lower than that in 1993–94.
- (d) Deficit intensity has increased every year between 1993–94 and 1996–97.

*Sol.* (d) It is clear from the given data, that since we only know ratios, we are not in a position to answer any questions about absolute value changes for any individual component of the ratio. Thus, we are not in a position to conclude anything about the increase/decrease in exports or imports or Deficits. Hence, we can safely delete options (a), (b) and (c). From the values of deficit intensity calculated for question 76, we

see that deficit intensity has grown every year from 1993–94 to 1996–97. Thus, option (d) is correct.

**Directions for Questions 34 to 39:** Answer these questions based on the data given below:

The figures below present annual growth rate, expressed as the percentage change relative to the previous year, in four sectors of the economy of the Republic of Reposia during the 9-year period from 1990 to 1998. Assume that the index of production for each of the four sectors is set at 100 in 1989. Further, the four sectors are set at 100 in 1989. Furthermore, the four sectors: Manufacturing, Mining and Quarrying, Electricity, and chemicals, respectively, constituted 20 per cent, 15 per cent, 10 per cent and 15 per cent of total industrial production in 1989.



34. Which is the sector with the highest growth during the period from 1989 to 1998?
- Manufacturing
  - Mining and Quarrying
  - Electricity

(d) Chemicals

*Sol. (c) It is evident from a visual inspection of the four charts given in the question that the highest growth rate is in the Electricity sector.*

35. The overall growth rate in 1991 of the four sectors together is approximately:

- (a) 10%
- (b) 1%
- (c) 5%
- (d) 1.5%

*Sol. (d) The overall growth rate of the four sectors would be given by:*

$$0.2 \times 1 + 0.15 \times 1 + 0.1 \times 9 + 0.15 \times 1 = 1.5\%$$

36. When was the highest level of production in the manufacturing sector achieved during the nine-year period 1990–1998?

- (a) 1998
- (b) 1995
- (c) 1990
- (d) Cannot be determined

*Sol. (a) Since the manufacturing sector has always grown year on year, it is obvious that the highest level of production in this sector in the given period would be seen in the last year i.e. 1998.*

37. When was the lowest level of production of the mining and quarrying sector achieved during the nine year period 1990–1998?

- (a) 1996
- (b) 1993
- (c) 1990
- (d) Cannot be determined

*Sol. (c) If we assume production of the Mining and Quarrying sector in 1989 to be 100, then it grows by 4% approximately in 1990, then by 1%, then by 2% and then goes down by approximately 4% in 1993. After that it consistently increases. It is obvious that the least level of production would be in 1990.*

38. The percentage increase of production in the four sectors, namely, manufacturing, mining & quarrying, electricity and chemicals, taken together, in 1994, relative to 1989, is approximately:

- (a) 25  
 (b) 20  
 (c) 50  
 (d) 40
39. It is known that the index of total industrial production in 1994 was 50 per cent more than that in 1989. As a result, the percentage increase in production between 1989 and 1994 in sectors other than the four listed above is:  
 (a) 57.5  
 (b) 87.5  
 (c) 127.5  
 (d) 47.5

*Sol. 38 and 39.* In order to solve question 38, we would need to calculate the individual growths of each of the 4 sectors over the 5 year period—using compounding and then take a weighted average of the 4 growths thus obtained—definitely something you should not solve, since the amount of calculations involved in this question is almost impossible. (It might take you 4–5 minutes to do it with a calculator).

However, if you look at what the next question is asking and try to match the two questions, you realize that the entire industrial production in 1989 would be divided into two broad parts—60% comprising these four sectors (@ 20%, 15%, 10% and 15% respectively as given in the data) and 40% comprising others.

Thus,  $100\% \text{ (total Industrial Production)} = 60\% \text{ (4 given sectors)} + 40\% \text{ (Others)}$

We also know that between 1989 to 1994, the growth in the total industrial production is 50% (given in question 85).

Thus, the vision we should have is:

$$100 = 60 + 40$$

$$150 = ?? + ??$$

The two values represented by question marks in the above equation, would help us find the percentage growth in the 4 sectors combined between 1989 to 1994 (answer to question 38) and the percentage growth in the other sectors during the same period (answer

to question 85).

From this realisation, we can move to the options:

Checking option 1 from question 38: If there is 25 per cent growth in these four sectors combined-

| Year        | Total | Four Listed Sectors | Other Sectors                                  |
|-------------|-------|---------------------|--|
| 1989        | 100   | 60                  | 40   |
| 1994        | 150   | 75                  | 75   |
| Growth Rate | 50%   | 25% (from option 1) | Calculated as 87.5%—option (b) in question 85. |

If you were to check for any of the other three options for Question 84, you would not get a matching value in the options for question 85 and hence we can conclude that the answers are:

38. 1

39. 2

For example if we check for option (b) of question 84 i.e. 20% growth in the four listed sectors combined.

| Year        | Total | Four Listed Sectors                  | Other Sectors   |
|-------------|-------|--------------------------------------|---|
| 1989        | 100   | 60                                   | 40  |
| 1994        | 150   | 72                                   | 78  |
| Growth Rate | 50%   | 20% (from option (a) of question 84) | Calculated as 95%—This value is not present in the options for question 85. |

Thus, we reject option (b).

Similarly option (c) can be rejected through the following calculation:

| Year        | Total | Four Listed Sectors                  | Other Sectors   |
|-------------|-------|--------------------------------------|---|
| 1989        | 100   | 60                                   | 40  |
| 1994        | 150   | 90                                   | 60  |
| Growth Rate | 50%   | 50% (from option (c) of question 84) | Calculated as 50%—This value is not present in the options for question 85. |

Thus, we reject option (c).

For Option (d) of question 38:

|                          | <i>Year</i> | <i>Total</i>                         | <i>Four Listed Sectors</i>  | <i>Other Sectors</i> |
|--------------------------|-------------|--------------------------------------|---|----------------------|
|                          | 1989        | 100                                  | 60  | 40                   |
|                          | 1994        | 150                                  | 84  | 66                   |
| Growth Rate value is not | 50%         | 40% (from option (d) of question 84) | Calculated as 65%—This is not present in the options for question 85. |                      |

*Thus, option (d) is also rejected.*

**Directions for Questions 40 to 47:** Answer these questions based on the table given below.

The following table shows the revenue and expenses in millions of Euros (European currency) associated with REPSOL YPF company's oil and gas activities in operations in different parts of the world for the year 1998–2000.

### **REPSOL YPF'S Operations of Oil and Gas Producing Activities**

| CATEGORY          | Year        | North Africa |       |                            |           |                       |          |           |                   |
|-------------------|-------------|--------------|-------|----------------------------|-----------|-----------------------|----------|-----------|-------------------|
|                   |             | World Total  | Spain | North Africa & Middle East | Argentina | Rest of Latin America | Far East | North Sea | Rest of the World |
| Revenue           | 1998        | 916          | 70    | 366                        | 281       | 34                    | 82       | 78        | 5                 |
|                   | 1999        | 3374         | 55    | 666                        | 2006      | 115                   | 301      | 140       | 91                |
|                   | 2000        | 8328         | 394   | 1290                       | 5539      | 482                   | 603      | 0         | 20                |
| Expenses          | 1998        | 668          | 39    | 255                        | 187       | 57                    | 63       | 52        | 15                |
|                   | 1999        | 1999         | 48    | 325                        | 1168      | 131                   | 204      | 65        | 58                |
|                   | 2000        | 3709         | 43    | 530                        | 2540      | 252                   | 311      | 0         | 33                |
| Income            | 1998        | 248          | 31    | 111                        | 94        | —23                   | 19       | 26        | —10               |
| Before Tax        | 1999        | 1375         | 7     | 341                        | 838       | —16                   | 97       | 75        | 33                |
| and Charges       | 2000        | 4619         | 351   | 760                        | 2999      | 230                   | 292      | 0         | —13               |
|                   | Taxes and   | 152          | 6     | 104                        | 33        | —3                    | 9        | 6         | —3                |
|                   | charges     | 1999         | 561   | 3                          | 169       | 338                   | —6       | 39        | 21                |
| Taxes and charges | 2000        | 1845         | 126   | 404                        | 1150      | 61                    | 103      | 0         | 1                 |
|                   | Income      | 96           | 25    | 7                          | 61        | —20                   | 10       | 20        | —7                |
|                   | After Taxes | 814          | 4     | 172                        | 500       | —10                   | 58       | 54        | 36                |
| and Charges       | 2000        | 2774         | 225   | 356                        | 1849      | —169                  | 189      | 0         | 014               |

40. How many operations (Spain, North Africa and Middle East,...) of the company accounted for less than 5 per cent of the total revenue earned in the year 1999?
- (a) 2
  - (b) 3
  - (c) 4
  - (d) none of these

*Sol. (c) The benchmark value (5 per cent of total world in 1999) would be*

*around 166. There are 4 operations below this value.*

41. How many operations (Spain, North Africa and Middle East,...) of the company witnessed more than 200 per cent revenue from the year 1999 to 2000?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) none of these

*Sol. (b) We are looking for operations whose revenue went up by more than 200 per cent, which means that we are looking for revenue which is three times the original revenue. There are only two operations—Spain and Rest of Latin America.*

42. How many operations registered a sustained yearly increase in income before taxes and charges from 1998 to 2000?
- (a) 3
  - (b) 4
  - (c) 5
  - (d) none of these

*Sol. (c) There are five such operations.*

43. Ignoring the loss making operations of the company in 1998, for how many operations was the percentage increase in net income before taxes and charges higher than the average from 1998 to 1999?
- (a) 0
  - (b) 1
  - (c) 2
  - (d) none of these

*Sol. (b) It is only true for one operation Argentina.*

44. If profitability is defined as the ratio of net income after taxes and charges to expenses, which of the following statements is true?
- (a) The Far East operations witnessed its highest profitability in 1998.
  - (b) The North Sea operations increased its profitability from 1998 to 1999.
  - (c) The operations in Argentina witnessed a decrease in profitability

from 1998 to 1999.

- (d) Both b and c are true.

*Sol. (b) It can be easily seen that the North Sea operation has gone up from 20/52 to 54/65 from 1998 to 1999.*

45. In the year 2000, which among the following countries had the best profitability?

- (a) North Africa and Middle East
- (b) Spain
- (c) Rest of Latin America
- (d) Far East

*Sol. (b) Profitability as defined in the previous question is highest for Spain in 2000 (225/43).*

46. If efficiency is defined as the ratio of revenue to expenses, which operation was the least efficient in the year 2000?

- (a) Spain
- (b) Argentina
- (c) Far East
- (d) None of these

*Sol. (d) The rest of world operation can be seen to be the least efficient (20/58).*

47. Of the following statements which one is not true?

- (a) The operations in Spain had the best efficiency in 2000.
- (b) The Far East operations witnessed an efficiency improvement from 1999 to 2000.
- (c) The North Sea operations witnessed an efficiency improvement from 1998 to 1999.
- (d) In the year 1998, the operations in Rest of Latin America were the least efficient.

*Sol. (d) In 1998, the Rest of the World operations are more inefficient than Rest of Latin America. Hence, the fourth option is not true.*

**Directions for Questions 48 to 52:**

Answer the questions on the basis of the following information.

Recently, the answers of a test held nationwide were leaked to a group of unscrupulous people. The investigative agency has arrested the mastermind and nine other people A, B, C, D, E, F, G, H and I in this matter. Interrogating them, the following facts have been obtained regarding their operation. Initially the mastermind obtains the correct answer-key. All the others create their answer-keys in the following manner.

They obtain the answer key from one or two people who already possess the same. These people are called his/her “sources”. If the person has two sources, then he/she compares the answer-keys obtained from both sources. If the key to a question from both sources is identical, it is copied, otherwise it is left blank. If the person has only one source, he/she copies the source’s answers into his/her copy. Finally, each person compulsorily replaces one of the answers (not a blank one) with a wrong answer in his/her answer-key.

The paper contained 200 questions; so the investigative agency has ruled out the possibility of two or more of them introducing wrong answers to the same question. The investigative agency has a copy of the correct answer key and has tabulated the following data. This data represents question numbers.

### **Answer key**

| Name | Wrong Answer(s) | Blank Answer(s) |
|------|-----------------|-----------------|
| A    | 46              | ---             |
| B    | 96              | 46, 90, 25      |
| C    | 27, 56          | 17, 46, 90      |
| D    | 17              | -----           |
| E    | 46, 90          | -----           |
| F    | 14, 46          | 92, 90          |
| G    | 25              | -----           |
| H    | 46, 92          | -----           |
| I    | 27              | 17, 26, 90      |

*Sol. The first thing you need to understand while trying this question is that there are essentially two ways of forming an answer key:*

1. **If you have one source**—All you do is carry forward that source's answer key and introduce 1 error from your own side in it. Thus, if the mastermind is your key then you would have 1 error in your answer key—which you would have introduced yourself. (Note: this is the only way of someone having an answer key with no blanks and 1 wrong answer only)

Similarly, if a person had a source who had 1 wrong answer in his answer key—you would have 2 wrong answers—1 carried over and another one introduced by you.

Thus, in essence you would carry forward the entire answer key of your source (blanks and wrongs as it is) and add one wrong answer of your own.

**2. If you have two sources—**

- (a) **Blank introduced**—If you have two different answers for the same question in the answer keys of the two sources. This means that if for one answer, one of the two sources had a right answer and the other had a wrong answer, then a blank would be introduced. Even if one of them had a blank and the other one had a correct or a wrong answer, it would still be a blank.
- (b) **Wrong answer carried forward**: If both sources had the same wrong answer, that wrong answer would be carried forward.

And according to the basic situation of the question, one new wrong answer of his own would also be carried forward.

The following table shows the first set of deductions:

| Name | Wrong Answer(s) | Blank Answer(s) | Deduction about source | Deduction about wrong answer introduced |
|------|-----------------|-----------------|------------------------|---|
| A    | 46              | —               | Mastermind             | 46                                      |
| B    | 96              | 46, 90, 25      |                        |   |
| C    | 27, 56          | 17, 46, 90      |                        |   |
| D    | 17              | —               | Mastermind             | 17                                      |
| E    | 46, 90          | —               | Single Source A        | 90                                      |
| F    | 14, 46          | 92, 90          |                        |   |
| G    | 25              | —               | Mastermind             | 25                                      |
| H    | 46, 92          | —               | Single Source A        | 92                                      |
| I    | 27              | 17, 46, 90      |                        |   |

We now need to think of the remaining people in the group:

B—His answer key is possible if his sources are E and G. In such a case, he would get blanks for 25, 46 and 90 (since the answers would be different for these questions in both the sources).

New wrong answer introduced would be 96.

F—His answer key is possible if his sources are E and H. This would give us blank answers as 90 and 92, the wrong answer 46 would be carried forward and 14 would be the new wrong answer introduced by him.

The table would now look like:

| Name | Wrong Answer(s) | Blank Answer(s) | Deduction about source | Deduction about wrong answer introduced |
|------|-----------------|-----------------|------------------------|---|
| A    | 46              | —               | Mastermind             | 46                                      |
| B    | 96              | 46, 90, 25      | Two Sources: E and G   |   |
| C    | 27, 56          | 17, 46, 90      |                        |   |
| D    | 17              | —               | Mastermind             | 17                                      |
| E    | 46, 90          | —               | Single Source A        | 90                                      |
| F    | 14, 46          | 92, 90          | Two Sources E and H    |   |
| G    | 25              | —               | Mastermind             | 25                                      |
| H    | 46, 92          | —               | Single Source A        | 92                                      |
| I    | 27              | 17, 46, 90      |                        |   |

We, now, need to think about C and I.

Looking at C and I's answer keys, it is evident that C would have I as a source.

I's answer key can be explained as: Two sources D and E.

| Name | Wrong Answer(s) | Blank Answer(s) | Deduction about source | Deduction about wrong answer introduced |
|------|-----------------|-----------------|------------------------|---|
| A    | 46              | —               | Mastermind             | 46                                      |
| B    | 96              | 46, 90, 25      | Two Sources: E and G   | 96                                      |
| C    | 27, 56          | 17, 46, 90      | Single source I        | 56                                      |
| D    | 17              | —               | Mastermind             | 17                                      |
| E    | 46, 90          | —               | Single Source A        | 90                                      |
| F    | 14, 46          | 92, 90          | Two Sources E and H    | 14                                      |
| G    | 25              | —               | Mastermind             | 25                                      |
| H    | 46, 92          | —               | Single Source A        | 92                                      |
| I    | 27              | 17, 46, 90      | Two sources D and E    | 27                                      |

*The answers can be read off the table.*

48. Which one among the following must have two sources?

- (a) A
- (b) B
- (c) C
- (d) D

*Sol. (B (Option b).)*

49. How many people (excluding the mastermind) needed to make answer-keys before C could make his answer-key?

- (a) 2
- (b) 3
- (c) 4
- (d) 5

*Sol. (c) For C to make his answer key, I has to make this answer key. For I, D and E have to make their answer key. For E to make his answer key, A should make his answer key before that. Thus, A, D, E and I should make their answer keys before C makes his. Thus, option 3 is correct.*

50. Both G and H were sources to

- (a) F
- (b) B
- (c) 1

- (d) none of the nine

*Sol. (d) None of the nine (Option d).*

51. Which of the following statements is true?

- (a) C introduced the wrong answer to question 27.
- (b) E introduced the wrong answer to question 46.
- (c) F introduced the wrong answer to question 14.
- (d) H introduced the wrong answer to question 46.

*Sol. (c) F introduced the wrong answer to question 14 (Option c).*

52. Which of the following two groups of people had identical sources?

- (I) A, D and G
- (II) E and H
  - (a) Only (I)
  - (b) Only (II)
  - (c) Neither (I) nor (II)
  - (d) Both (I) and (II)

*Sol. (d) A, D and G's source was the mastermind. E and H's source was A.*

*Thus, option (d) is correct.*

**Directions for Questions 53 to 56:**

Answer the questions on the basis of the following table that lists countries region-wise. Each region-wise list is sorted, first by birth rate and then alphabetically by name of country. We now wish to merge the region-wise list into one consolidated list and provide overall rankings to each country, based first on birth rate and then on death rate. Thus, if some countries have the same birth rate, then the country with a lower death rate will be ranked higher. Further, countries having identical birth and death rates will get the same rank. For example, if two countries are tied for the third position, then both will be given rank 3, while the next country (in the ordered list) will be ranked 5.

| Rank | Country      | Birth Rate | Death Rate | Region | Rank | Country        | Birth Rate | Death Rate | Region     |
|------|--------------|------------|------------|--------|------|----------------|------------|------------|------------|
| 1    | South Africa | 36         | 12         | Africa | 1    | Germany (FRG)  | 12         | 12         | Europe     |
| 2    | Egypt        | 39         | 13         | Africa | 2    | Austria        | 12         | 13         | Europe     |
| 3    | Cameroon     | 42         | 22         | Africa | 3    | Belgium        | 12         | 12         | Europe     |
| 4    | Mozambique   | 45         | 18         | Africa | 4    | Germany (DRG)  | 12         | 14         | Europe     |
| 5    | Zaire        | 45         | 18         | Africa | 5    | Sweden         | 12         | 11         | Europe     |
| 6    | Ghana        | 46         | 14         | Africa | 6    | Switzerland    | 12         | 9          | Europe     |
| 7    | Angola       | 47         | 23         | Africa | 7    | UK             | 12         | 12         | Europe     |
| 8    | Madagascar   | 47         | 22         | Africa | 8    | Netherlands    | 13         | 8          | Europe     |
| 9    | Morocco      | 47         | 16         | Africa | 9    | France         | 14         | 11         | Europe     |
| 10   | Tanzania     | 47         | 17         | Africa | 10   | Italy          | 14         | 10         | Europe     |
| 11   | Ethiopia     | 45         | 23         | Africa | 11   | Greece         | 16         | 9          | Europe     |
| 12   | Ivory Coast  | 43         | 23         | Africa | 12   | Bulgaria       | 17         | 10         | Europe     |
| 13   | Rhodesia     | 48         | 14         | Africa | 13   | Hungary        | 18         | 12         | Europe     |
| 14   | Uganda       | 48         | 17         | Africa | 14   | Spain          | 18         | 8          | Europe     |
| 15   | Nigeria      | 49         | 22         | Africa | 15   | USSR           | 18         | 9          | Europe     |
| 16   | Saudi Arabia | 49         | 19         | Africa | 16   | Yugoslavia     | 18         | 8          | Europe     |
| 17   | Sudan        | 49         | 17         | Africa | 17   | Czech Republic | 19         | 11         | Europe     |
| 18   | Algeria      | 50         | 16         | Africa | 18   | Portugal       | 19         | 10         | Europe     |
| 19   | Kenya        | 50         | 14         | Africa | 19   | Romania        | 19         | 10         | Europe     |
| 20   | Uppa Volta   | 50         | 28         | Africa | 20   | Poland         | 20         | 9          | Europe     |
| 1    | Japan        | 16         | 6          | Asia   | 1    | USA            | 15         | 9          | N. America |
| 2    | Korea (ROK)  | 26         | 6          | Asia   | 2    | Canada         | 16         | 7          | N. America |
| 3    | Sril Lanka   | 26         | 9          | Asia   | 3    | Cuba           | 20         | 6          | N. America |
| 4    | Taiwan       | 26         | 5          | Asia   | 4    | Mexico         | 40         | 7          | N. America |
| 5    | Malaysia     | 30         | 6          | Asia   | 1    | Australia      | 16         | 8          | Pacific    |
| 6    | China        | 31         | 11         | Asia   | 2    | Philippines    | 34         | 10         | Pacific    |
| 7    | Thailand     | 34         | 10         | Asia   | 3    | Indonesia      | 38         | 16         | Pacific    |
| 8    | Turkey       | 34         | 12         | Asia   | 1    | Argentina      | 22         | 10         | S. America |
| 9    | India        | 36         | 15         | Asia   | 2    | Chile          | 22         | 7          | S. America |
| 10   | Burma        | 38         | 15         | Asia   | 3    | Colombia       | 34         | 10         | S. America |
| 11   | Iran         | 42         | 12         | Asia   | 4    | Brazil         | 36         | 10         | S. America |
| 12   | Vietnam      | 42         | 17         | Asia   | 5    | Venezuela      | 36         | 6          | S. America |
| 13   | Korea (DPRK) | 43         | 14         | Asia   | 6    | Guatemala      | 40         | 14         | S. America |
| 14   | Pakistan     | 44         | 12         | Asia   | 7    | Peru           | 40         | 13         | S. America |
| 15   | Nepal        | 46         | 20         | Asia   | 8    | Ecuador        | 42         | 11         | S. America |
| 16   | Bangladesh   | 47         | 19         | Asia   |      |                |            |            |            |
| 17   | Syria        | 47         | 14         | Asia   |      |                |            |            |            |
| 18   | Iraq         | 48         | 14         | Asia   |      |                |            |            |            |
| 19   | Afghanistan  | 52         | 30         | Asia   |      |                |            |            |            |

*Sol.* In order to solve this question, you need to understand the process for making the consolidated list. The logic, as explained in the question is, that while making the consolidated list, we would first take the least birth rate as the first criteria. In the case of two or more countries having the same birth rate, then we would look at the death rates in

*those countries to act as a tie breaker—the country with the least death rate getting the lowest rank amongst the countries which are tied for rankings on the basis of their birth rates. Note that the usage of the death rate is only a tie breaker—in the event of countries tying on the basis of birth rates.*

*The other thing you need to take into account is that if there is a tie between two or more countries on the basis of both the birth rate and the death rate—then, they share the same rank and the next rank is not given to any country.*

53. In the consolidated list, what would be the overall rank of the Philippines?

- (a) 32
- (b) 33
- (c) 34
- (d) 35

*Sol. (b) The Phillipines has a birth rate of 34 and a death rate of 10. Thus, in order to find the position of Phillipines in the consolidated list—we should first look at the countries which have a birth rate of less than 34. There are 20 countries in Europe, 3 in N America, 0 in Africa, 6 in Asia, 1 in Pacific and 2 in S. America which have birth rates below 34. (A total of 32 countries). For the 33rd rank we need to check between Phillipines (34,10), Colombia (34,10) Thailand (34,10) and Turkey (34,12). It is evident that there would be a tie between Colombia, Phillipines and Thailand for the 33<sup>rd</sup> position (Option b).*

54. In the consolidated list, how many countries would rank below Spain and above Taiwan?

- (a) 9
- (b) 8
- (c) 7
- (d) 6

*Sol. (a) Spain (18, 8) would be ranked 17<sup>th</sup> jointly with Yugoslavia, while Taiwan (26, 5) would be ranked 28<sup>th</sup>. Thus, there would be 9 countries below Spain and above Taiwan in the consolidated list (Option a).*

55. In the consolidated list, which country ranks 37<sup>th</sup>?

- (a) South Africa
- (b) Brazil
- (c) Turkey
- (d) Venezuela

*Sol. (d) We already know that Phillipines, Colombia and Thailand jointly stand 33rd (34,10) and Turkey would be 36<sup>th</sup> (34,12). The next country would be Venezuela (37<sup>th</sup>) (Option d).*

56. In the consolidated list, how many countries in Asia will rank lower than every country in South America, but higher than at least one country in Africa?

- (a) 8
- (b) 7
- (c) 6
- (d) 5

*Sol. (a) The lowest country in S. America is at 42,11. Thus we need to look at countries in Asia below 42,11. Starting from Iran (42,12) there are 9 such countries. However, out of these 9, Afghanistan does not satisfy the condition of being higher than at least one of the African countries. (Option 8).*

**Directions for Questions 57 to 59:** Answer the questions on the basis of the following information.

In a Decathlon, the events are 100m, 400m, 100m hurdles, 1500m, High jump, Pole vault, Long jump, Discus, Shot Put and Javelin. The performance in the first four of these events is consolidated into Score 1, the next three into Score 2 and the last three into Score 3. Each such consolidation is obtained by giving appropriate positive weights to individual events. The final score is simply the total of these three scores. The athletes with the highest, second highest and the third highest final scores receive the gold, silver and bronze medals, respectively. The table below gives the scores and performances of 19 top athletes in this event.

| Name              | Country | Final Score | Score 1 | Score 2 | Score 3 | 100 M | High Jump | Pole Vault |
|-------------------|---------|-------------|---------|---------|---------|-------|-----------|------------|
| Eduard Hamalainen | BLS     | 8802        | 491     | 5322    | 2989    | 10.74 | 2.08      | 4.8        |
| Michael Smith     | CAN     | 8855        | 174     | 5274    | 3407    | 11.23 | 1.97      | 4.9        |
| Tomas Dvorak      | CZE     | 8796        | 499     | 5169    | 3128    | 10.63 | 1.91      | 4.7        |
| Uwe Frimuth       | DDR     | 8799        | 441     | 5491    | 3124    | 11.06 | 1.97      | 4.8        |
| Torsten Voss      | DDR     | 8880        | 521     | 5234    | 2868    | 10.69 | 2.10      | 5.1        |
| Erki Nool         | EST     | 8768        | 408     | 5553    | 2808    | 10.71 | 1.99      | 5.4        |
| Christian Plaziat | FRA     | 8775        | 563     | 5430    | 2781    | 10.72 | 2.10      | 5.0        |
| Jurgen Hingsen    | FRG     | 8792        | 451     | 5223    | 3033    | 10.95 | 2.00      | 4.9        |
| Siegfried Wentz   | FRG     | 8856        | 470     | 5250    | 3137    | 10.85 | 2.05      | 4.8        |
| Guido Kratschmer  | FRG     | 8861        | 575     | 5308    | 3064    | 10.58 | 2.00      | 4.6        |
| Daley Thompson    | GBR     |             | 582     |         | 3003    | 10.55 | 2.11      | 4.6        |
| Frank Busemann    | GER     | 8905        | 568     | 5392    | 2945    | 10.60 | 2.04      | 4.8        |
| Alexandr Apaichev | SOV     | 8803        | 492     | 5370    | 3115    | 10.92 | 1.95      | 4.8        |
| Grigory Degtyarov | SOV     | 8823        | 339     | 5196    | 3114    | 11.05 | 2.08      | 4.9        |
| Robert Zmelik     | TCH     | 8832        | 494     | 5455    | 2883    | 10.78 | 2.06      | 5.1        |
| Dave Johnson      | USA     | 8811        | 366     | 5370    | 3114    | 10.78 | 2.10      | 5.0        |
| Steve Fritz       | USA     | 8827        | 427     | 5163    | 3119    | 10.75 | 2.04      | 5.0        |
| Bruce Jenner      | USA     | 8846        | 483     | 5280    | 3200    | 10.94 | 2.03      | 4.8        |
| Dan O'Brien       | USA     | 8897        | 408     | 5331    | 3120    | 10.36 | 2.09      | 4.8        |

57. The athletes from FRG and USA decided to run a  $4 \times 100\text{m}$  relay race for their respective countries with the country having three athletes borrowing the athlete from CZE. Assume that all the athletes ran their stretch of the relay race at the same speed as in Decathlon event. How much more time did the FRG relay team take as compared to the USA team?

- (a) 0.18
- (b) 0.28
- (c) 0.78
- (d) 0.00

*Sol.* (a) From the table, it is clear that the FRG team has 3 athletes, while the USA team has 4. Thus, the FRG team would borrow a runner from the CZE team. The FRG team would take  $10.95 + 10.85 + 10.58 + 10.63$  second, while the USA team would take  $10.78 + 10.75 + 10.94 + 10.36$  seconds. The difference in time is equivalent to  $+ 17 + 10 - 36 + 27$  to be written as  $+ 0.17 + 0.10 - 0.36 + 0.27$  seconds = 0.18 seconds: (Option a).

58. What is the least that Daley Thomson must get in Score 2 that ensures him a bronze medal?

- (a) 5309

- (b) 5296
- (c) 5271
- (d) 5270

*Sol. (b) In order to get a bronze medal, Daley Thomson should get an aggregate of at least 8881 (>Torsten Voss). Daley Thomson's score is 582 + 3003 + Unknown Score 2. This sum should be equal to 8881 at least, for him to get a bronze medal. Hence,  $8881 - 3585 = 5296$  (option b).*

59. At least how many competitors (excluding Daley Thompson) must Michael Smith have out-jumped in the long jump event?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

*Sol. (d) Michael Smith scores 5274 in Score 2 (which is formed on the basis of high jump, pole vault and long jump). His high jump is of 1.97m and pole vault of 4.9m. In order to find the number of athletes who he must have out-jumped in long jump, we need to look for athletes who had greater values in high jump and pole vault than Michael Smith, yet who got a lower overall score than Michael Smith in Score 2. Thus, we are looking for athletes who had less than 5274 in Score 2 and greater than or equal to 1.97 in high jump and 4.9 in pole vault.*

*In visual terms, this can be represented as:*

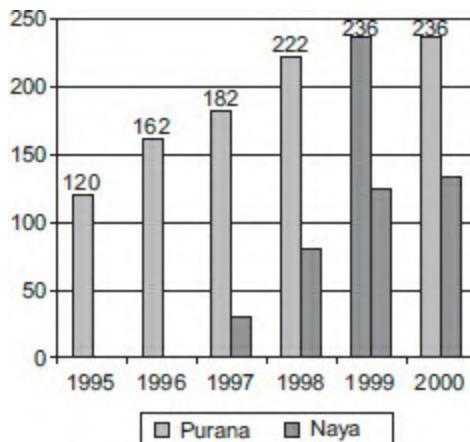
*Score 2 < 5274; High Jump > 1.97, Pole vault > 4.9*

*Torsten Voss, Jurgen Hingsen, Gregory Degtyarov and Steve Fritz satisfy all these conditions. Thus, the answer is four athletes (Option d).*

**Directions for Questions 60 to 63:** Answer the questions on the basis of the information given below.

Purana and Naya are two brands of kitchen mixer-grinders available in the local market. Purana is an old brand that was introduced in 1990, while Naya was introduced in 1997. For both these brands, 20 per cent of the

mixer-grinders bought in a particular year are disposed off as junk exactly two years later. It is known that 10 Purana mixer-grinders were disposed off in 1997. The following figures show the number of Purana and Naya mixer-grinders in operation from 1995–2000 at the end of the year.



60. How many Naya mixer-grinders were disposed off by the end of 2000?
- 10
  - 16
  - 22
  - Cannot be determined from the data

*Sol. (b) 20% of 1997 will be disposed off in 1999 and 20% of 1998 will be disposed off in 2000.*

$$\text{Hence, } 6 + 10 = 16$$

61. How many Naya mixer-grinders were purchased in 1999?
- 44
  - 50
  - 55
  - 64

*Sol. (b) 50 (As in  $124 - 80 + 6$ )*

62. How many Purana mixer-grinders were disposed off in 2000?
- 0
  - 5
  - 6
  - Cannot be determined from the data

*Sol.* (d) Cannot be determined since this is asking the value for an even year.

63. How many Purana mixer-grinders were purchased in 1999?

- (a) 20
- (b) 23
- (c) 50
- (d) Cannot be determined from the data

*Sol.* (a) 20 (from the table and the logic  $222 - 6 + \text{purchases in 1999} = 236$ )

**Directions for Questions 64 to 67:** Answer questions 64–67 on the basis of the information given below.

The year is 2089. Beijing, London, New York and Paris are in contention to host the 2096 Olympics. The eventual winner is determined through several rounds of voting by members of the IOC with each member representing a different city. All the four cities in contention are also represented in IOC.

- In any round of voting, the city receiving the lowest number of votes in that round gets eliminated. The survivor after the last round of voting gets to host the event.
- A member is allowed to cast votes for at most two different cities in all rounds of voting combined. (Hence, a member becomes ineligible to cast a vote in a given round if both the cities (s)he voted for in earlier rounds are out of contention in that round of voting.)
- A member is also ineligible to cast a vote in a round, if the city (s)he represents is in contention in that round of voting.
- As long as the member is eligible, (s)he must vote and vote for only one candidate city in any round of voting.

The following incomplete table shows the information on cities that received the maximum and minimum votes in different rounds, the number of votes cast in their favour, and the total votes that were cast in those rounds.

| Round | Total<br>votes<br>cast | Maximum<br>votes cast |                 | Eliminated |                 |
|-------|------------------------|-----------------------|-----------------|------------|-----------------|
|       |                        | City                  | No. of<br>votes | City       | No. of<br>votes |
| 1     |                        | London                | 30              | New York   | 12              |
| 2     | 83                     | Paris                 | 32              | Beijing    | 21              |
| 3     | 75                     |                       |                 |            |                 |

It is also known that:

- All those who voted for London and Paris in round one, continued to vote for the same cities in subsequent rounds, as long as these cities were in contention. Seventy five per cent of those who voted for Beijing in round one, voted for Beijing in round two as well.
- Those who voted for New York in round one, voted either for Beijing or Paris in round two.
- The difference in votes cast for the two contending cities in the last round was one.
- Fifty per cent of those who voted for Beijing in round one, voted for Paris in round three.

*Sol. for 64 to 67: When you read the initial set of instructions, you would have realised that there are essentially two rules which are operating here in order to change the eligibility of a country's representative from voting. From the language "A member is allowed to cast a vote for at most two different cities in all rounds of voting combined", we can infer the following rule:*

**Rule 1: Making an eligible member ineligible:** This would occur when a member votes for 1 city in the first round, and another in the second round and both these cities get eliminated before the third round. Looking at the table—an eligible member would become ineligible to vote only in case he has voted for New York in the first round and Beijing in the second round. This is the only way of making an eligible member ineligible to vote and hence, would only occur for some of those voters who voted for New York in the first round but shifted their votes to Beijing in the second round.

This rule, when it is applied, would naturally reduce the number of voters who voted in a particular round, from the number who voted in the previous round. Also, the third round is the first time this rule

would apply.

**Rule 2:** Making an ineligible member eligible: This rule can be inferred from the language “A member is also ineligible ... in that round of voting.” This obviously means that if I am a member whose city is in contention—then I cannot vote. However, if my city gets eliminated from the fray, then I would become eligible to vote.

This rule would obviously apply only to the member from New York in the second round (as he would become eligible to vote in the second round) and to the member from Beijing in the third round as these are the only two cities that are becoming eligible from being ineligible.

Based on these deductions, we derive the following table:

| Round | Total<br>votes<br>cast | Maximum votes<br>cast |                 | Eliminated  |                 |
|-------|------------------------|-----------------------|-----------------|-------------|-----------------|
|       |                        | City                  | No. of<br>votes | City        | No. of<br>votes |
| 1     | 82                     | London                | 30              | New<br>York | 12              |
| 2     | 83                     | Paris                 | 32              | Beijing     | 21              |
| 3     | 75                     |                       |                 | London(30)  |                 |

The following deductions can be drawn:

In the first round, the number of votes cast must be 82 (as in the second round the member from New York has become eligible to vote). This means that Paris + Beijing must be 40 (for the first round).

Now, from the first clue we realise that since 75 per cent of the Beijing voters continued to vote for Beijing in the second round—the inference is that Beijing’s number in the first round must be a multiple of 4. (Otherwise 75 per cent would not be an integer).

This gives us the following possibilities for Paris and Beijing in the first round:

|               | Paris | Beijing |
|---------------|-------|---------|
| Possibility 1 | 24    | 16      |
| Possibility 2 | 20    | 20      |
| Possibility 3 | 16    | 24      |

*At this point of time, you should also realise that the change from 83 votes cast in the second round and 75 votes cast in the third round would be due to two things:*

*The member from Beijing becoming eligible (thus, increasing the number of eligible voters to 84) and the members who shifted out of New York to Beijing becoming ineligible to vote in the third round.  $83 + 1 - x = 75$ . Thus, nine New York voters must have shifted to Beijing in the second round.*

*We also know that the London voters continued to vote for London—so London must have found no new voters. This means that Paris must have got three of the New York voters from the first round—voting for it in the second round.*

*We need to now try to fit in one of the above three possibilities to see which of them gives us the correct situation.*

*We also know that 75 per cent of Beijing's first round voters continued to vote for Beijing in the second round—thus 25 per cent of Beijing's first round voters must have shifted out of Beijing.*

*In the second round—there are a total of 12 New York voters, one member from New York and 25 per cent of Beijing's first round voters who are free to vote.*

*Since, Beijing got 21 votes, the only way this could have happened would be if Possibility 1 was correct in the above case. In such a case—the following numbers would work out:*

*London—30 voters in first round, all carry over to the second round.*

*Beijing—16 voters in the first round, of which 75 per cent (12) voted again for them + 9 voters who voted for New York in the first round shifted to Beijing in the second round = A total of 21 votes in the second round.*

*Paris—24 votes in the first round + 4 voters who voted for Beijing in the first round voted for Paris in the second + 3 voters who voted for New York in the first round voted for Paris in the second + 1 member from New York who was not eligible to vote in the first round and becomes eligible to vote in the second round = A total of 32 votes in the second round.*

*In the third round, since there are 75 votes and the difference between*

*the votes cast for the two cities was 1, it must be that the two cities got 38 and 37 votes respectively. What we need to see is, which city had how many votes?*

*For this purpose, we first need to understand how many free votes there are. An analysis of the second round would give us that.*

*Out of the 21 voters for Beijing in the second round, 9 have become ineligible to vote. So, there must be 12 free votes from there.*

*Also, the member from Beijing would be eligible to vote in the third round.*

*Thus, there would be a total of 13 free votes in the third round.*

*We need to match this deduction with the clues we are left with.*

*For this purpose, we have the last clue—50 per cent of those who voted for Beijing in the first round voted for Paris in Round 3.*

*This means that Paris must have got an additional 4 voters from Beijing (as it already got four voters in the second round—and those four cannot move to London, as they have already voted for two cities in the first two rounds).*

*Thus, out of the 12 free votes available from Beijing's voters, 4 have gone to Paris and 8 must have shifted to London. Thus, London reaches 38 and consequently Paris must have got the member from Beijing to vote for it.*

*So, London = 30 votes in round 2 + 8 Beijing voters = 38 votes.*

*Paris = 32 votes in round 2 + 4 Beijing voters + 1 member from Beijing = 37 votes*

64. What percentage of members from among those who voted for New York in round one, voted for Beijing in round two?

- (a) 33.33
- (b) 50
- (c) 66.67
- (d) 75

*Sol. (d) 9 out of 12 = 75% (option d).*

65. What is the number of votes cast for Paris in round one?

- (a) 16
- (b) 18

- (c) 22
- (d) 24

*Sol.* (d) 24 (option d).

66. What percentage of members from among those who voted for Beijing in round two and were eligible to vote in round three, voted for London?

- (a) 33.33
- (b) 38.10
- (c) 50
- (d) 66.67

*Sol.* (d)  $8 \text{ out of } 12 = 66.66\%$  (option d).

67. Which of the following statements must be true?

1. IOC member from New York must have voted for Paris in round two.
  2. IOC member from Beijing voted for London in round three.
- (a) Only (1)
  - (b) Only (2)
  - (c) Both (a) and (2)
  - (d) Neither (1) nor (2)

*Sol.* (a) A is true but B is not. Hence, option (a) is correct.

**Directions for Questions 68 to 71:** Answer questions 68–71 on the basis of the information given below:

The table below presents the revenue (in million rupees) of four firms in three states. These firms, Honest Ltd., Aggressive. Ltd, Truthful Ltd. and Profitable Ltd. are disguised in the table as A, B, C and D, in no particular order.

| States | Firm A | Firm B | Firm C | Firm D |
|--------|--------|--------|--------|--------|
| UP     | 49     | 82     | 80     | 55     |
| Bihar  | 69     | 72     | 70     | 65     |
| MP     | 72     | 63     | 72     | 65     |

Further, it is known that:

- In the state of MP, Truthful Ltd. has the highest market share.

- Aggressive Ltd.'s aggregate revenue differs from Honest Ltd.'s by ₹5 million.

*Sol. for 68 to 71*

*The basic info contained in this question gives us that there are four companies—Honest Ltd.(H), Aggressive Ltd. (A), Truthful Ltd. (T) and Profitable Ltd. (P) disguised in the table as A, B, C and D, in no particular order.*

| States | Firm A | Firm B | Firm C | Firm D |
|--------|--------|--------|--------|--------|
| UP     | 49     | 82     | 80     | 55     |
| Bihar  | 69     | 72     | 70     | 65     |
| MP     | 72     | 63     | 72     | 65     |
| Total  | 190    | 217    | 222    | 185    |

*Using the additional information given in the question—*

- *In the state of MP, Truthful Ltd. has the highest market share. We can see that T has to be either Firm A or Firm C.*
- *Aggressive Ltd.'s aggregate revenue differs from Honest Ltd.'s by ₹5 million.*

*This means that Aggressive and Honest can be distributed in a random order between Firms A and D or Firms B and C.*

*Based on our interpretations of the above two statements, we can make the following possibilities structure for the four firms:*

| Possibility 1 | Possibility 2 | Possibility 3 | Possibility 4 |
|---------------|---------------|---------------|---------------|
| A TRUTHFUL    | TRUTHFUL      | AGGRESSIVE    | HONEST        |
| B AGGRESSIVE  | HONEST        | PROFITABLE    | PROFITABLE    |
| C HONEST      | AGGRESSIVE    | TRUTHFUL      | TRUTHFUL      |
| D PROFITABLE  | PROFITABLE    | HONEST        | AGGRESSIVE    |

*Based on this Possibility table, we can work out the questions that follow.*

68. What can be said regarding the following two statements?

**Statement 1:** Profitable Ltd. has the lowest share in MP market.

**Statement 2:** Honest Ltd.'s total revenue is more than Profitable Ltd.

- If Statement 1 is true then Statement 2 is necessarily true.
- If Statement 1 is true then Statement 2 is necessarily false.
- Both Statement 1 and Statement 2 are true.

- (d) Neither Statement 1 nor Statement 2 is true.

*Sol. (b) For this question, we have to consider the truth/false nature of the following two statements:*

**Statement 1:** Profitable Ltd. has the lowest share in MP market.

*If this statement is true, we are referring to the situation where Profitable is firm B. This is true in Possibilities 3 and 4 only.*

**Statement 2:** Honest Ltd.'s total revenue is more than Profitable Ltd.

*It can be seen that in both Possibilities 3 and 4, this statement is false.*

*Hence, if the first statement is true, the second has to be necessarily false. Option (b) is correct.*

69. What can be said regarding the following two statements?

**Statement 1:** Aggressive Ltd.'s lowest revenues are from MP.

**Statement 2:** Honest Ltd.'s lowest revenues are from Bihar.

- (a) If Statement 2 is true then Statement 1 is necessarily false.

- (b) If Statement 1 is false then Statement 2 is necessarily true.

- (c) If Statement 1 is true then Statement 2 is necessarily true.

- (d) None of the above.

*Sol. (c) For this question, we have to consider the truth/false nature of the following two statements:*

**Statement 1:** Aggressive Ltd's lowest revenues are from MP.

*For this statement to be true, Aggressive should be Firm B. This takes us to Possibility 1 in the possibility table above.*

**Statement 2:** Honest Ltd.'s lowest revenues are from Bihar.

*In Possibility 1, Honest becomes Firm C—and it can be seen that its lowest revenues would indeed come from Bihar.*

*Thus, we can say that if Statement 1 is true, then Statement 2 is necessarily true. Option (c) is the correct answer.*

70. What can be said regarding the following two statements?

**Statement 1:** Honest Ltd. has the highest share in the UP market.

**Statement 2:** Aggressive Ltd. has the highest share in the Bihar market.

- (a) Both statements could be true.

- (b) At least one of the statements must be true.

- (c) At most one of the statements is true.
- (d) None of the above.

*Sol. (c) For this question we have to consider the truth/false nature of the following two statements.*

**Statement 1:** Honest Ltd. has the highest share in the UP market.

*In this case, Honest becomes Firm B and we go to Possibility 2.*

**Statement 2:** Aggressive Ltd. has the highest share in the Bihar market.

*In this case, Aggressive becomes Firm B—which means possibility 1.*

*It is clear that at most one of these can be true at a time. Hence, option (c) is correct.*

71. If Profitable Ltd.'s lowest revenue is from UP, then which of the following is true?
- (a) Truthful Ltd.'s lowest revenues are from MP.
  - (b) Truthful Ltd.'s lowest revenues are from Bihar.
  - (c) Truthful Ltd.'s lowest revenues are from UP.
  - (d) No definite conclusion is possible.

*Sol. (c) If Profitable Ltd.'s lowest revenue is from UP, then Profitable must be Firm D. In such a case, Truthful becomes Firm A (as both possibilities 1 and 2 give us the same thing). It can be seen that in such a case Truthful's least revenues would be from UP. Option (c) is correct.*

**Directions for Questions 72 to 75:** Answer questions 72–75 on the basis of the information given below.

Help Distress (HD) is an NGO involved in providing assistance to people suffering from natural disasters. Currently, it has 37 volunteers. They are involved in three projects: Tsunami Relief (TR) in Tamil Nadu, Flood Relief (FR) in Maharashtra and Earthquake Relief (ER) in Gujarat. Each volunteer working with HD has to be involved in at least one relief work project.

- A maximum number of volunteers are involved in the FR project. Among them, the number of volunteers involved in FR project alone is equal to the volunteers having additional involvement in the ER project.

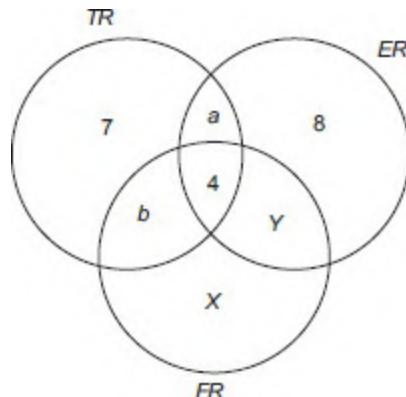
- The number of volunteers involved in the ER project alone is double the number of volunteers involved in all the three projects.
- Seventeen volunteers are involved in the TR project.
- The number of volunteers involved in the TR project alone is one less than the number of volunteers involved in ER project alone.
- Ten volunteers involved in the TR project are also involved in at least one more project.

*Sol. for 72 to 75*

*The figure has been made on the following deductions and facts which can be deduced based on the following clues:*

- *The number of volunteers involved in the ER project alone is double the number of volunteers involved in all the three projects.*
  - *Seventeen volunteers are involved in the TR project.*
  - *The number of volunteers involved in the TR project alone is one less than the number of volunteers involved in ER project alone.*
  - *Ten volunteers involved in the TR project are also involved in at least one more project.*
1. *TR is given as 17 (overall) out of which 10 are involved in at least 1 more project apart from TR. Hence, only TR would be 7.*
  2. *ER alone is one more than TR alone. So, ER alone would be eight. Also, all three is half of ER alone—so, all three should be four.*

*At this point of analysis we have the figure as shown below:*



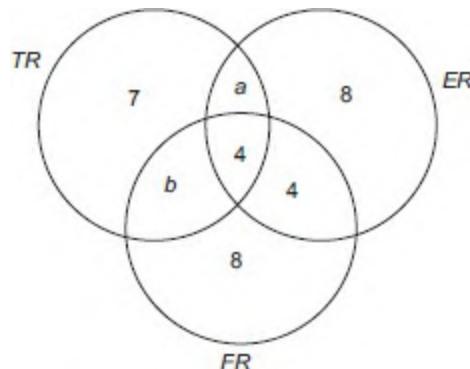
*At this point we also know—*

$$x + y = 12 \text{ and } a + b = 6$$

At this point of our analysis, the only clue we need to further interpret is the first one—a maximum number of volunteers are involved in the FR project. Among them, the number of volunteers involved in FR project alone is equal to the volunteers having additional involvement in the ER project.

From the second statement in this clue we can deduce that, since FR only has to be equal to the number having additional involvement in ER—X must be 8 and Y must be 4.

**Note:** There was an interpretation based confusion which test-takers had while thinking about this clue in the exam. The confusion was—what does additional involvement in ER mean? Does it mean FR and ER only or does it include both the areas viz., FR and ER only as well as FR, ER and TR.



A little bit of clear thinking would tell you that when we say—FR with additional involvement of ER, we are not referring to any third (or for that matter fourth) category. Hence, the four people in all three, would also be counted in this category.

Thus, the new figure evolves to:

Now, we know that  $a + b = 6$ .

This leads to the following possibility matrix:

|               | <i>TR</i> | <i>FR</i><br>(A Maximum) | <i>ER</i>   |                 |
|---------------|-----------|--------------------------|-------------|-----------------|
|               |           |                          | <i>16+b</i> | <i>16+a</i>     |
| Possibility 1 | a=6,b=0   | 17                       | 16          | 22 Not possible |
| Possibility 2 | a=5,b=1   | 17                       | 17          | 21 Not possible |
| Possibility 3 | a=4,b=2   | 17                       | 18          | 20 Not possible |
| Possibility 4 | a=3,b=3   | 17                       | 19          | 19 Possible     |
| Possibility 5 | a=2,b=4   | 17                       | 20          | 18 Possible     |
| Possibility 6 | a=1,b=5   | 17                       | 21          | 17 Possible     |
| Possibility 7 | a=0,b=6   | 17                       | 22          | 16 Possible     |

**Note here:** There was huge confusion in the minds of test takers—as must be in yours as you read this. FR is given as “A maximum”. So, does this condition allow us to take  $a=3$  and  $b=3$  as a possible distribution of 6 between  $a$  and  $b$  (as shown in possibility 4 above).

As you can see, at these values, we get  $FR=ER=19$  [and FR is not a unique maximum].

And, that is exactly what you perhaps need to understand—The language used in the question “A maximum” means literally “one of the maximums”, i.e., it allows for more than one maximum simultaneously. Hence, interpreting that FR is a unique maximum in this situation is an error.

Based on the above tabular analysis, we can get the answers to the question asked.

72. Based on the information given above, the minimum number of volunteers involved in both FR and TR projects, but not in the ER project is:

- (a) 1
- (b) 3
- (c) 4
- (d) 5

*Sol. (b)* The minimum value of (b) is asked for. From the table, it is 3. Option (b) is correct.

73. Which of the following additional information would enable us to find the exact number of volunteers involved in various projects?
- (a) Twenty volunteers are involved in FR.
  - (b) Four volunteers are involved in all the three projects.

- (c) Twenty-three volunteers are involved in exactly one project.
- (d) No need for any additional information.

*Sol. (a) The first option is the correct answer as we know that  $FR=20$ , then we know the value of  $b=4$  and we get all the values in the given situation. Notice that the information carried in statements of options (b) and (c) are already known to us.*

*For 74 and 75, the following changes would take place:*

|                         | $TR$<br>(one person<br>opted out of<br>$TR$ ) | $FR$<br>$=14+b$ | $ER =$<br>$15+a$ |          |
|-------------------------|---|-----------------|------------------|----------|
| Possibility 1 $a=3,b=3$ | 16  | 17              | 18               | Possible |
| Possibility 2 $a=2,b=4$ | 16  | 18              | 17               | Possible |
| Possibility 3 $a=1,b=5$ | 16  | 19              | 16               | Possible |
| Possibility 4 $a=0,b=6$ | 16  | 20              | 15               | Possible |

*We have deleted the values of  $a=4, 5$  and  $6$ , as we had ruled those values out for the previous questions' analysis.*

74. After some time, the volunteers who were involved in all the three projects were asked to withdraw from one project. As a result, one of the volunteers opted out of the TR project, and one opted out of the ER project, while the remaining ones involved in all the three projects opted out of the FR project. Which of the following statements, then, necessarily follows?

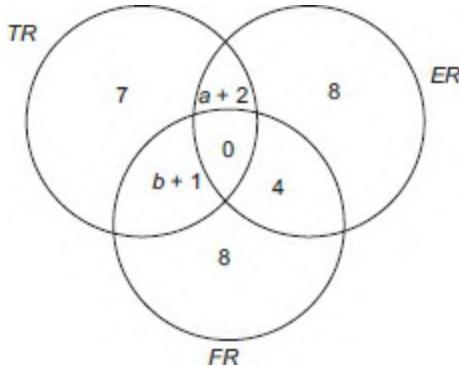
- (a) The lowest number of volunteers is now in TR project.
- (b) More volunteers are now in FR project as compared to ER project.
- (c) More volunteers are now in TR project as compared to ER project.
- (d) None of the above

*Sol. (d) It can be seen that option (a) is not true (rejected by possibility 4 where ER has the least number of volunteers).*

*Option (b) can be rejected, as possibility 1 has  $ER > FR$ .*

*Option (c) is rejected due to possibilities 1, 2 and 3.*

*Hence, the correct answer is none of these.*



75. After the withdrawal of volunteers, as indicated in Question 130, some new volunteers joined the NGO. Each one of them was allotted only one project in a manner such that, the number of volunteers working in one project alone for each of the three projects became identical. At that point, it was also found that the number of volunteers involved in FR and ER projects was the same as the number of volunteers involved in TR and ER projects. Which of the projects now has the highest number of volunteers?
- ER
  - FR
  - TR
  - Cannot be determined

*Sol. (a) For FR & ER to be same as TR + ER, it means  $a + 2 = 5$ . Hence,  $a = 3$  and  $b = 3$ .*

*Then the numbers become:*

$$TR = 16 + m + 1 = 17 + m$$

$$ER = 18 + m$$

$$FR = 17 + m$$

*Where,  $m$  is the number of volunteers inducted into ER alone and FR alone. ( $m + 1$  being the number inducted into TR alone).*

*Clearly, ER would have the highest number of volunteers [option (a)].*

**Directions for Questions 76 to 80:** Answer questions 76–80 on the basis of the information given below.

Mathematicians are assigned a number called Erdos number (named after the famous mathematician, Paul Erdos). Only Paul Erdos himself has an

Erdos number of zero. Any mathematician who has written a research paper with Erdos has an Erdos number of 1. For other mathematicians, the calculation of his/her Erdos number is illustrated below:

Suppose that a mathematician X has co-authored papers with several other mathematicians. From among them, mathematician Y has the smallest Erdos number. Let the Erdos number of Y be  $y$ . Then X has an Erdos number of  $y + 1$ . Hence, any mathematician with no co-authorship chain connected to Erdos has an Erdos number of infinity.

In a seven day long mini-conference organised in memory of Paul Erdos, a close group of eight mathematicians, call them A, B, C, D, E, F, G and H, discussed some research problems. At the beginning of the conference, A was the only participant who had an infinite Erdos number. Nobody had an Erdos number less than that of F.

On the third day of the conference, F co-authored a paper jointly with A and C. This reduced the average Erdos number of the group of eight mathematicians to three. The Erdos numbers of B, D, E, G and H remained unchanged with the writing of this paper. Further, no other co-authorship among any three members would have reduced the average Erdos number of the group of eight to as low as three.

- At the end of the third day, five members of this group had identical Erdos numbers while the other three had Erdos numbers distinct from each other.
- On the fifth day, E co-authored a paper with F, which reduced the group's average Erdos number by 0.5. The Erdos numbers of the remaining six were unchanged with the writing of this paper.
- No other paper was written during the conference.

*Sol. for 76–80:*

*In order to solve this question (and in fact most questions of this nature where you have a long data/info filled passage), the key is to be able to decode the language step by step. So instead of getting bogged down by the surfeit of information which you have— focus on reacting to the language of the information sentence by sentence.*

*So let us now go through the information sentence by sentence and see how one should react in this question.*

*Mathematicians are assigned a number called Erdos number (named*

after the famous mathematician, Paul Erdos). [Reaction: The question is introducing a variable called “Erdos Number”]. Only Paul Erdos himself has an Erdos number of zero. Any mathematician who has written a research paper with Erdos has an Erdos number of 1. For other mathematicians, the calculation of his/her Erdos number is illustrated below:

Suppose that a mathematician X has co-authored papers with several other mathematicians. From among them, mathematician Y has the smallest Erdos number. Let the Erdos number of Y be  $y$ . Then, X has an Erdos number of  $y+1$ . Hence, any mathematician with no co-authorship chain connected to Erdos has an Erdos number of infinity. [Reaction: We now have a process for assigning the value of the Erdos number—from the co-authors to an individual whose Erdos number you want to find, choose the co-author with the smallest Erdos number. The required Erdos number would be got by adding 1 to this least number. A-ha point: If an individual x has a co-author list with the following Erdos numbers—2, 4, 6, 3, 8, then x would have an Erdos number of  $2 + 1 = 3$ —since 2 is the least value in his list of co-authors.]:

In a seven day long mini-conference organised in memory of Paul Erdos [Reaction: Paul Erdos is dead—he would not be a part of the group.], a close group of eight mathematicians, call them A, B, C, D, E, F, G and H, discussed some research problems. At the beginning of the conference, A was the only participant who had an infinite Erdos number. Nobody had an Erdos number less than that of F.

Reaction:

| Person          | A        | B | C | D | E | F                        | G | H |
|-----------------|----------|---|---|---|---|--------------------------|---|---|
| Erdos<br>Number | Infinite | b | c | d | e | f(least<br>Erdos number) | g | h |

Note here that ‘f’ is the least value but not necessarily the single such least value, i.e. there can be more than 1 person having the same number. At this point of time the only conclusion we can make is that there is nobody else with an Erdos number less than f—but that does not guarantee the fact that there cannot be anybody with a number equal to f.

*On the third day of the conference F co-authored a paper jointly with A and C.*

*Reactions:*

*A's Erdos number would come down to  $f + 1$ .*

*For C's Erdos number, there could be three specific cases*

*CASE 1: C's number would come down to  $f + 1$  from a higher number.*

*Obviously, this would happen if C had a higher Erdos number earlier.*

*CASE 2: C's Erdos number was  $f + 1$  earlier. In such a case, his number would not change and would remain  $f + 1$  again.*

*CASE 3: C's Erdos number was  $f$  earlier. In such a case his number would not change and remain at  $f$ .*

| Person       | A     | B | C            | D | E | F                        | G | H |
|--------------|-------|---|--------------|---|---|--------------------------|---|---|
| Erdos Number | $f+1$ | b | $f$ or $f+1$ | d | e | $f$ (least Erdos number) | g | h |

*This reduced the average Erdos number of the group of eight mathematicians to 3. The Erdos numbers of B, D, E, G and H remained unchanged with the writing of this paper.*

*Reaction: The sum of the eight numbers must be  $8 \times 3 = 24$ .*

*Further, no other co-authorship among any three members would have reduced the average Erdos number of the group of eight to as low as 3.*

*Reaction: Since the effect of A and C co-authoring with F is to bring the average of the group to the lowest possible, this clearly means that C's starting Erdos number must have been the second highest amongst all the values (after A). This can be understood further by the fact that if someone other than C (say H) had the second highest Erdos number in the group initially, then the least possible average would have been got by co-authoring F with A and H.*

*Thus, we can conclude that C must have had the second highest Erdos number in the group—in which case we can also reject Case 3 above and conclude that C's new Erdos number must be  $f + 1$ . We also know that C's number must have fallen to  $f + 1$ —It could not have been  $f + 1$  earlier—since, C's new number must represent the largest drop apart from A's drop in value.*

Thus the table would evolve to:

| Person       | A       | B | C       | D | E | F                        | G | H |
|--------------|---------|---|---------|---|---|--------------------------|---|---|
| Erdos Number | $f + 1$ | b | $f + 1$ | d | e | $f$ (least Erdos number) | g | h |
|              |         |   |         |   |   |                          |   |   |

At the end of the third day, five members of this group had identical Erdos numbers while the other three had Erdos numbers distinct from each other.

*Reaction: Since we know that A and C both have  $f + 1$  as their values, it is clear from this statement that there must be five people having  $f + 1$  as their Erdos numbers. For the other three there should be unique values for each of them. One of them being  $f$ , the other two should be distinct values (say  $m$  and  $n$ ).*

Thus, we can create the equation:

$$5(f + 1) + f + m + n = 24$$

The issue now is to try to fix the value of  $f$ . If we take the value of  $f$  as 2, then the following would happen to the equation above:

$$5 \times 3 + 2 + m + n = 24 \rightarrow 17 + m + n = 24.$$

We now realise that the sum of  $m$  and  $n$  (i.e.,  $m + n$ ) would be equal to 7. Also, since  $f + 1$  is 3, the least values of  $m$  and  $n$  can be 4 and 5 respectively. This is not possible in this situation.

It is also easily seen that if we change the value of  $f$ , (from 2) we cannot take it further up—as that would only worsen the situation. Thus, the only possibility left would be the value of  $f$  is 1.

Then the equation,

$5(f + 1) + f + m + n = 24$ , would transform to  $5 \times 2 + 1 + m + n = 24$ , giving us the sum of  $m$  and  $n$  as 13.

The sum of  $m$  and  $n$  as 13 can happen through four possibilities as:

- (i)  $3 + 10$ ,
- (ii)  $4 + 9$ ,
- (iii)  $5 + 8$  or
- (iv)  $6 + 7$ .

Thus, the table would evolve to:

| Person       | A | B | C | D | E | F | G | H |
|--------------|---|---|---|---|---|---|---|---|
| Erdos Number | 2 | b | 2 | d | e | 1 | g | h |

and we also know that amongst b, d, e, g and h three have to be equal to 2 and the remaining two would be taking the values of m and n. At this point, however, we do not know which one is which.

On the fifth day, E co-authored a paper with F which reduced the group's average Erdos number by 0.5. The Erdos numbers of the remaining six were unchanged with the writing of this paper.

Reactions: If E co-authors with F, E's value would reduce to 2. Also, since the average is reducing by 0.5, it would mean that there is a drop in the total by 4. ( $0.5 \times 8 = 4$ ). Thus, E's value right through in each of the above tables would have been 6 and would go down to 2 after the fifth day. Thus, the value for m + n which would fit, would be possibility iv (6 + 7) above.

Thus the table would evolve to:

| Person       | A | B | C | D | E | F | G | H |
|--------------|---|---|---|---|---|---|---|---|
| Erdos Number | 2 | b | 2 | d | 2 | 1 | g | h |

Out of b, d, g and h, three would have a value of 2 and one would have a value of 7.

No other paper was written during the conference.

We are now ready to answer the questions which were asked.

76. The person having the largest Erdos number at the end of the conference must have had Erdos number

- (a) 5
- (b) 7
- (c) 9
- (d) 14
- (e) 15

Sol. (b) Obviously 7. Hence, option (b) is the right answer.

77. How many participants in the conference did not change their Erdos number during the conference?

- (a) 2
- (b) 3

- (c) 4
- (d) 5
- (e) Cannot be determined

*Sol. (d) It would be better to look at how many changed their numbers. We know that A, C and E have changed their numbers and also that the others have not changed. Hence, the option (d) is correct.*

78. The Erdos number of C at the end of the conference was:

- (a) 1
- (b) 2
- (c) 3
- (d) 4
- (e) 5

*Sol. (b) C's number at the end of the conference would be 2. Hence, option (b) is correct.*

79. The Erdos number of E at the beginning of the conference was:

- (a) 2
- (b) 5
- (c) 6
- (d) 7
- (e) 8

*Sol. (c) C's number at the beginning of the conference would be 6. Hence, option (c) is correct.*

80. How many participants had the same Erdos number at the beginning of the conference?

- (a) 2
- (b) 3
- (c) 4
- (d) 5
- (e) Cannot be determined

*Sol. (b) After A and C's Erdos number went down to 2, there were 5 people with the same Erdos number. Hence, before that only 3 people must have had the same Erdos number (option b).*

*Let us now go through the inferences for the next question set of*

*questions 137 to 141.*

**Directions for Questions 81 to 85:** Answer questions 81–85 on the basis of the information given below.

Two traders, Chetan and Michael, were involved in the buying and selling of MCS shares over five trading days. At the beginning of the first day, the MCS share was priced at ₹100, while at the end of the fifth day it was priced at ₹110. At the end of each day, the MCS share price either went up by ₹10, or else, it came down by ₹10. Both Chetan and Michael took buying and selling decisions at the end of each trading day. The beginning price of MCS share on a given day was the same as the ending price of the previous day. Chetan and Michael started with the same number of shares and amount of cash, and had enough of both. Below are some additional facts about how Chetan and Michael traded over the five trading days.

- Each day if the price went up, Chetan sold 10 shares of MCS at the closing price. On the other hand, each day if the price went down, he bought 10 shares at the closing price.
- If on any day, the closing price was above ₹110, then Michael sold 10 shares of MCS, while if it was below ₹90, he bought 10 shares, all at the closing price.

*Sol. for 81–85:*

*Two traders, Chetan and Michael, were involved in the buying and selling of MCS shares over five trading days. At the beginning of the first day, the MCS share was priced at ₹100, while at the end of the fifth day it was priced at ₹110. At the end of each day, the MCS share price either went up by ₹10, or else, it came down by ₹10.*

*Reaction: This clearly means that there must have been 3 increases of ₹10 each and two drops of ₹10 each. At this point, of course we are in no condition to comment on the order they are going to take—but a little bit of permutation and combination thinking would give you that there can be  ${}^5C_3 = 10$  ways of ordering the increases and the decreases.*

*Both Chetan and Michael took buying and selling decisions at the end of each trading day. The beginning price of MCS share on a given day*

*was the same as the ending price of the previous day. Chetan and Michael started with the same number of shares and amount of cash, (Reaction: Take a note of this at this point.) and had enough of both. Below are some additional facts about how Chetan and Michael traded over the five trading days.*

- *Each day if the price went up, Chetan sold 10 shares of MCS at the closing price. On the other hand, each day if the price went down, he bought 10 shares at the closing price.*

*Reaction: Chetan must have sold 10 shares thrice and bought 10 shares twice during this period. Thus, obviously it means that he must have been a net seller of 10 shares during this period. Obviously, this would have a positive effect on his cash balance and it would go up by around 1000 to 1200 rupees due to offloading 10 of his shares. Of course, he might gain or lose some value due to the profit/loss he might have made in the other buying and selling transactions he might have made.*

- *If on any day, the closing price was above ₹110, then Michael sold 10 shares of MCS, while if it was below ₹90, he bought 10 shares, all at the closing price.*

*Reaction: Michael's buying trigger—price of 80*

*Michael's selling trigger—Price of 120 or 130.*

*It is obvious at this point that if we consider Michael's activity, it is not possible for him to both buy and sell under any conditions. This is because, if the price hits 120 on any of the 5 days, it cannot have gone to 80 during the 5 days under consideration as we have only 2 decreases of ₹10 each in price. So from 120 the minimum level the price can reach is 100. Similarly, if the price had hit 80, it could not have gone up to 120 in the same 5 day cycle as we have only a maximum of 3 increases of ₹10 each—giving an upper limit of price reaching to 100 if it had hit 80 during the time under consideration.*

*Thus, if during a 5 day cycle, a sell trigger is activated for Michael, then a buy trigger cannot occur in that cycle and vice versa.*

*Obviously, we have to move directly into the questions and react to what has been written there—in terms of the conditions mentioned.*

81. If Chetan sold 10 shares of MCS on three consecutive days, while Michael sold 10 shares only once during the five days, what was the price of MCS at the end of day 3?
- (a) ₹90
  - (b) ₹100
  - (c) ₹110
  - (d) ₹120
  - (e) ₹130

*Sol. (c) If Chetan sold 10 shares of MCS on three consecutive days, (Reaction: Since Chetan sells everytime there is a price increase, this obviously means that the price must have increased on three consecutive days, i.e. the three price rises on the five days must have happened on consecutive days. These can happen in three cases:*

**Case 1:** Price goes up on first three days and falls on fourth and fifth days—110, 120, 130, 120, 110

**Case 2:** Price goes up on second to fourth days and falls on the first and fifth days—90, 100, 110, 120, 110.

**Case 3:** Price goes up on the last three days and falls on the first two days—90, 80, 90, 100, 110) while Michael sold 10 shares only once during the five days (Reaction: Michael's selling trigger of ₹120 must have got activated only once in the five days under consideration. From the above reaction, it can be easily seen that this condition is fulfilled only by Case 2), what was the price of MCS at the end of day 3? (Reaction: In case 2, price at the end of day 3 is 110).

*Option (c) is the correct answer.*

82. If Michael ended up with ₹100 less cash than Chetan at the end of day 5, what was the difference in the number of shares possessed by Michael and Chetan (at the end of day 5)?
- (a) Michael had 10 shares less than Chetan.
  - (b) Michael had 10 shares more than Chetan.
  - (c) Chetan had 10 shares more than Michael.
  - (d) Chetan had 20 shares more than Michael.

- (e) Both had the same number of shares.

*Sol. (e) If Michael ended up with ₹100 less cash than Chetan at the end of day five, (Reaction: We know that Chetan is a net seller of 10 shares, so obviously we expect his cash balance to have gone up from his initial level. Now, if we further know that Michael ended up with just ₹100 cash difference from Chetan, then his cash balance would also have gone up by almost the same amount as Chetan's. This can only happen if Michael is also a net seller of 10 shares overall.) What was the difference in the number of shares possessed by Michael and Chetan (at the end of day 5)? (Reaction: Obviously the number of shares possessed by both of them at the end of day 5 would be equal—as they started with equal amount of shares and cash at the start of the 5 day period).*

*Option (e) is the correct answer. Note that this is 100% safe thought logic to arrive at this answer. In case, you do not get it I would suggest that you try to see the cash and share balance of both under each of the 10 possible conditions of price rise and fall. You would discover that whenever there is a difference in the number of shares, the cash balance would also vary distinctly.*

83. If Chetan ended up with ₹1300 more cash than Michael at the end of day 5, what was the price of MCS share at the end of day 4?

- (a) ₹90
- (b) ₹100
- (c) ₹110
- (d) ₹120
- (e) Not uniquely determinable

*Sol. (b) If Chetan ended up with ₹1300 more cash than Michael at the end of day 5, (Reaction: Since Chetan is a net seller of 10 shares, Michael must not have sold or bought any shares. If you make Michael buy shares, the difference in the number of shares would be 20 and the difference in cash balance would be around ₹2000. On the other hand if Michael had sold shares, there would not be such a gap in the cash balance.) What was the price of MCS share at the end of day 4? (Reaction: Michael neither sells nor buys. So the price does not hit either 80 or 120. So on day 4, the price can only be ₹100—if the price*

was 120, Michael's sell trigger would have occurred.)

Option (b) is the correct answer. If you are not confident of your answer—try it out.

The pricing would have been: 90, 100, 110, 100, 110 (in order for Michael not to have a sell or buy trigger).

In such a case, the cash balance of Chetan would get affected as shown below:

Day 1—price 90, buy 10 shares, cash balance -900.

Day 2—price 100, sell 10 shares, cash balance +100,

Day 3—Price 110, sell 10 shares, cash balance +1200,

Day 4—Price 100, buy 10 shares, cash balance +2000,

Day 5—Price 110, sell 10 shares, cash balance +1300. Goes to confirm the line of thought I was talking about in the reactions to this question.

84. What could have been the maximum possible increase in combined cash balance of Chetan and Michael at the end of the fifth day?

- (a) ₹3700
- (b) ₹4000
- (c) ₹4700
- (d) ₹5000
- (e) ₹6000

Sol. (d) For maximum possible increase in cash balance, the condition that should be met is that the maximum number of shares should be sold. Since Chetan's transactions are largely fixed in that, we know definitely that he has sold 10 shares net, Michael should have sold the maximum number of shares. For this to happen, the price must have been over 110 for the maximum time. This happens in the case of:

| Day              | 1            | 2     | 3     | 4     | 5            | Net effect |
|------------------|--------------|-------|-------|-------|--------------|------------|
| Price            | 110          | 120   | 130   | 120   | 110          |            |
| Chetan           | Sells        | Sells | Sells | Buys  | Buys         |            |
| Effect on        | +1100        | +1200 | +1300 | -1200 | -1100        | +1300      |
| Chetan's<br>cash |              |       |       |       |              |            |
| Michael          | No<br>action | Sells | Sells | Sells | No<br>action |            |
|                  | 0            | +1200 | +1300 | +1200 | 0            | +3700      |

So, the combined increase in cash balance is ₹5000 (option d).

85. If Michael ended up with 20 more shares than Chetan at the end of day five, what was the price of the share at the end of day three?
- (a) ₹90
  - (b) ₹100
  - (c) ₹110
  - (d) ₹120
  - (e) ₹130

*Sol. (a) If Michael ended up with 20 more shares than Chetan at the end of day 5, (Reaction: Share wise, we know that Chetan is -10, so obviously Michael must be +10 shares in order for him to have 20 more shares than Chetan. This means that Michael must have bought once. For that to happen the price of the share must have gone down to ₹80. The only way that occurs is if we take the price down on both the first two days. Thus, the price string would be 90, 80, 90, 100, 110) what was the price of the share at the end of day 3? (Reaction: Obviously 90).*

Hence, option (a) is correct.

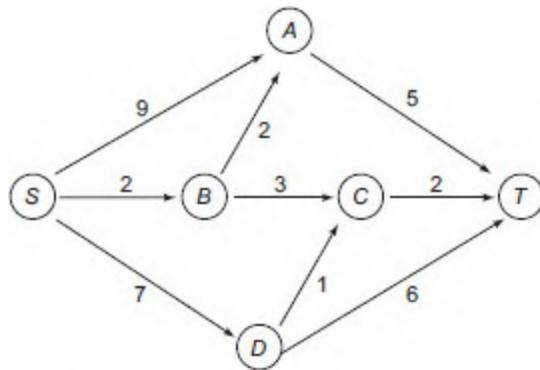
**Directions for Questions 86 to 90:** Answer questions 86–90 on the basis of the information given below.

A significant amount of traffic flows from point S to point T in the one-way street network shown below. Points A, B, C and D are junctions in the network, and the arrows mark the direction of traffic flow. The fuel cost in rupees for travelling along a street is indicated by the number adjacent to the

arrow representing the street.

Motorists traveling from point S to point T would obviously take the route for which the total cost of traveling is the minimum. If two or more routes have the same least travel cost, then motorists are indifferent between them. Hence, the traffic gets evenly distributed among all the least cost routes.

The government can control the flow of traffic only by levying appropriate toll at each junction. For example, if a motorist takes the route S-A-T (using junction A alone), then the total cost of travel would be ₹14 (i.e. ₹9 + ₹5) plus the toll charged at junction A.



*Sol. for 86–90:*

*Reaction: Possible routes*

- (1) SAT—Cost 14+A
- (2) SBAT—Cost 9 + A +B
- (3) SBCT—Cost 7 + B + C
- (4) SDCT—Cost 10 + C + D
- (5) SDT—Cost 13 + D

86. If the government wants to ensure that all motorists travelling from S to T pay the same amount (fuel costs and toll combined) regardless of the route they choose and the street from B to C is under repairs (hence unusable), then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:
- (a) 2, 5, 3, 2
  - (b) 0, 5, 3, 1
  - (c) 1, 5, 3, 2
  - (d) 2, 3, 5, 1

- (e) 1, 3, 5, 1

Sol. (b)/(c) If the government wants to ensure that all motorists travelling from S to T pay the same amount (fuel costs and toll combined) (Reaction: The question is asking us to fix toll charges in such a way that the total cost on all feasible routes is equal.) regardless of the route they choose and the street from B to C is under repairs (hence, unusable) (Reaction: Route SBCT is closed), then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:

Reaction: To equate SDCT cost with SDT cost, C should be 3. This leaves only options b and c. Checking option 2, SAT = 14, SBAT = 14, SDCT = 14 and SDT = 14 (feasible as all 4 routes cost is equated).

Checking option (c), SAT = 15, SBAT = 15, SDCT = 15 and SDT = 15 (feasible again as all 4 routes' cost is equated). This question is clearly giving 2 answers. Mark either one and move ahead. [Note—this question was neglected from the final score calculations].

87. If the government wants to ensure that no traffic flows on the street from D to T, while equal amount of traffic flows through junctions A and C, then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:

- (a) 1, 5, 3, 3
- (b) 1, 4, 4, 3
- (c) 1, 5, 4, 2
- (d) 0, 5, 2, 3
- (e) 0, 5, 2, 2

Sol. (e) If the government wants to ensure that no traffic flows on the street from D to T, (Reaction: SDT has to be made infeasible) while equal amount of traffic flows through junctions A and C, (Reaction: There are 2 routes each through A and C. In order to make an equal amount of traffic flow through each junction A and C respectively, we need to ensure either of two things: 1. All four routes SAT, SBAT, SBCT and SDCT should be the same least cost, OR 2. One route through A and one route through C should be the least cost. At the same time SDT should not be the least cost route.) then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal

is:

*Reaction: Looking at the options, four of the five options give the value of B as 5. We can clearly see that if B is 5, SAT and SBAT give the same cost. In such a case, the two routes through C should also give the same least cost. Also for SBCT to be equal to SBAT, C should exceed A by 2. This is occurring in option (a) and (e). From this point checking for option (a) and (e) it is evident that option (e), is the correct solution as SAT = SBAT = SDCT = SBCT = 14.*

88. If the government wants to ensure that all routes from S to T get the same amount of traffic, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively, to achieve this goal is:
- (a) 0, 5, 2, 2
  - (b) 0, 5, 4, 1
  - (c) 1, 5, 3, 3
  - (d) 1, 5, 3, 1
  - (e) 1, 5, 4, 2

*Sol. (d) If the government wants to ensure that all routes from S to T get the same amount of traffic, then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:*

*Reaction: We need to equate all 5 routes. Thus, looking at the equations for total cost on each route, we see the following:*

*For SAT = SBAT, B should be 5 (All options have this).*

*For SAT = SDT, D should be 1 more than A (Only options (b) and (e) have this).*

*For SDT = SDCT, C should be 3. Only option (e) has this. Hence, we will mark option (e).*

89. If the government wants to ensure that the traffic at S gets evenly distributed along streets from S to A, from S to B, and from S to D, then a feasible set of toll charged (in rupees) at junctions A, B, C, and D respectively to achieve this goal is:
- (a) 0, 5, 4, 1
  - (b) 0, 5, 2, 2
  - (c) 1, 5, 3, 3
  - (d) 1, 5, 3, 2

(e) 0, 4, 3, 2

*Sol.* (a) If the government wants to ensure that the traffic at S gets evenly distributed along streets from S to A, from S to B, and from S to D, then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:

*Reaction:* Since SA has only 1 route going through it, there should be exactly 3 least distance cost routes— 1 each through SA, SB and SD. Further, SAT has to be one of the least cost routes. In Option (a), (b) and (e), SAT would cost 14 while in options (c) and (d), SAT would cost 15. On checking Option (a) gives:

$SAT = SBAT = SDT = 14$  while  $SBCT (16)$  and  $SDT (15)$  would not be least cost routes. The traffic would get evenly distributed between SAT, SBAT and SDT as required by the question.

Hence, we will mark option (a).

90. The government wants to devise a toll policy such that the total cost to the commuters per trip is minimised. The policy should also ensure that not more than 70 per cent of the total traffic passes through junction B. The cost incurred by the commuter travelling from point S to point T under this policy will be:

- (a) ₹7
- (b) ₹9
- (c) ₹10
- (d) ₹13
- (e) ₹14

*Sol.* (c) The government wants to devise a toll policy such that the total cost to the commuters per trip is minimised. The policy should also ensure that not more than 70 per cent of the total traffic passes through junction B. (Reaction: There should be at least 1 least cost route which is not passing through B.) The cost incurred by the commuter travelling from point S to point T under this policy will be:

*Reaction:* The minimum cost on a route not passing through B is 10, hence options (a) and (b) are not feasible. The issue to look out for is, whether we can create a total cost of 10 and have the 70 per cent condition met.

*Looking at the cost equations, it is clear that if we want SDCT to cost 10 totally, C and D should be toll free. Then, SBCT should also cost 10 at least to share the least cost route with SDCT. Thus, the toll at B should be 3. In such a case, SDCT = 10 = SBCT and the other routes cost more than 10. Hence, the traffic would get divided 50-50 between SDCT and SBCT and 10 would represent the least cost you would need to get the value required (option c).*

**Directions for Questions 91 to 93:** Answer the following questions based on the information given below.

There are 100 employees in an organization across five departments. The following table gives the department-wise distribution of average age, average basic pay and allowances. The gross pay of an employee is the sum of his/her basic pay and allowances.

| Department  | Number of employees | Average age (years) | Average basic pay (₹) | Allowances (% of basic pay) |
|-------------|---------------------|---------------------|-----------------------|-----------------------------|
| HR          | 5                   | 45                  | 5000                  | 70                          |
| Marketing   | 30                  | 35                  | 6000                  | 80                          |
| Finance     | 20                  | 30                  | 6500                  | 60                          |
| Business    | 35                  | 42                  | 7500                  | 75                          |
| Development |                     |                     |                       |                             |
| Maintenance | 10                  | 35                  | 5500                  | 50                          |

There are limited number of employees considered for transfer/promotion across departments. Whenever a person is transferred/promoted from a department of lower average age to a department of higher average age, he / she will get an additional allowance of 10 per cent of basic pay over and above his/her current allowance. There will not be any change in pay structure if a person is transferred/promoted from a department with higher average age to a department with lower average age.

*Sol. for 91 to 93*

*Before you start solving the questions in this set, you need to understand the following:*

*a. Interpretation of the values in the table:*

*The table gives us department-wise four pieces of information—*

1. *The number of employees in the department.*
2. *The average age of these employees, thus, you can get the total age of any department by multiplying the average age & the number of employees of that department.*
3. *The average basic pay—gives us again the average basic pay of the department employees. We do not have any particular information about a single employee, but we have only aggregate information about the department.*
4. *The allowances as percentage of basic pay, would also be fixed within a department and would be fixed for all employees within the department.*

*However, since we do not know the basic pay of individual employees, we cannot find out the allowance given to an individual employee. Thus, we conclude that the allowances date is also on aggregate that can be calculated as on average.*

*b. Transfer conditions:*

*When an employee is transferred from one department to another, his allowance would increase if the transfer is from lower average age department to a higher average age department. In any other case this would not occur.*

Questions below are independent of each other.

91. There was a mutual transfer of an employee between Marketing and Finance department and transfer of one employee from Marketing to HR. As a result, the average age of the Finance department increased by one year and that of Marketing department remained the same. What is the new average age of the HR department?
- (a) 30
  - (b) 35
  - (c) 40
  - (d) 45
  - (e) Can't be determined

*Sol. (c) The net result is that there would be 1 person less in the marketing department and one person more in HR. However, the number of people in the Finance department would remain the same.*

*The normal way a student and most instructors would approach this problem would be as follows:*

*Initial total age of the three departments = Final total age of the three departments.*

$$\rightarrow 5 \times 45 + 30 \times 35 + 20 \times 30 = 6 \times A + 29 \times 35 + 20 \times 31.$$

*Solving, we would get the value of A as 40. However this would be a very cumbersome process as it would involve tedious calculations and the minimum time would range between 45 secs to 2 mins depending on the calculation speed of the individual solver.*

*A much superior way to do this would be as follows:*

*Net change in total age should be zero.*

*Thus,*

*Change in total age of Marketing + Change in total age of Finance + change in total age of HR = 0*

$$\Rightarrow -1 \times 35 + 20 \times 1 + x = 0$$

$$\Rightarrow x = 15 = \text{change in total age of HR department}$$

*Thus, the total age of the HR department would increase from  $45 \times 5 = 225$  to 240 for 6 people.*

*Thus, the new average age of HR = 40 (option (c)).*

92. What is the approximate percentage change in the average gross pay of the HR department due to transfer of a 40-year old person with a basic pay of ₹8000 from the Marketing department?
- (a) 9%
  - (b) 11%
  - (c) 13%
  - (d) 15%
  - (e) 17%

*Sol. (c) This can be calculated by:*

*Total gross pay of HR before the transfer =  $8500 \times 5 = 42500$ .*

*(₹8500 from 5000 + 3500)*

*Total gross pay of HR after the transfer*

$$= 42500 + 8000 + (90\% \text{ of } 8000)$$

$$= 42500 + 15200 = 57700.$$

$$\text{Average gross pay} = 57700/6 = 9616.66$$

*The change in average gross pay can be calculated by calculating the percentage change in the value from 8500 to 9616.66 which is approximately 13% (option (c)).*

93. If two employees (each with a basic pay of ₹6000) are transferred from Maintenance department to the HR department and one person (with a basic pay of ₹8000) was transferred from Marketing department to the HR department, what will be the percentage change in the average basic pay of HR department?
- (a) 10.5%
  - (b) 12.5%
  - (c) 15%
  - (d) 30%
  - (e) 40%

*Sol. (b) Initial average = 5000*

*Initial total = 25000 (5000 × 5)*

*New total = 25000 + 6000 + 6000 + 8000 = 45000*

*New average = 45000/8 = 5625*

*Percentage change = 12.5 %*

*Hence, option (b) is the correct option.*

**Directions for Questions 94 to 96:** Answer the following questions based on the information given below.

Abdul, Bikram and Chetan are three professional traders who trade in shares of a company XYZ Ltd. Abdul follows the strategy of buying at the opening of the day at 10 am and selling the whole lot at the close of the day at 3 pm. Bikram follows the strategy of buying at hourly intervals: 10 am, 11 am, 12 noon, 1 pm and 2 pm; and selling the whole at the close of the day. Further he buys an equal number of shares in each purchase. Chetan follows a similar pattern as Bikram but his strategy is somewhat different. Chetan's total investment amount is divided equally among his purchases. The profit or loss made by each investor is the difference between the sale value at the close of the day less the investment made in purchase. The "return" for each investor is defined as the ratio of the profit or loss to the investment amount expressed as a percentage.

## Sol. for 94 to 96

The following set of questions is based on your understanding of the concept of weighted averages.

The simplest one to understand is the one about Abdul. Abdul will make a profit if the price goes up and loss if the price goes down.

Further, his percentage profit/loss would be exactly the same as the percentage increase/decrease of the share price.

Before you hit the question, you need to understand clearly the difference between Bikram and Chetan's strategies.

Since, Chetan invests an equal amount at every hour, the no. of shares he has bought would be dependent on the price fluctuation. For example, if the prices are going down on a particular day, he would end up purchasing more shares at the lower price. In fact, his strategy of inverting an equal amount every hour ensures that he buys a higher number of shares at the lower prices irrespective of the fluctuation. Thus, his average purchase price per share would be the weighted average of all the prices with higher weights allocated to the lowest one during the day.

For Bikram on the other hand, his investment would always be in buying an equal no. of shares every hour. Thus, his average purchase price would always be the simple average of his 5 purchase prices.

Naturally, on any fluctuation prices day, Bikram's average price would be greater than Chetan's average price. As Chetan's average price would be the weighted average of the 5 price (@ 10, 11, 12, 1 & 2) with higher weights attached to the lower prices.

Note: what you need to have clear in your mind is that weighted average with higher weights attached to the lower prices would always have a lower value than a simple average.

However, if the prices are flat the whole day (i.e. there is no change in prices through out the day) the weighted average and simple average both would be equal to that single price.

94. Which one of the following statements is always true?
  - (a) Abdul will not be the one with minimum return.
  - (b) Return for Chetan will be higher than that of Bikram.

- (c) Return for Bikram will be higher than that of Chetan.
- (d) Return for Chetan cannot be higher than that of Abdul.
- (e) none of the above

*Sol. (e) We can solve this by looking at and eliminating individual options. Option (a) cannot be true as Abdul would have the minimum return if the price is highest at 10 am and continuously drops till 3 pm.*

*Option (b) would normally ‘have been true, but is not always true because if the price remains constant at 10, 11, 12, 1 & 2, Chetan would have the same return as Bikram.*

*Option (c) is also eliminated as we have seen that most of the time Chetan has a higher return than Bikram.*

*Option (d) can be eliminated on the basis of the thought that it is easily possible that Chetan has higher return than Abdul. For example, on a day of consistently reducing prices, Abdul has the least return.*

*Thus, option (e) is correct.*

95. On a “boom” day, the share price of XYZ Ltd. keeps rising throughout the day and peaks at the close of the day. Which trader got the minimum return on that day?

- (a) Bikram
- (b) Chetan
- (c) Abdul
- (d) Abdul or Chetan
- (e) cannot be determined

*Sol. (a) Abdul would get the maximum return on that day, since his purchase price (average) would be the least. Also, between Chetan and Bikram, we know that Bikram’s average purchase price is higher and hence he would have the least returns.*

*Hence, we will mark option (c).*

96. On a day of fluctuating market prices, the share price of XYZ Ltd. ends with a gain, i.e. it is higher at the close of the day compared to the opening value. Which trader got the maximum return on that day?

- (a) Bikram
- (b) Chetan
- (c) Abdul

- (d) Bikram or Chetan
- (e) cannot be determined

*Sol. (e) The maximum return could be for Abdul or Chetan. But, between the two we cannot determine who gained more because in order to get that we would need to know the exact price at each hour, starting from 10 am.*

*Hence, we will mark option (e).*

**Directions for Questions 97 to 98:** One day two other traders, Dane and Emily joined Abdul, Bikram and Chetan for trading in the shares of XYZ Ltd. Dane followed a strategy of buying equal number of shares at 10 am, 11 am, and 12 noon, and selling the same numbers at 1 pm, 2 pm and 3 pm. Emily, on the other hand, followed the strategy of buying shares using all her money at 10 am and selling all of them at 12 noon; and again buying the shares for all the money at 1 pm and again selling all of them at the close of the day at 3 pm. At the close of the day, the following was observed:

- (a) Abdul lost money in the transactions.
- (b) Both Dane and Emily made profits.
- (c) There was an increase in the share price during the closing hour compared to the price at 2 pm.
- (d) Share price at 12 noon was lower than the opening price.

Before solving 153 and 154 we need to logically work out what happened with respect to prices on that day.

- (a) Since Abdul lost money, price at 3 pm < price at 10 am i.e.  $P_3 < P_{10}$
- (b) Dane made profits means  $P_{10} + P_{11} + P_{12} < P_1 + P_2 + P_3$
- (c) Emily made profits means  $P_{10} + P_1 < P_{12} + P_3$
- (d)  $P_2 < P_3$
- (e)  $P_{12} < P_{10}$
- (f) From (c) & (e) above, we know that  $P_3 > P_1$ .
- (g) Also, from (c) we have  $P_{10} - P_{12} < P_3 - P_1$ . and from (b) & (g) we have:  $2 P_{10} + P_{11} < 2 P_3 + P_2 \rightarrow P_{11} < P_2$

97. Which of the following is necessarily false?
- (a) Share price was at its lowest at 2 pm.
  - (b) Share price was at its lowest at 11 am.
  - (c) Share price at 1 pm was higher than the share price at 2 pm.
  - (d) Share price at 1 pm was higher than the share price at 12 noon.
  - (e) None of the above

Sol. (e) *None of the four options (a – d) can be said to be necessarily false.*

As:

*Option (a) (share price least at 2 pm) can happen.*

*Option (b) (share price least at 11 am) can also happen.*

*In terms of equalities, what we know is:*

$$P_{10} - P_{12}, P_{10} < P_3, P_3 > P_1 \text{ & } P_3 > P_2 \text{ & } P_2 > P_{11}$$

*Option (c) and option (d) could also be true in some cases and hence are not necessarily false.*

98. Share price was at its highest at:

- (a) 10 am
- (b) 11 am
- (c) 12 noon
- (d) 1 pm
- (e) Cannot be determined

Sol. (a) *From the above, we have:*

$P_{10} > P_{12}, P_{10} > P_3$  & since  $P_3 > P_1$  and  $P_3 > P_2$ , it follows that  $P_{10} > P_{11}$  and  $P_{10} > P_{12}$  would also be true.

*Thus, the highest price would definitely be at 10 am (option (a)).*

## PART 2

# Twelve Minute Tests

Twelve Minute  
Tests 1 – 30

### In This Part You will Learn:

- **To solve difficult reasoning based questions in Data Interpretation in the format of a mock test.**
- **Not only to tackle the DI section more effectively but also by solving this part you would**
  - Improve your ability to handle new unknown situations and unforeseen twists in a DI question
  - Improve your anticipation/recognition of

novelties in DI question sets

- Improve the depth and breadth of your exposure to DI questions as well as your DI problem solving skills
- Improve your ability to make earlier decisions about whether you are going to be able to solve a question set or not
- Improve your ability to work around hurdles in advanced DI problems
- Improve your ability to work around hurdles in advanced DI problems
- Increase your confidence level to take on any challenge thrown at you in a DI question paper

### **This Part Contains:**

- **30 Mock Tests on the latest pattern of the CAT Paper, where you would be expected to solve 16 DI questions in 30 minutes.**

# 1

# Twelve Minute Tests

## OUTLINE

### Learning Objectives

- A unique collection of questions to test your mettle, your guts, and your intelligence
- Question sets of advanced reasoning based on Data Interpretation.

This part contains 30 Twelve minute tests. These tests have been designed in such a way that they will test your solving prowess of Logical Data Interpretation. The twelve minute time limit has been set since, in order to crack the DI-LR section of the CAT with a high 99+ percentile, you would need to solve 5 sets in an hour (as I have explained in the preface of the book).

For each of these sets, you are expected to first solve the set in a strict 12 minute time frame. Each of the tests in this part contains 1 high quality set based on Logical DI. If you are able to do the set in that time then you are clearly heading to a good percentile in the CAT - however, you might still need to ask yourself the question of how you can reduce your time further - since 100 percentile would be breached only if you solve 6+ sets in an hour (meaning 10 minutes per set).

If you are not able to solve the set in 12 minutes your focus should be to first make sure that you can solve the same beyond the time limit and learn to identify what you were missing in the solving of the questions. It is imperative to first try to do it on your own - since that is going to be crucial

to make sure that you extract maximum learning from each question. Hence, after the 12 minute time limit, don't bother about how much more time you take - and how many times you have to try the question, but it is important to stick to trying to solve on your own. After sufficient trial (that might include trying the set 5-10 times) if you are not done with the set by yourself, you can then try to check the solutions and try to identify what it is that you were not able to see in the question, due to which you weren't able to solve the question. You will be expected to use the same process for every set contained in [Part 3 \(Mock Test Papers of Logical DI\)](#) of this Section. Have a great learning experience!

# 1 Test I

**Direction for Question 1 to 4:** Zaffran is a famous street food joint serving four items: fried rice, noodles, chips and ice creams. It has three employees Vijay, Bhola and Palan who prepare the items ordered by the customers. Preparation time is 12 minutes for fried rice, 8 minutes for noodles and 3 minutes for an order of ice cream and. An employee can prepare only one of these items at a time. The chips are prepared in an automatic fryer which can prepare up to 3 portions of chips at a time, and takes 5 minutes irrespective of the number of pieces. The fryer does not need an employee to constantly attend to it, and we can ignore the time taken by an employee to start and stop the fryer; thus, an employee can be engaged in preparing other items while the frying is on. However chips cannot be prepared in anticipation of future orders. Zaffran wishes to serve the orders as early as possible. The individual items in any order are served as and when ready; however, the order is considered to be completely served only when all the items of that order are served. The table below gives the orders of five customers and the times at which they placed their orders;

| <b><i>Customer No.</i></b> | <b><i>Time</i></b> | <b><i>Order</i></b>                            |
|----------------------------|--------------------|--|
| 1                          | 11:00              | 1 Fried Rice, 3 portions of chips, 1 ice cream |
| 2                          | 11:05              | 1 Noodle, 2 portions of chips, 2 ice cream     |
| 3                          | 11:07              | 1 Fried Rice, 1 Noodle and 1 portion of chips  |
| 4                          | 11:11              | 1 Fried Rice, 2                                |

|   |       |   |
|---|-------|---|
|   |       | portions of chips and<br>1 Noodle             |
| 5 | 11:17 | 1 ice cream, 2<br>Noodles and 1 Fried<br>Rice |

---

1. If they all take the most optimal decisions based on the constraints above, at what time would customer 5 get his complete order served?
  - (a) 11:35
  - (b) 11:36
  - (c) 11:38
  - (d) 11:40
2. If they all take the most optimal decisions based on the constraints above, at what time would customer 4 get his complete order served?
  - (a) 11:30
  - (b) 11:26
  - (c) 11:28
  - (d) 11:32
3. Assume that only one customer's order can be processed at any given point of time. So, Vijay, Bhola and Palan cannot start preparing a new order while a previous order is being prepared. At what time is the order placed by Customer 5 completely served?
  - (a) 11:58
  - (b) 11:55
  - (c) 11:56
  - (d) 11:52
4. Assume that only one customer's order can be processed at any given point of time. So, Vijay, Bhola and Palan cannot start preparing a new order while a previous order is being prepared. What is the total idle time for the three workers starting from 11:00 AM to the time when the last order was served?
  - (a) 58 minutes

- (b) 67 minutes
- (c) 63 minutes
- (d) 99 minutes

## 2 Test II

**Directions for Questions 1 to 4:** A public poll was conducted to find the cleanest city of India in the year 2015. The public poll was conducted in five rounds namely Round I, Round II, Round III, Round IV and Round V in that particular order. The same group of 20000 people voted in each of the five rounds. The nominees for the most popular city award were P, Q, R, S, T and U. The following table provides information about the number of votes received by each of these six cities in the given rounds. One person could vote for only one city in the given rounds.

|   | Round-1 | Round-2 | Round-3 | Round-4 | Round-5 |
|---|---------|---------|---------|---------|---------|
| P | 6800    | 7800    | 8600    | 5800    | 6800    |
| Q | 5200    | 7800    | 6200    | 7000    | 5800    |
| R | 10400   | 6400    | 8600    | 7200    | 8200    |
| S | 4200    | 6800    | 5600    | 5800    | 5600    |
| T | 8600    | 8600    | 7200    | 7000    | 8800    |
| U | 4800    | 2600    | 3800    | 7200    | 4800    |

### Additional Information Given:

- (i) People, who voted for P in any round, voted for either S or T in the following round.
  - (ii) Only those people, who voted for Q or U in any round, voted for P in the following round.
  - (iii) People, who voted for T in any round, voted for either R or U in the following round.
  - (iv) People who voted for S in round 1, voted for S in each of the next three rounds.
1. The Montmorency number for a city is defined as the number of cities who have got lesser number of votes than it in exactly two rounds. What is the sum total of all the Montmorency numbers of all the 6 cities in the table?

- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
2. Out of the number of people who voted for P in any round, the minimum number of people who voted for S in the next round (counting for all the five rounds) is at least
- (a) 2200
  - (b) 600
  - (c) 1600
  - (d) 1100
3. The number of people who were retained by Q or U across the rounds of voting was at most:
- (a) 7400
  - (b) 8200
  - (c) 14800
  - (d) 15600
4. What is the maximum number of voters that U could have retained in round 2?
- (a) 2600
  - (b) 2200
  - (c) 1300
  - (d) 400

# 3 Test III

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

In a Maori village of New Zealand elections are held every 5 years for the local elected representatives. The rules of voting are very strict – i.e. only those who are at least 18 years of age are allowed to vote – and unlike a lot of democracies voting is compulsory if you are eligible. The elections are always held on the 1st of May – which is the beginning of their calendar year. The following table gives the number of people of different age groups, who have cast their votes in the five elections from 1999 through 2019. During this period, in every election, every person who is eligible to vote casts his/her vote. Assume that during this time nobody left the village and nobody came into the village from outside.

|                   | 1999 | 2004 | 2009 | 2014 | 2019 |
|-------------------|------|------|------|------|------|
| 18 Age < 38 years | 438  | 380  | 384  | 440  | 450  |
| 38 Age < 58       | 472  | 500  | 400  | 440  | 432  |
| 58 Age            | 410  | 400  | 500  | 440  | 460  |

1. What is the least possible number of people who died between 1999 and 2019?
  - (a) 422
  - (b) 96
  - (c) 428
  - (d) 432
2. What is the maximum possible number of people who cast their votes in the year 1999 cast their votes in 2014 as well?
  - (a) 1220
  - (b) 1192
  - (c) 1200
  - (d) 892

3. If exactly 1100 people who cast their votes in 1999, cast their votes in 2004 also, then what is the maximum possible number of people whose age is between 38 and 43 in 2004?

  - (a) 238
  - (b) 218
  - (c) 138
  - (d) 28
4. What is the minimum possible number of people who cast their votes in both 1999 and 2009?

  - (a) 800
  - (b) 850
  - (c) 880
  - (d) 900

# 4 Test IV

**Directions for Question 1 to 4:** Four golfers Tiger, Shubhankar, Jeev and Els took some shots on the green in order to test their putting form. The following table gives the number of successful putts made by the four during the day on four different holes of the golf course – viz: Hole 1, Hole 2, Hole 3 and Hole 4.

|            | Hole 1 | Hole 2 | Hole 3 | Hole 4 |
|------------|--------|--------|--------|--------|
| Tiger      | 7 or 8 | 5 or 6 | 3 or 4 | 5 or 6 |
| Shubhankar | 3 or 4 | 5 or 6 | 5 or 6 | 7 or 8 |
| Jeev       | 6      | 3 or 4 | 7 or 8 | 3 or 4 |
| Els        | 3 or 4 | 7 or 8 | 5 or 6 | 5 or 6 |

It is further known that:

1. No golfer putted the same number of putts on any two holes.
  2. No two golfers putted the same number of putts on any hole.
  3. The aggregate of the number of putts on the four holes, for each golfer was different.
  4. The aggregate of the number of putts done by the four golfers was different across the four holes.
1. What is the total number of successful putts by the four golfers on Hole 1?
    - (a) 21
    - (b) 19
    - (c) 20
    - (d) Cannot be determined
  2. On which of the following holes can the total number of putts by all the four golfers never be the maximum?
    - (I) Hole 2
    - (II) Hole 3
    - (III) Hole 4

- (a) I only
  - (b) II only
  - (c) III only
  - (d) II and III
3. The aggregate total number of putts for all four golfers put together is?
- (a) 83
  - (b) 84
  - (c) 85
  - (d) 86
4. The aggregate putts successfully made by Tiger, if Shubhankar putted 7 times on Hole 4 was?
- (a) 24
  - (b) 23
  - (c) 21
  - (d) 22

# 5 Test V

**Directions for Question 1 to 5:** A group of 5 students- Pawan, Qazi, Ram, Shravan, Tarun participated in the National Management competition- 2019. The competition consists of four exams of different subjects Verbal Ability (VA), Data Interpretation (DI), Logical Reasoning (LR) and Quantitative Aptitude (QA). Physics, Chemistry, Biology, Maths.

The tables given below show the marks of all the candidates on different subjects and the total marks of all students on a given subject.

---

**Table- A** Students and their scores on different subjects.

| Student | VA  | DI  | LR  | QA  |
|---------|-----|-----|-----|-----|
| Pawan   |     | 300 |     | 159 |
| Qazi    | 264 | 195 |     | 156 |
| Ram     |     |     | 330 |     |
| Shravan | 216 | 225 | 60  | 168 |
| Tarun   | 180 |     | 234 |     |

---

**Table- B:**

| Subject | Combined score of all students |
|---------|--------------------------------|
| VA      | 810                            |
| DI      | 900                            |
| LR      | 720                            |
| QA      | 600                            |

In [table-A](#) each column has two missing values which are the least two scores on that subject and none of the missing values is more than 10% of the total marks scored by all the candidates together in that subject. Also assume

that all the missing numbers in the table are integers.

1. What are the Maximum possible marks of Qazi in LR:
  - (a) 24
  - (b) 12
  - (c) 16
  - (d) None of these.
2. What is the maximum possible percentage contribution of Ram in the total marks obtained by all the students in all the subjects?
  - (a) 19.33
  - (b) 18.51
  - (c) 24.47
  - (d) None of these.
3. If the absolute difference between the total marks obtained by Pawan and Ram in the four subjects is minimum possible then what is the absolute difference between total marks obtained by Shravan and Tarun?
4. The student with highest total marks in all the four subjects got 1st rank and student with lowest total marks got 5th rank and it is known that no two students got same number of total marks then what rank did Ram get?
  - (a) 3rd
  - (b) 4th
  - (c) 5th
  - (d) Cannot be determined
5. In the previous question what rank did Qazi get if his total score in all the four subjects is a prime integer and his score in LR has more than four factors?

# 6 Test VI

**Directions for Questions 1 to 4:** MS, MBA and M.TECH are the three most sought after professional degree programmes in each of the five countries viz. India, US, UK, Australia, and Singapore. To complete any of these degrees, students can choose to study in any of these five countries. After the completion of their degrees, these students become professionals employable in all the five countries. The following table lists the total Expenses Incurred (EI) on these professional degrees and the Annual Incomes (AI) earned by the professionals, in their first job after the completion of their degrees, in each of these five countries in the local currencies.

|            | Expenses Incurred (EI) and Annual Incomes (AI) |         |          |        |          |       |                 |       |                 |        |
|------------|--|---------|----------|--------|----------|-------|-----------------|-------|-----------------|--------|
|            | INDIA  |         | US (USD) |        | UK (GBP) |       | AUSTRALIA (AUD) |       | SINGAPORE (SGD) |        |
|            | EI   | AI      | EI       | AI     | EI       | AI    | EI              | AI    | EI              | AI     |
| HUMANITIES | 300000   | 300000  | 52000    | 56000  | 40000    | 36000 | 50000           | 45000 | 60000           | 70000  |
| MBA        | 1200000  | 1800000 | 90000    | 100000 | 56000    | 50000 | 60000           | 90000 | 65000           | 110000 |
| M TECH     | 400000   | 620000  | 70000    | 80000  | 40000    | 40000 | 40000           | 50000 | 50000           | 75000  |

Using the following table, the EI and the AI figures of different countries can be compared in terms of Indian Rupees.

I USD = 68.65 INR

1 GBP = 90.81 INR

1 AUD = 48.68 INR

1 SGD = 50.76 INR

Assume that the data given above is valid for every year. Also assume that professionals receive no increment in their salaries, unless specified.

1. Studying in which of these five countries, a student gets the best return on the expense incurred by him, at the end of the first year of his first job, if he completes any of the courses and works in the same country?
  - (a) India

- (b) US
  - (c) Singapore
  - (d) Australia
2. Harshit works in Australia for an Australian company. The company sponsors him an interest free loan of 75% of the total expense on his MBA degree in UK. In return, Amit has to serve the company for three consecutive years in Australia after completing his MBA. The annual salary, net of deductions, that the company can pay Harshit, when employing him again, for full recovery of the loan amount over the period of three years should be closest to? (assume that the salary payable is the same as the average income for an MBA in Australia.)
- (a) 84600 AUD
  - (b) 64100 AUD
  - (c) 77700 AUD
  - (d) 192300 AUD
3. Mukul Sharma lives in India. In a few days, he will leave for UK to pursue a one year MBA degree. Airfare from India to UK is INR 22500 and that from UK to India is GBP 340. Before completing his degree, he wishes to visit India. Before allocating money for his expenses on his MBA degree in UK, his total Budget for tuition and travel is INR 2340000 only. How many times, from UK, can he make a return trip to India?
- (a) Only Once
  - (b) Only Twice
  - (c) Only Thrice
  - (d) Only Four Times
4. Parikshit and Shwetank completed their degrees in M Tech from Singapore and US respectively. Their M Tech was funded through a zero interest loan taken and to be refunded in Indian rupees. After completion of their degrees, Parikshit started working in US and Shwetank started working in Singapore. Taking into account, their expenditures on degrees and their salaries only, the difference in the income available to be spent for them after repaying their study loans, at the end of first year of their jobs is approximately

- (a) INR 544000
- (b) 3100 USD
- (c) INR 422000
- (d) INR 318000

# 7 Test VII

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

The Used car market in India is dominated by five major companies - Udhar, Sudhar, Sutradhar, Bhrashtachar and Sishtachar - and three minor companies -Mindtree, Lemontree and Boringtree. Each of these eight companies sold only Sedans. In all the years from 2019 onwards, each minor company had a sales value less than that of each major company, but the sales value of all the minor companies put together was at least as much as that of the least selling major company (by value). The table below, gives the percentage market shares (by value) of the top three selling major companies (by value), in each year from 2020 to 2023.

|      | <i>Udhar</i> | <i>Sudhar</i> | <i>Sutradhar</i> | <i>Bhrashtachar</i> | <i>Sishtachar</i> | <i>Mindtree</i> | <i>Lemon-tree</i> | <i>Boring-tree</i> | <i>Total sales Value in Rs. Crore</i> |
|------|--------------|---------------|------------------|---------------------|-------------------|-----------------|-------------------|--------------------|---------------------------------------|
| 2020 |              | 30%           | 20%              | 24%                 |                   |                 |                   |                    | 1200                                  |
| 2021 | 23%          |               |                  | 32%                 |                   | 25%             |                   |                    | 1500                                  |
| 2022 | 25%          | 22%           |                  |                     |                   | 28%             |                   |                    | 2000                                  |
| 2023 | 24%          |               |                  |                     | 22%               | 20%             |                   |                    | 3000                                  |

It is also known that in each of the given years, the percentage shares of the eight companies were distinct natural numbers.

1. In how many numerical combinations of percentage distributions can we possibly distribute the remaining percentages for the year 2020?
2. The approximate percentage increase in the sales value of the smart phones of major companies from 2020 to 2023, is at most
  - (a) 158%
  - (b) 159%
  - (c) 161%
  - (d) 162%
3. The number of years in which each of the given eight companies had a sales value of more than Rs.50 crore, is at most

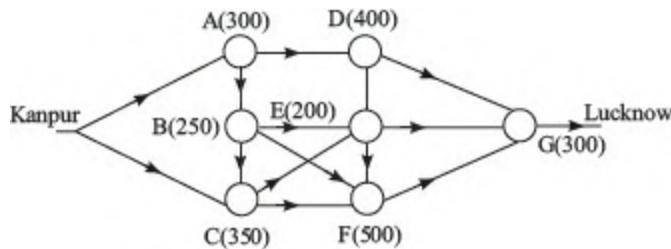
4. The total sales value (in Rs. crore) of company C in the given four years, was at least

# 8

# Test VIII

**Directions for Questions 1 to 3:** Answer the questions on the basis of the information given below.

In the diagram given below, all the routes of going from Kanpur to Lucknow are shown by the help of arrows. Each route passes through some of the seven villages called A, B, C, D, E, F and G. The number given in brackets along with the name of a village represents the number of people staying in that village.



It is also known that:

- (i) An Indian oil tanker is loaded with kerosene oil at Kanpur. It takes one of the possible routes to Lucknow and distributes oil cans among the people staying in all the villages along its route.
  - (ii) Each person staying in a village is given an oil can of 1.5 litres. A tanker is allowed to pass through a village on its route only after each person staying in the village gets the oil can.
1. How many different routes can a tanker loaded with 2100 liters of oil take from Kanpur to Lucknow such that it can give oil cans to all the people staying in villages along that route?
    - (a) 4
    - (b) 6
    - (c) 10
    - (d) 8
  2. A tanker loaded with 2100 liters of oil is barely able to give oil cans to

all the people staying in villages along its route and is left with no oil when it reaches Lucknow. How many villages fall in the route taken by the tanker?

- (a) 5
  - (b) 4
  - (c) 3
  - (d) Cannot be determined
3. A pair of two routes on which the quantity of oil that needs to be distributed by a tanker is exactly the same is called a “Perfect-pair”. How many Perfect-pairs are there among the different routes from Kanpur to Lucknow?
- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3

## 9 Test IX

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

A group of 5 students Aman, Bendre, Charwak, Denboo and Elangovan participated in an interschool science quiz, the quiz had four different rounds (1 to 4). The following table gives partial information about their individual points and the total points scored by the team in each round.

Each column has two values missing. These are the points scored by the two lowest scorers in that round. None of the two missing values is more than 10% of the total points scored in that round.

|              | Round-1    | Round-2    | Round-3    | Round-4    |
|--------------|------------|------------|------------|------------|
| Aman         |            | 200        |            | 106        |
| Bendre       | 176        | 130        |            | 104        |
| Charwak      |            |            | 220        |            |
| Denboo       | 144        | 150        | 40         | 112        |
| Elangovan    | 120        |            | 156        |            |
| <b>TOTAL</b> | <b>540</b> | <b>600</b> | <b>480</b> | <b>400</b> |

1. What is the maximum possible percentage contribution of Aman in the total points scored in the quiz?
  - (a) 18.66 %
  - (b) 19.2%
  - (c) 18.1%
  - (d) None of these
2. If the absolute difference between the total points scored by Aman and Charwak in the four rounds is minimum possible then what is the absolute difference between total points scored by Ben and Elan in the quiz?
  - (a) 70
  - (b) 34

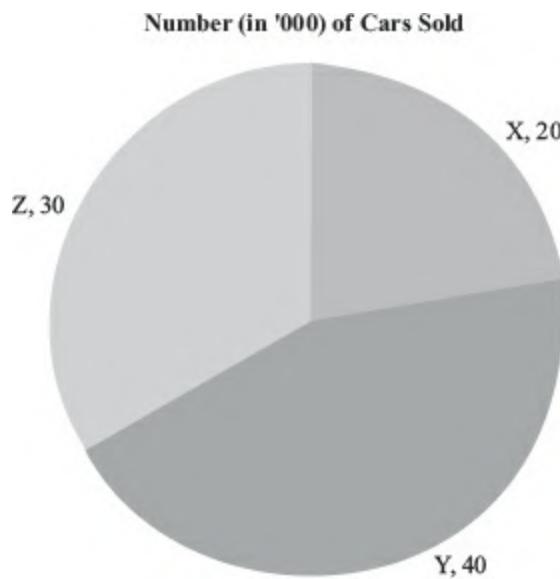
- (c) 72
  - (d) Cannot be determined
3. If the difference between the total points scored by Aman and Charwak in the four rounds is the maximum possible then what is the difference between the difference of the total points scored by Aman and Charwak and the difference between the total points scored by Bendre and Elangovan?
  4. The students are ranked 1 to 5 on the basis of the total points scored by them in the quiz, with the highest scorer getting Rank 1. If it is known that no two students scored the same number of total points, how many students are there whose rank can be exactly determined?

# 10 Test X

Each of three companies, X, Y and Z, sells a different car among Falcon, Gauntlet and Prize, not necessarily in the same order. The companies did not sell any other products apart from these three cars.

The pie chart below provides, for the year 2018, the number (in '000) of cars sold by each of the three companies.

The table provides the price at which each car was sold (price/unit) in 2018.



| Cars     | Price/Unit (in Rs) |
|----------|--------------------|
| Falcon   | 20000              |
| Gauntlet | 40000              |
| Prize    | 30000              |

**Note:** The market share of a company is calculated as the revenue of the company as a percentage of the revenues of the three companies combined.

1. If it is known that the market share of none of the three companies was

greater than 40%, which company sold Prize?

- (a) Y
  - (b) X
  - (c) Z
  - (d) Cannot be determined
2. What is the lowest possible market share of any of the three companies, approximately?
- (a) 13.8%
  - (b) 14.3%
  - (c) 21.4%
  - (d) 23.1%
3. If the company that sells Prize has more than 45% market share, what is the market share of the company that sells Falcon
- (a) 30.8%
  - (b) 27.4%
  - (c) 31.2%
  - (d) 23.1%
4. What is the highest possible difference between the highest market share of any company and the second-lowest market share of any company?
- (a) 41.4%
  - (b) 42.8%
  - (c) 37.9%
  - (d) 48.3%

# 11 Test XI

Arun wanted to get a new phone number, which comprises eight non-zero digits. He chose a phone number which satisfied all the following conditions, with the digits being referred to as first to eighth, starting from the leftmost digit:

- (i) The last digit was greater than the third digit, while the fourth digit and the fifth digit, taken in that order, comprised (i.e., formed) a prime number.
  - (ii) The sixth and the third digits, taken in that order, comprised an even number greater than 40, while the first and the second digits are not the same.
  - (iii) The sum of the fourth digit and the third digit was the same as the fifth digit.
  - (iv) The sum of the fifth and the sixth digits was exactly 9, while the sixth and the seventh digits, taken in that order, comprised a prime number.
  - (v) The second and the eighth digits, taken in that order, comprised a number which was four more than the number comprised by the first and the second digits, taken in that order.
1. In how many ways could Arun have chosen the phone number?
- (a) 1
  - (b) 2
  - (c) 4 or 5
  - (d) 8
2. Which of the following is the seventh digit of the phone number?
- (a) 3
  - (b) 6
  - (c) 1 or 7

- (d) None of these
3. Which of the following is the number comprised by the fifth and the third digits off the phone number, taken in that order?
- (a) 72
  - (b) 32
  - (c) 39
  - (d) 59
4. What is the difference between the first and the sixth digit of the phone number?
- (a) 2
  - (b) 6
  - (c) 8
  - (d) 3

## 12 Test XII

Three panel members, A, B and C, interviewed four candidates - P, Q, R and S. Each panel member scored each of the four candidates on four parameters - P1, P2, P3 and P4. The following tables A provides partial information about the score given by each panel member to each candidate in each parameter:

| Panel Member: B |    |    |    |    |
|-----------------|----|----|----|----|
|                 | P1 | P2 | P3 | P4 |
| P               |    | 7  |    |    |
| Q               |    |    |    | 5  |
| R               |    |    |    |    |
| S               |    | 8  |    |    |

| Panel Member: A |    |    |    |    |
|-----------------|----|----|----|----|
|                 | P1 | P2 | P3 | P4 |
| P               | 1  |    |    |    |
| Q               |    |    |    |    |
| R               |    |    |    |    |
| S               | 4  |    |    |    |

| Panel Member: C |    |    |    |    |
|-----------------|----|----|----|----|
|                 | P1 | P2 | P3 | P4 |
| P               |    |    |    | 4  |
| Q               |    |    |    |    |
| R               |    |    |    |    |
| S               |    |    |    | 5  |

The following information is known about the scores given by each panel member:

- (i) In each parameter, A gave a different score to each candidate and, for each candidate, A gave a different score in each parameter.
- (ii) In each parameter, B gave a different score to each candidate and, for each candidate, B gave a different score in each parameter.
- (iii) The scores that A gave to any candidate in any parameter was a

positive integer less than 5.

- (iv) The scores that B gave to any candidate in any parameter was an integer less than 9 and greater than 4.
  - (v) The score given by C to any candidate in any parameter was the average of the scores given by A and B to that candidate in that parameter.
  - (vi) The score given by C to any candidate in any parameter was an integer.
1. What is the score given by B to R in P3?
  2. What is the score given by A to Q in P4?
  3. What was the highest composite score in P3?
  4. How many candidates received a higher composite score in P2 as compared to that in P3?

# 13 Test XIII

Exactly 60 employees work in an office. During each of eight consecutive days, from Day 1 through Day 8, each of these 60 employees drank exactly one drink among Fanta, Pepsi and Sprite. On Day 1, an equal number of employees drank Fanta, Pepsi and Sprite.

The following table provides, for each day, starting from Day 2, the number of people who switched from Pepsi to Fanta, from Pepsi to Sprite, from Fanta to Pepsi, from Fanta to Sprite, from Sprite to Pepsi and from Sprite to Fanta as compared to the previous day.

|                 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|
| Pepsi to FANTA  | 5     | 3     | 4     | 6     | 9     | 7     | 5     |
| Pepsi to SPRITE | 4     | 2     | 6     | 4     | 5     | 2     | 7     |
| FANTA to Pepsi  | 8     | 3     | 3     | 4     | 2     | 7     | 1     |
| FANTA to SPRITE | 6     | 6     | 8     | 2     | 3     | 1     | 6     |
| SPRITE to Pepsi | 7     | 2     | 5     | 4     | 6     | 3     | 1     |
| SPRITE to FANTA | 2     | 5     | 2     | 2     | 8     | 3     | 4     |

1. How many employees drank Sprite on Day 6?
2. What is the average number of employees who drank Fanta per day during the given period?
3. During the given period, on how many days did at least 16 employees drink each of the three drinks?
4. What is the maximum number of employees that could have had Sprite on each of the 8 days?

## 14 Test XIV

Seven persons - P through V - are standing in a line, from left to right, all facing the same direction. Among the seven persons, Q, S, T and U are girls, while the remaining are boys. Starting from the left, each person declared the number of persons standing adjacent to him/her who are not of the same gender as him/her. The numbers that each person declared, from left to right, are 1, 1, 1, 2, 2, 2 and 1 respectively.

Further, it is known that Q is standing adjacent to neither P nor R, while S is standing to the immediate right of V. Also, R is standing to the immediate left of T, who, in turn was not standing at the extreme right.

1. How many girls are standing to the right of Q?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
2. Who among the following is standing adjacent to P?
  - (a) S
  - (b) V
  - (c) T
  - (d) R
3. Among the seven persons, exactly two persons exchanged their places and each of them again declared the number of persons standing adjacent to him/her who are not of the same gender as him/her. If the maximum number of persons declared the highest possible number, who among the following exchanged his/her place?
  - (a) R
  - (b) S
  - (c) U
  - (d) Q

4. Among the seven persons, exactly two persons exchanged their places and each of them as again declared the number of persons standing adjacent to him/her who are not of the same gender as him/her. If, starting from the left, six persons declared the same number, who among the following exchanged his/her place?
- (a) P
  - (b) Q
  - (c) V
  - (d) None of these

## 15 Test XV

Shikha, an assistant to the dean of a college, was given a task to tabulate the courses taken by the students in the college. The students can take any number of courses among ME, CV, CH, AE, CS, EC and TL. She prepared a table comprising eight columns, with the students' names mentioned in the first column and the remaining seven columns, i.e., the second column to the eighth column, representing the seven courses, in the same order, from left to right, as mentioned above. In the row corresponding to every student, Shikha marked every cell corresponding to a course that the student took with a tick and every cell corresponding to a course that the student did not take with a cross.

After preparing the table, she made the following observations:

- (i) The student in the first row of the table took all the courses.
  - (ii) The student in the second row took all the courses except for the courses in the second and eighth columns.
  - (iii) The student in the third row took all the courses except for the courses in the second, third, seventh and eighth columns.
  - (iv) The student in the fourth row took all the courses except for the courses in the second, third, fourth, sixth, seventh and eighth columns.
  - (v) The students in the fifth, sixth and seventh rows took the same courses as the students in the third, second and first rows respectively.
  - (vi) This pattern mentioned from (i) through (v) repeats, starting from the seventh row for all the students in the table, and continues repeating until the last row.
1. If the number of students who took at least three courses was 243, how many students are there in the college?
- (a) 291

- (b) 292
  - (c) 290
  - (d) Cannot be determined
2. If exactly 59 students in the college took CS, how many students are there in the college?
- (a) 69
  - (b) 71
  - (c) 70
  - (d) Cannot be determined
3. If there were 93 students in the college, how many students?
- (a) 33
  - (b) 30
  - (c) 31
  - (d) 32
4. How many students took EC, if only 43 students took ME?
- (a) 127
  - (b) 126
  - (c) 125
  - (d) 130

## 16 Test XVI

Professor Kumar gave five assignments - a, b, c, d and e - to five of his students - Rajiv, Dinesh, Max, Rishi and Anand, as part of a group assignment. The following table shows the times (in hours) taken by each of the students to complete the assignments:

| Student | a   | b   | c   | d | e   |
|---------|-----|-----|-----|---|-----|
| Rajiv   | 2   | 5   | 1.5 | 3 | 5   |
| Dinesh  | 4   | 2   | 3   | 1 | 4   |
| Max     | 1   | 3   | 4   | 2 | 1.5 |
| Rishi   | 1.5 | 2.5 | 3.5 | 3 | 3   |
| Anand   | 5   | 4   | 3.5 | 2 | 4   |

In a group assignment, all the assignments given must be completed and it is not necessary that every person does each and every assignment. At a time only one student can work on a given assignment

1. Prof. Kumar decided to form a group of Dinesh, Max and Rishi to complete all the 5 assignments. What is the minimum time required by the group?
2. What is the minimum cumulative time spent by all the students in completing the group assignment given that each student completed an assignment?
3. What is the maximum cumulative time spent by all the students in completing the group assignment given that each student completed an assignment?
4. What is the average cumulative time taken by the 5 students to complete the assignment?

## 17 Test XVII

Exactly three persons, Rajeev, Dev and Kabeer, participated in a weightlifting competition, comprising three rounds, in which each person lifts a weight exactly once in each of the three rounds. After the three persons participate in the three rounds, the Combined Total Weight, which is defined as the sum of the heaviest two weights lifted in any round by a person, is calculated for each of the three persons. The three persons are then ranked, from 1 to 3, in the descending order of their Combined Total Weights. No person lifted the same weight across any two rounds and the Combined Total Weight for each person was distinct. Further, the weight (in kg) that each person lifted was an integer.

Kabeer lifted 17 kg more in the first round than Dev did in that round, while Rajeev lifted the same weight in the second round as Dev did in the third round. Also, the round in which a person lifted his least weight was distinct for the three persons. The difference in the weight lifted by Dev in the first round and that by Kabeer in the third round was 20 kg, while the difference in the weights lifted by Kabeer in the first round and Rajeev in the third round was 18 kg. Dev lifted 25 kg more in the second round than Rajeev did in the first round. The Combined Total Weight for Rajeev was calculated using the weights that he lifted in the first and second rounds. Further, Kabeer lifted 15 kg more in the second round than Dev did in the third round.

1. If Kabeer was ranked first in the competition, then what is the maximum difference (in kg) in the weights lifted by Rajeev in the first round and Dev in the first round?
2. If Dev is ranked first in the competition, what is the minimum difference (in kg) between the highest weight that any person lifted in any round and the lowest weight that any person lifted in any round?
3. If Rajeev was ranked second in the competition, what is the minimum difference (in kg) between the weight that Dev lifted in the second

round and the weight that Kabeer lifted in the second round?

4. If the weights lifted by each person in the second round were all distinct integral multiples of 15, what is the minimum combined total weight (in kg) of the person who was ranked first?

## 18 Test XVIII

On a particular day, six persons, P through U, got into and got down a train at seven different train stations - S1 through S7. The train stopped at the seven stations in the same order as mentioned above. The first table below provides the persons who got into and got down the train at each station and the second table provides the duration (in minutes) for which each person was in the train:

| <i>Train Station</i> | <i>Persons who got into the train</i> | <i>Persons who got out of the train</i> |
|----------------------|---------------------------------------|---|
| S1                   | P, U                                  | -                                       |
| S2                   | T                                     | -                                       |
| S3                   | S                                     | -                                       |
| S4                   | Q                                     | P, T                                    |
| S5                   | R                                     | S, U                                    |
| S6                   | -                                     | Q                                       |
| S7                   | -                                     | R                                       |

| <i>Person</i> | <i>Duration in train (in minutes)</i> |
|---------------|---------------------------------------|
| P             | 41                                    |
| Q             | 16                                    |
| R             | 23                                    |
| S             | 17                                    |
| T             | 29                                    |
| U             | 47                                    |

Assume that the duration for which the train stops at any station is negligible.

1. How many minutes did it take to reach S5 from S4?
2. For how many minutes were both P and S in the train?

3. For how many minutes were there at least two persons in the train?
4. For how many minutes were there four persons in the train?

## 19 Test XIX

Two football teams, A and B, from the same college play against each other frequently. During a particular year, the two teams played exactly 100 matches against each other. It is also known that the number of goals scored in any match was at most 4; the number of goals scored by A in any match was at least 1; the number of goals scored by B in any match was at least 1. The following information is known about the number of goals scored by the two teams in each match:

- (i) The number of matches that A won was 27 more than the number of matches in which B scored at least 2 goals.
  - (ii) The number of matches that ended as a draw was the same as the number of matches in which A scored exactly 1 goal.
  - (iii) The number of matches in which the difference in the number of goals scored by the two teams was at least 2 was twice the number of matches in which 3 goals were scored in total.
  - (iv) The sum of the number of matches that A did not win and those it won by at most 1 goal was 15 more than the number of matches that it won.
  - (v) The number of matches in which one team scored exactly one goal more than the other team was 20 less than the number of matches in which one team scored exactly two goals more than the other team.
1. How many matches ended in a win for A?
  2. How many goals did B score in all the matches it played against A during the year?
  3. In how many matches did B score 2 goals more than A?
  4. What is the goal difference (goals for – goal against) of A for all the matches it played against B?

## 20 Test XX

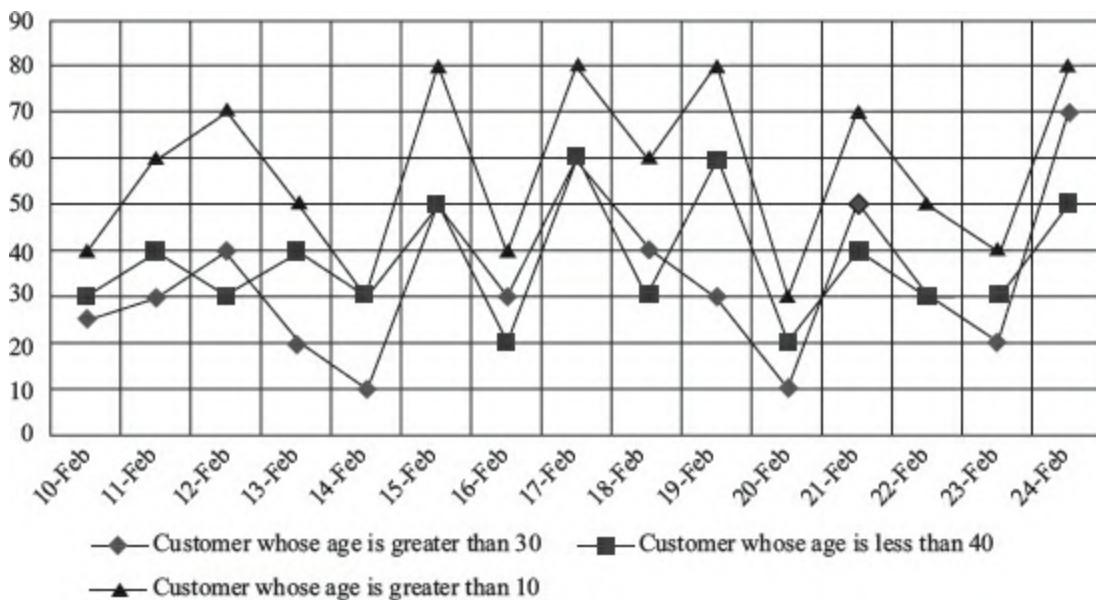
A sales representative, Rishi Agarwal, deals with only six drugs – P, Q, R, S, T, U. He purchases the drugs from the company at Rs.120, ₹400, ₹160, ₹320, ₹640 and ₹140 per unit respectively and sells them to pharmacies at ₹184, ₹460, ₹256, ₹352, ₹720 and ₹196 per unit respectively. He sells each drug only in packs of 100 units.

1. On a certain day, if he sold a total of 200 units, then which of the following cannot be his total profit on that day?
  - (a) ₹8,800
  - (b) ₹12,800
  - (c) ₹14,600
  - (d) ₹17,600
2. On a day on which he sold all the six drugs, selling 100 units of each drug, what was his total profit (in ₹)?
3. On a given day Rishi attained a profit percentage of 12.8%. Which of these drugs did he definitely sell?
  - (a) Q
  - (b) S
  - (c) T
  - (d) Cannot be determined
4. Rishi wanted to maximise his revenue on a given day. On that day he sold 600 units of drugs. It is known that he sold at least 3 drugs on that day. What is the maximum revenue he can make on that day?

## 21 Test XXI

Utkarsh, the manager of a retail shop, tracks the number of customers of different ages who visited the shop on 15 days, from February 10th to February 24th. He observed that no customer whose age is 10 years or less visited the shop during the given time.

He made the following line graph which provides the number of customers of different age groups who visited the shop on each of the 15 days:



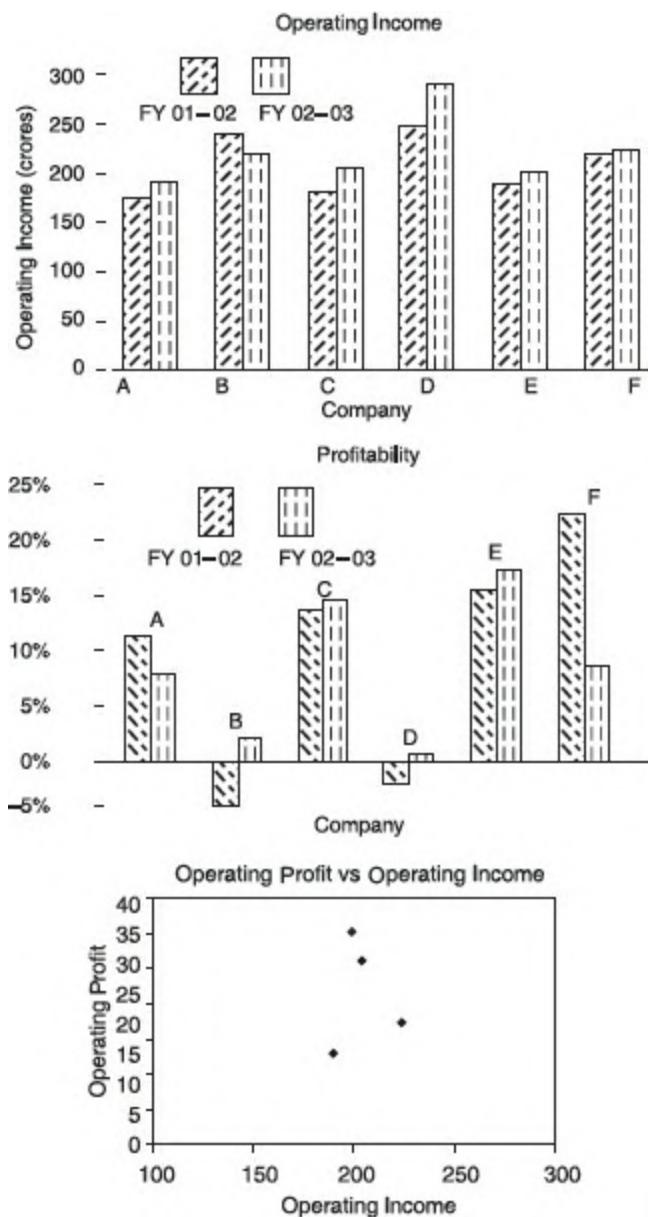
1. On one of the 15 days, Anjali, a 36-year-old beautician visited the shop. On which of the following days did she definitely not visit the shop.
  - (a) 14th Feb
  - (b) 22nd Feb
  - (c) 18th Feb
  - (d) None of these
2. What is the minimum possible average age of all the persons that

visited the shop on one of the 15 days. (To one decimal point)

3. On one of the days, 12 teenagers visited the shop along with 12 customers with ages between 30 and 40. Also, at least 15 customers over the age of 40 visited the shop. On how many of the 15 days could this happen?
4. What is the mean age of all the customers that visited the shop in these 15 days?
  - (a) 24.67
  - (b) 28.72
  - (c) 25
  - (d) Cannot be determined

## 22 Test XXII

**Directions for Questions 1 to 4:** Answer the questions on the basis of the following charts.



*The profitability of a company is defined as the ratio of its operating profit to its operating income, typically expressed in percentage. The following two charts show the operating income as well as the profitability of six companies in the Financial Years (F.Y.s) 2001–02 and 2002–03.*

*The operating profits of four of these companies are plotted against their respective operating income figures for the F. Y. 2002–03, in the third chart given above.*

1. What is the approximate average operating profit, in F.Y. 2001–2002, of the two companies excluded from the third chart?
  - (a) –7.5 crore
  - (b) 3.5 crore
  - (c) 25 crore
  - (d) Cannot be determined
2. Which company recorded the highest operating profit in F. Y. 2002–03.
  - (a) A
  - (b) C
  - (c) E
  - (d) F
3. Which of the following statements is NOT true?
  - (a) The company with the third lowest profitability in F.Y. 2001–02 has the lowest operating income in F.Y. 2002–03.
  - (b) The company with the highest operating income in the two financial years combined has the lowest operating profit in F.Y. 2002–03.
  - (c) Companies with a higher operating income in F.Y. 2001–02 than in F.Y. 2002–03 have higher profitability in F.Y. 2002–03 than in F.Y. 2001–02.
  - (d) Companies with profitability between 10% and 20% in F.Y. 2001–02 also have operating incomes between 150 crore and 200 crore in F.Y. 2002–03.
4. The average operating profit in F.Y. 2002–03, of companies with profitability exceeding 10% in F.Y. 2002–03, is approximately:

- (a) 17.5 crore
- (b) 25 crore
- (c) 27.5 crore
- (d) 32.5 crore

## 23 Test XXIII

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

Prof. Singh has been tracking the number of visitors to his homepage. His service provider has provided him with the following data on the country of origin of the visitors and the university they belong to:

### Number of visitors

| COUNTRY     | DAY |   |   |
|-------------|-----|---|---|
|             | 1   | 2 | 3 |
| Canada      | 2   | 0 | 0 |
| Netherlands | 1   | 1 | 0 |
| India       | 1   | 2 | 0 |
| UK          | 2   | 0 | 2 |
| USA         | 1   | 0 | 1 |

### Number of visitors

| UNIVERSITY   | DAY |   |   |
|--------------|-----|---|---|
|              | 1   | 2 | 3 |
| University 1 | 1   | 0 | 0 |
| University 2 | 2   | 0 | 0 |
| University 3 | 0   | 1 | 0 |
| University 4 | 0   | 0 | 2 |
| University 5 | 1   | 0 | 0 |
| University 6 | 1   | 0 | 1 |
| University 7 | 2   | 0 | 0 |
| University 8 | 0   | 2 | 0 |

1. University 1 can belong to
  - (a) UK
  - (b) Canada
  - (c) Netherlands
  - (d) USA
2. To which country does University 5 belong?

- (a) India or Netherlands but not USA
  - (b) India or USA but not Netherlands
  - (c) Netherlands or USA but not India
  - (d) India or USA but not UK
3. Which among the listed countries can possibly host three of the eight listed universities?
- (a) None
  - (b) Only UK
  - (c) Only India
  - (d) Both India and UK
4. Visitors from how many universities from UK visited Prof. Singh's homepage in the three days?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4

## 24 Test XXIV

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

The Dean's office recently scanned student results into the central computer system. When their character reading software cannot read something, it leaves that space blank. The scanner output reads as follows:

In the grading system, A, B, C, D, and F grades fetch 6, 4, 3, 2, and 0 grade points respectively. The Grade Point Average (GPA) is the arithmetic mean of the grade points obtained in the five subjects. For example Nisha's GPA is  $(6 + 2 + 4 + 6 + 0)/5 = 3.6$ .

Some additional facts are also known about the students' grades. These are

| Name    | Finance | Marketing | Statistics | Strategy | Operations | GPA |
|---------|---------|-----------|------------|----------|------------|-----|
| Aparna  | F       | B         | F          | F        | C          | 1.4 |
| Bikas   | D       | D         | F          | F        |            |     |
| Chandra |         | D         | A          | F        | F          | 2.4 |
| Deepak  | A       | B         |            | D        | D          | 3.2 |
| Fazal   | D       | F         | B          | B        | D          | 2.4 |
| Gowri   | C       | C         | A          | C        | B          | 3.8 |
| Hari    |         | B         | A          |          | D          | 2.8 |
| Ismet   |         |           | B          |          | A          |     |
| Jagdeep | A       | A         | B          |          | C          | 3.8 |
| Kunal   | F       |           | A          | F        | F          | 1.8 |
| Leena   | B       | A         |            | B        | F          | 3.2 |
| Manab   |         |           | A          | B        | B          |     |
| Nisha   | A       | D         | B          | A        | F          | 3.6 |
| Osman   | C       |           | B          | B        | A          | 4.6 |
| Preeti  | F       | D         |            | D        |            | 3.2 |
| Rahul   | A       | C         | A          |          | F          | 4.2 |
| Sameer  |         | C         | F          | B        |            |     |
| Tara    | B       |           |            |          |            | 2.4 |
| Utkarsh | D       | B         | F          | C        | A          | 3.0 |
| Vipul   | A       | F         | C          | C        | F          | 2.4 |

- (a) Vipul obtained the same grade in Marketing as Aparna obtained in Finance and Strategy.
- (b) Fazal obtained the same grade in Strategy as Utkarsh did in

*Marketing.*

- (c) *Tara received the same grade in exactly three courses.*
1. In Operations, Tara could have received the same grade as
    - (a) Ismet
    - (b) Hari
    - (c) Jagdeep
    - (d) Manab
  2. What grade did Preeti obtain in Statistics?
    - (a) A
    - (b) B
    - (c) C
    - (d) D
  3. In Strategy, Gowri's grade point was higher than that obtained by
    - (a) Fazal
    - (b) Hari
    - (c) Nisha
    - (d) Rahul
  4. What grade did Utkarsh obtain in Finance?
    - (a) B
    - (b) C
    - (c) D
    - (d) F

## 25 Test XXV

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

The year was 2006. All six teams in Pool A of World Cup hockey, play each other exactly once. Each win earns a team three points, a draw earns one point and a loss earns zero points. The two teams with the highest points qualify for the semifinals. In case of a tie, the team with the highest goal difference (Goal For - Goals Against) qualifies.

In the opening match, Spain lost to Germany. After the second round (after each team played two matches), the pool table looked as shown below. In the third round, Spain played Pakistan, Argentina played Germany, and New Zealand played South Africa. All the third round matches were drawn. The following are some results from the fourth and fifth round matches

- (a) Spain won both the fourth and fifth round matches.
- (b) Both Argentina beat and Germany won their fifth round matches by 3 goal to 0
- (c) Pakistan won both the fourth and fifth round matches by 1 goal to 0.

| Pool A       |              |     |       |      |           |               |        |
|--------------|--------------|-----|-------|------|-----------|---------------|--------|
| Teams        | Games Played | Won | Drawn | Lost | Goals For | Goals Against | Points |
| Germany      | 2            | 2   | 0     | 0    | 3         | 1             | 6      |
| Argentina    | 2            | 2   | 0     | 0    | 2         | 0             | 6      |
| Spain        | 2            | 1   | 0     | 1    | 5         | 2             | 3      |
| Pakistan     | 2            | 1   | 0     | 1    | 2         | 1             | 3      |
| New Zealand  | 2            | 0   | 0     | 2    | 1         | 6             | 0      |
| South Africa | 2            | 0   | 0     | 2    | 1         | 4             | 0      |

1. Which one of the following statements is true about matches played in the first two rounds?
  - (a) Pakistan beat South Africa by 2 goals to 1.
  - (b) Argentina beat Pakistan by 1 goal to 0.

- (c) Germany beat Pakistan by 2 goals to 1.
  - (d) Germany beat Spain by 2 goals to 1.
2. Which one of the following statements is true about matches played in the first two rounds?
- (a) Germany beat New Zealand by 1 goal to 0.
  - (b) Spain beat New Zealand by 4 goals to 0.
  - (c) Spain beat South Africa by 2 goals to 0.
  - (d) Germany beat South Africa by 2 goals to 1.
3. Which team finished at the top of the pool after five rounds of matches?
- (a) Argentina
  - (b) Germany
  - (c) Spain
  - (d) Cannot be determined
4. If Pakistan qualified as one of the two teams from Pool A, which was the other team that qualified?
- (a) Argentina
  - (b) Germany
  - (c) Spain
  - (d) Cannot be determined

## 26 Test XXVI

**Directions for Questions 1 to 4:** Venkat, a stockbroker, invested a part of his money in the stock of four companies—A, B, C and D. Each of these companies belonged to different industries, viz., Cement, Information Technology (IT), Auto, and Steel, in no particular order. At the time of investment, the price of each stock was ₹ 100. Venkat purchased only one stock of each of these companies. He was expecting returns of 20%, 10%, 30%, and 40% from the stock of companies A, B, C and D, respectively. Returns are defined as the change in the value of the stock after one year, expressed as a percentage of the initial value. During the year, two of these companies announced extraordinarily good results. One of these two companies belonged to the Cement or the IT industry, while the other one belonged to either the Steel or the Auto industry. As a result, the returns on the stocks of these two companies were higher than the initially expected returns. For the company belonging to the Cement or the IT industry with extraordinarily good results, the returns were twice that of the initially expected returns. For the company belonging to the Steel or the Auto industry, the returns on announcement of extraordinarily good results were only one and a half times that of the initially expected returns. For the remaining two companies, which did not announce extraordinarily good results, the returns realized during the year were the same as initially expected.

1. What is the minimum average return Venkat would have earned during the year?
  - (a) 30%
  - (b)  $31\frac{1}{4}\%$
  - (c)  $32\frac{1}{2}\%$
  - (d) Cannot be determined
2. If Venkat earned a 35% return on average during the year, then which

of these statements would necessarily be true?

- I. Company A belonged either to Auto or to Steel Industry.
  - II. Company B did not announce extraordinarily good results.
  - III. Company A announced extraordinarily good results.
  - IV. Company D did not announce extraordinarily good results.
- (a) I and II only
  - (b) II and III only
  - (c) III and IV only
  - (d) II and IV only
3. If Venkat earned a 38.75% return on average during the year, then which of these statement(s) would necessarily be true?
- I. Company C belonged either to Auto or to Steel Industry.
  - II. Company D belonged either to Auto or to Steel Industry.
  - III. Company A announced extraordinarily good results.
  - IV. Company B did not announce extraordinarily good results.
- (a) I and II only
  - (b) II and III only
  - (c) I and IV only
  - (d) II and IV only
4. If Company C belonged to the Cement or the IT industry and did announce extraordinarily good results, then which of these statement(s) would necessarily be true?
- I. Venkat earned not more than 36.25% return on average.
  - II. Venkat earned not less than 33.75% return on average.
  - III. If Venkat earned 33.75% return on average, Company A announced extraordinarily good results.
  - IV. If Venkat earned 33.75% return on average, Company B belonged either to Auto or to Steel Industry.
- (a) I and II only
  - (b) II and IV only
  - (c) II and III only
  - (d) III and IV only

## 27 Test XXVII

**Directions for Questions 1 to 4:** In the following table is the listing of players, seeded from highest (#1) to lowest (#32), who are due to play in an Association of Tennis Players (ATP) tournament for women. This tournament has four knockout rounds before the final, i.e., first round, second round, quarterfinals, and semi-finals. In the first round, the highest seeded player plays the lowest seeded player (seed # 32) which is designated match No. 1 of first round; the 2nd seeded player plays the 31<sup>st</sup> seeded player which is designated match No. 2 of the first round, and so on. Thus, for instance, match No. 16 of first round is to be played between 16<sup>th</sup> seeded player and the 17<sup>th</sup> seeded player. In the second round, the winner of match No. 1 of first round plays the winner of match No. 16 of first round and is designated match No. 1 of second round. Similarly, the winner of match No. 2 of first round plays the winner of match No. 15 of first round, and is designated match No. 2 of second round. Thus, for instance, match No. 8 of the second round is to be played between the winner of match No. 8 of first round and the winner of match No. 9 of first round. The same pattern is followed for later rounds as well.

| Seed # | Name of Player      | Seed# | Name of Player     | Seed | Name of Player       |
|--------|---------------------|-------|--------------------|------|----------------------|
| 1.     | Maria Sharapova     | 12.   | Mary Pierce        | 23.  | Silver Farina Elia   |
| 2.     | Lindsay Davenport   | 13.   | Anastasia Myskina  | 24.  | Tatiana Golovin      |
| 3.     | Amelie Mauresmo     | 14.   | Alicia Molik       | 25.  | Shinobu Asagoe       |
| 4.     | Kim Clijsters       | 15.   | Nathalie Dechy     | 26.  | Francesca Schiavone  |
| 5.     | Svetlana Kuznetsova | 16.   | Elena Bovina       | 27.  | Nicole Vaidisova     |
| 6.     | Elena Dementieva    | 17.   | Jelena Jankovic    | 28.  | Gisela Dulko         |
| 7.     | Justine Henin       | 18.   | Ana Ivanovic       | 29.  | Flavia Pennetta      |
| 8.     | Serena Williams     | 19.   | Vera Zvonareva     | 30.  | Anna Chakvetadze     |
| 9.     | Nadia Petrova       | 20.   | Elena Likhovtseva  | 31.  | Ai Sugiyama          |
| 10.    | Venus Williams      | 21.   | Daniela Hantuchova | 32.  | Anna-Lena Groenefeld |
| 11.    | Patty Schnyder      | 22.   | Dinara Safina      |      |                      |

1. If Elena Dementieva and Serena Williams lose in the second round,

while Justine Henin and Nadia Petrova make it to the semi-finals, then who would play Maria Sharapova in the quarterfinals, in the event Sharapova reaches quarterfinals?

- (a) Dinara Safina
  - (b) Justine Henin
  - (c) Nadia Petrova
  - (d) Patty Schnyder
2. If the top eight seeds make it to the quarterfinals, then who, amongst the players listed below would definitely not play against Maria Sharapova in the final, in case Sharapova reaches the final?
- (a) Amelie Mauresmo
  - (b) Elena Dementieva
  - (c) Kim Clijsters
  - (d) Lindsay Davenport
3. If there are no upsets (a lower seeded player beating a higher seeded player) in the first round, and only match Nos. 6, 7, and 8 of the second round result in upsets, then who would meet Lindsay Davenport in quarter finals, in case Davenport reaches quarter finals?
- (a) Justine Henin
  - (b) Nadia Petrova
  - (c) Patty Schnyder
  - (d) Venus Williams
4. If, in the first round, all even numbered matches (and none of the odd numbered ones) result in upsets, and there are no upsets in the second round, then who could be the lowest seeded player facing Maria Sharapova in semi-finals?
- (a) Anastasia Myskina
  - (b) Flavia Pennetta
  - (c) Nadia Petrova
  - (d) Svetlana Kuznetsova

## 28 Test XXVIII

**Directions for Questions 1 to 4:** The table below shows the comparative costs, in US Dollars, of major surgeries in USA and a select few Asian countries.

| Procedure               | Comparative Costs in USA and some Asian countries<br>(in US Dollars) |       |          |           |          |
|-------------------------|--|-------|----------|-----------|----------|
|                         | USA  | India | Thailand | Singapore | Malaysia |
| Heart Bypass            | 130000   | 10000 | 11000    | 18500     | 9000     |
| Heart Valve Replacement | 160000   | 9000  | 10000    | 12500     | 9000     |
| Angioplasty             | 57000  | 11000 | 13000    | 13000     | 11000    |
| Hip Replacement         | 43000  | 9000  | 12000    | 12000     | 10000    |
| Hysterectomy            | 20000  | 3000  | 4500     | 6000      | 3000     |
| Knee Replacement        | 40000  | 8500  | 10000    | 13000     | 8000     |
| Spinal Fusion           | 62000  | 5500  | 7000     | 9000      | 6000     |

The equivalent of one US Dollar in the local currencies is given below:

| 1 US Dollar equivalent |        |           |
|------------------------|--------|-----------|
| India                  | 40.928 | Rupees    |
| Malaysia               | 3.51   | Ringits   |
| Thailand               | 32.89  | Bahts     |
| Singapore              | 1.53   | S Dollars |

A consulting firm found that the quality of the health services were not the same in all the countries above. A poor quality of a surgery may have significant repercussions in future, resulting in more cost in correcting mistakes. The cost of poor quality of surgery is given in the table below.

| Procedure               | Comparative Costs of poor quality in USA and some Asian countries<br>(in US Dollars '000) |       |          |           |          |
|-------------------------|---|-------|----------|-----------|----------|
|                         | USA   | India | Thailand | Singapore | Malaysia |
| Heart Bypass            | 0   | 3     | 3        | 2         | 4        |
| Heart Valve Replacement | 0   | 5     | 4        | 5         | 5        |
| Angioplasty             | 0   | 5     | 5        | 4         | 6        |
| Hip Replacement         | 0   | 7     | 5        | 5         | 8        |
| Hysterectomy            | 0   | 5     | 6        | 5         | 4        |
| Knee Replacement        | 0   | 9     | 6        | 4         | 4        |
| Spinal Fusion           | 0   | 5     | 6        | 5         | 6        |

1. Approximately, what difference in amount in Bahts will it make to a Thai citizen if she were to get a hysterectomy done in India instead of in her native country, taking into account the cost of poor quality? It costs 7500 Bahts for one-way travel between Thailand and India.
  - (a) 235000
  - (b) 40500
  - (c) 57500
  - (d) 67500
  - (e) 75000
2. Taking the cost of poor quality into account, which country/countries will be the most expensive for knee replacement?
  - (a) India
  - (b) Thailand
  - (c) Malaysia
  - (d) Singapore
  - (e) USA
3. A US citizen is hurt in an accident and requires an angioplasty, hip replacement and a knee replacement. Cost of foreign travel and stay is not a consideration since the government will take care of it. Which country will result in the cheapest package, taking cost of poor quality into account?
  - (a) India
  - (b) Thailand
  - (c) Malaysia
  - (d) Singapore
  - (e) USA

4. The rupee value increases to ₹ 35 for a US Dollar, and all other things including quality, remain the same. What is the approximate difference in cost, in US Dollars, between Singapore and India for a Spinal Fusion, taking this change into account?
- (a) 1700
  - (b) 2500
  - (c) 4500
  - (d) 8000
  - (e) No difference

## 29 Test XXIX

**Directions for Questions 1 to 5:** Answer the following questions based on the information given below:

A low-cost airline company connects ten India cities, A to J. The table below gives the distance between a pair of airports and the corresponding price charged by the company. Travel is permitted only from a departure airport to an arrival airport. The customers do not travel by a route where they have to stop at more than two intermediate airports.

| Sector | Airport of No. | Airport of Departure | Distance between Arrival | Price (₹) the Airports (km) |
|--------|----------------|----------------------|--------------------------|-----------------------------|
| 1      | A              | B                    | 560                      | 670                         |
| 2      | A              | C                    | 790                      | 1350                        |
| 3      | A              | D                    | 850                      | 1250                        |
| 4      | A              | E                    | 1245                     | 1600                        |
| 5      | A              | F                    | 1345                     | 1700                        |
| 6      | A              | G                    | 1350                     | 2450                        |
| 7      | A              | H                    | 1950                     | 1850                        |
| 8      | B              | C                    | 1650                     | 2000                        |
| 9      | B              | H                    | 1750                     | 1900                        |
| 10     | B              | I                    | 2100                     | 2450                        |
| 11     | B              | J                    | 2300                     | 2275                        |
| 12     | C              | D                    | 460                      | 450                         |
| 13     | C              | F                    | 410                      | 430                         |
| 14     | C              | G                    | 910                      | 1100                        |
| 15     | D              | E                    | 540                      | 590                         |
| 16     | D              | F                    | 625                      | 700                         |
| 17     | D              | G                    | 640                      | 750                         |
| 18     | D              | H                    | 950                      | 1250                        |
| 19     | D              | J                    | 1650                     | 2450                        |
| 20     | E              | F                    | 1250                     | 1700                        |
| 21     | E              | G                    | 970                      | 1150                        |
| 22     | E              | H                    | 850                      | 875                         |
| 23     | F              | G                    | 900                      | 1050                        |
| 24     | F              | I                    | 875                      | 950                         |
| 25     | F              | J                    | 970                      | 1150                        |
| 26     | G              | I                    | 510                      | 550                         |
| 27     | G              | J                    | 830                      | 890                         |
| 28     | H              | I                    | 790                      | 970                         |
| 29     | H              | J                    | 400                      | 425                         |
| 30     | I              | J                    | 460                      | 540                         |

- What is the lowest price, in rupees, a passenger has to pay for

travelling by the shortest route from A to J?

- (a) 2275
  - (b) 2850
  - (c) 2890
  - (d) 2930
  - (e) 3340
2. The company plans to introduce a direct flight between A to J. The market research results indicate that all its existing passengers travelling between A and J will use this direct flight if it is priced 5% below the minimum price that they pay at present. What should the company charge approximately, in rupees, for this direct flight?
- (a) 1991
  - (b) 2161
  - (c) 2707
  - (d) 2745
  - (e) 2783
3. If the airports C, D and H are closed down owing to security reasons, what would be the minimum price, in rupees, to be paid by a passenger travelling from A to J?
- (a) 2275
  - (b) 2615
  - (c) 2850
  - (d) 2945
  - (e) 3190
4. If the prices include a margin of 10% over the total cost that the company incurs, what is the minimum cost per kilometer that the company incurs in flying from A to J?
- (a) 0.77
  - (b) 0.88
  - (c) 0.99
  - (d) 1.06
  - (e) 1.08
5. If the prices include a margin of 15% over the total cost that the company incurs, which among the following is the distance to be

covered in flying from A to J that minimizes the total cost per kilometer for the company?

- (a) 2170
- (b) 2180
- (c) 2315
- (d) 2350
- (e) 2390

## 30 Test XXX

**Directions for Questions 1 to 3:** Answer the following questions based on the information given as follows:

Abdul, Bikram and Chetan are three professional traders who trade in shares of a company XYZ Ltd. Abdul follows the strategy of buying at the opening of the day at 10 a.m. and selling the whole lot at the close of the day at 3 p.m. Bikram follows the strategy of buying at hourly intervals: 10 a.m., 11 a.m., 12 noon, 1 p.m. and 2 p.m., and selling the whole at the close of the day. Further, he buys an equal number of shares in each purchase. Chetan follows a similar pattern as Bikram but his strategy is somewhat different. Chetan's total investment amount is divided equally among his purchases. The profit or loss made by each investor is the difference between the sale value at the close of the day less the investment in purchase. The "return" for each investor is defined as the ratio of the profit or loss to the investment amount expressed as a percentage.

1. Which one of the following statement is always true?
  - (a) Abdul will not be the one with minimum return.
  - (b) Return for Chetan will be higher than that of Bikram.
  - (c) Return for Bikram will be higher than that of Chetan.
  - (d) Return for Chetan cannot be higher than that of Abdul.
  - (e) None of the above.
2. On a "boom" day, the share price of XYZ Ltd. keeps rising throughout the day and peaks at the close of the day. Which trader got the minimum return on that day?
  - (a) Bikram
  - (b) Chetan
  - (c) Abdul
  - (d) Abdul or Chetan

- (e) Cannot be determined
3. On a day of fluctuating market prices, the share price of XYZ Ltd. ends with a gain, i.e., it is higher at the close of the day compared to the opening value. Which trader got the maximum return on that day?
- (a) Bikram
  - (b) Chetan
  - (c) Abdul
  - (d) Bikram or Chetan
  - (e) Cannot be determined

**Directions for Questions 4 to 5:** One day two other traders, Dane and Emily joined Abdul, Bikram and Chetan for trading in the shares of XYZ Ltd. Dane followed a strategy of buying equal number of shares at 10 a.m., 11 a.m., and 12 noon, and selling the same numbers at 1 p.m., 2 p.m. and 3 p.m. Emily, on the other hand, followed the strategy of buying shares using all her money at 10 a.m. and selling all of them at 12 noon and again buying the shares for all the money at 1 p.m. and again selling all of them at the close of the day at 3 p.m. At the close of the day, following observations were made:

- (A) Abdul lost money in the transactions.
  - (B) Both Dane and Emily made profits.
  - (C) There was an increase in the share price during the closing hour compared to the price at 2 p.m.
  - (D) Share price at 12 noon was lower than the opening price.
4. Which of the following is necessarily false?
- (a) Share price was at its lowest at 2 p.m.
  - (b) Share price was at its lowest at 11 a.m.
  - (c) Share price at 1 p.m. was higher than the share price at 2 p.m.
  - (d) Share price at 1 p.m. was higher than the share price at 12 noon.
  - (e) None of the above
5. Share price was at its highest at
- (a) 10 a.m.
  - (b) 11 a.m.
  - (c) 12 noon
  - (d) 1 p.m.

(e) Cannot be determined

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## ANSWER KEY

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### Test 1

- 1. (b)
- 2. (c)
- 3. (c)
- 4. (b)

### Test 2

- 1. (b)
- 2. (a)
- 3. (d)
- 4. (d)

### Test 3

- 1. (c)
- 2. (a)
- 3. (a)
- 4. (d)

### Test 4

- 1. (c)
- 2. (b)
- 3. (d)
- 4. (b)

### Test 5

- 1. (d)
- 2. (d)

- 3. 108
- 4. (c)
- 5. 2

## **Test 6**

- 1. (c)
- 2. (b)
- 3. (c)
- 4. (a)

## **Test 7**

- 1. 34
- 2. (c)
- 3. 2
- 4. 1000

## **Test 8**

- 1. (d)
- 2. (a)
- 3. (c)

## **Test 9**

- 1. (a)
- 2. (c)
- 3. 22
- 4. 3

## **Test 10**

- 1. (c)
- 2. (a)
- 3. (d)
- 4. (b)

## **Test 11**

- 1. (b)
- 2. (c)
- 3. (b)
- 4. (a)

## **Test 12**

- 1. 6
- 2. 1
- 3. 18
- 4. 1

## **Test 13**

- 1. 23
- 2. 15.25
- 3. 3
- 4. 11

## **Test 14**

- 1. (c)
- 2. (a)
- 3. (a)
- 4. (a)

## **Test 15**

- 1. (d)
- 2. (b)
- 3. (c)
- 4. (a)

## **Test 16**

- 1. 3.5

- 2. 8.5
- 3. 21
- 4. 14.8 hours

### **Test 17**

- 1. 10
- 2. 38
- 3. 46
- 4. 65

### **Test 18**

- 1. 6
- 2. 11
- 3. 57
- 4. 11

### **Test 19**

- 1. 49
- 2. 126
- 3. 4
- 4. 70

### **Test 20**

- 1. (c)
- 2. 38800
- 3. (d)
- 4. 369200

### **Test 21**

- 1. (d)
- 2. 17.6
- 3. 3

4. (d)

## Test 22

- 1. (b)
- 2. (c)
- 3. (d)
- 4. (d)

## Test 23

- 1. (c)
- 2. (a)
- 3. (a)
- 4. (b)

## Test 24

- 1. (d)
- 2. (a)
- 3. (b)
- 4. (c)

## Test 25

- 1. (b)
- 2. (d)
- 3. (c)
- 4. (d)

## Test 26

- 1. (a)
- 2. (b)
- 3. (c)
- 4. (b)

## Test 27

1. (d)
2. (c)
3. (d)
4. (b)

## Test 28

1. (d)
2. (a)
3. (c)
4. (a)

## Test 29

1. (a)
2. (b)
3. (c)
4. (b)
5. ()

## Test 30

1. (e)
2. (a)
3. (e)
4. (e)
5. (a)

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## SOLUTIONS

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### TEST 1

The most optimal decisions would involve the following (assuming that they work in the order Vijay, Bhola and Palan)

| Person          |                                   |                                      |  |                                      |                           |
|-----------------|-----------------------------------|--------------------------------------|--|--------------------------------------|---------------------------|
| Vijay           | 11 to 11:12 FR<br>for (1)         | 11:12 to 11:20 N<br>for (3)          | 11:20 to 11:28 N<br>for (4)            | 11:28 to 11:36<br>N for (5)          |                           |
| Bhola           | 11 to 11:03<br>I for 1            | 11:05 to 11:13 N<br>for (2)          | 11:13 to 11:25 FR<br>for (4)           | 11:25 to 11:33 N<br>for (5)          | 11:33 to 11:36 I<br>for 5 |
| Palan           | 11:05 to 11:08<br>I for (2)       | 11:08 to 11:11<br>I for (2)          | 11:11 to 11:23<br>FR for (3)           | 11:23 to 11:35<br>FR for (5)         |                           |
| Fryer for Chips | 11 to 11:05<br>3 portions for (1) | 11:05 to 11:10<br>2 portions for (2) | 11:10 to 11:15<br>1 portion for<br>(3) | 11:15 to 11:20<br>2 portions for (4) |                           |

- Customer 5 gets served at 11:36. Option (b) is correct.
- Customer 4 gets served at 11:28. Option (c) is correct.

For questions 3 and 4, the table would change to the following:

| Person          |                                   |  |  |                                      |                             |
|-----------------|-----------------------------------|--|--|--------------------------------------|-----------------------------|
| Vijay           | 11 to 11:12 FR<br>for (1)         | 11:20 to 11:32 FR<br>for (3)           | 11:32 to 11:44 FR<br>for (4)           | 11:44 to 11:56 FR<br>for (5)         |                             |
| Bhola           | 11 to 11:03<br>I for 1            | 11:12 to 11:18 2<br>Ice Creams for (2) | 11:20 to 11:28 N<br>for (3)            | 11:44 to 11:52 N<br>for (5)          | 11:52 to 11:55 I<br>for (5) |
| Palan           | 11:12 to 11:20<br>N for (2)       | 11:32 to 11:40 N<br>for (4)            |  | 11:44 to 11:52<br>N for (5)          |                             |
| Fryer for Chips | 11 to 11:05<br>3 portions for (1) | 11:12 to 11:17<br>2 portions for (2)   | 11:20 to 11:25<br>1 portion for<br>(3) | 11:32 to 11:37<br>2 portions for (4) |                             |

- Customer 5 is completely served at 11:56 when his fried rice is served. Option (c) is correct.
- It can be seen from the above table that Vijay's idle time is: 8 minutes, Bhola's idle time is ( $9 + 2 + 16 = 27$  minutes) & Palan's idle time is ( $12 + 12 + 4 + 4 = 32$  minutes). Hence, the total idle time is:  $8 + 27 + 32 = 67$  minutes. Note: for questions 3 and 4 you can change the work definition of the three people, yet the overall outcome for these questions would not change. Also note that we are not supposed to add the idle time for the Fryer during this time.

## TEST 2

- R with respect to T is the only case where we see a city having lesser votes than another city in exactly 2 rounds. Thus, there is only 1 instance in the table. Option (b) is correct.
- We need to minimize the number of people who voted for S from those who voted for P in the previous round. In order to do this, the following is required:

Round 1 to 2: People who voted for P: 6800, Shifted to T in Round 2 = 6800 (maximize this to minimize those who shift to S); Voted for S = 0;

Round 2 to 3: People who voted for P: 7800, Shifted to T in Round 3 = 7200 (maximize this to minimize those who shift to S); Voted for S in Round 3 = 600;

Round 3 to 4: People who voted for P: 8600, Shifted to T in Round 4 = 7000 (maximize this to minimize those who shift to S); Voted for S = 1600;

Round 4 to 5: People who voted for P: 5800, Shifted to T in Round 4 = 5800 (maximize this to minimize those who shift to S); Voted for S = 0;

Thus, the required answer is  $600 + 1600 = 2200$ . Option (a) is correct.

### 3–4.

3. The shifts in the table are defined as: P to S; P to T; Q to P; Q to U; T to R and T to U. In order to maximize the number of retentions, we would need to shift a voter only if he/she really needs to be shifted.

According to the problem:

Voters retained by P = 0; P's second round 7800 has to come from Q or U's first round voters. For this to occur – the total requirement of 7800 has to be serviced from the  $5200 + 4800$  of Q and U. Thus, Q and U have to transfer 7800 votes to P in round 2. Thus, the combined retention of Q and U would be 2200 at the maximum. Likewise, this number for round 3, would be:  $7800 + 2600 - 8600 = 1800$ ; For round 4 =  $6200 + 3800 - 5800 = 4200$  and For round 5 =  $7000 + 7200 - 6800 = 7400$ . Thus, the total votes retained by Q or U would be a maximum of:  $2200 + 1800 + 4200 + 7400 = 15600$ . Option (d) is correct.

4. Voters Retained by P = 0; Voters retained by Q and U (maximum) = 15600; Voters retained by T = 0 (according to the 3rd clue);

Also, since voters of T shift to R or U in the next round, we can see that:

Round1 to Round 2: 8600 voters of T, have to shift to R or U (who have 6400 and 2600 votes respectively in round 2). Thus, of the total of 9000 votes that R and U got in round 2, 8600 must come from T.

The minimum U would have received from T, would be 2200 and thus out of its 2600 voters in round 2, U could have retained a maximum of 400 voters. Hence, the correct answer would be 400.

Option (d) is correct.

### TEST 3

1. The key to solve this is to look at the fact, that all the below 38 voters (18 to 38 age group) of the 1999 elections, would be between the age groups of 38 to 58 in 2019. Since, there are 438 voters below 38 in 1999 and there are only 432 voters in 2019 in the 18 to 38 age group, it must mean that a minimum of 6 voters who were between 18 to 38 in 1999 must have died. Likewise, those who were between 38 to 58 in 1999, were all above 58 in 2019. Since there are 472 voters in the 38 to 58 category, and only 460 in the 58 + category, it means that there were a minimum of 12 deaths in this category. Further, if we assume that all the 460 above 58 voters in 2019, were from the 18 to 38 category of 1999, it follows that all the 410 voters who were above 58 years of age in 1999 were dead by 2019. Thus it follows that there must be a minimum of  $410 + 12 + 6 = 428$  deaths between 1999 to 2019. Option (c) is correct.
2. In order to solve this question, you need to consider how many of each of the groups can at maximum vote in each of the years 1999, 2004, 2009 and 2014. Between 1999 and 2004, there is a minimum transfer of 28 people into the 38 – 58 category from the 18 to 38 category. Also, a maximum of 380 people can be retained in the voters of the 18 and 38 age group. Thus, of, the 438 people in the 18 – 38 category, who voted in 1999,  $380 + 28 = 408$  could have also voted in 2004. In 2009, all these 380 could possibly continue in the 18 and 38 category. Also, in 2014, a minimum of 40 from these 380 people would have to come into the 38 and 58 category. Thus, a maximum of 340 would continue to be in the 18 and 38 age group. Thus, from the 438 people in the first age group,  $28 + 340 + 40 = 408$  people could have possibly voted in all the three elections.

A similar analysis of the second category would show us that a maximum of 372 people could possibly continue to vote in this

category through the four elections. [Note: The numbers break up could be seen as: 1999 election: 472; 2004 election: 472 (retained) + 28 (coming from the first category); 2009 election – 100 transferred out from the second to the third category: 372 (retained) + 28 (retained) and 100 transferred out to the third category. 2014 election: 372 (retained) + 28(retained) + 40 (coming in from the first age category into this category for the 2014 election). We have already added the 28 and 40 in the addition for the first group. We will need to see what happens to the 100 who moved to the third category when we consider the numbers in the third category. So, we get 372 people that we should count from here.

We now turn our attention to the numbers in the third group:

1999: 410; 2004: 400 (retained) 10 died; 2009: 400 (retained) + 100 coming in from the second age category as detailed above; 2014: 440 retained and 60 died from the 2009 list. So we need to add 440 from this group.

The required answer =  $408 + 372 + 440 = 1220$ . Option (a) is correct.

3. In order to maximize the number of people who were between 38 and 43 years of age in 2004, we need to maximize the number of people who got transferred from the 18 to 38 age category to the 38 to 58 age category, between 1999 and 2004. Also, we can see that the total number of voters in 1999 is 1320. So, out of these 1320 voters if only 1100 are voting in 2004, it means that there are 220 deaths in all the groups combined. Of these, 10 deaths must have happened in the 58 + age category. We will get the required maximum, when we assume that all the remaining 210 deaths occurred from amongst the 472 people in the 38 to 58 category. If we assume that, of the 472 people 210 deaths have occurred, it means that the 38 to 58 age category would only be retaining 262 people. Thus, 238 people must have come into this category from the first category between 1999 and 2004. Thus, a maximum of 238 people would be aged between 38 and 43 in 2004. Option (a) is correct.
4. The minimum retentions between 1999 to 2009 would occur under the following conditions:

Assume we minimize the number of people retained in the first group

– i.e. of the 438 people in group 1, everybody shifted out to group 2 in 2004. This means that group 2 can retain at maximum only 62 people. In this situation, the 380 people in group 1 in 2004 must be all fresh 18 year olds who became eligible to vote in the interim. Thus, in the first group's 384 voters in 2009, none of them would have voted in 1999. Now, if we look at the second group in 2004, its construct would be: 438 (coming in from group 1) + 62(retained). Now, if we look at the numbers of groups 2 and 3 in 2004, we realise that a minimum of 100 need to be transferred into the third group from the second group between 2004 and 2009. But, this is not possible – since the second group in 2004 has only 62 retentions. Thus, the second group needs to have at least 100 retentions for the table to adhere to the logic. Thus, the story of the numbers would be as:

Group 1: 1999: 438; 2004: 400 (moved to group 2), 38 retained & 342 fresh first time voters who became 18 years old during 1999 to 2004; 2009: 342 retained + 42 new voters, 38 deaths.

Group 2: 1999:472; 2004: Retained 100 + 400 (Coming from Group 1); 2009: 400 who had come in from group 1 in 2004 would be retained. 100 would get transferred out to group 3.

Group 3:1999: 410; 2004: 10 died and 400 (retained); 2009: 400 retained + 100 (coming from group 2).

The minimum number of people who voted in 1999 and 2009 both = 0 + 400 + 500 = 900. Option (d) is correct.

## TEST 4

### 1–4:

Based on the information provided in the table and the further conditions of the problem, we can deduce the following table of possibilities:

|               | Hole 1  | Hole 2   | Hole 3   | Hole 4   |
|---------------|---|--|--|--|
| Tiger         | 7 or 8  | 5/6  | 3 or 4   | 6/5  |
| Shubhankar    | 3/4   | 6/5  | 5/6  | 7 or 8   |
| Jeev          | 6   | 3/4  | 7 or 8   | 4/3  |
| Els           | 4/3   | 7 or 8   | 6/5  | 5/6  |
| <b>TOTALS</b> | Numbers with Shubhankar 3 and Els 4:<br>$7 + 3 + 6 + 4 = 20$<br>OR<br>$8 + 3 + 6 + 4 = 21$<br><br>Numbers with Shubhankar 4 and Els 3:<br>$7 + 4 + 6 + 3 = 20$<br>OR $8 + 4 + 6 + 3 = 21$ | Numbers with Tiger as 5 and Shubhankar as 6:<br>$5 + 6 + 3 + 7 = 21$ OR<br>$5 + 6 + 3 + 8 = 22$ OR<br>$5 + 6 + 4 + 7 = 22$<br>OR $5 + 6 + 4 + 8 = 23$<br><br>Numbers with Tiger as 6 and Shubhankar as 5:<br>$6 + 5 + 3 + 7 = 21$ OR<br>$6 + 5 + 3 + 8 = 22$ OR<br>$6 + 5 + 4 + 7 = 22$<br>OR $6 + 5 + 4 + 8 = 23$ | Numbers with Shubhankar as 5 and Els as 6:<br>$3 + 5 + 7 + 6 = 21$ OR<br>$3 + 5 + 8 + 6 = 22$ OR<br>$4 + 5 + 7 + 6 = 22$<br>OR $4 + 5 + 8 + 6 = 23$<br><br>Numbers with Shubhankar as 6 and Els as 5:<br>$3 + 6 + 7 + 5 = 21$ OR<br>$3 + 6 + 8 + 5 = 22$ OR<br>$4 + 6 + 7 + 5 = 22$<br>OR $4 + 6 + 8 + 5 = 23$ | Numbers with Tiger as 6 and Els as 5:<br>$6 + 7 + 4 + 5 = 22$ OR<br>$6 + 7 + 3 + 5 = 21$ OR<br>$6 + 8 + 4 + 5 = 23$<br>OR $6 + 8 + 3 + 5 = 22$<br><br>Numbers with Tiger as 5 and Els as 6:<br>$5 + 7 + 4 + 6 = 22$ OR<br>$5 + 7 + 3 + 6 = 21$ OR<br>$5 + 8 + 4 + 6 = 23$<br>OR $5 + 8 + 3 + 6 = 22$ |

Note the following things about the above table:

**Deduction 1:** On Hole 2, Tiger could be 5 or 6. If we put Tiger as 5 on hole 2, then the following chain happens:

Tiger is 6 on Hole 4; Shubhankar is 6 on Hole 2; Shubhankar is 5 on hole 3; Els is 6 on Hole 3 and Els is 5 on Hole 4.

On the other hand, if we put Tiger as 6 on hole 2, then the following chain happens:

Tiger is 5 on Hole 4; Shubhankar is 5 on Hole 2; Shubhankar is 6 on hole 3; Els is 5 on Hole 3 and Els is 6 on Hole 4.

**Deduction 2:** We have similar logic on Hole 1 between Shubhankar and Els  
 → If Shubhankar is 3 on Hole 1, then Els would be 4 on hole 1. On the other hand if Shubhankar is 4 on Hole 1, then Els would be 3 on Hole 1. Please note, that this two way choice between Shubhankar and Els on hole 1 is not connected to the chain of 5's and 6's described above.

**Deduction 3:** Similarly, for Jeev, 3 and 4 have to be shared between Hole 2 and Hole 4. Thus, if Jeev is 3 on Hole 2, then he is 4 on Hole 4, and vice versa. Again, this chain for Jeev's numbers on hole 2 and hole 4 is not connected to the other chains mentioned above.

Hence, there are a total of 8 possible scenarios for the numbers in the table.

**Deduction 4:** It is given to us that the sum of the number of putts on each hole is different. ('The aggregate of the number of putts done by the four golfers was different across the four holes.') If we look through the possibilities, we see that the sum of the first hole is 20 or 21. The sums of the

second, third and fourth hole are 21 or 22 or 23. This necessarily means that the sums of 21, 22 and 23 would necessarily be shared between Holes 2, 3 and 4. Thus, Hole 1 cannot have a 21. Hence, Hole 1 would be 20. This also means that Tiger's number of putts on hole 1 would be necessarily 7. The table would then look as follows:

|                              | Hole 1 | Hole 2   | Hole 3   | Hole 4   |
|------------------------------|--------|----------|----------|----------|
| Tiger                        | 7      | 5/6      | 3 or 4   | 6/5      |
| Shubhankar                   | 3/4    | 6/5      | 5/6      | 7 or 8   |
| Jeev                         | 6      | 3/4      | 7 or 8   | 4/3      |
| Els                          | 4/3    | 7 or 8   | 6/5      | 5/6      |
| Possible Sums for each hole: | 20     | 21/22/23 | 21/22/23 | 21/22/23 |

1. The required total is 20. Option (c) is correct.
2. From this point we can move forward to the second question. In order to solve the second question, we need to consider the sums of the putts for each golfer.

|                              | Hole 1 | Hole 2   | Hole 3   | Hole 4   | Possible Sums for each golfer |
|------------------------------|--------|----------|----------|----------|-------------------------------|
| Tiger                        | 7      | 5/6      | 3 or 4   | 6/5      | 21 or 22                      |
| Shubhankar                   | 3/4    | 6/5      | 5/6      | 7 or 8   | 21 or 22 or 23                |
| Jeev                         | 6      | 3/4      | 7 or 8   | 4/3      | 20 or 21                      |
| Els                          | 4/3    | 7 or 8   | 6/5      | 5/6      | 21 or 22 or 23                |
| Possible Sums for each hole: | 20     | 21/22/23 | 21/22/23 | 21/22/23 |                               |

In the sums column for the number of putts made by each golfer, we can see that the number of putts is 21 or 22 for Tiger, 21/22/23 for Shubhankar and Els. This means that 21 cannot belong to anyone outside these three – since if you tried to make Jeev as 21, the numbers for Tiger, Shubhankar and Els would not be distinct from each other.

Thus, Jeev cannot have a total of 21 and hence his total is 20. This also means that Jeev's Hole 3 score cannot be 8. Hence, his Hole 3 score must be 7. Thus, 23 is ruled out as the sum of Hole 3. Hence, Hole 3 cannot have the largest number of putts.

Option (b) is correct.

3. The total number of putts for the four holes would be the addition of 20 (hole 1) + 21 + 22 + 23 (Holes 2 to 4 in no particular order) = 20 + 21 + 22 + 23 = 86 putts. Option (d) is correct.
4. To the current table if we add the fact that Shubhankar has a 7 on Hole 4, the following chain of deductions emerge: We already know that

Jeev is 7 on Hole 3. The sum of hole 3 would be between 21 or 22. Likewise, the sum of hole 4 (after inserting 7 for Shubhankar as stated in the question) would be 21 or 22. This means that Hole 2 has to be 23. If you continue this chain of thought to its' logical concluding point, the table that emerges from these conclusions would look as follows

|                              | Hole 1 | Hole 2 | Hole 3 | Hole 4 | Possible Sums for each golfer |
|------------------------------|--------|--------|--------|--------|-------------------------------|
| Tiger                        | 7      | 5/6    | 4      | 6/5    | 22                            |
| Shubhankar                   | 3      | 6/5    | 5/6    | 7      | 21                            |
| Jeev                         | 6      | 4      | 7      | 3      | 20                            |
| Els                          | 4      | 8      | 6/5    | 5/6    | 23                            |
| Possible Sums for each hole: | 20     | 23     | 22     | 21     |                               |

In this situation, we can clearly see that Tiger's aggregate putts was 22.

Hence, option (d) is correct.

## TEST 5

We can make the following table to understand the total value of the missing numbers to be allocated to each subject:

|   | VA  |     |     |     |
|---|-----|-----|-----|-----|
| Total Score                                 | 810 | 900 | 720 | 600 |
| Total of top three scores given             | 660 | 720 | 624 | 483 |
| Total Score of the last two missing numbers | 150 | 180 | 96  | 117 |
| 10% limit                                   | 81  | 90  | 720 | 60  |
| Third scorer's limit                        | 180 | 195 | 60  | 156 |

1. The total marks in LR are equal to 720. Out of this, 624 marks have been scored by Ram, Shravan and Tarun. This leaves a total of 96 marks left to be scored by Pawan and Qazi. Also, both of them should score a maximum of 59 marks – as they have to score below Shravan's score of 60. So, the maximum possible score for Qazi in LR is 59. Hence, option (d) is correct.
2. Ram's maximum contribution would occur if he gets the maximum possible marks in the 3 subjects for which his score is missing. In VA it is 81, in DI it is 90, and in QA it is 60. So his total score (maximum possible) would be:  $81 + 90 + 330 + 60 = 571$  out of a total of 3030. It

works out to 18.84%. Hence, option (d) is correct.

3. With the given numbers in the table, Pawan has an advantage of 129 marks over Ram. In order to make the difference between their scores the minimum, we would need to ensure that Ram's score catches up as much as possible with Pawan's. For this to happen, Ram should be given the maximum possible score in the three subjects whose scores are missing and Pawan should be given the minimum score in the two scores that are missing. The allocations would be: VA: Ram = 81 and Pawan = 69; DI: Ram = 90; LR: Pawan = 37 and QA: Ram = 60. The table of values would look as follows with these allocations:

| Student | VA  | DI  | LR  | QA  |
|---------|-----|-----|-----|-----|
| Pawan   | 69  | 300 | 37  | 159 |
| Qazi    | 264 | 195 | 59  | 156 |
| Ram     | 81  | 90  | 330 | 60  |
| Shravan | 216 | 225 | 60  | 168 |
| Tarun   | 180 | 90  | 234 | 57  |

In this situation, the difference between Shravan and Tarun is 108 marks.

4. We can draw the following table with the limits for the missing values inserted and the totals for each person.

| Student | VA             | DI  | LR           | QA           | Totals      | Range for total |
|---------|----------------|-----|--------------|--------------|-------------|-----------------|
| Pawan   | a (= 69 to 81) | 300 | b (37 to 59) | 159          | 459 + a + b | 565 to 599      |
| Qazi    | 264            | 195 | c (37 to 59) | 156          | 615 + c     | 652 to 674      |
| Ram     | d (= 69 to 81) | 90  | 330          | F (57 to 60) | 420 + d + f | 546 to 561      |
| Shravan | 216            | 225 | 60           | 168          | 669         | 669             |
| Tarun   | 180            | 90  | 234          | h (57 to 60) | 504 + h     | 561 to 564      |

**Note** A sample thought used to create the total above is that for VA – the total of the two missing scores ( $a + d$ ) should be 150. Also, the maximum that anyone of  $a$  or  $d$  can take is 81. Hence, the minimum that one of them would have to take is  $150 - 81 = 69$ . Thus, the values of  $a$  and  $d$  must range between 69 to 81. For DI the residual value of 180 has to be equally divided between Ram and Tarun. Likewise, for  $b$  and  $c$  (the missing value for LR) the maximum score is limited to 59 and hence the minimum score would be  $96 - 59 = 37$ .

Based on the ranges for the total, we can see that the first two ranks

would be shared by Qazi and Shravan. Pawan would definitely get the third rank. Tarun and Ram would have different scores, hence a tie is not possible between them. Thus, Tarun would be 4th and Ram 5th. Hence, option (c) is correct.

5. Qazi's totals could be any prime integer between 652 to 674. The prime numbers between these numbers are: 653, 659, 661, 667 and 673. To score a total of 673 marks, he would need to get 58 in LR. But 58 has only 4 factors (1, 2, 29, 58), which is not allowed in the question. Hence, he must have scored less than 669 (Shravan's score). Hence, Qazi must have got the second rank. Thus, the correct answer is the number 2.

## TEST 6

1. The highest return on investment is clearly for an MBA in Singapore, as the return in the first year itself is 45000 on an investment of 65000 SGD – a return of over 60%.
2. The company would finance a value of 42000 GBP. Since, conversions are given only in terms of India Rupees, we would need to assume that converting the value of the GBP into AUD using the go through of the INR rates for the two currencies, would lead to the same result as using the direct rate between the GBP and the AUD.

So, the loan is worth:  $\frac{42000 \times 90.8}{48.7} \approx 42000 \times 1.85 \approx 77700$  AUD.

Since, this loan has to be recovered in 3 years, and the annual salary to Harshit should be 90000 AUD – it follows that in 3 years out of the total salary of 270000 AUD, there should be a deduction of 77700 AUD. Hence, the net payout in 3 years should be 192300. Annual payout would be  $192300/3 = 64100$  AUD. Hence, option (b) is correct.

3. The cost of a UK MBA is 56000 GBP. That would cost Rs.5085000 in Indian Rupees. His first trip from India to UK would cost him Rs.22500. Thus he would be left with a balance of 5300000 – 5085000 – 22500 = 192500. A return trip from UK to India and back would cost him  $340 \times 90.8 + 22500 \approx 53372$ . He would be able to make 3 return trips to India and back from the UK. Option (c) is correct.
4. The cost for Parikshit would be  $50000 \times 50.76 = 2538000$  while for

Shwetank the cost would be  $70000 \times 68.65 \approx 4800000$ . Parikshit's salary would be  $80000 \times 68.65 \approx 5490000$  while Shwetank's salary would be  $75000 \times 1.5 \times 50.76 \approx 5700000$ . If they are paying off their loans in 3 years, then Parikshit would repay 846000 per year. His disposable annual income would be  $5490000 - 846000 = 4644000$ . Shwetank's disposable income would be:  $5700000 - 1600000 = 4100000$ . The difference in their annual disposable income would be: 544000 in Indian Rupees. Option (a) is correct.

## TEST 7

If we were to look at the values for 2020, we see that a total of 26% of the market share has to be distributed amongst 2 major companies and 3 minor companies. The conditions we have to adhere to, in order to distribute the 26% market share are: i) The two major companies should get a higher percentage value than any particular minor company. ii) The share of the three minor companies should be at least equal to the share of the lowest major company. iii) All numbers should be distinct integers. The following table would give us the combinations possible:

|  | <i>4th Major company's share</i> | <i>5th Major company's share</i> | <i>3 minor companies share</i> | <i>Possibility Count</i> |
|--|----------------------------------|----------------------------------|--------------------------------|--------------------------|
|  | 19                               | 3                                | 4                              | No possibility           |
|  | 18                               |                                  |                                | No possibility           |
|  | 17                               |                                  |                                | No possibility           |
|  | 16                               |                                  |                                | No possibility           |
|  | 15                               | 5                                | 6 (1,2,3)                      | 1 possibility            |
|  | 14                               | 5                                | 7 (1,2,4)                      | 1 possibility            |
|  | 14                               | 6                                | 6 (1,2,3)                      | 1 possibility            |
|  | 13                               | 6                                | 7 (1,2,4)                      | 1 possibility            |
|  | 13                               | 5                                | 8 (1,3,4)                      | 1 possibility            |
|  | 12                               | 7                                | 7 (1,2,4)                      | 1 possibility            |
|  |                                  | 6                                | 8 (1,2,5); (1,3,4)             | 2 possibilities          |
|  |                                  | 5                                | 9 (1,3,5); (2,3,4)             | 2 possibilities          |
|  | 11                               | 7                                | 8 (1,2,5); (1,3,4)             | 2 possibilities          |
|  |                                  | 6                                | 9 (1,3,5); (2,3,4)             | 2 possibilities          |
|  | 10                               | 8                                | 8 (1,2,5); (1,3,4)             | 2 possibilities          |
|  |                                  | 7                                | 9 (1,2,6); (1,3,5); (2,3,4)    | 3 possibilities          |
|  |                                  | 6                                | 10 (1,4,5); (2,3,5)            | 2 possibilities          |
|  | 9                                | 8                                | 9 (1,2,6); (1,3,5); (2,3,4)    | 3 possibilities          |
|  |                                  | 7                                | 10 (1,3,6); (1,4,5); (2,3,5)   | 3 possibilities          |
|  |                                  | 6                                | 11 (1,4,6); (2,3,6)            | 2 possibilities          |
|  | 8                                | 7                                | 11 (1,4,6); (2,3,6); (2,4,5)   | 3 possibilities          |
|  |                                  | 6                                | 10 (1,4,5); (2,3,5)            | 2 possibilities          |
|  |                                  |                                  |                                | 34 possibilities         |

2. The highest percentage increase in the sales value would occur if the combined percentage of the major companies for the year 2020 is the least, while at the same time the combined percentage of the major companies in 2023 should be the maximum. The minimum percentage value for 2020 for the 5 major companies is:  $74 + 8 + 6 = 88\%$  (as seen from the table we have drawn for the first question). The maximum percentage value for 2023 would occur when the last two major companies are allocated percentage shares of 19 and 7 respectively. This would give the 5 major companies a total market share of 92%. The required percentage change would be got by calculating the percentage change from 88% of 1200 (= 1056) to 92% of 3000 (= 2760). The closest approximation of the percentage value is 161%. Hence, option (c) is correct.
3. For all the companies to have a sales value of above 50 crore, for 2020 each of the companies should have a market share of 5% or above. We have already seen in the solution to the first question above, that this is not possible. Likewise, in 2021 we can see again that it would not be possible to allocate the residual 20% of the market share amongst the 5 remaining companies so that each company has a share of greater than 4% (because in 2021, we need each company to have a market share of at least 4% to cross a sales value of 50 crore). In 2022, since the total market size is 2000 crore, we need a possible distribution where the smallest minor company gets 3%. Since, in 2022, the residual percentage is 25%, this can be done by distributing the value in 7,6 and 3,4,5. Thus in 2022 it is possible. Likewise, it is possible for 2023 (when we allocate 10,9,4,5,6 to the five companies for instance). Hence, option (b) is correct.
4. The required minimum value would be when we allocate the 5th position in the major companies to Sutradhar and also make the percentage allocation to the 5th position company as the least amongst all the possible values. For 2022, this would be at 5% (with a distribution of 14,5,1,2,3). For 2023, this would occur at 6% (at 16,6,3,4,5). Thus, the least total sales value for Sutradhar would be: 20% of 1200 + 32% of 1500 + 5% of 2000 + 6% of 3000 = 240 + 480 + 100 + 180 = 1000.

## TEST 8

The table given below lists all the possible routes, the number of villages covered in a route and the total number of people staying across all the villages covered in a route.

| S. No. | Route   | The number of villages covered | The total number of people |
|--------|---|--------------------------------|----------------------------|
| 1      | Kanpur – A – D – G – Lucknow                  | 3                              | 1000                       |
| 2      | Kanpur – A – D – E – G – Lucknow              | 4                              | 1200                       |
| 3      | KANPUR – A – D – E – F – G – LUCKNOW          | 5                              | 1700                       |
| 4      | KANPUR – A – B – E – G – LUCKNOW              | 4                              | 1050                       |
| 5      | KANPUR – A – B – E – F – G – LUCKNOW          | 5                              | 1550                       |
| 6      | KANPUR – A – B – F – G – LUCKNOW              | 4                              | 1350                       |
| 7      | KANPUR – A – B – C – E – G – LUCKNOW          | 5                              | 1400                       |
| 8      | KANPUR – A – B – C – E – F – G – LUC-<br>KNOW | 6                              | 1900                       |
| 9      | KANPUR – A – B – C – F – G – LUCKNOW          | 5                              | 1700                       |
| 10     | KANPUR – C – E – G – LUCKNOW                  | 3                              | 850                        |
| 11     | KANPUR – C – E – F – G – LUCKNOW              | 4                              | 1350                       |
| 12     | KANPUR – C – F – G – LUCKNOW                  | 3                              | 1150                       |

- As the tanker contains 2100 liters of oil supply and everybody is given an oil can of 1.5 L, the tanker can deliver oil to at most  $2100/1.5 = 1400$  people in a trip. There are eight routes on which the total number of people are either less than or equal to 1400.
- The only route along which exactly 1400 people stay in the villages is Kanpur – A – B – C – E – G – Lucknow. The number of villages covered is 5.
- The two Perfect – pairs are:
  - 1350 people – Kanpur – C – E – F – G – Lucknow and Kanpur – A – B – F – G – Lucknow.
  - 1700 people – Kanpur – A – D – E – F – G – Lucknow and Kanpur – A – B – C – F – G – Lucknow.

## TEST 9

The given table of values can be completed based on the possible ranges of the incomplete scores as follows:

|                              | <i>Round – 1</i> | <i>Round – 2</i> | <i>Round – 3</i> | <i>Round – 4</i> |                |
|------------------------------|------------------|------------------|------------------|------------------|----------------|
| Aman                         | 46 TO 54         | 200              | 25 TO 39         | 106              | 306 + 71 to 93 |
| Bendre                       | 176              | 130              | 39 TO 25         | 104              | 410 + 25 to 39 |
| Charwak                      | 54 TO 46         | 60               | 220              | 38 TO 40         | 280 + 84 to 94 |
| Denboo                       | 144              | 150              | 40               | 112              | 446            |
| Elangovan                    | 120              | 60               | 156              | 40 TO 38         | 336 + 38 to 40 |
| TOTAL                        | 540              | 600              | 480              | 400              | 2020           |
| SUM OF MISSING VALUES        | 100              | 120              | 64               | 78               |                |
| TEN PERCENT LIMIT            | 54               | 60               | 48               | 40               |                |
| THIRD HIGHEST SCORERS' LIMIT | 120              | 130              | 40               | 104              |                |

We can then use the above table to find the answers to the questions asked.

1. Aman's minimum contribution would occur if he scores  $306 + 46 + 25 = 377$ . Out of a total score of 2020, this means  $377/2020 \approx 18.66\%$ .
2. It can be seen that the score of Aman is  $306 + \text{two missing numbers}$  for rounds 1 and 3. For Charwak, the scores is  $280 + \text{two missing numbers}$  for round 1 and 4. Since, Charwak's score is below Aman's score for the two rounds for which their scores are known, we need to cover this gap in order to make the difference between the two minimized. For this to occur – we should give Charwak as high a possible score for round as allowed, while minimizing Aman's score. Thus, we will allocate 46 to Aman and 54 to Charwak. This makes the scores as: Aman =  $352 + \text{Round 3 score}$ ; Charwak =  $340 + \text{Round 4 score}$ . At this point we still notice that Aman has a higher score (by 12) over Charwak. With one score for each unknown, we should allocate this score in such a way that their scores get equated (if possible) or the difference between their scores is minimized.

We can easily see that in the event we allocate

**Case i)** 40 to Charwak in round 4 & Aman 28 in round 3, their scores are equated. Likewise Case ii) 39 for Charwak and 27 for Aman also has the same effect – their difference becomes 0.

**Case iii)** 38 for Charwak and 26 for Aman also minimizes their difference to 0.

In these three cases Bendre gets: 36, 37 and 38 respectively in his Round 3 score, while Elangovan gets 38, 39 or 40 in his round 4 scores.

There are three cases for Bendre's total: Case i)  $410 + 36 = 446$ ; Case ii)  $410 + 37 = 447$  and Case iii)  $410 + 38 = 448$ .

In these three cases, Elangovan's totals are:

**Case i)**  $336 + 38 = 374$ ; Case ii)  $336 + 39 = 375$ ; Case iii)  $336 + 40 = 376$ . In each case, it can be seen that their difference is always 72. Hence, option (c) is correct.

3. If the difference between Aman and Charwak is the maximum, we need to think exactly opposite to the thought for the previous question in allocating the missing numbers amongst them. Since Aman's score is:  $306 + (46 \text{ to } 54) + (25 \text{ to } 39)$  while Charwak's score is  $280 + (46 \text{ to } 54) + (38 \text{ to } 40)$ , for maximizing their difference, we should take the following scenario:

Aman =  $306 + 54 + 39 = 399$ . Charwak =  $280 + 46 + 38 = 364$ . In this case their difference is maximized at 35.

In such a case, Bendre scores  $410 + 25 = 435$ ; while Elangovan scores  $336 + 40 = 376$ . The difference between Bendre and Elangovan is 59 points. The required difference is the difference between these two differences. Hence, the required answer is  $59 - 37 = 22$ .

4. The respective scores for the five people are:

| <b>Student</b> | <b>Total Range</b> | <b>Rank</b>          |
|----------------|--------------------|----------------------|
| Aman           | 377 to 399         | 3rd                  |
| Bendre         | 435 to 449         | Cannot be determined |
| Charwak        | 364 to 374         | 5th                  |
| Denboo         | 446                | Cannot be determined |
| Elangovan      | 374 to 376         | 4th                  |

Hence, the correct answer is 3.

## TEST 10

1. Since there are three unique products (F, G, P) and three companies (X, Y, Z), there are 6 possible ways of associating the products with the company. They are:

| <b>Company</b> | <b>Case 1</b> | <b>Case 2</b> | <b>Case 3</b> | <b>Case 4</b> | <b>Case 5</b> | <b>Case 6</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| X              | F             | F             | G             | G             | P             | P             |
| Y              | G             | P             | F             | P             | F             | G             |
| Z              | P             | G             | P             | F             | G             | F             |

The revenue of the companies in the all the cases are (in '000):

| <b>Company</b> | <b>Case 1</b> | <b>Case 2</b> | <b>Case 3</b> | <b>Case 4</b> | <b>Case 5</b> | <b>Case 6</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| X              | 400           | 400           | 800           | 800           | 600           | 600           |
| Y              | 1600          | 1200          | 800           | 1200          | 800           | 1600          |
| Z              | 900           | 1200          | 900           | 600           | 1200          | 600           |
| Total          | 2900          | 2800          | 2500          | 2600          | 2600          | 2800          |

Only in case 3 is the revenue of all the companies less than 40%.

So, the answer is (c) Z.

2. The market share of each company in all the six cases is given below:

| <b>Company</b> | <b>Case 1</b> | <b>Case 2</b> | <b>Case 3</b> | <b>Case 4</b> | <b>Case 5</b> | <b>Case 6</b> |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| X              | 13.8          | 14.3          | 32            | 30.8          | 23.1          | 21.4          |
| Y              | 55.2          | 42.9          | 32            | 46.2          | 30.8          | 57.1          |
| Z              | 31            | 42.9          | 36            | 23.1          | 46.2          | 21.4          |

The lowest market share was of Company X in Case 1.

So, the answer is (a) 13.8%.

3. As from the table in the above answer, the market share of the company selling Prize is more than 45% only in Case 4. The market share of the company selling Falcon in case 4 is 23.1%. So, the answer is (d) 23.1%
4. The highest market share of any company = 57.1% for Y in Case 6, and the second – lowest market share of any company = 14.3% for company X in case 2.

The difference between the two values = 42.8%

So, the answer is (b) 42.8%.

## TEST 11

1. We know that 4th and 5th digit taken together forms a prime number, so the 5th digit is an odd number  $\neq 5$ . The 6th digit is  $\geq 4$  and the 3rd digit is even. As the sum of 5th and 6th digit = 9, therefore, the 5th digit is either 1 or 3, but as 4th + 3rd = 5th, 5th cannot be 1, hence the 5th digit = 3. Hence, from (iv) 6th digit = 6.

From (ii) & (iii) 3rd digit = 2 and the 4th digit = 1. As 6th and 7th digit together comprised a prime number, 7th digit = 1 or 7.

As the 1st and 2nd digit is not the same and according to (v), 2nd digit

is 1 more than the 1st digit. Also, the difference between 2nd and 8th digit = 6. As the 8th digit is greater than the 3rd digit and  $\leq 4$ , the 8th digit = 3. Hence, the 2nd digit = 9 and the 1st digit = 8.

| Position | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th    | 8th |
|----------|-----|-----|-----|-----|-----|-----|--------|-----|
| Digit    | 8   | 9   | 2   | 1   | 3   | 6   | 1 or 7 | 3   |

So, Arun could have chosen the sets in 2 ways. Hence, the answer is (b).

2. From the table in the above solution, the 7th digit of the number could be either 1 or 7. Hence, the answer is (c).
3. From the table in the first answer of this set, the number comprised by the fifth and the third digits off the phone number, taken in that order is 32. Hence, the answer is (b).
4. From the table in the first answer of this set, the difference between the first and the sixth digit of the phone number =  $8 - 6 = 2$ . Hence, the answer is (a).

## TEST 12

From (i) & (iii), the score given by panel member A ranges from 1 to 4. From (ii) & (iv). The score given by panel member B ranges from 5 to 8.

Also, from (v), score given by panel member C =  $(A + B)/2$ , i.e.,  $2C = A + B$ . And as score given by C is always an integer (vi), so score given by A and B for the same candidate and the same parameter are either both even or both odd.

From the tables provided, the value for score given by B to P in P4 can only be 6 and as  $A + B = 8$  and 5 and 7 cannot be the score. Therefore, the value for score given by A to P in P4 =  $8 - 6 = 2$ .

Similarly, the value for score given by B to S in P4 = 7 and value for score given by A to S in P4 =  $10 - 7 = 3$ .

Also, the value for score given by A to Q in P4 = 1 (both odd), and value for score given by C to S in P4 = 3.

So on and so forth, we are able to find the scores given by all the panel members to all the candidates in all the parameters. The result is as follows:

| Panel Member: A |    |    |    |    |
|-----------------|----|----|----|----|
|                 | P1 | P2 | P3 | P4 |
| P               | 1  | 3  | 4  | 2  |
| Q               | 2  | 4  | 3  | 1  |
| R               | 3  | 1  | 2  | 4  |
| S               | 4  | 2  | 1  | 3  |

| Panel Member: B |    |    |    |    |
|-----------------|----|----|----|----|
|                 | P1 | P2 | P3 | P4 |
| P               | 5  | 7  | 8  | 6  |
| Q               | 8  | 6  | 7  | 5  |
| R               | 7  | 5  | 6  | 8  |
| S               | 6  | 8  | 5  | 7  |

| Panel Member: C |    |    |    |    |
|-----------------|----|----|----|----|
|                 | P1 | P2 | P3 | P4 |
| P               | 3  | 5  | 6  | 4  |
| Q               | 5  | 5  | 5  | 3  |
| R               | 5  | 3  | 4  | 6  |
| S               | 5  | 5  | 3  | 5  |

1. The score given by B to R in P3 = 6. Hence, the answer is 6.
2. The score given by A to Q in P4 = 1. Hence, the answer is 1.
3. The highest composite score in P3 was received by P3. And the total composite score received by P in P3 =  $4 + 8 + 6 = 18$ . Hence, the answer is 18.
4. As can be seen from the table, only S got a higher composite score in P2 as compared to P3. Hence, the answer is 1.

## TEST 13

1. The number of employees that drink Sprite on Day 7 =  $20 + \text{No. of employees that have shifted to sprite in the 7 days} - \text{No. of employees that have shifted away from Sprite in the 7 days}$ .
 
$$= 20 + (\text{P to S}) + (\text{F to S}) - ((\text{S to P}) + (\text{S to F}))$$

$$= 20 + 21 + 25 - (24 + 19)$$

$$= 20 + 46 - 43 = 23.$$
 Hence, the answer is 23.
2. It would be easier to solve this question and the questions to follow, if we make a table of the number of employees that consume each beverage on each of the 8 days. To find the no. of employees consuming a drink on any specific day, use the calculation as shown in the previous question.

| Beverage | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Fanta    | 20    | 13    | 12    | 7     | 9     | 21    | 23    | 25    |
| Pepsi    | 20    | 26    | 26    | 24    | 22    | 16    | 17    | 7     |
| Sprite   | 20    | 21    | 22    | 29    | 29    | 23    | 20    | 28    |

Average no. of employees that drank Fanta per day =  $130/8 = 15.25$ . Hence, the answer is 15.25.

3. As can be seen from the table, on 3 days did atleast 16 employees drank each of the three drinks. Hence, the answer is 3.
4. As 9 employees switch from Sprite to other beverages on Day 1,

therefore, 11 employees drank sprite on the 1st and the 2nd day. Also, these 11 employees can be drinking Sprite also on all the 8 days, as the number of employees leaving on each of the 8 days is less than the total number of employees who have switched to sprite in the previous days, keeping the 11 employees constant. Hence, the answer is 11.

## TEST 14

As the numbers declared by each person from left to right is 1, 1, 1, 2, 2, 2, 1, therefore 1 and 2 or of different gender. Also, 2 and 3 are of the same gender. 3, 5 and 7 are of the same gender. As there are 4 women and 3 men, therefore, women occupy positions 2, 3, 5 and 7 and men occupy positions 1, 4 and 6.

As Q is not standing adjacent to either P or R and S is standing to the immediate right of V, therefore, Q is to the immediate left of V. From the above statement, it is clear that Q, V and S occupy positions 3, 4 and 5 respectively. As T is not standing at extreme right, therefore, U occupies the 7th position. As R is to the immediate left of T, R can only be at 1st position, meaning T is at the 2nd position and P occupies the 6th position.

The order is as follows

| 1st | 2nd | 3rd | 4th | 5th | 6th | 7th |
|-----|-----|-----|-----|-----|-----|-----|
| R   | T   | Q   | V   | S   | P   | U   |

- As can be seen from the analysis above, S and U are the only 2 girls standing to the right of Q. Therefore, the answer is (c).
- As can be seen from the analysis above, S is standing adjacent to P. Hence, the answer is (a).
- If R and T exchange their places then 5 people will have to declare the number 2 as the number of people of different gender standing adjacent to them. Thus, the answer is (a).
- As only 5 people can declare the number 2 at max, therefore, 6 people must have declared number 1. For this to happen, 5th and 6th position must have interchanged their places, i.e., P and S must interchange their places for 6 people to have the same number. Hence, the answer is (a).

## TEST 15

According to the data in the set, following table can be prepared:

| <b>Student</b> | <b>ME</b> | <b>CV</b> | <b>CH</b> | <b>AE</b> | <b>CS</b> | <b>EC</b> | <b>TL</b> |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1              | Yes       |
| 2              | No        | Yes       | Yes       | Yes       | Yes       | Yes       | No        |
| 3              | No        | No        | Yes       | Yes       | Yes       | No        | No        |
| 4              | No        | No        | No        | Yes       | No        | No        | No        |
| 5              | No        | No        | Yes       | Yes       | Yes       | No        | No        |
| 6              | No        | Yes       | Yes       | Yes       | Yes       | Yes       | No        |
| 7              | Yes       |
| 8              | No        | Yes       | Yes       | Yes       | Yes       | Yes       | No        |

For all the answers in this set we will be using the help of the table.

- As is evident from the table, the pattern of the first 6 rows keeps on repeating for other students. So, out of the first 6 rows (students), 5 have taken at least 3 subjects. If the number of students taking at least 3 subjects = 243 then the total number of students approximately =  $243 \times 6/5 = 291.6$ .

If the total number of students were 291, then there would be 48 batches of 6 students along with 3 extra students. No. of students who have taken at least 3 subjects would be equal to  $48 \times 5 = 240$ . And as the next 3 students will also have taken at least 3 subjects so, for 243 students to take at least 3 subjects, at least 291 students must be there in the college.

But, if the 4th student of the 49th batch is added (292nd student), then also the number of students who have taken at least 3 subjects will remain 243.

Therefore, the answer is (d).

- As is evident from the table, the pattern of the first 6 rows keeps on repeating for other students. In the first six rows, CS courses were opted for by 5 students. Therefore, for 59 students to opt for CS, 11 batches of 6 students should be present where 5 students opt for CS and 4 students from the 12th batch must have opted for CS. This can only be done if there are 5 students in the 12th batch. Hence, the total number of students =  $11 \times 6 + 5 = 71$ . So, the answer is (b).
- From the table, there are 2 students out of every 6 six students, who take CS but not take CV. If there are 93 students in total, then it will form 15 sets of 6 students and 3 students in the 16th set. In each of the

first 15 sets there will be 2 students that select CS but not CV. And in the 16th set, there will be 1 student who opts for CS but not CV. Number of students who took CS but did not take CV =  $15 \times 2 + 1 = 31$ . Hence, the answer is (c).

4. If 43 students took ME, then that means there are 42 complete sets of 6 students and there are more than 1 student in the 43rd set. As there are 3 students who took TL in each set, therefore there are  $42 \times 3 = 126$  students in the first 42 sets and 1 to 3 students who have opted for TL in the 43rd set. So, the number of students who opted for TL is in the range of 127 to 129. As 127 is the only value from this range in the option set, hence, the answer is (a).

## TEST 16

1. If Dinesh, Max and Rishi handle the 5 assignments, then the minimum taken by the three will occur when Max completes assignment a & e, Dinesh completes assignment b & d and Rishi completes assignment c. In this scenario, the total time taken will be equal to 3.5 hrs (The time taken by Rishi to complete assignment c, as Max and Dinesh will finish their assignments before that. So, the answer is 3.5).
2. As Rajiv takes the minimum time to complete assignment c by a long margin, so he is assigned that assignment. Max takes the minimum time to complete assignment e by a long margin, so he is assigned that assignment. As out of the remaining students Rishi takes the minimum time to complete assignment a, therefore he is assigned a. Between Dinesh and Anand the minimum cumulative time will occur when Dinesh does assignment b and Anand does assignment d. So, the minimum cumulative time take by the group to complete the task =  $1.5 + 1.5 + 1.5 + 2 + 2 = 8.5$  hrs. Hence, the answer is 8.5.
3. Maximum cumulative time will occur in the following case –
  - a – Anand – 5
  - b – Rajiv – 5
  - c – Max – 4
  - d – Rishi – 3
  - e – Dinesh – 4

So, the maximum cumulative time taken = 21 hr and the answer is 21.

- Time taken by each student to complete the assignment –

Rajiv – 16.5; Dinesh – 14; Max – 11.5; Rishi – 13.5; Anand – 18.5

Average cumulative time taken to complete the assignment =  $74 / 5 = 14.8$  hrs.

## TEST 17

First solve the set as much as possible and then answer the questions:

Let the weights lifted by Dev in the 1st round be  $a$ , weights lifted by Rajeev in 2nd round be  $b$  and weights lifted by Rajeev in the 3rd round be  $c$ , then from the information provided we can create the following table:

| Round | Rajeev          | Dev      | Kabeer     |
|-------|-----------------|----------|------------|
| 1     | $c$             | $A$      | $a + 17$   |
| 2     | $b$             | $c + 25$ | $b + 15$   |
| 3     | $a + 17 \pm 18$ | $B$      | $a \pm 20$ |

In the 3rd round, Kabeer cannot have the minimum weights that he lifted, as Rajeev has his minimum weights lifted in that round. So, weights lifted by Kabeer in the 3rd round will be  $a + 20$  (as  $a - 20$  will be lesser than both  $b + 15$  and  $a + 17$ ).

Weights lifted by Rajeev in round 3 cannot be  $a + 35$ , as in that case  $b > a + 35$  and that would mean that both Dev and Kabeer will have their minimum weights lifted in the 1st round (which is not possible). So, the weights lifted by Rajeev in the 3rd round =  $a - 1$ .

We know that  $b > a - 1$  and as  $a$  and  $b$  cannot be the same, therefore  $b > a$ . This means that Dev will have his minimum weights lifted in round 1 and Kabeer will have his minimum weights lifted in round 2, i.e.,  $b + 15 < a + 17$ . This will only happen when  $b = a + 1$ .

After these conclusions, the following picture emerges:

| Round                 | Rajeev      | Dev          | Kabeer    |
|-----------------------|-------------|--------------|-----------|
| 1                     | $c$         | $a$          | $a + 17$  |
| 2                     | $a + 1$     | $c + 25$     | $a + 16$  |
| 3                     | $a - 1$     | $a + 1$      | $a + 20$  |
| Combined total weight | $c + a + 1$ | $c + a + 26$ | $2a + 37$ |

- If Kabeer was first, then,  $2a + 37 > c + a + 26$ , i.e.,  $c < a + 11$  or  $c - a$

- $< 11$ . Therefore, the maximum difference between the weights lifted by Rajeev and Dev in the 1st round can be 10 kg. So, the answer is 10.
2. If Dev was first, then  $c + a + 26 > 2a + 37$ , i.e.,  $c > a + 11$ . The highest weight anybody lifted in the competition =  $c + 25$  kg and lowest weight lifted =  $a - 1$  kg. As  $c > a + 11$ , therefore, the lowest value c can take is  $a + 12$ . The minimum difference between the highest and lowest weight lifted in the competition will be:  $a + 12 + 25 - (a - 1) = 38$  kg. Hence, the answer is 38.
  3. If Rajeev was ranked second in the competition, then  $c + a + 1 > 2a + 37$ , i.e.,  $c > a + 36$ . The lowest value c can take is:  $a + 37$ . The minimum difference between the weight that Dev lifted in the second round and the weight that Kabeer lifted in the second round =  $a + 37 + 25 - (a + 16) = 46$  kg. Hence, the answer is 46.
  4. To minimize the combined total weight of the first ranked person, a must be 14, b ( $a + 1$ ) must be 15 and c must be 20. Putting these values in the table, we obtain the following results:

| Round                 | Rajeev | Dev | Kabeer |
|-----------------------|--------|-----|--------|
| 1                     | 20     | 14  | 31     |
| 2                     | 15     | 45  | 30     |
| 3                     | 14     | 15  | 34     |
| Combined total weight | 35     | 60  | 65     |

Therefore, the answer is 65.

## TEST 18

We can make out the following with respect to the total time required between stations:

| Travel Between Stations | Time taken |
|-------------------------|------------|
| S1 – S2                 | 12         |
| S2 – S3                 | 18         |
| S3 – S4                 | 11         |
| S4 – S5                 | 6          |
| S5 – S6                 | 10         |
| S6 – S7                 | 13         |

The answers can be read off from the above table:

1. It takes 6 minutes to reach S5 from S4.
2. They were both in the train between stations S3 and S4 – a total of 11 minutes.
3. There were at least two people in the train between S1 to S6 – a total time of:  $12 + 18 + 11 + 6 + 10 = 57$  minutes.
4. 4 persons were in the train between S3 to S4 – a total of 11 minutes.

## TEST 19

The following are the possible scores in the matches:

| <i>Number of matches</i> | <i>Goals Scored by A</i> | <i>Goals Scored by B</i> | <i>Result</i> |
|--------------------------|--------------------------|--------------------------|---------------|
| D                        | 1                        | 1                        | Draw          |
| E                        | 2                        | 2                        | Draw          |
| F                        | 2                        | 1                        | A wins        |
| G                        | 3                        | 1                        | A wins        |
| H                        | 1                        | 2                        | B wins        |
| J                        | 1                        | 3                        | B wins        |

According to the clues:

$$\text{CLUE V: } F + H + 20 = G + J \quad (\text{i})$$

$$\text{CLUE IV: } D + E + H + J + F - 15 = F + G \quad (\text{ii})$$

$$\text{CLUE III: } G + J = 2(F + H) \quad (\text{iii})$$

$$\text{CLUE II: } D + E = D + H + J \rightarrow E = H + J \quad (\text{iv})$$

$$\text{CLUE I: } F + G = E + H + J + 27 \quad (\text{v})$$

$$\text{Also we know that } D + E + F + G + H + J = 100 \quad (\text{vi})$$

$$\begin{aligned} \text{From (iv), (v) and (vi), we get: } & F + G = 2(H + J) + 27 \rightarrow D + 4(H + J) \\ & = 73 \end{aligned} \quad (\text{vii})$$

$$\text{From, (ii) and (v) we have: } D + E + H + J + F - 15 = F + G \text{ & } F + G = E + H + J + 27 \rightarrow D + F + G - 27 + F - 15 = F + G \rightarrow D + F = 42$$

From (vii), we know that since:  $D + 4(H + J) = 73$ , D can only(viii) take such values that  $4(H + J)$  should be a multiple of 4. Thus, values possible for  $D = 1, 5, 9, 13, 17, \dots$  etc. However, from (viii) we know that since  $D + F = 42$ , D can only take the values of 1, 5, 9, ..., 41. In these cases, F would be 41, 37, 33, ..., 1 respectively. We can start to form the following table of possible values:

| Possibility No: | D  | E               | F  | G   | H          | J  | H+J   |
|-----------------|----|-----------------|----|---|------------|----|---|
| 1               | 1  | 18              | 41 | 22  | Infeasible |    | 18  |
| 2               | 5  | 17              | 37 | 24  | Infeasible |    | 17  |
| 3               | 9  | 16              | 33 | 26  | Infeasible |    | 16  |
| 4               | 13 | 15              | 29 | 28  | Infeasible |    | 15  |
| 5               | 17 | 14              | 25 | 30  | Infeasible |    | 14  |
| 6               | 21 | 13              | 21 | 32  | 1          | 12 | 13  |
| 7               | 25 | 12              | 17 | 34  | 4          | 8  | 12  |
| 8               | 29 | 11              | 13 | 36  | 7          | 4  | 11  |
| 9               | 33 | 10              | 9  | 38  | 10         | 0  | 10  |
| 10              | 37 | 9               | 5  | 40  | Infeasible |    | 9   |
| 11              | 41 | 8               | 1  | 42  | Infeasible |    | 8   |
|                 |    | Since E = H + J |    | G will be got by subtracting the sum of all known values from 100 |            |    | H + J's value is derived from D + 4(H + J) = 73 |

At this stage, we also know that:  $G + J = 2(F + H)$ . If we try to fit in possibilities 1 to 5 with this equation, we will get an infeasible situation in each of these cases. Possibilities 10 and 11 are also not feasible since we cannot create a situation where  $G + J = 2(F + H)$ . For possibilities 6 to 9, the values of H and J such that this equation is satisfied are shown in the table.

Checking the other equations with this table, we can see that only possibility 8 satisfies equation (i):  $F + H + 20 = G + J$ . Hence, we get the final table of values for each match outcome:

$56 + J = 2(3 + H)$ . The maximum value we can allot to H is 16 (since  $H + J = 16$  in this possibility.) However, even by the distribution of  $H = 16$  and  $J = 0$ , we will not be able to satisfy the equation. Hence, possibility 3 is rejected. Similarly, Possibility 2 is also rejected.

Possibility 1 is the only possibility, and it works if we allot  $H = 16$  and  $J = 2$ , we get:  $G + J = 2(F + H) \rightarrow 52 + 2 = 2(11 + 16) \rightarrow 54 = 54$ .

Hence, the final values are:

| Possibility No: | D  | E  | F  | G  | H | J | H+J |
|-----------------|----|----|----|----|---|---|-----|
| 8               | 29 | 11 | 13 | 36 | 7 | 4 | 11  |

We can derive the answers from the table:

1.  $F + G = 13 + 36 = 49$ .
2. B would have scored:  $29 \times 1 + 11 \times 2 + 13 \times 1 + 36 \times 1 + 7 \times 2 + 4 \times 3 = 126$  goals.
3.  $J = 4$
4. We already know that B scored 126 goals. A would have scored:  $29 \times 1 + 11 \times 2 + 13 \times 2 + 36 \times 3 + 7 \times 1 + 4 \times 1 = 196$  goals. Goal

difference =  $196 - 126 = 70$ .

## TEST 20

We can make the following table for getting a sense of the information:

| Drug Name | Purchase Price | Selling Price | Profit Per Unit | Profit Per 100 Units |
|-----------|----------------|---------------|-----------------|----------------------|
| P         | 120            | 184           | 64              | 6400                 |
| Q         | 400            | 460           | 60              | 6000                 |
| R         | 160            | 256           | 96              | 9600                 |
| S         | 320            | 352           | 32              | 3200                 |
| T         | 640            | 720           | 80              | 8000                 |
| U         | 140            | 196           | 56              | 5600                 |

1. We can see that the values in options (a), (b) and (d) are possible – if he sells 100 units each of S & U (8800); 100 units each of R & S (12800) and 100 units each of R & T (17600). Only the value in option (c) cannot be made as a profit. Hence, the correct answer is option (c).
2. His total profit would be:  $6400 + 6000 + 9600 + 3200 + 8000 + 5600 = 38800$ .
3. The only drug that gives a profit percentage of below 12.8% is S. All other drugs are giving Rishi a profit percentage greater than 12.8%. Hence, if his profit percentage is only 12.8%, it follows that there is definitely some sale of S. Hence, option (b) is the correct answer.
4. The maximum revenues with the sale of three drugs would occur if he sold 400 units of T, 100 units of Q and 100 units of S. The total revenue would be:  $288000 + 46000 + 35200 = 369200$ .

## TEST 21

| Date                 | Number of customers above 10 (A) | Number of customers above 30 (B) | Number of customers below 40 (C) | Number of customers between 10 and 30 (D = A - B) | Number of customers between 30 and 40 (E = C - D) | Number of customers above 40 (F = B - E) |
|----------------------|----------------------------------|----------------------------------|----------------------------------|---|---|--|
| 10 <sup>th</sup> Feb | 40                               | 25                               | 30                               | 15  | 15  | 10                                       |
| 11 <sup>th</sup> Feb | 60                               | 30                               | 40                               | 30  | 10  | 20                                       |
| 12 <sup>th</sup> Feb | 70                               | 40                               | 30                               | 30  | 0   | 40                                       |
| 13 <sup>th</sup>     | 50                               | 20                               | 40                               | 30  | 10  | 10                                       |
| 14 <sup>th</sup>     | 30                               | 10                               | 30                               | 20  | 10  | 0  |
| 15 <sup>th</sup>     | 80                               | 50                               | 50                               | 30  | 20  | 30                                       |
| 16 <sup>th</sup>     | 40                               | 30                               | 20                               | 10  | 10  | 20                                       |
| 17 <sup>th</sup>     | 80                               | 60                               | 60                               | 20  | 40  | 20                                       |
| 18 <sup>th</sup>     | 60                               | 40                               | 30                               | 20  | 10  | 30                                       |
| 19 <sup>th</sup>     | 80                               | 30                               | 60                               | 50  | 10  | 20                                       |
| 20 <sup>th</sup>     | 30                               | 10                               | 20                               | 20  | 0   | 10                                       |
| 21 <sup>st</sup>     | 70                               | 50                               | 40                               | 20  | 20  | 30                                       |
| 22 <sup>nd</sup>     | 50                               | 30                               | 30                               | 20  | 10  | 20                                       |
| 23 <sup>rd</sup>     | 40                               | 20                               | 30                               | 20  | 10  | 10                                       |
| 24 <sup>th</sup>     | 80                               | 70                               | 50                               | 10  | 40  | 30                                       |

From the table we can read off the answers to the questions:

1. Since she is a 36 year old, she would be counted in the 30 – 40 category. There are two days viz: 12th February and 20th February when nobody in that age group visited the shop. On all other days it is possible for a 36 year old to visit the shop. Since the options given to us in this question are 14th, 18th and 22nd February, the correct answer is none of these.
2. The minimum average age would be on 14th February when nobody aged 40 + would have come to the shop. The average on 14th February is  $(20 \times 11 + 10 \times 31) \div 30 = 530 \div 30 = 17.6$ .
3. This can happen when the number of customers between 11 and 30 are greater than 12, the number of customers between 31 and 40 are greater than 12 and the number of customers above 40 is greater than 15. Such a situation is seen on three days – viz: 15th February, 17th February and 21st February. Hence, the correct answer is 3 days.
4. We cannot determine the answer to this since we do not know the exact ages of each of the customers. Hence option (d) is correct.

## Test 22

**1–4.** In order to solve these questions you need to find out the operating profit of each of the six companies and then identify the points represented on the

third chart to the correct company.

From the first and third chart it is very obvious that company D is excluded from the third chart. (why? Think!). Also, one of B and F must have been excluded. This is so evident from the first and third charts. You will realise that B and D are excluded.

The answers are:

1. Option (b).
2. Option (c).
3. Option (d).
4. Option (d).

### Test 23

#### 1–4.

Start solving from Day 3. You can deduce that university 4 is from UK and 6 is from USA. From Day 2, University 8 belongs to India and university 3 to Netherlands. Adding the clues from Day 1 to the above deduction, the following possibilities table emerges:

|              |                       |
|--------------|-----------------------|
| University 1 | The Netherlands/India |
| University 2 | Canada/U.K.           |
| University 3 | Netherlands           |
| University 4 | U.K.                  |
| University 5 | Netherlands/India     |
| University 6 | USA                   |
| University 7 | Canada/U.K.           |
| University 8 | India                 |

**Note** University 2 and 7 have to be distributed amongst Canada and UK, while University 1 and 5 go to India and Netherlands.

Hence answers are:

1. Option (c) the Netherlands is the correct Option.
2. Option (a) is the correct Option.
3. Option (a) is the correct Option.
4. Option (b) is the correct Option.

## Test 24

### 1–4.

Partially complete the table at the relevant places by using the 3 clues given.

1. Tara must have obtained either a B or F. Hence, Option (d) is the correct option.
2. Must have obtained an A in both unknown subjects since she has to have a total of 16 points.
3. Gauri got a C in strategy, Fazal got a B, Nisha and Rahul got an A. While Hari got a D. Hence Option (b) is the correct option.
4. Fazal gets a B in Marketing. So does Utkarsh (as per clue 2). Hence, Utkarsh gets a D in Finance.

## Test 25

**1–4.** (Detailed solution to this question is provided in my book—*How to Prepare for Data Interpretation and Logical Reasoning for CAT*)

The table of matches in the first two rounds will look like:

*Round 1:*

- Germany beat Spain 1 – 0,
- Argentina beat New Zealand 1 – 0
- Pakistan beat South Africa 2 – 0

*Round 2:*

- Germany beat SA 2 – 1
- Spain beat New Zealand 5 – 1
- Argentina beat Pakistan 1 – 0

*Round 3:*

- Germany drew with Argentina
- Spain drew with Pakistan
- New Zealand drew with South Africa

1. Argentina beat Pakistan 1 – 0 is true. Hence, Option (b) is correct.
2. Germany beat SA 2 – 1 is true. Hence, Option (d) is correct.
3. Spain will finish on top after 5 rounds. Hence, Option (c) is correct.
4. This cannot happen since at least Spain and Germany will have a higher goal difference than Pakistan. Besides, all the teams except

South Africa and New Zealand will score 10 points. Hence (d).

## Test 26

### 1–4.

- For the minimum possible average return, extraordinary good results should be in company A (1.5 times) and company B (2 times). The average return will be:  $\frac{30 + 20 + 30 - 40}{4} = 30\%$

Hence Option (a) is correct.

- For Venkat to get 35% average return, the only combination possible is 40, 10, 30 and 60 from A, B, C, and D respectively. In order to visualize this, draw a table as below.

| Company | Normal | 1.5 times | 2 times |
|---------|--------|-----------|---------|
| A       | 20     | 30        | 40      |
| B       | 10     | 15        | 20      |
| C       | 30     | 45        | 60      |
| D       | 40     | 60        | 80      |

When you try out the various combinations to make a total of 140 (since  $140/4 = 35$ ), you will also need to take care that there should be exactly 2 companies showing extraordinary results; one with 1.5 times, and the other with 2 times. Also, there should be exactly 2 companies with normal returns. The required answer will be got with company A producing 2 times the returns and D producing 1.5 times the returns.

Hence, II and III are correct. Option (b) is correct.

- For 38.75% returns, your combination should add up to 155.

From the table we drew for solving question 73, it is clear that total of 155 can only be achieved by:

$$20(A) + 10(B) + 45(C) + 80(D).$$

This means that C got 1.5 times the normal return, while D got 2 times the normal return. Hence, C must belong to the Auto or Steel industry, while B did not announce extraordinarily good results. Hence, Option (c) is correct (i.e. statements I and IV).

- As per the condition and the table above, company C gave 60% returns. With this the maximum possible returns are 150% giving an average of 37.5%. Hence statement I is wrong. (Note: This occurs at

$20(A) + 10(B) + 60(C) + 60(D)$ .

However, on the lower side, the minimum return will be for the following conditions:

$$20(A) + 15(B) + 60(C) + 40(D) = 135.$$

In this case the average returns will be 33.75. This means that statements II and IV are true. Option (b) is correct.

## Test 27

### 1–4.

Visualise the rounds as:

| First Round | Second Round | Quarters | Semis | Final |
|-------------|--------------|----------|-------|-------|
| 1 – 32      | 1 – 16       | 1 – 8    | 1 – 4 | 1 – 2 |
| 2 – 31      | 2 – 15       | 2 – 7    | 2 – 3 |       |
| 3 – 30      | 3 – 14       | 3 – 6    |       |       |
| 4 – 29      | 4 – 13       | 4 – 5    |       |       |
| 5 – 28      | 5 – 12       |          |       |       |
| 6 – 27      | 6 – 11       |          |       |       |
| 7 – 26      | 7 – 10       |          |       |       |
| 8 – 25      | 8 – 9        |          |       |       |
| 9 – 29      |              |          |       |       |
| 10 – 23     |              |          |       |       |
| 11 – 22     |              |          |       |       |
| 15 – 18     |              |          |       |       |
| 16 – 17     |              |          |       |       |

1. In the quarters, Maria Sharapova is seeded to play the 8<sup>th</sup> seed (Serena Williams). But Serena Williams loses in the second round (where she must have played either the 9<sup>th</sup> or the 24<sup>th</sup> seed). But it can be seen that the 9<sup>th</sup> seed Nadia Petrova reaches the semis. Hence, Maria Sharapova must play Nadia Petrova in the Quarter finals. Option (d) is correct.
2. Maria Sharapova is seeded to meet the 8<sup>th</sup> seed in the quarters and the 4<sup>th</sup>/5<sup>th</sup> seed in the semis. Neither of them can play her in the final, since they have to meet in the earlier rounds. Amongt these only Kim Clijsters name figures in the options. Hence Option (c) is correct.
3. Davenport being the 2<sup>nd</sup> seed is scheduled to play the winner of match 7 of the second round in the quarters. As per the question Match 7 has resulted in an upset in the second round. This means that Venus Williams won the Match 7 and will play Davenport in the quarters. Hence, Option (d) is correct.

4. According to this question seeds 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29 and 31 will reach the second round. In such a case, 4<sup>th</sup> seed is replaced by 29<sup>th</sup> seed. Hence, the correct answer is Flavia Pennetta. Option (b) is the correct answer.

## Test 28

1–4.

1. In India a hysterectomy would cost  $3000 + 5000 = 8000$  dollars, while in Thailand it costs her  $4500 + 6000 = 10500$  dollars. Thus the difference would be equivalent to an advantage of  $2500 \times 32.89$  bahts out of which she would lose 15000 bahts for two way travel giving her a net saving of apporx.67500 bahts.
2. For knee replacement, costs are: India 17500  
Thailand 16000  
Malaysia 12000  
Singapore 17000.  
Hence, India is the costliest
3. India's cost for the package would be:  
 $[11000 + 5000](\text{angioplasty}) + [9000 + 7000](\text{hip replacement}) + [8500 + 9000] (\text{Knee Replacement}) = 49500$ .  
Similarly, other countries would cost:  
Thailand: 51000  
Singapore:51000  
Malaysia: 47000  
USA: 140000.  
Hence, Malaysia is the cheapest.
4. Spinal fusion in India costs \$5500 while in Singapore it costs \$9000. We can ignore the cost of poor quality here since there is no difference in costs in the same. The current exchange rate, which is equivalent to  $\text{₹} 10500 \times 40.928$  and at the new rate it would be equivalent to US \$  $10500 \times 40.928/35 = 10500 \times 1.17$  (approx) = \$ 12280, while the cost in Singapore is equal to 14000 dollars.  
Hence, the difference is 1700 dollar.

## Test 29

### 1–5.

1. The possible routes for A to J with one intermediate stop are: ABJ, ADJ, AFJ, AHJ and AJJ.

There are many more routes possible with two intermediate stops but these would not be considered because the costs would become very high (as can be seen from the table).

The shortest route would be between AHJ and the cost would be Rs.2275. Hence, Option (a) is correct.

2.  $2275 \times 0.95 = 2161$ . Hence, option (b) is correct
3. AFJ will then become the cheapest route and its cost would be  $1700 + 1150 = 2850$ .
4. The cheapest route for the airline (even on a per kilometre basis) continues to be AHJ. Note: This can be spotted by the fact that the AH route is the only one which has a per kilometer cost below 1. Hence, the required answer would be given by  $0.9 * 2275/2350 = 0.88$  (approx).
5. As we have seen for the above question AHJ minimizes the total kilometers. This value comes out to be  $1950 + 400 = 2350$ .

## Test 30

### 1–5.

1. We can solve this by looking at and eliminating individual options. Option (a) cannot be true as Abdul would have the minimum return if the price is highest at 10 a.m. and continuously drops till 3 p.m.

Option (b) would normally have been true, but is not always true because if the price remains constant at 10, 11, 12, 1 and 2, Chetan would have the same return as Bikram.

Option (c) is also eliminated as we have seen that most of the time Chetan has a higher return than Bikram. Option (d) can be eliminated on the basis of the thought that it is easily possible that Chetan has higher return than Abdul. For example, on a day of consistently reducing prices, Abdul has the least return. Thus, option (e) is correct.

2. Abdul would get the maximum return on that day since his purchase

price (average) would be least. Also, between Chetan and Bikram, we know that for Bikram, average purchase price is higher and hence he would have the least returns.

3. The maximum return could be for Abdul or Chetan but between the two we cannot determine who gains more because in order to get that we would need to know the exact price at each hour starting from 10 a.m.

**Before solving 7 & 8 we need to logically work out what happened with respect to prices on that day.**

- (a) Since Abdul lost money, price at 3 p.m. < price at 10 a.m. i.e.  $P_3 < P_{10}$
  - (b) Dane made profits means  $P_{10} + P_{11} + P_{12} < P_1 + P_2 + P_3$
  - (c) Emily made profits means  $P_{10} + P_1 < P_{12} + P_3$
  - (d)  $P_2 < P_3$
  - (e)  $P_{12} < P_{10}$
  - (f) From (c) & (e) above, we know that  $P_3 > P_1$ .
  - (g) Also, from (c) we have  $P_{10} - P_{12} < P_3 - P_1$ .  
& from (b) & (g) we have:  $2 P_{10} + P_{11} < 2 P_3 + P_2 \rightarrow P_{11} < P_2$
4. None of the four options (a) to (d) can be said that it has to be necessarily false. As:  
Option (a) (share price least at 2 p.m.) can happen.  
Option (b) (share price least at 11 a.m.) can also happen.  
In terms of equalities what we know is:  
 $P_{10} - P_{12}, P_{10} < P_3, P_3 > P_1 \& P_3 > P_2 \& P_2 > P_{11}$   
Option (c) and option (d) could also be true in some cases and hence are not necessarily false.
  5. From the above we have:  
 $P_{10} > P_{12}, P_{10} > P_3$  and since  $P_3 > P_1 \& P_3 > P_2$  it follows that  $P_{10} > P_{11}$   
&  $P_{10} > P_{11}$  would also be true.  
Thus, the highest price would definitely be at 10 a.m.

## PART 3

# Mock Tests on Logical Data Interpretation

**Chapter 1**  
Mock Tests on  
Logical Data  
Interpretation

### In This Part You will Learn:

- To solve difficult reasoning based questions in Data Interpretation in the format of a mock test.
- Not only to tackle the DI section more effectively but also by solving this part you would
  - Improve your ability to handle new unknown situations and unforeseen twists in a DI question
  - Improve your anticipation/recognition of novelties in DI question sets

- Improve the depth and breadth of your exposure to DI questions as well as your DI problem solving skills
- Improve your ability to make earlier decisions about whether you are going to be able to solve a question set or not
- Improve your ability to work around hurdles in advanced DI problems
- Improve your ability to work around hurdles in advanced DI problems
- Increase your confidence level to take on any challenge thrown at you in a DI question paper

### **This Part Contains:**

- **30 Mock Tests on the latest pattern of the CAT Paper, where you would be expected to solve 16 DI questions in 30 minutes.**

1. For each test first try to solve the test within a strict time limit of 30 minutes. If you want to compete against the 100 percentilers in CAT, you should be able to solve a minimum of 13-14 questions in the stipulated time (of course all correct). The 99 percentiler would be able to solve around 10-11 questions on average out of 16 in these tests in the stipulated time.
2. After you finish a test, go through the provided solution for each question set to see what you were to check, how you could have seen things faster.
3. For sets you were not able to solve in the stipulated time period, do not jump to the solutions, since doing that would cut short your learning from those questions. Naturally there would be two kinds of question sets that you did not solve during the time limit.
  - (a) Sets you did not reach: For these try to adhere to a strict 12 minute time limit while trying to solve the same after the test. If you can solve it in 12 minutes, then you can proceed to look at the solution provided to see if you can learn something more.
  - (b) Sets you tried but could not solve: For these sets as I have mentioned in the introduction to Part 2 of this section, I would prefer you to first try the unsolved questions. Your focus should be to first make sure that you can solve the same beyond the time limit and learn to identify what you were missing in the solving of the questions. It is imperative to first try to do it on your own - since that is going to be crucial to make sure that you extract maximum learning from each question. Hence, after the 12 minute time limit, don't bother about how much more time you take - and how many times you have to try the question, but it is important to stick to trying to solve on your own. After sufficient trial (that might include trying the set 5-10 times) if you are not done with the set by yourself, you can then try to check the solutions and try to identify what it is that you were not able to see in the question, due to which you weren't able to solve the question.

# 1

# Mock Tests on Logical DI

## OUTLINE

### Learning Objectives

- A unique collection of questions to test your mettle, your guts, and your intelligence
- Question sets of advanced reasoning based on Data Interpretation.

This part consists of 30 Mock Tests containing Logical DI questions, designed on the latest pattern of CAT – with each test consisting of around 16 questions to be solved in 30 minutes (which is what you would be exactly required to face in the actual CAT exam).

The logic of solving each of these tests in a strict time limit of 30 minutes comes essentially from what you have to do in the CAT – where in the DI-LR section you would be facing 4 sets of DI and 4 sets of LR in 1 hour. So, on the average, you would be spending around 30 minutes doing Data Interpretation in the exam.

For each of these tests, you are expected to first solve the test as if you are solving the actual CAT – so during the solving of the test, your approach would be to solve in such a way so that you can maximize your score (+3 for every correct answer, -1 for every option based question whose answer went wrong and 0 marks for a wrong answer to a TITA question). Needless to say, you should try to solve any sets you have not been able to solve during the time of the test, as well as those you got wrong. While doing this, for any untouched set, try to solve first in a 12 minute time period – and if not solved

in that time, then just focus on solving it without time limits. Remember, most of your learning in Data Interpretation would occur while solving and learning through tough sets.

The following is an indicative score assessment algorithm, which would indicate to you the approximate percentile you can expect on different net scores in these tests.

| <i>NET SCORE</i> | <i>Percentile expected</i> | <i>Suggested Action</i>   |
|------------------|----------------------------|---|
| 40+              | 100                        | None – just maintain your score. You would be very close to the top.  |
| 32–40            | 99.9+                      | You are doing great. Continue your learning journey, try to reduce your time taken to solve each set, improve your selection and try to improve your  |
| 25–32            | 99 to 99.9                 | There is scope for improvement. Try to identify your personal scope of improvement – think about how can you improve your learning quality, selectively go back to questions that you have already solved, re-do them, identify repetitive processes, work on reducing the amount of time you use to read a set of questions. You might also want to take a look at your question selection and think about how you could improve the same. |
| 18–25            | 90 to 99                   |   |
| 14–18            | 80–90                      |   |
| <14              | <80                        | You would need to do all the above, plus you need to re-do everything you have done and improve the quality of your learning through each question you have already solved and also through the questions that you would do in the future.  |

# 1

# Mock Test Paper

**Directions for Question 1 to 4:** Answer the questions on the basis of the information below.

A Shopkeeper has some marbles in five different boxes B1, B2, B3, B4 and B5. [Table- 1](#) provides the data about the Number of marbles (N), Average weight per marble (AWPM) and Average Selling Price per marble (ASPPM) for each of the 5 boxes. [Table- 2](#) shows the relationship between AWPM and Ease of Selling Index (ESI)

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**Table-1**

| BOX | N  | AWPM | ASPPM |
|-----|----|------|-------|
| B1  | 16 | 180  | 15    |
| B2  | 48 | 90   | 12    |
| B3  | 32 | 140  | 11    |
| B4  | 64 | 130  | 18    |
| B5  | 40 | 170  | 17    |

---

**Table-2**

| AWPM              | ESI |
|-------------------|-----|
| < = 100           | 6.5 |
| 100 < and <=120   | 7.5 |
| 120 < and < = 140 | 8   |
| 140 < and <=170   | 9   |
| > 170             | 10  |

1. If 5 marbles of Box B1 are mixed with 10 marbles of Box B2, then what is the ESI of the mixture?

- (a) 7.5
  - (b) 6.5
  - (c) 8
  - (d) Cannot be determined
2. All the marbles of Box B2 are to be mixed with all the marbles of exactly one of the other four boxes. Which box should be chosen to maximize the ESI of the mixture?
- (a) B1
  - (b) B4
  - (c) B3
  - (d) B5
3. If the retailer wants to keep the ESI of the mixture at least 7.5 and the ASPPM between 13 and 15, which of the following combinations should he make?
- (a) B1, B2 and B3
  - (b) B2, B3 and B4
  - (c) B3, B4 and B5
  - (d) B1, B4 and B5
4. If the retailer wants to keep the ESI of the mixture at least perfect 10 and the ASPPM between 12 and 18, which of the following combinations should he make?
- (a) B1, B4 and B5
  - (b) B2, B3 and B4
  - (c) B3, B4 and B5
  - (d) None of these

**Directions for Question 5 to 8:** Answer the questions on the basis of information below.

Advent of Mr. Narendra Modi as the Prime Minister of India in 2014 brought along a lot of awareness campaigns to promote various causes within India. Table given on the next page gives you the information about four of these campaigns, their star campaigners and the they charge per campaign. No celebrity, other than the eight mentioned, has worked in these campaigns. Each of the celebrities has worked in exactly two of the four

*campaigns. Table also gives you partial information about the celebrities who have worked in a particular campaign.*

*Additional information given: Fee paid to celebrities (star campaigners) is exactly 25% of the total budget of that campaign.*

5. In which of the following campaigns has Kajal worked?

- (a) Give It Up India
- (b) Digital India
- (c) Swachh Bharat Abhiyaan
- (d) Cannot be determined

|   | Fee charged per campaign<br>(in INR) | Digital India | Give It Up India | Startup India | Swachh Bharat Abhiyaan |
|---|--------------------------------------|---------------|------------------|---------------|------------------------|
| Total budget for the campaign (in Lakh INR) |                                      | 176           | 144              | 192           | 288                    |
| Star campaigner                             |                                      |               |                  |               |                        |
| Mohli                                       | 20                                   |               | Yes              |               |                        |
| Imran                                       | 16                                   | Yes           |                  |               |                        |
| Sairukh                                     | 10                                   | Yes           | No               | No            | Yes                    |
| Moni  | 12                                   |               |                  | Yes           |                        |
| Kajal                                       | 12                                   |               |                  | Yes           |                        |
| Anshika                                     | 10                                   |               |                  |               |                        |
| Hansika                                     | 14                                   |               |                  |               | Yes                    |
| Amir  | 6                                    |               | Yes              |               |                        |

6. Which celebrity has not worked with Sairukh in any of the given campaigns?

- (a) Mohli
- (b) Anshika
- (c) Hansika
- (d) Amir

7. What is the absolute difference (in Lakh INR) in the total budget of the campaign released in which Mohli has worked and total budget of the campaigns in which both Moni and Kajal have worked?

- (a) 192
- (b) 48
- (c) 64
- (d) 240

8. Disappointed with the kind of fee these celebrities charge for such

noble national causes, PM Narendra Modi bans all the campaigns from appointing any celebrity whosoever. He instead decided to use the amount that was previously kept aside for celebrities from all campaigns put together to start a new campaign called Make In India to finance Small and Medium sized Indian manufacturing enterprises. He also announced that whatever the amount sums up to for Make In India, he'd add 20% of it more from the National treasure to facilitate this campaign.

However, this campaign requires 23 Paise to be spent on banners and ads for every 1 INR invested in it. How much money (in Lakhs INR) was spent on banners and ads in Make In India campaign?

- (a) 55.2
- (b) 46.46
- (c) 23.2
- (d) 185.8

**Directions for Question 9 to 12:** The following table (on the start of the next page) gives us the data of the total number of employees of Mindworkzz of different age group. The data is given for years from 1995 to 2015, for different years at 5-year intervals. The data is recorded on the 1<sup>st</sup> of April of each of the given years. A few employees left the job during these years. According to the company policy employees above 25 years are categorized as permanent employees. It is also known that Mindworkzz only hires new employees below 25 years of age but this condition was relaxed during the period 1<sup>st</sup> April 2010 to 1<sup>st</sup> April 2015 as some experienced people had come to the company seeking employment during this time.

- 9. If exactly 900 employees who were under the permanent employees list in 1995 also fall in the same list in 2000 as well, then the maximum possible number of employees whose age was more than 40 and less than 45 in 2000 was? (Assume no new recruitments between 1995 and 2000)
- 10. What is the minimum possible number of employees who moved from the 20 to 40 age group, to the 40 to 60 age group during this time?
- 11. Least possible number of employees who left the job between 1995

and 2015?

12. What is the minimum number of recruitments that must have taken place during the period 1995 to 2015?

**Directions for Question 13 to 14:** The graph shown at the bottom of the next page shows the total salary of the employees of Mindworkzz with respect to the total number of units sold by them. Each employee gets two types of salary: Fixed salary ... Variable salary.

Total salary of the employee = Fixed salary + Variable salary

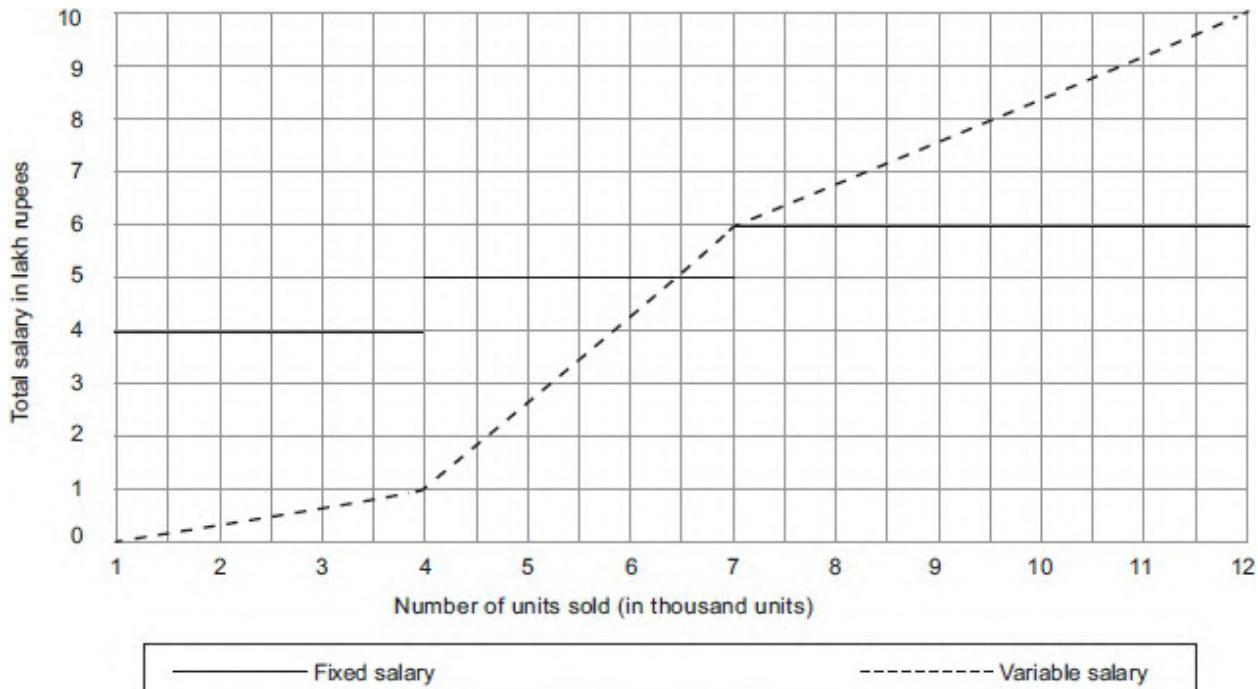
Average salary per unit = Total salary/Total units sold

Variable salary continuously increases with number of units sold by the employee (as shown in the diagram below) and fixed salary varies in discrete levels. For 1<sup>st</sup> 4000 units his fixed salary is 4 lakh rupees. If the number of units sold by the employee is more than 4000 and less than or equals to 7000 then his fixed salary will be 5 lakh rupees. If the number of units sold by the employee is more than 7000 and less than 12000 then the fixed salary will be 6 lakh rupees.

| Year | $20 < \text{Age} < 40$ years | $40 \leq \text{Age} < 60$ | $\text{Age} \geq 60$ |
|------|------------------------------|---------------------------|----------------------|
| 1995 | 329                          | 346                       | 315                  |
| 2000 | 300                          | 360                       | 310                  |
| 2005 | 302                          | 310                       | 360                  |
| 2010 | 330                          | 330                       | 330                  |
| 2015 | 335                          | 326                       | 340                  |

13. If average salary per unit sales of an employee is the maximum, then how many units has that employee sold?
- (a) 7000  
(b) 6000  
(c) 8000  
(d) 1000
14. Which of the following statement is true?
- (a) From 1000 to 12000 units average salary per unit sold of an employee first decreases then increases then decreases.  
(b) From 1000 to 12000 units average salary per unit sold of an employee first increases then decreases then increases.

- From 1000 to 12000 average salary per unit sold of an employee
- first increases then decreases.
  - None of these.



**Directions for Questions 15 to 17:** There are three tables given.

**Table A** gives the monthly production capacity of five different farmers. **Table B** gives monthly consumption of four different families. **Table C** gives the transportation cost involved in transporting grains from different farmers to different families.

**Table A**

| Farmer's name | Total production per month (in tons) |
|---------------|--------------------------------------|
| Piku          | 20                                   |
| Qadir         | 60                                   |
| Ramu          | 20                                   |
| Sonu          | 60                                   |
| Tinku         | 40                                   |

**Table B**

| <i>Family</i> | <i>Consumption per month (in tons)</i> |
|---------------|--|
| A             | 80                                     |
| B             | 60                                     |
| C             | 20                                     |
| D             | 40                                     |

**Table C**

| <i>Farmer</i> | <i>Transportation cost per ton (in INR)</i> |     |     |     |
|---------------|---|-----|-----|-----|
|               | A   | B   | C   | D   |
| Piku          | 200   | 150 | 300 | 50  |
| Qadir         | 250   | 150 | 300 | 100 |
| Ramu          | 300   | 200 | 200 | 50  |
| Sonu          | 150   | 200 | 350 | 200 |
| Tinku         | 100   | 150 | 200 | 100 |

Assume that only these five farmers are the source of food for these four families and production of grains at any month is transported to the family on only one day in a month such that monthly demand of the families is met.

15. In a given month what is the minimum possible value (in INR) of sum of transportation costs paid by all the farmers to transport the grains to all the families?
16. If due to some transportation problems, Qadir cannot supply grains to family B and D, then the monthly cost of transportation of grains to all the families is at least:
17. The transportation cost for which of the following is least?
  - (a) Piku supplies 20 tons to A.
  - (b) Piku supplies 20 tons to B.
  - (c) Qadir supplies 20 tons to A.
  - (d) Tinku supplies 20 tons to D.

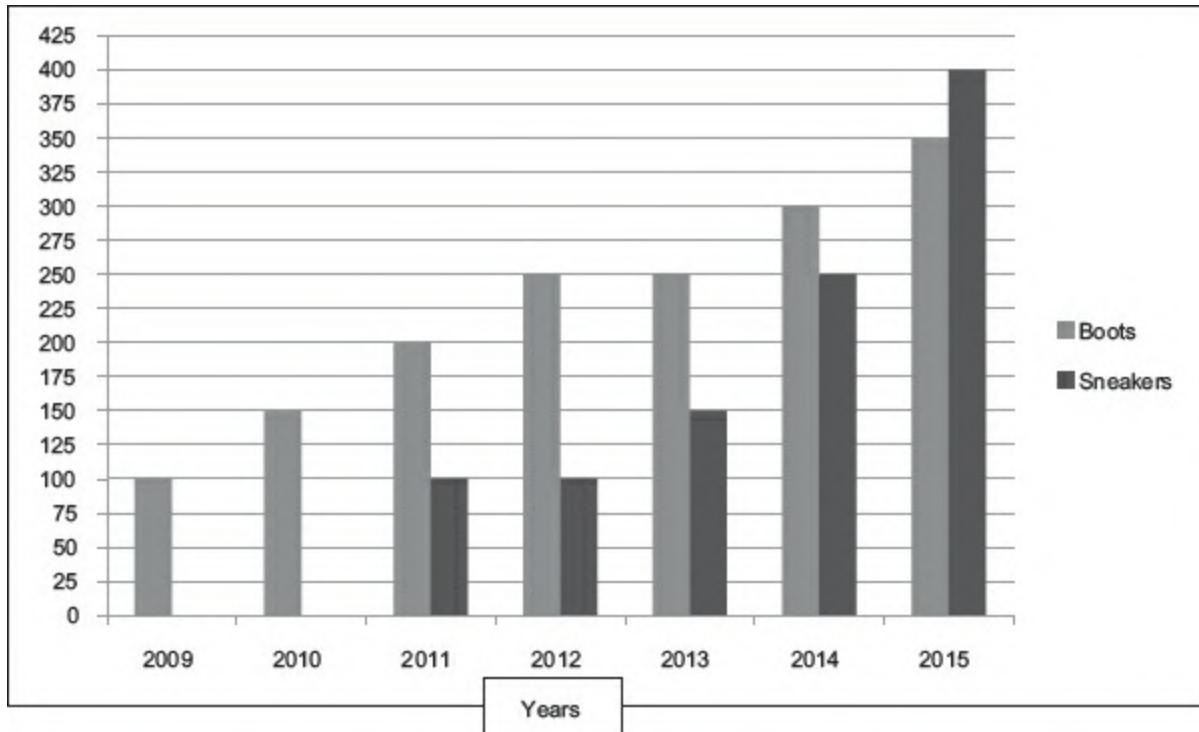
## 2 Mock Test Paper

**Directions for Question 1 to 5:** Answer the questions on the basis of information below.

Sneakers and Boots are 2 types of shoes of brand Quma available in the local market. Boots were introduced by Quma in 2007 while Sneakers in 2011. For both these types, 30% of the shoes bought in any given year are disposed off 2 years later. It is known that 20 Boots were disposed off in 2011. The following figures show the Number of Boots and Sneakers being used by customers from 2009 through 2014, as in the end of that year.

1. How many Sneakers were purchased in 2013?
  - (a) 50
  - (b) 80
  - (c) 100
  - (d) Cannot be determined
2. How many Sneakers were disposed off by the end of 2015?
  - (a) 54
  - (b) 84
  - (c) 75
  - (d) 45
3. How many Boots were disposed off in 2013?
  - (a) 15
  - (b) 6
  - (c) 21
  - (d) Cannot be determined
4. How many boots were bought in 2012?
  - (a) 80

- (b) 50
- (c) 70
- (d) Cannot be determined



5. How many Boots were purchased in 2013?

- (a) 0
- (b) 21
- (c) 16
- (d) Cannot be determined

**Directions for Questions 6 to 9:** Answer the questions on the basis of information below.

There are 2700 students in first year of college Amethi University. They belong to one of the four courses – MBBS, B.Tech, BA and B.Com. All courses have different number of students. The [tables 1](#) and [2](#) give partial information about the sets of books bought by the students of first year. A set of books contains all the subject books corresponding to the course of the student. Two different books are available for each subject and a student can choose any one of the two.

**Table - 1** shows the percentage of students buying different books (e.g. ‘p’ percent of students in the MBBS course buy book type- B1 for Biology).

**Table - 2** shows the total number of the sets of books bought by the students of each course.

Additional information given is:

1. ‘XX’ means that the subject is not studied in that course
2. Percentage of students who buy books in each stream is a multiple of 10.
3. Percentage of students is different for all 4 courses
4. At least one student in each course does not buy the set of books
5. Number of students in each stream is a multiple of 10. It is also known that the number (or percentage) of students of a particular course who buy books for any of the subjects for which they have to purchase books are equal. In other words, for the MBBS course for instance, in the table below  $p + q = n + s = o + r$  and so on.
6. What is the total number of Indian Politics books bought by students?
  - (a) 666
  - (b) 1998
  - (c) 2430
  - (d) 2700
7. How many students are there in BA course of Amethi college?
  - (a) 378
  - (b) 810
  - (c) 540
  - (d) 630
8. Which is the book bought by the maximum number of students in the MBBS course?
  - (a) E1
  - (b) E2
  - (c) M1
  - (d) P2
9. What is difference between the number of students of Amethi College who buy E1 and those who buy P1?
  - (a) 328

- (b) 99  
 (c) 324  
 (d) 297

**Table 1**

|        | <i>Biology</i> |    | <i>Maths</i> |    | <i>Indian Politics</i> |    | <i>English</i> |    |
|--------|----------------|----|--------------|----|------------------------|----|----------------|----|
|        | B1             | B2 | M1           | M2 | P1                     | P2 | E1             | E2 |
| MBBS   | P              | q  | n            | s  | o                      | r  | m              | t  |
| B.Tech | XX             | XX | p            | r  | n                      | t  | o              | s  |
| BA     | XX             | XX | XX           | XX | q                      | r  | p              | s  |
| B.Com  | XX             | XX | XX           | XX | XX                     | XX | q              | s  |

**Table 2**

|  | <i>Total sets of books bought in various courses</i> |               |           |              |
|--|--|---------------|-----------|--------------|
|  | <i>MBBS</i>  | <i>B.Tech</i> | <i>BA</i> | <i>B.Com</i> |
|  | 972  | 648           | 378       | 162          |

**Directions for Questions 10 to 13:** In Charlie's chocolate factory, one day there are 10 children visiting. Let's call them - A, B, C, D, E, F, G, H, I, J. Charlie distributes a certain number of chocolates to these 10 children. He has given them chocolates in packs of 4 chocolates each, or 6 chocolates each or as single chocolates. The first table given below shows the percentage of the total number of chocolates that Charlie distributed and that each child has. The second table shows the percentage distribution of the total number of chocolates each child has got – in terms of 4 and 6 chocolate packs. The total number of chocolates distributed by Charlie is less than 375 and no two children have got the same number of chocolates except A and D.

**Table 1:**

| <i>Child</i>              | <i>Percentage of total chocolates</i> |
|---------------------------|---------------------------------------|
| A                         | 25                                    |
| B                         | 30                                    |
| C                         | 10                                    |
| D                         | 25                                    |
| Others (E, F, G, H, I, J) | 10                                    |

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**Table 2:**

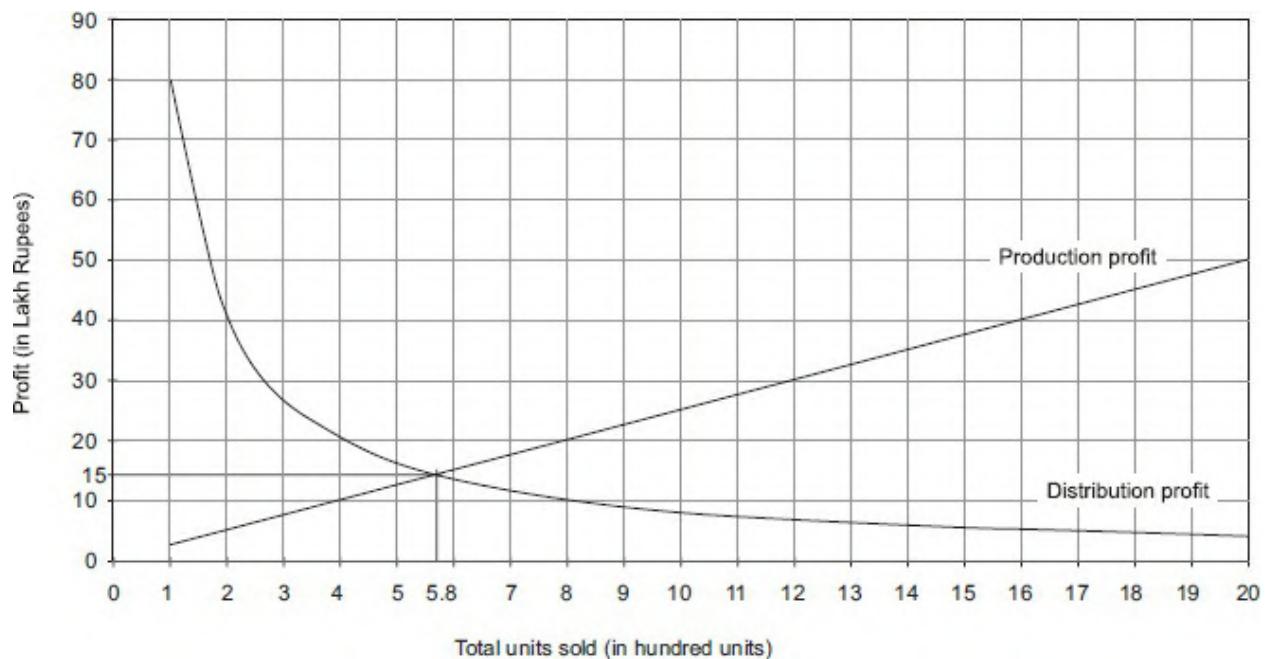
| Player      | Percentage of total chocolates in 4 chocolate packs | Percentage of total chocolates in 6 chocolate packs |
|-------------|---|---|
| A           | 13.33333  | 40  |
| B           | 22.22222  | 11.1111   |
| C           | 66.6666   | 33.3333   |
| D           | 40  | 20  |
| Others(E-J) | 33.3333   | 33.3333   |

10. If B has got a total of ‘n’ chocolates then  $n = ?$
11. If D has a total of ‘x’ 6- chocolate packs then  $x=?$
12. Find the total number of 4-chocolate packs given by Charlie.
13. At most how many children could not have any chocolate?

**Directions for Questions 14 to 16:** The graph given shows the profit of a company XYZ in terms of its’ total production profit and its total distribution profit at different sales volumes.

Total Profit = Production profit+ Distribution profit

14. If company made a total profit of ‘X’ by selling ‘n’ units and ‘3X’ by selling ‘3n’ units then how many values of n are possible?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) Infinite values are possible
15. What is the minimum possible total profit (in lakh rupees) of the company if it is known that total units sold by the company is between 200 to 1200 units?
  - (a) 12
  - (b) 15
  - (c) 25
  - (d) None of these
16. What is the value of the total units sold by the company for which the total profit is least?



# 3 Mock Test Paper

**Directions for Question 1 to 4:** Answer the questions on the basis of information below.

The following tables show the sales of 5 Mobile phone companies: TTC, Bokorola, Kokia, Hi-Phone and Mony across various grades of mobile phones in India

**Table- 1** gives percentage break up of sales of different grades of mobile phones across different companies

**Table- 2** gives percentage break up of sales of mobile phones of various companies across different grades

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**Table 1**

| Company  | Grade |     |     |     |     |
|----------|-------|-----|-----|-----|-----|
|          | A++   | A+  | A   | B+  | B   |
| TTC      | 20    | 21  | 20  | 10  | 23  |
| Bokorola | 18    | 09  | 20  | 15  | 27  |
| Kokia    | 22    | 21  | 20  | 25  | 01  |
| Hi-Phone | 17    | 31  | 20  | 30  | 23  |
| Mony     | 23    | 18  | 20  | 20  | 26  |
|          | 100   | 100 | 100 | 100 | 100 |

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**Table 2**

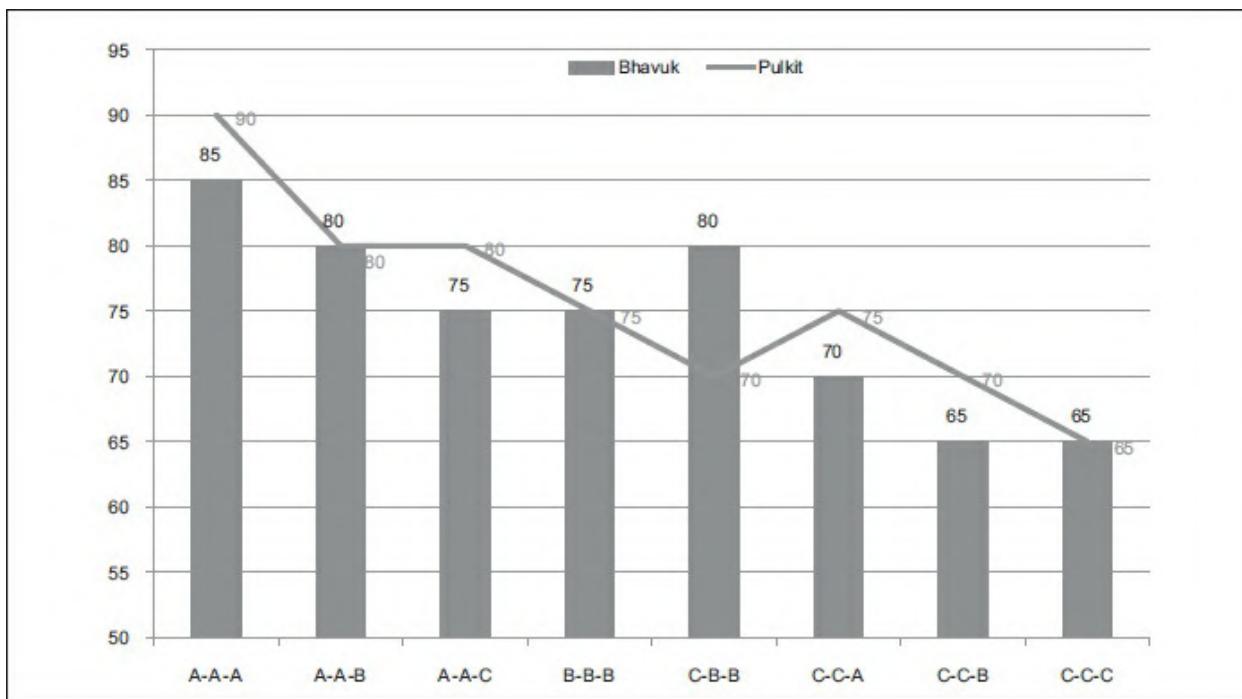
|       |     | Company |          |       |          |      |
|-------|-----|---------|----------|-------|----------|------|
|       |     | TTC     | Bokorola | Kokia | Hi-Phone | Mony |
| Grade | A++ | 01      | 82       | 01    | 09       | 11   |
|       | A+  | 08      | 04       | 02    | 09       | 01   |
|       | A   | 08      | 08       | 20    | 09       | 09   |
|       | B+  | 07      | 03       | 01    | 09       | 09   |
|       | B   | 76      | 03       | 76    | 64       | 70   |
|       |     | 100     | 100      | 100   | 100      | 100  |

1. What is the number of Mobile phones sold in Grade A++ by Bokorola?
  - (a) 100
  - (b) 89
  - (c) 189
  - (d) Cannot be determined
2. In which grade is the total number of mobile phones sold equal to the total number of mobile phones sold by one of the given companies?
  - (a) B
  - (b) A+
  - (c) A
  - (d) A++
3. Based on the figures in the tables related to the Kokia company, what is the ratio of mobile phones across the different grades in the order A++, A +, B+ and B?
  - (a) 22 : 21 : 1 : 25 : 76
  - (b)  $1/22 : 2/21 : 1 : 1/25 : 23/21$
  - (c)  $1/22 : 2/21 : 1 : 1/25 : 76$
  - (d) Cannot be determined
4. If Kokia company sold 55,000 phones in total, what is the total number of phones sold of Grade A++ of all the brands put together?
  - (a) 2500
  - (b) 550
  - (c) 12100
  - (d) Cannot be determined

**Directions for Question 5 to 8:** Answer the questions on the basis of information below.

The bar chart on the next page shows mock tests performance of 2 students Bhavuk and Pulkit while studying for three different sections on the next page CAT- Verbal, Quants, LR ... DI from three different groups of CAT experts. Ratings given to these teachers are C, B and A, with C being the lowest and A being the highest.

The bar chart also gives numbers, which are the percentage marks obtained by Bhavuk and Pulkit in these 3 sections. Each section carries 100 marks. A student always gets integral marks, which are multiples of 5 in each section. For example: If Bhavuk studies all the three sections from a group of teachers such that all 3 have a rating of A, then he scores 85% marks of total marks of the 3 sections put together. In this case, Pulkit scores 90% of total marks of the 3 sections put together and so on.



5. Clearly Bhavuk performs his best when he is taught the 3 sections, all by A rated teachers. However this combination costs him a lot and since he has left his job for CAT preparation he cannot pay that amount anymore. Thus he decided he'd compromise on any one teacher with a lower rating. What is the maximum change (in percentage) his total score will go through due to this decision?

- (a) 5.88%
  - (b) 17.64%
  - (c) 11.76%
  - (d) None of these
6. What is the lowest possible score in any section Pulkit can achieve if he decides to take coaching from all B rated teachers?
- (a) 0
  - (b) 25
  - (c) 75
  - (d) Cannot be determined
7. Combination of teachers is called “manageable” if average score of all 3 sections of Bhavuk and Pulkit is equal to or more than 70% and individual percentage (of all 3 sections per individual) is greater than or equal to 75%. How many combinations from those mentioned are manageable?
- (a) 3
  - (b) 5
  - (c) 6
  - (d) 4
8. A student is inherently smart if his average percentage of percentages of all the possible combinations as mentioned above is greater than or equal to 74%. That is, his performance is 74% on average. Who is inherently smart amongst Bhavuk and Pulkit?
- (a) Only Bhavuk
  - (b) Only Pulkit
  - (c) Both are smart
  - (d) None is smart

**Directions for Question 9 to 12:** Answer the questions on the basis of information below

Ampa Loompa is an ethical hacker and wants to hack computer servers of Internet Cafes to gather logged in users' details. He decides to hack into servers of eight Cafes (Cafe1, Cafe2.....Cafe8) in five areas- Shalimar Bagh, Ashok Vihar, Rohini, Pitampura and Haiderpur. However to start with

*he decided that he'd only fetch the information on the number of visitors in the above-mentioned cafes over a period of 3 days. The tables on the next page provide details of cafes and the areas they belong to.*

9. How many Cafés are there in Haiderpur area?
  - (a) 2
  - (b) 1
  - (c) 7
  - (d) 3
10. Café 1 can belong to which of the following areas?
  - (a) Rohini
  - (b) Pitampura
  - (c) Shalimar Bagh
  - (d) Haiderpur
11. To which area does Café- 2 belong to?
  - (a) Pitampura or Ashok Vihar but not Shalimar Bagh
  - (b) Shalimar Bagh or Rohini but not Haiderpur
  - (c) Shalimar Bagh or Pitampura but not Ashok Vihar
  - (d) Only Pitampura
12. How many of the below listed areas can have 3 cafes?
  - (a) Only Ashok Vihar
  - (b) Only Shalimar Bagh
  - (c) Both Pitampura and Shalimar Bagh
  - (d) None

**Directions for Question 13 to 16:** In Kuwait eleven major oil companies A, B, C, D, E, F, G, H, I, J and K produce all the crude oil. In July 2013 Kuwait produced exactly 1000 tons crude oil. The [Table-A](#) given below gives total oil production of these companies in July 2013. These 11 companies owned by 5 business tycoons Parizad, Qadir, Rahim, Sakib and Taufiq. [Table- B](#) gives the percentage production share of these five business tycoons of total production in July 2013.

### Number of visitors

| AREA          | DAY   |       |       |
|---------------|-------|-------|-------|
|               | Day 1 | Day 2 | Day 3 |
| Shalimar Bagh | 4     | 0     | 0     |
| Ashok Vihar   | 2     | 6     | 0     |
| Rohini        | 2     | 9     | 0     |
| Pitampura     | 4     | 0     | 1     |
| Haiderpur     | 2     | 0     | 7     |

### Number of visitors

| CAFE   | DAY   |       |       |
|--------|-------|-------|-------|
|        | Day 1 | Day 2 | Day 3 |
| Café 1 | 2     | 0     | 0     |
| Café 2 | 4     | 0     | 0     |
| Cafe 3 | 0     | 6     | 0     |
| Café 4 | 0     | 0     | 1     |
| Café 5 | 2     | 0     | 0     |
| Café 6 | 2     | 0     | 7     |
| Café 7 | 4     | 0     | 0     |
| Café 8 | 0     | 9     | 0     |

**Table A**

| Company | Total production (in tons) |
|---------|----------------------------|
| A       | 100                        |
| B       | 80                         |
| C       | 70                         |
| D       | 110                        |
| E       | 70                         |
| F       | 120                        |
| G       | 120                        |
| H       | 140                        |
| I       | 80                         |
| J       | 60                         |
| K       | 50                         |

**Table B**

| Owner   | Percentage share in total production |
|---------|--------------------------------------|
| Parizad | 20%                                  |
| Qadir   | 26%                                  |

|        |     |
|--------|-----|
| Rahim  | 22% |
| Sakib  | 18% |
| Taufiq | 14% |

---

13. Find the difference between the maximum and minimum number of companies which can be owned by Taufiq.
14. If each owner owned more than a single company, then at most how many companies did Parizad own?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) None of these.
15. If Sakib and Taufiq sold all of their companies to Rahim, then find the minimum number of companies owned by Rahim.
16. If each owner owned at least two companies in such a way that no owner owned any two companies with same production quantity, then for how many of the given owners can the companies owned by them be uniquely determined?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 4

## 4

# Mock Test Paper

**Directions for Questions 1 to 5:** Answer the questions on the basis of information below.

The table below shows what Bhavuk observed about the fuel consumption of his bike when he drives from Delhi to Leh via Kurukshetra, Mandi and Debring.

Some more information is given below:

- (a) Whenever Bhavuk fills the bike tank with fuel, he resets the trip meter to zero
  - (b) Range is the distance that the fuel will last, at the current fuel efficiency
  - (c) “Km/L” is the fuel efficiency of Bhavuk’s bike for the distance he covered from the time the trip meter was reset
1. What is the fuel efficiency of Bhavuk’s bike (in Km/L) between Kurukshetra (K) and Mandi (M)?
    - (a) 17.5
    - (b) 20
    - (c) 28
    - (d) Cannot be determined
  2. How much fuel (approximately) was consumed (in L) in the entire trip from Delhi to Leh?
    - (a) 38L
    - (b) 43.5L
    - (c) 53L
    - (d) Cannot be determined

3. How much fuel did the bike start with?
- (a) 50L
  - (b) 40L
  - (c) 53L
  - (d) Cannot be determined
4. If Bhavuk could not find an active fuel station in Kurukshetra because of a bandh called all across Haryana, where should he get his bike refueled next to ensure hassle free ride to Leh?
- Note that Bhavuk gets his bike refueled only from registered fuel stations at the stops mentioned above (D, K, M, Deb and Leh)
  - Mandi, Debring and Leh are not in Haryana and the fuel stations there are active
  - Bhavuk is a miser and likes to refuel only if he thinks that he actually needs to. Every time he stops at a stop, he analyzes his immediate fuel efficiency and calculates if he can leave without refueling and save on money
  - Bhavuk cannot predict his bike's fuel efficiency from the point he is at till the next planned stop
- (a) Mandi
  - (b) Debring
  - (c) Bhavuk did not feel the need to refuel
  - (d) Cannot be determined
5. If stations at Kurukshetra were open, would Bhavuk get refuel done there? (Consider all data from previous question)
- (a) Definitely Yes
  - (b) Definitely No
  - (c) May be Yes, but he can do without it
  - (d) Can't say

| Place           | Distance to Leh<br>(in Km) | Km/L | Range | Fuel filled? |
|-----------------|----------------------------|------|-------|--------------|
| Delhi (D)       | 1000                       |      |       | Yes          |
| Kurukshetra (K) | 860                        | 14   | 560   | ?            |
| Mandi (M)       | 580                        | 21   |       | ?            |
| Debring (Deb)   | 120                        | 23   |       | ?            |

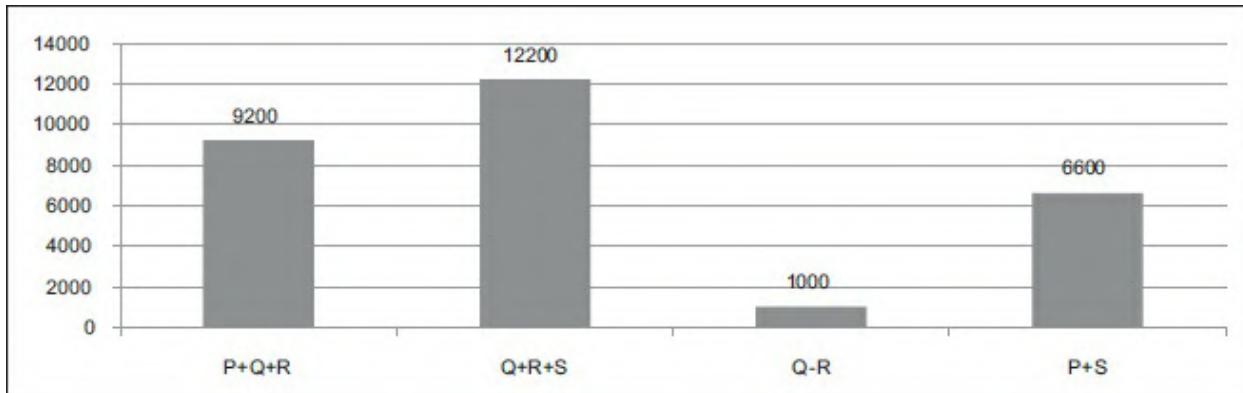
**Directions for Questions 6 to 9:** Answer the questions on the basis of information below.

The Table below provides information about the number of experienced and non-experienced faculty in each of the four MBA coaching institutes- Lime, Mindworkzz, Career Lander and ITS as a percentage of the total number of professors in that institute.

6. What is the number of Non-experienced faculty members in Lime institute?
  - (a) 3200
  - (b) 1600
  - (c) 3000
  - (d) 2800
7. What is the absolute difference between number of experienced faculty members in ITS and non-experienced members in Mindworkzz?
  - (a) 11200
  - (b) 11400
  - (c) 5400
  - (d) 6900

|   | Lime- C- R | Mindworkzz- D- S | Career Lander- B- Q | ITS- A- P |
|---|------------|------------------|---------------------|-----------|
| Percentage of Experienced faculty members     | 80%        | 60%              | 70%                 | 90%       |
| Percentage of Non-experienced faculty members | 20%        | 40%              | 30%                 | 10%       |

Number of Non-experienced faculty members in institutes Lime, Mindworkzz, Career Lander and ITS is R, S, Q, P. Also, the number of experienced faculty members in Lime, Mindworkzz, Career Lander and ITS are C, D, B and A respectively.



8. What is the ratio of the total number of faculty members in Mindworkzz to the number of experienced faculty members in Lime?
- 4:5
  - 3:4
  - 15:16
  - 16:15
9. If ITS shut down due to some reasons, and all faculty members of ITS joined Lime, Mindworkzz and Career Lander in equal number (irrespective of their experience), then number of faculty members in Mindworkzz increased by what percentage?
- 25%
  - 40%
  - 60%
  - 50%

**Directions for Question 10 to 13:** Answer the questions on the basis of the information given below.

| DISH | Cardamom | Milk | Sugar | Gram flour | Saffron |
|------|----------|------|-------|------------|---------|
| A    | 10%      | 40%  |       |            | 10%     |
| B    | 25%      | 15%  | 50%   | 5%         | 5%      |
| C    | 15%      |      | 20%   |            | 35%     |
| D    | 20%      | 25%  | 15%   | 30%        | 10%     |
| E    | 5%       | 50%  | 25%   | 5%         | 15%     |
| F    | 40%      | 10%  | 5%    | 30%        | 15%     |

The following table provides partial information about the composition of six different Gujarati sweet dishes namely- A, B, C, D, E and F. Each of these six dishes contains five ingredients namely Sugar, Milk, Saffron, Cardamom and Gram flour. Another dish- “Gujarati cocktail”, ingredients of which are

*not given in the table, contains dishes A, B and C in the ratio 2:1:3. It is also known that in Gujarati cocktail- Milk, Sugar and Gram flour are present in an equal quantity.*

10. What is the percentage of Gram flour in Dish A?
  - (a) 95/6
  - (b) 92/9
  - (c) 95/3
  - (d) 25/3
11. If a dish X, which contains 15% Saffron, at least 15% Cardamom and at most 20% Gram flour, is to be made, how many combinations of exactly two of the six mentioned dishes can be used to make it?
  - (a) 2
  - (b) 1
  - (c) 3
  - (d) 4
12. Which of the following can be a value of the ratio in which dishes A, E and F need to be mixed to get at least 12% Sugar in the resulting mixture?
  - (a) 1 : 2 : 3
  - (b) 4 : 3 : 5
  - (c) 3 : 2 : 3
  - (d) 4 : 1 : 1
13. If a dish Z, which contains at least 8.25% Saffron, is to be made by using the dishes mentioned in the table, the percentage of dish B in dish Z cannot be more than?
  - (a) 95.46%
  - (b) 83.16%
  - (c) 85.17%
  - (d) 89.16%

**Directions for Questions 14 to 16:** *The state of AmpaZampa consists of 12 districts – all rich in minerals – especially bauxite. In each of the twelve districts, there are a certain number of companies operational in Bauxite mining. The following table gives for each of the 12 districts, the highest*

*production and the least production of any company (in metric tons). It is also known that the production of each company (in metric tons) is a distinct integer and the total production in each of the given district is 100 metric tons. Also, it is known that no two companies produce the same amount of bauxite in any district.*

14. Find the maximum number of districts possible in which there are at least two companies with production greater than 32 metric tons for each company.
15. Find the maximum possible number of districts in which the production of the company with the second highest production could be more than thrice the production of the company with second lowest production?
16. Find the maximum possible number of districts in which less than half the number of companies produce more than half of the total production of the district.

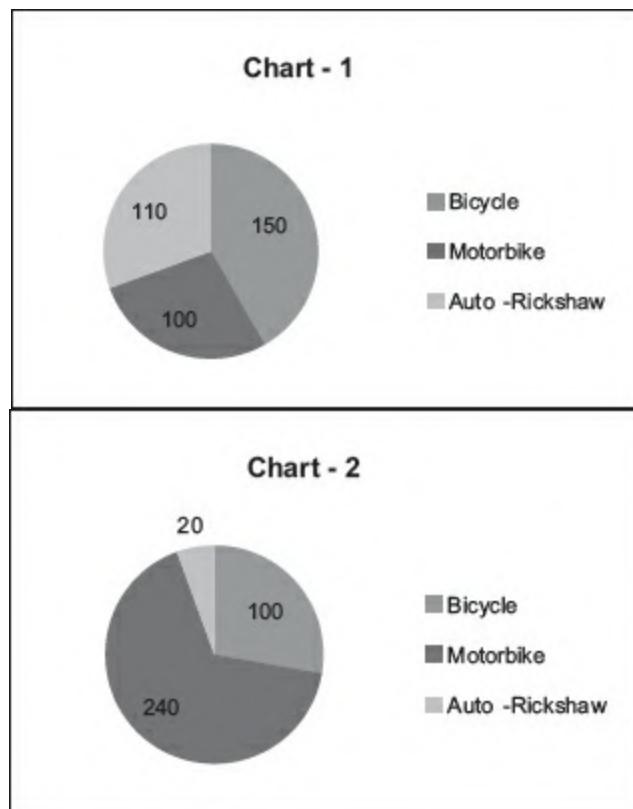
| District | Highest production (in metric tons) | Lowest production (in metric tons) | Number of companies in the district |
|----------|-------------------------------------|------------------------------------|-------------------------------------|
| A        | 30                                  | 8                                  | 6                                   |
| B        | 40                                  | 14                                 | 4                                   |
| C        | 24                                  | 6                                  | 6                                   |
| D        | 32                                  | 16                                 | 4                                   |
| E        | 34                                  | 12                                 | 5                                   |
| F        | 34                                  | 12                                 | 4                                   |
| G        | 30                                  | 8                                  | 5                                   |
| H        | 30                                  | 20                                 | 4                                   |
| I        | 45                                  | 11                                 | 4                                   |
| J        | 35                                  | 9                                  | 5                                   |
| K        | 40                                  | 5                                  | 6                                   |
| L        | 35                                  | 10                                 | 6                                   |

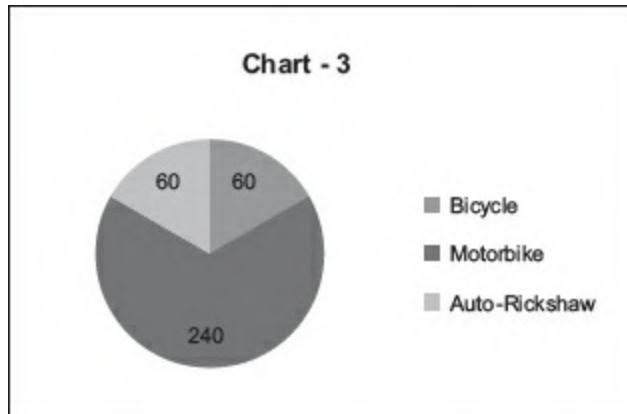
# 5

# Mock Test Paper

**Directions for Question 1 to 4:** Answer the questions on the basis of information below.

Grocers Pvt. Ltd. is a grocery delivery service company that uses three delivery modes for its services- Bicycle, Motorbike and Auto-Rickshaw delivery. Following pie charts show the distribution of Total number of deliveries (Chart- 1), Revenue generated (Chart- 2) and Total cost incurred (Chart- 3) for the mentioned different modes of transport in the year 2015. Assume that only cost involved was that incurred on travel.



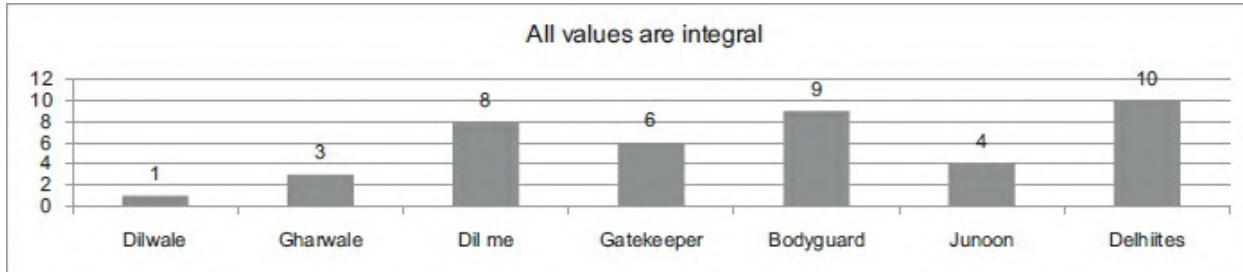


Values represent degrees out of  $360^\circ$ .

1. If Grocers makes 50% profit in the year 2015, what is the profit percentage on deliveries sent by Motorbike?
  - (a) 50%
  - (b) 33.33%
  - (c) 66.67%
  - (d) 240%
2. Through which mode of transport does Grocers make maximum profit in the year 2015?
  - (a) By Auto-Rickshaw
  - (b) By Motorbike
  - (c) By Bicycle
  - (d) Data insufficient
3. Which mode of delivery offers the least Cost of transport per delivery in 2015 for Grocers?
  - (a) Motorbike
  - (b) Bicycle
  - (c) Auto-Rickshaw
  - (d) Data insufficient
4. If the Revenue generated from delivery by Auto-Rickshaw is 10 INR and Cost incurred from delivery by it is 20 INR, what is the ratio of Cost incurred to Revenue generated by delivery on Bicycle?
  - (a) 5/2
  - (b) 2/3
  - (c) 2/5

(d) Cannot be determined

| Name of Person          | Bijoy | Pulkit | Kanu | Sanju | Guddu | Neha | Bhavye | Charu | Shanky | Dimpy |
|-------------------------|-------|--------|------|-------|-------|------|--------|-------|--------|-------|
| No. of movies Not liked | 5     | 4      | 5    | 4     | 1     | 2    | 6      | 7     | 0      | 3     |



**Directions for Question 5 to 8:** Answer the questions on the basis of information below.

Saimukh Khan is one of the biggest actors of Bollywood and has casted in more than 50 Bollywood movies. In 2019 alone, he was casted in 8 movies. In a survey conducted to get the reviews of these 8 movies, 10 people were interviewed. They either Liked or Disliked a movie. These 8 movies were: Dilwale, Gharwale, Dil me, Gatekeeper, Bodyguard, Junoon, Delhiites, Salam Bombay

Additional information:

- The Bar-Chart given provides details about the number of people (10 surveyed) who liked the movies Dilwale, Gharwale, Dil me, Gatekeeper, Bodyguard, Junoon and Delhiites.
- Details about the movie- Salam Bombay is not provided in the chart
- The given table gives the information about the number of movies Not liked by each of the 10 people

5. How many people did not like the movie- Salam Bombay?

- (a) 9
- (b) 2
- (c) 8
- (d) 7

6. Which of the following movies is not liked by Dimpy?

- (a) Salam Bombay
- (b) Delhiites

- (c) Bodyguard  
 (d) Dil me
7. Out of the given 8 movies, how many movies are liked by Pulkit but not by Charu?
- (a) 4  
 (b) 2  
 (c) 3  
 (d) 1
8. Out of the given 8 movies, how many movies are not liked by Kanu but liked by Neha?
- (a) 4  
 (b) 3  
 (c) 5  
 (d) 6

**Directions for Question 9 to 12:** 100 students of five different countries France, UK, USA, India, China participated in an International science Olympiad. In the competition each student took 10 exams of different subjects with a maximum marks of 500 marks for each subject.

It was observed that only 9 students- A, B, C, D, E, F, G, H, I scored 100 or more marks in at least one subject.

**Table-X** gives the detail of number of instances in which a student from the given country scored 100 to 199 marks, 200 to 299 marks, 300 or more.

**Table-Y** gives the detail of number of subjects in which each of these nine students scored 100 or more marks, 200 or more marks, 300 or more marks.

**Table- X:**

| Country / Marks | 100 to 199 | 200 to 299 | 300+ |
|-----------------|------------|------------|------|
| UK              | 1          | 2          | 2    |
| USA             | 3          | 1          | 2    |
| INDIA           | 1          | 2          | 1    |
| CHINA           | 2          | 0          | 1    |
| FRANCE          | 1          | 1          | 2    |

**Table- Y:**

| <i>Student / Marks</i> | <i>100+</i> | <i>200+</i> | <i>300+</i> |
|------------------------|-------------|-------------|-------------|
| A                      | 3           | 2           | 2           |
| B                      | 2           | 2           | 1           |
| C                      | 4           | 3           | 2           |
| D                      | 1           | 1           | 0           |
| E                      | 4           | 2           | 1           |
| F                      | 2           | 2           | 0           |
| G                      | 2           | 1           | 1           |
| H                      | 3           | 1           | 1           |
| I                      | 1           | 0           | 0           |

9. Which of the following student is from India?
- E
  - F
  - B
  - H
10. Out of these nine students, the maximum number of students, belong to which country?
- India
  - USA
  - China
  - UK
11. Which of the following student belongs to the same country as G?
- F
  - B
  - E
  - None of these.
12. How many students (among these nine students) came from France?

**Directions for Question 13 to 17:** A group of 5 students- Pulkit, Qasim, Rahim, Shaan, Tejas participated in the National Science competition 2019. The competition consists of four exams of different subjects- Physics, Chemistry, Biology, Maths.

The tables given below show the marks of all candidate on different subjects ([Table A](#)) and the total marks of all students in a given subject ([Table B](#)).

In [table A](#) each column has two missing values which are the least two

scores on that subject and none of the missing values is more than 10% of the total marks scored by all the candidates together in that subject.

13. The maximum possible marks of Pulkit in Physics is:
  - (a) 34.5
  - (b) 36.5
  - (c) 39.5
  - (d) None of these.
14. What is the maximum possible percentage contribution of Rahim in the total marks obtained by all the students in all the subjects?
  - (a) 19.33
  - (b) 18.51
  - (c) 24.47
  - (d) None of these.
15. If the absolute difference between the total marks obtained by Pulkit and Rahim in the four subjects is the minimum possible, then what is the absolute difference between the total marks obtained by Qasim and Tejas?
16. The student with the highest total marks in all the four subjects got the 1st rank and the student with the lowest total marks got 5th rank and it is known that no two students got the same number of total marks. What rank did Pulkit get?
  - (a) 1st
  - (b) 2nd
  - (c) 3rd
  - (d) cannot be determined
17. In the previous question what rank did Qasim get, if his total score in all the four subjects is a prime integer?

---

**Table A:** Students and their scores on different subjects.

| Student | Physics | Chemistry | Biology | Math |
|---------|---------|-----------|---------|------|
| Pulkit  |         | 150       |         | 79.5 |
| Qasim   | 132     | 97.5      |         | 78   |
| Rahim   |         |           | 165     |      |
| Shaan   | 108     | 112.5     | 30      | 84   |
| Tejas   | 90      |           | 117     |      |

---

**Table B**

| <i>Subject</i> | <i>Combined score of all students</i> |
|----------------|---------------------------------------|
| Physics        | 405                                   |
| Chemistry      | 450                                   |
| Biology        | 360                                   |
| Math           | 300                                   |

# 6

# Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the data given below ([Table 1.1](#)) and answer the questions that follow:

The Management entrance scenario has undergone a drastic change in the last 200 years. In the current year (2222) an MBA course is essentially a six year course consisting of MBA 1, MBA 2, MBA 3, MBA 4, MBA 5, and Internship Year (following which students pass out of their B Schools).

[Table 1.1](#) gives the number of students in Indian School of Management, Ahmedabad in each year of the MBA program. The years are 2222 and 2223 respectively.

Entrance examinations being very tough (an estimated 23 lac students appeared for the entrance in 2221), the school only admits students in MBA 1 and no student leaves the B-School without passing out through his internship program. Students who fail have to repeat the year completely, and are only promoted if they satisfactorily pass their exams.

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**Table 1.1**

| Class               | Students in the year 2222 | Students in the year 2223 |
|---------------------|---------------------------|---------------------------|
| MBA 1               | 360                       | 420                       |
| MBA 2               | 252                       | 300                       |
| MBA 3               | 216                       | 210                       |
| MBA 4               | 192                       | 180                       |
| MBA 5               | 144                       | 168                       |
| MBA Internship Year | 108                       | 162                       |

1. If no student of MBA 5 failed in the year 2222, then what is the pass

percentage of MBA Internship Year for the year 2222?

- (a) 22.66%
  - (b) 16.66%
  - (c) 83.33%
  - (d) 77.77%
2. If the new joiners in the year 2223 were 228, then the number of students failed in MBA Internship Year in the year 2222?
- (a) 30
  - (b) 42
  - (c) 24
  - (d) 48
3. How many students of MBA 3 failed in the year 2222, if no student of MBA 5 failed in the year 2222?
- (a) 36
  - (b) 24
  - (c) 30
  - (d) None of these
4. If 192 students of MBA 1 failed in the year 2222, then what is the total number of students who failed in the year 2222?
- (a) 450
  - (b) 546
  - (c) 585
  - (d) 492

**Directions for Questions 5 to 8:** Refer to the data given below ([Table 1.2](#)) and answer the following questions:

Six friends Arun, Barun, Charan, Deep, Ela, and Faiz play a Unique game every Sunday. Each of them started with some initial no. of Marbles. In each round every player transacted marbles with exactly one person. At the end of the 5<sup>th</sup> round it was observed that each person had exchanged marbles with every other person. Refer to [table 1.2](#) on the next page and answer the questions that follow:

5. For how many rounds is it not possible to find all the pairs who

transacted?

- (a) 5
  - (b) 4
  - (c) 3
  - (d) 0
6. With whom did Faiz exchange marbles in the last round?
- (a) Deep
  - (b) Ela
  - (c) Barun
  - (d) Either Barun or Deep
7. In the 5<sup>th</sup> round, if those who transacted with Charan and Deep gave them half the numbers of the marbles they had with them, then what would be the difference between the number of marbles of Charan and Deep?
- (a) 35
  - (b) 20
  - (c) 30
  - (d) 2
8. With whom did Arun transact with in the fourth round?
- (a) Deep
  - (b) Barun
  - (c) Faiz
  - (d) Charan

---

**Table 1.2**

|  | <i>Arun</i> | <i>Barun</i> | <i>Charan</i> | <i>Deep</i> | <i>Ela</i> | <i>Faiz</i> |
|--|-------------|--------------|---------------|-------------|------------|-------------|
| Initial No. of Marbles                             | 160         | 130          | 150           | 180         | 150        | 200         |
| No. of Marbles at the end of 1 <sup>st</sup> round | 140         | 150          | 180           | 160         | 170        | 170         |
| No. of Marbles at the end of 2 <sup>nd</sup> round | 150         | 140          | 190           | 190         | 140        | 160         |
| No. of Marbles at the end of 3 <sup>rd</sup> round | 170         | 130          | 170           | 200         | —          | 150         |
| No. of Marbles at the end of 4 <sup>th</sup> round | 180         | 120          | 180           | 190         | —          | 170         |
| No. of Marbles at the end of 5 <sup>th</sup> round | —           | —            | —             | —           | —          | —           |

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**Table 1.3**

|             | Cyclist I | Cyclist II | Cyclist III | Cyclist IV | Final Standing |
|-------------|-----------|------------|-------------|------------|----------------|
| National    | 52.27     | 48.55      |             | 55.00      |                |
| Loreto      | 53.43     | 45.29      | 55.45       | 44.77      | 5              |
| Colvin      | 43.35     |            |             | 48.50      |                |
| Taluqdars   |           |            |             |            |                |
| St. Francis | 46.79     |            | 44.63       | 50.06      |                |
| St. Fidelis | 43.40     |            |             | 44.91      |                |
| St. Anthony | 51.40     | 45.27      | 44.56       |            |                |

**Directions for Questions 9 to 12:** Refer to the data given ([Table 1.3](#)) and answer the following questions:

In a cycle rally in the international Interschool Games, six schools from the Indian city of Lucknow participated.

There are 4 cyclists from each team and cyclists are given penalty points based on their timings in the race. The performance of some of the four players of all six teams is given in the table along with some missing values. The final standings of a team are considered on the basis of the sum of the penalty points earned by all 4 players. The team which gets the least penalty points wins the rally.

Cyclist I of National gets 52.37 penalty points, while Cyclist II of National in turn gets 48.45 penalty points & so on. Following additional informations are also known:

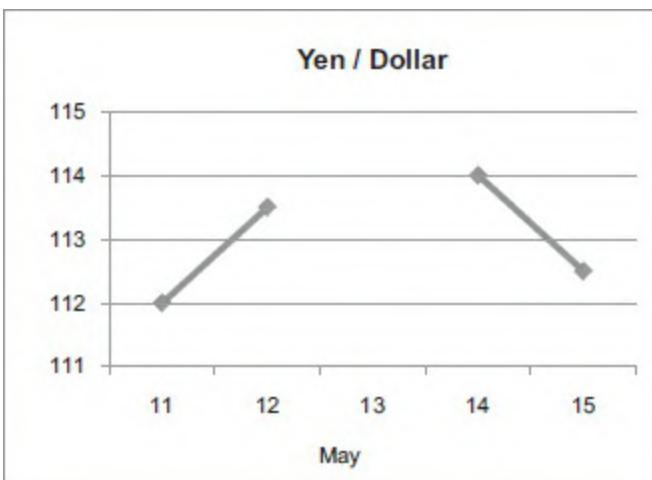
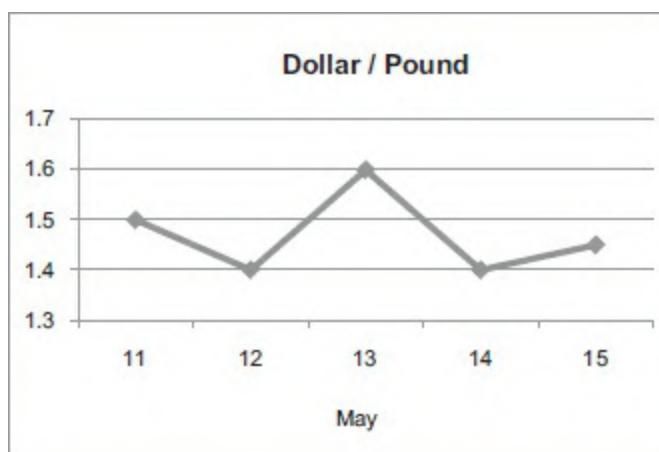
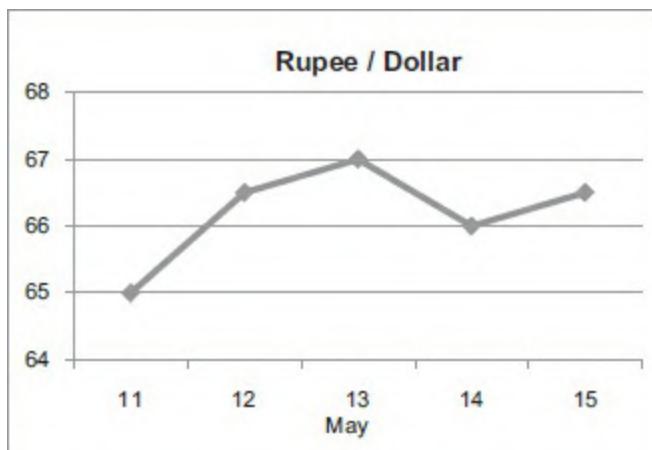
1. Before this tournament, the International Inter games record of 400 metres was 43.19 penalty points.
2. Before this tournament, the Team Record for the rally was 178.21 penalty points combined for all 4 members of a team.
3. None of the cyclists of any team got less than 40.15 penalty points.
4. The worst score (maximum penalty points) in this event is recorded by Cyclist III of Loreto.
5. There is no tie (same penalty points) between any 2 teams for the complete race.
9. If St. Fideles secured 6<sup>th</sup> and Colvin Taluqdars secured the 4<sup>th</sup> place in the overall standings, then what can be said about these statements?

**Statement I:** At least 1 Cyclist breaks the individual record in this event.

**Statement II:** At Most 3 Cyclists break the individual record in this event.

- (a) I is true while II is false
  - (b) II is true while I is false
  - (c) Both I and II are false
  - (d) Both I and II are true
10. If two of the teams managed to break the team record, then what can be said about these statements?
- I. At least 1 Cyclist of Colvin Taluqdars breaks the individual record for the rally.
  - II. 1 Cyclist of St. Fideles breaks the individual record for the rally.
- (a) I is true while II may be true
  - (b) II is true while I may be true
  - (c) Both I and II are false
  - (d) Both I and II are true
11. If St. Anthony's secured the first position in the event where Cyclist IV of St. Anthony gets 44.30 penalty points, then what can be the maximum number of cyclists (of all 6 teams) who can break the individual record mentioned above?
- (a) One
  - (b) Two
  - (c) Three
  - (d) Four
12. If St. Francis secured the first place with Cyclist II of St. Francis getting 43.16 penalty points and was the only Cyclist to break the individual record of 400 meters in all the 6 teams then which of the following statements is definitely false?
- (a) St. Fideles secured Second Place
  - (b) St. Anthony secured Second Place
  - (c) Colvin Taluqdars secured Fourth Place
  - (d) National secured Third Place

**Directions for Questions 13 to 17:** Refer to the following charts and solve the questions based on them: Following charts show currency ratio from 11th May to 15th May



Conversion ratio of Yen/Dollar on 13<sup>th</sup> May is NOT mentioned deliberately.

If needed, let the currency symbols be \$ for dollar, INR for Indian Rupee, ¥ for Yen and £ for Pound

13. On May 14<sup>th</sup>, how much Yen did INR 4,000 yield approximately?

(Rounded off to nearest integer)

- (a) 6020
- (b) 6910
- (c) 2316
- (d) 30096

14. On 15<sup>th</sup> May, Bhavuk went to a local market in Los Angeles, USA and liked a watch worth \$ 300. Being a frequent traveler, he carries different currencies of different amounts on him. For now, he only has INR 19,500; £ 200 and ¥ 34,250 on him. Being in a local market, the shopkeeper there won't agree on accepting any foreign currency, however with relentless effort Bhavuk could convince him to sell the watch in a single foreign currency for this transaction. What currency would Bhavuk offer to buy this watch in? Consider currency exchange charges as NIL for this question and the fact that the shopkeeper gets the received currency exchanged for dollars on the same day.
- (a) Yen
  - (b) Pound
  - (c) Indian Rupee
  - (d) Bhavuk cannot buy this watch with a single currency
15. If Bhavuk had visited this market on 13<sup>th</sup> May, which currency would he have offered to buy this watch in?
- (a) Yen
  - (b) Pound
  - (c) Indian Rupee
  - (d) Cannot be determined
16. China, which has Yen as its official currency, learnt that the Yen is overvalued in global markets. Thus on 16<sup>th</sup> May it depreciated its currency by 2.22% of its value on 15<sup>th</sup> May against the dollar as a measure to boost exports. How many dollars will 56000 Yen yield on 16<sup>th</sup> May? (Rounded off to nearest Integer)

**Note:** When a currency is depreciated, it gets cheaper and you can buy more of that currency against another currency now.

- (a) 487

- (b) 500
  - (c) 467
  - (d) 115
17. By what percent did the Indian Rupee appreciate/depreciate against Yen on 16<sup>th</sup> May over 15<sup>th</sup> May after the devaluation measure taken by China for Yen?
- Given that fluctuation of Indian Rupee was negligible on 16<sup>th</sup> May.
- (a) 2.22% appreciated
  - (b) 2% depreciated
  - (c) 2.22% depreciated
  - (d) 4.44% appreciated

## 7

# Mock Test Paper

**Directions for Questions 1 to 5:** Refer to the data given below (Table 1.1) and answer the questions that follow:

Praveen Kumar Tiwari has a factory which manufactures Kryptonite, Arsonite, and Liptonite. All these are manufactured by processing Ramena 55. Kryptonite requires 2 kg/unit, Arsonite requires 4 kg/unit, and Liptonite requires 5 kg per unit of Ramena 55, which costs ₹4 per kilogram. The total availability of Ramena 55 is 700 kilograms. The processing is done on a machine having a production capacity of 324 hours per month in the day shift and 364 hours per month in the night shift. The time required per unit production for each product is different for each shift and is as follows:

**Table 1.1**

| Product    | Day Shift | Night Shift |
|------------|-----------|-------------|
| Kryptonite | 4 hours   | 5 hours     |
| Arsonite   | 6 hours   | 8 hours     |
| Liptonite  | 2 hours   | 3 hours     |

The machine costs ₹2 per hour.

The sales price for Kryptonite, Arsonite, and Liptonite are ₹16 per Unit, ₹24 per Unit, and ₹7 per Unit respectively. At least 50 units of Kryptonite have to be produced and at the most 150 units of Liptonite can be produced.

1. Which of the following is possible?

- (a) 75 units of Kryptonite, 4 units of Arsonite in day shift, manufacture 40 units of Arsonite I and 40 units of Liptonite and 10 units of Kryptonite in night shift.

- (b) 75 units of Kryptonite I, 4 units of Arsonite I, in the day shift, manufacture 40 units of Arsonite and 40 units of Liptonite and 5 units of Kryptonite in night shift.
  - (c) 74 units of Kryptonite I, 4 units of Arsonite in day shift, 25 units of Arsonite I, and 10 units of Liptonite and 20 units of Kryptonite in night shift.
  - (d) 74 units of Kryptonite I, 5 units of Arsonite in day shift, 40 units of Arsonite I, 10 units of Liptonite and 30 units of Kryptonite in night shift.
2. What percentage of the available raw material is utilised if 100 units of Kryptonite, 40 units of Arsonite, and 10 units of Liptonite are produced?
- (a) 50%
  - (b) 58%
  - (c) 68%
  - (d) 78%
3. If Praveen Kumar Tiwari spends initially 300 machine hours in the day shift to manufacture Liptonite, 20 hours to manufacture Kryptonite, and in the night shift manufactures 53 units of Liptonite and spends the rest of the night shift to manufacture Kryptonite. What will be his profit/loss?
- (a) loss of ₹ 65
  - (b) profit ₹ 65
  - (c) loss of ₹ 165
  - (d) This manufacturing pattern is not possible
4. If the minimum possible manufacturing requirement for Kryptonite is met and the remaining raw material is utilised for the manufacture of the other 2 products then
- (a) 10 units of Arsonite can be manufactured
  - (b) 0 units of Arsonite can be manufactured
  - (c) 5 units of Arsonite can be manufactured
  - (d) Any of these
5. If in the day shift, 65 units of Kryptonite, 4 units of Arsonite, 15 units of Liptonite and in the night shift 20 units of Arsonite, 40 units of

Liptonite and 10 units of Kryptonite are manufactured then which of the following is true?

- I. 5 hours of machine time is unutilised
  - II. Total cost of production is ₹ 540
  - III. More than 20% of the available raw material is unutilised
- (a) Only I
  - (b) Only II
  - (c) I and III
  - (d) Only III

**Directions for Questions 6 to 8:** Refer to the data given below and answer the following questions.

Two jewellers (a British and an American) go to buy newly designed weights from the trade fair. In the shop they visit, the salesman asks their limits of weighing at a time. Both of them tell the salesman that their limit of weighing required is 120 grams at a time and also mention that they are required to measure jewellery in such a way that the number is always an integer. The salesman shows them the price list as:

Any weight less than and including 10 grams—\$10 per piece

More than 11 grams but less than 50 grams—\$ 20 per piece

More than 51 grams but less than 100 grams—\$ 30 per piece. More than 100 grams \$ 50 per piece.

The two jewellers, however, have a difference in their requirements in the sense that the British has a weighing scale which allows him to put weights on both sides of the scale.

For example: If one wants to measure a weight of 7 grams, then you could put 10 grams on weight side and put 3 grams on the goods side.

However, the American shopkeeper does not have this facility in the weighing balance that he uses and hence, needs to put the weights only on the weight side and cannot put any weight on the goods side.

6. What is the minimum number of weights the British jeweller would require to purchase so that he incurs the least cost of purchase?
- (a) 8
  - (b) 10

- (c) 5  
(d) 4
7. If the American jeweller has to buy weights, what is the minimum number of weights he would need to buy at the lowest cost so that he is able to satisfy his requirements?
- (a) 5  
(b) 7  
(c) 10  
(d) 8
8. One of them needed as much more amount as the other has left after purchase. Suppose both of them left their home with the same amount. Who borrowed and what amount was borrowed?
- (a) British Jeweller borrowed \$ 30  
(b) American jeweller borrowed \$30  
(c) American jeweller borrowed \$ 15  
(d) None of these

**Directions for Questions 9 to 12:** Refer to the data given below ([Table 1.2](#)) and answer the following questions :

The Indian Premier League is a hockey tournament organised every year on the lines of its more famous counterpart— The IPL cricket league. There are five teams in the IPL hockey tournament. Delhi Daredevils, Chennai Superkings, Mumbai Indians, Kolkata Knight Riders, and Kings Eleven Punjab. In the year 2017, the IPL was keenly contested and fought. The following data gives the results of that tournament.

The tournament is played as a round robin league where in each team plays each other exactly twice on a home and away basis. Table 1.33 gives us information about the results of the first leg of matches.

Here, Chennai Superkings 4-2 means Chennai Superkings scored 4 goals and the other team 2 goals.

The winning team gets 3 points and if the game is a draw, then both the teams get 1 point each. Losing teams do not get any points. The team with maximum number of points at the end of the tournament wins the cup.

Also, team performance ratio is defined as the ratio of the number of

*goals for to the number of goals against. Lesser the ratio, lower the performance.*

---

**Table 1.2**

|    |                             | 3–1 | 2–0 | 1–1 | 4–2 |
|----|-----------------------------|-----|-----|-----|-----|
| 1. | Chennai Superkings (CSK)    |     |     |     |     |
| 2. | Mumbai Indians (MI)         | 1–0 | 0–2 | 1–3 | 1–1 |
| 3. | Kolkata Knight Riders (KKR) | 3–1 | 2–2 | 1–2 | 1–1 |
| 4. | Kings Eleven Punjab (KEP)   | 1–3 | 1–1 | 2–2 | 1–1 |
| 5. | Delhi Daredevils (DD)       | 1–1 | 0–1 | 2–1 | 2–4 |

9. The only match that Delhi Daredevils had drawn was with
  - (a) Mumbai Indians
  - (b) Chennai Superkings
  - (c) Kolkata Knight Riders
  - (d) Kings Eleven Punjab
10. The only match which KEP lost was with
  - (a) Chennai Superkings
  - (b) Mumbai Indians
  - (c) Delhi Daredevils
  - (d) Kings Eleven Punjab
11. In terms of performance ratio which is the worst team
  - (a) Chennai Superkings
  - (b) Mumbai Indians
  - (c) Kings Eleven Punjab or Delhi Daredevils
  - (d) Chennai Superkings or Mumbai Indians
12. In the second leg of the tournament, what is the minimum number of matches to be played in order for the team second in standing, to take over the 1<sup>st</sup> ranked team pool?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5

**Directions for Questions 13 to 16:** Answer the questions on the basis of information given below:

10 contestants namely Ashok, Bilal, Chetan, Danish, Esha, Fatima, Garima, Hatim, Imran, Jai contested for the post of President of. In Round 1, if any candidate gets more than 50% of the total number of votes cast in that round, he/she is declared the winner, else top five candidates based on number of votes move to Round 2. In Round 2, if any candidate gets more than 50% of the total number of votes cast in that round, he/she is declared the winner, else top three candidates based on number of votes move to Round 3. In Round 3, the candidate who gets the maximum number of votes out of total votes cast in that round is declared the winner.

Also note that-

1. In any round, no two candidates get the same number of votes.
2. Total number of votes cast in any round is independent of the votes cast in other rounds i.e. total number of votes cast in these 3 rounds may/may not be different.

Table below shows number of votes received by these 10 candidates in Round 1 of the election.

| Name of Candidate | Number of votes received in Round- 1 |
|-------------------|--------------------------------------|
| Ashok             | 4501                                 |
| Bilal             | 4523                                 |
| Chetan            | 4499                                 |
| Danish            | 4498                                 |
| Esha              | 4300                                 |
| Fatima            | 4651                                 |
| Garima            | 4444                                 |
| Hatim             | 4455                                 |
| Imran             | 4419                                 |
| Jai               | 5000                                 |

13. If 45000 votes were cast in Round- 2, then the value of the sum of the number of votes received by the candidate who got the maximum votes and the number of votes received by the candidate who got minimum votes in that round could not be less than:
14. If the winner was decided after Round 3 and 20,000 votes were cast in

each of Round 2 and Round 3, then total number of votes received, in the three rounds put together, by a candidate who was not the winner could not be more than:

- (a) 24999
  - (b) 25000
  - (c) 0
  - (d) 45000
15. If 48000 votes were cast in Round 2 and 51000 votes were cast in Round 3, then the total number of votes received, in the three rounds put together, by the candidate who won the election could not be less than:
- (a) 21303
  - (b) 21502
  - (c) 21301
  - (d) 37300
16. The number of votes received, in all the 3 rounds put together, by a candidate who reached Round 3 but did not win the election could not be less than:
- (a) 4300
  - (b) 4302
  - (c) 4501
  - (d) 8097

# 8

# Mock Test Paper

**Directions for Questions 1 to 2:** Refer to the data given below and answer the following questions:

A certain perfume is available at a duty-free shop at the Bangkok international airport.

It is priced in the Thai currency Baht but other currencies are also acceptable.

In particular, the shop accepts Euro and US Dollar at the following rates of exchange:

US Dollar 1 = 41 Bahts

Euro 1 = 46 Bahts

The perfume is priced at 1040 Bahts per bottle. After one bottle is purchased, subsequent bottles are

available at a discount of 30%. Three friends Shaurya, Raghav, and Nehal together purchase three bottles of the perfume, agreeing to share the cost equally. Raghav pays 4 Euros, Nehal pays 8 Euros and 54 Thai Bahts, and Shaurya pays the remaining amount in US Dollars.

1. How much does Nehal owe to Shaurya in US Dollars?

- (a) 6
- (b) 8
- (c) 10
- (d) 12
- (e) 18

2. How much does Raghav owe to Shaurya in Thai Baht?

- (a) 856
- (b) 716

- (c) 668
- (d) 648
- (e) 632

**Directions for Questions 3 to 7:** Refer to the data given below and answer the following questions

Three friends Aishwarya, Bebo, and Chiranjeevi together have 25 marbles together, when they go to a fair. Aishwarya has 10 marbles and Chiranjeevi has one more marble than Bebo. Mithilesh is a magician who has the ability to change the number of marbles that any person gives him by putting the marbles into his hat. This he does by making them undergo one of 4 distinct processes- He either halves (PROCESSNAME-DIVIDE BY 2), doubles (PROCESSNAME-MULTIPLY BY 2), triples (PROCESSNAME-MULTIPLY BY 3) or quadruples (PROCESSNAME-MULTIPLY BY 4) the number of marbles. In the game which consists of three consecutive rounds, each of Aishwarya, Bebo, and Chiranjeevi puts marbles in the hat of the magician in each of the 3 consecutive rounds.

You know the following additional things about the game:

- 1) In every round, the process on the marbles of the friends is different i.e. in any particular round, no two friends can have their marbles halved. The same rule applies to other processes of doubling, tripling or quadrupling also.
- 2) In no two rounds can any person have the same process done on his marbles. For example, if the process DIVIDE BY 2 is used with Aishwarya in the first round, then in subsequent rounds the DIVIDE BY 2 process cannot be used again for Aishwarya. The same rule applies to each of the other processes (viz: MULTIPLY BY 2, MULTIPLY BY 3, ... MULTIPLY BY 4).

An observer to the game also points out to you, "At any point in the game the number of marbles with any friend lies between 5 and 100 (both inclusive)." It is also known that each of the friends puts in all the marbles he had in the hat of the magician in each round.

3. How many combinations of processes on Aishwarya's marbles in the three rounds, will lead to the minimum possible number of marbles

with Aishwarya at the end of the game?

- (a)  $2! * 2$
  - (b)  $3!$
  - (c)  $0!$
  - (d)  $2!$
4. What can be the highest total number of marbles with all the three friends in the second round of the game?
- (a) 78
  - (b) 88
  - (c) 68
  - (d) 98
5. At the end of the game, what is the absolute difference between the maximum possible marbles with Aishwarya to minimum possible number of marbles with Chiranjeevi?
- (a)  $2!.3$
  - (b)  $3!.2$
  - (c)  $3!$
  - (d) 16
6. What can be the lowest total number of marbles with all the three friends at the end of the game?
- (a) 58
  - (b) 75
  - (c) 25
  - (d) 102
7. At the end of the game, what is the ratio of maximum possible number of marbles with Chiranjeevi and Bebo combined to the minimum possible number of marbles with Aishwarya?
- (a)  $2 : 1$
  - (b)  $4 : 1$
  - (c)  $5 : 2$
  - (d)  $3 : 1$

**Directions for Questions 8 to 12:** Refer to the data given below and

*answer the following questions:*

*International paper sizes table: The ‘A’ series is based on A0 (841 × 1189 mm) which is equivalent to a square metre in area, and each smaller size A1, A2, etc. is equal to half the area of the preceding larger size.*

| Size | Millimetres |
|------|-------------|
| 2A   | 1189 x 1682 |
| A0   | 841 x 1189  |
| A1   | 594 x 841   |
| A2   | 420 x 594   |
| A3   | 297 x 420   |
| A5   | ___ x ___   |
| A6   | ___ x ___   |
| A7   | ___ x ___   |
| A8   | ___ x ___   |
| A9   | ___ x ___   |
| A10  | 26 x 37     |

*‘C’ series is the series of envelopes or folders suitable for enclosing stationery in the A sizes.*

| Size | Millimetres |
|------|-------------|
| C3   | 324 x 458   |
| C4   | 229 x 324   |
| C5   | ___ x ___   |
| C6   | ___ x ___   |
| C7   | ___ x ___   |
| DL   | 110 x 220   |

*Based on the above, answer the following:*

8. What is the size of A8 papers?
  - (a)  $105 \times 210$
  - (b)  $52 \times 74$
  - (c)  $74 \times 26$
  - (d)  $26 \times 52$
9. 8 sheets of A1 paper is cut into A9 size papers. How many A9 papers can be obtained?

- (a) 1024
  - (b) 64
  - (c) 128
  - (d) 2048
10. In the envelop of size C3 how many type of different size papers of series A0 ( $841 \times 1189$  mm) can be placed without folding the paper :
- (a) 6
  - (b) 7
  - (c) 8
  - (d) 9
11. What is the size of the C6 envelop?
- (a)  $55 \times 110$
  - (b)  $55 \times 81$
  - (c)  $81 \times 114$
  - (d)  $114 \times 162$
12. The approximate sum of areas of all different papers equal to or larger than A9 is?
- (a)  $37 \times 52 \times [2^{11}-1]$
  - (b)  $37 \times 52 [2^{10}-1]$
  - (c)  $37 \times 52 \times [2^9-1]$
  - (d)  $37 \times 52 [2^8-1]$

**Directions for Question 13 to 16:** Answer the questions on the basis of information below.

*Liverpool, Chelsea, ManU, Real Madrid, Arsenal and ManCity take part in European Football League. In the first round, each team plays each of the other teams exactly once. At this stage 2 points are awarded for a win, 1 point for a draw and 0 points for a loss. After all the matches are played, the top 2 teams, in terms of points scored advance to Finals.*

In case 2 or more teams end up with same number of points, the team with a better goal difference/better performance is placed higher

13. The total number of matches played in the tournament is:
14. What is the minimum number of points with which a team can

advance to finals?

15. What is the maximum number of points that can be scored by a team, which failed to advance to the finals?
16. What is the maximum number of points a team can score in order to win the tournament?

# 9

# Mock Test Paper

**Directions for Questions 1 to 3:** Refer to the data given below and answer the following questions :

The captain of a ship played a trick on the sailors. He claimed that he can predict the future. He has three caskets with him and in each casket there are three plates with a single non-zero digit inscribed on each plate. No two plates have the same number and no casket contains two plates with digits totaling ten. Further, the total of three cards in the first casket is greater by two than the total in the second casket and by four than that of third casket. When any sailor asks for his prediction, the captain tells him to randomly pick a plate from the three caskets. Before making the prediction, the captain totals the digits on the three plates and charges the same amount from the sailor. On a day sailor paid seven rupee for his prediction.

1. What is the lowest payment possible?
  - (a) ₹ 5
  - (b) ₹ 7
  - (c) ₹ 6
  - (d) ₹ 8
2. What is the maximum possible amount that anyone can pay?
  - (a) ₹ 22
  - (b) ₹ 23
  - (c) ₹ 24
  - (d) ₹ 25
3. Which of the following payments can never be made by any customer?
  - (a) ₹ 19
  - (b) ₹ 16

- (c) ॥ 17
- (d) ॥ 23

**Directions for Questions 4 to 8:** Refer to the data given below ([Table 1.1 \(a\)](#)) and answer the following questions:

In an Inter School meet six schools from a city participated in “PIN POCKET TOURNAMENT” where in only one candidate from each school participated in the tournament. The rules of the game are as follows:

In the game ‘PIN POCKET’ ten different coloured balls are used to play on board with six pockets. If a Player manages to pocket a ball in any of these pockets then such a shot is known as G-Pots. If a Player manages to pocket 2 balls then it is said that he has made 2- G- Pots. A player uses a stick to pocket the balls in G-Pot.

[Table 1.1\(a\)](#) shows the number assigned to different color balls.

Special feature of this game is that balls are further hit in a particular sequence by the first ball depending upon the number of the ball which is hit first. Sequences are given as follows:

1. If a Prime numbered ball is hit first, then all prime numbered balls are hit in an increasing sequence followed by balls which are numbered in a sequential order. For example: If ball number 13 is hit first then it follows the sequence 13-17-19-11-12-14-15-16-18-20.
2. If a composite numbered ball is hit first, then balls with a composite number are hit first in an increasing sequential order For example: If ball number 16 is hit first then the sequence followed is: 16-18-20-12-14-15-17-19-11-13
3. The ball numbered 11 has a special property. If the ball numbered 11 is hit first then all balls with a number which are a perfect square, or a perfect square +1 or a perfect square -1 are hit first in an increasing order, followed by balls numbered in an increasing sequential order from the last number hit.

**Example:** If the first ball hit is 11 then the sequence followed is: 11-15-16-17-18-19-20-12-13-14.

A player scores points in this game depending upon the number of the balls he has hit and the balls he is able to pocket in any of the 6 G-Pots. Total

points scored by a player is the sum of the number of the balls he managed to hit plus the bonus points of ball numbers which he manages to pocket in the G-Pot. Suppose that he hits ball number 15 first and a total of 5 balls (i.e. sequence of balls would be 15-16-18-20-12. Further he managed to pocket ball number 18 and 20 in G-Pot. Then total points scored by that player =  $15+16 + 18+18+ 20+20+12 = 119$  points.

**Table 1.1 (a)**

| Blue | Black | Pink | Yellow | Green | Purple | Indigo | White | Violet | Red |
|------|-------|------|--------|-------|--------|--------|-------|--------|-----|
| 11   | 12    | 13   | 14     | 15    | 16     | 17     | 18    | 19     | 20  |

**Table 1.1 (b)**

| Player's Name | 1 <sup>st</sup> ball hit | Number of G-Pots made | G-Pot Number | Ball | Total hit | balls | Total | Points |
|---------------|--------------------------|-----------------------|--------------|------|-----------|-------|-------|--------|
| Rahul         | 12                       | 1                     | 15           |      | 4         |       |       |        |
| Tarun         |                          | 2                     |              |      | 2         |       | 56    |        |
| Akhil         | 14                       | 2                     |              |      | 5         |       | 97    |        |
| Samar         | 18                       | 2                     | 12,?         |      | 5         |       | 106   |        |
| Ritesh        | 11                       | 1                     |              |      | 10        |       | 168   |        |
| Mahim         | 11                       | 2                     | 19,?         |      |           |       | 188   |        |

In the above example, first ball hit is ball number 15, Number of G-Pots made is 2, G -Pot ball numbers are 18 and 20. Total balls hit is 5 and total points scored is the sum of number of balls hits and balls among them which are pocketed (G-pot) as bonus points.

A player is given only one chance to hit the ball and he can hit a maximum of 10 balls which are on board. [Table 1.1 \(b\)](#) given below shows the overall performance of the players in a tournament of ‘PIN POCKET’. A player cannot G-pot a ball more than once.

4. Which of the following ball can be G-pocketed twice considering the overall performance of six players in the tournament?
  - (a) Blue
  - (b) Black
  - (c) Violet
  - (d) Pink
5. Which of the following balls do maximum number of players in the tournament hit?

- (a) White
  - (b) Red
  - (c) Pink
  - (d) Green
6. What is the sum of the total points scored by all six players excluding the person whose name begins and ends with the same alphabet?
- (a) 509
  - (b) 489
  - (c) 499
  - (d) Indeterminable
7. What is the colour of the second ball that Mahim has potted?
- (a) Green
  - (b) Indigo
  - (c) White
  - (d) Yellow
8. What is the difference between the total points between the second highest scorer and the second lowest scorer?
- (a) 90
  - (b) 92
  - (c) 96
  - (d) 71

**Directions for Question 9 to 12:** Answer the questions on the basis of the information given below.

The following table shows business details of a company Grocers Pvt. Ltd.

9. If the salary of each “Inventory- Online” employee is increased by 50%, what is the new margin percentage of Grocers? (All other factors remain same)
- (a) 60.25%
  - (b) 54.40%
  - (c) 66.10%
  - (d) Cannot be determined

10. If the annual salary of a Services Online employee is made equal to a Services on Call employee, on call, what is the percentage increase/decrease in Services- online margin?
- (a) 80%
  - (b) 20%
  - (c) 60%
  - (d) Cannot be determined
11. If in each sub division, annual sales increases by 15%, what is the new profit of the company approximately, in crore INR? (Assume that margin remains same)
- (a) 12.05
  - (b) 14.77
  - (c) 13.8
  - (d) 10.09
12. Due to increasing orders each day on Grocers, a new division- “Phone requests” was introduced that’d take care of customer issues on phone. This division will also generate revenue (sales) by charging the customer for the call made to Grocers. If the margin is set to be at 10% and Annual Sales are estimated to be 10 Lakh INR, what should be the salary of each employee in Phone requests division if it is decided to employ 10 employees in this division?
- (a) 10,000 INR
  - (b) 1,000 INR
  - (c) 100 INR
  - (d) Cannot be determined

**Directions for Question 13 to 17:** Answer the questions on the basis of information below.

128 players participate in the Australian Open Tennis tournament. The tournament is scheduled to be held over 7 rounds and each round is a knock out round, where in any match between 2 players, the winner advances to the next round and the loser is eliminated from the tournament. There are no draws or byes in the tournament. Players who take part are seeded from 1 to 128, with seed 1 being the highest seed, 2 the next and so on. Matches are

*scheduled in such a way that in any round, assuming there are no upsets, the highest seeded player plays against the lowest seeded player at that point, the next highest seeded player plays against the next lowest seeded player and so on. An upset is said to happen when a lower seeded player beats a higher seeded player. The schedule of matches in the next rounds remains unchanged in case of an upset in a round, with the only difference being that the player who caused the upset advances to the next round and takes the designated place of the player he upset.*

| Division  | Sub division | Annual Sales<br>(in INR) | Margin | Number of<br>Employees | Annual salary per<br>employee<br>(in INR) |
|-----------|--------------|--------------------------|--------|------------------------|---|
| Services  | Online       | 3 crores                 | 42     | 25                     | 2,00,000                                  |
|           | On call      | 5 crores                 | 54     | 56                     | 3,00,000                                  |
| Inventory | Online       | 7 crores                 | 67     | 78                     | 3,00,000                                  |
|           | On call      | 5 crores                 | 68     | 68                     | 1,00,000                                  |

$$\text{Margin} = \text{Profit}/\text{Sales} * 100$$

13. In case of no upsets throughout the tournament, in which round would the player seeded-8 face a player seeded higher than him?
  - (a) 1<sup>st</sup> round
  - (b) 4<sup>th</sup> round
  - (c) 5<sup>th</sup> round
  - (d) 6<sup>th</sup> round
14. In case of no upset, how many players in the tournament won exactly 2 matches?
  - (a) 32
  - (b) 16
  - (c) 17
  - (d) None of these
15. If the player seeded 16 won the tournament, then a minimum of how many upsets would have happened in the tournament?
  - (a) 3
  - (b) 2
  - (c) 4
  - (d) 5

16. With no information given on the number of upsets, which of the following players could have faced the player seeded 15 in the 4<sup>th</sup> round?
- (a) Seed 34
  - (b) Seed 1
  - (c) Seed 128
  - (d) Seed 8
17. Assuming no upsets, which player beats Seed 25?
- (a) Seed 26
  - (b) Seed 24
  - (c) Seed 9
  - (d) Seed 8

# 10 Mock Test Paper

**Directions for Questions 1 to 5:** Refer to the data given below and answer the following questions:

Arun, Barun, Charan, Deep, and Eahsan are five brothers who are ancestors to the royal family of Kaluchistan. They have assets in the form of palaces and cash only. Together they have 9 palaces and each brother has at least 1 palace. Value (in terms of rupees) of all palaces is equal and constant. Cash with each brother is an integral multiple of ₹ 1 crore. The amount of cash with Barun is just enough to buy one more palace, all the other brothers have cash less than that of Barun. Eahsan has got the maximum number of palaces. Number of palaces with Arun = sum of number of palaces with Barun and Charan.

Amount of cash with Barun is double of that with Deep and Deep has got assets worth ₹ 200 Lakhs more than that of Barun.

1. What is the value of the nine palaces?
  - (a) ₹ 27 crore
  - (b) ₹ 45 crore
  - (c) ₹ 36 crore
  - (d) ₹ 18 crore
  - (e) Cannot be determined
2. What can be the maximum possible value of assets of Arun?
  - (a) ₹ 9 crore
  - (b) ₹ 10 crore
  - (c) ₹ 11 crore
  - (d) ₹ 12 crore
  - (e) ₹ 13 crore

3. What is the ratio of the maximum possible value of assets of Eahsan to minimum possible of assets value of Charan?
  - (a) 10: 4
  - (b) 20: 5
  - (c) 10: 5
  - (d) 6 : 2
  - (e) 6: 9
4. Which of these can be a possible value of the assets of all the brothers taken together?
  - (a) ₹ 54 crore
  - (b) ₹ 48 crore
  - (c) ₹ 55 crore
  - (d) ₹ 52 crore
  - (e) ₹ 43 crore
5. For how many brothers the exact value of their total assets can be found?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
  - (e) 5

**Directions for Questions 6 to 9:** Refer to the data given below ([Table 1.1](#)) and answer the following questions :

The GMAT for the year 2056 came as an altogether surprise for the students as the pattern of the paper was completely changed. Instead of the normal 3 sections, the paper consisted of only two sections – English (Section-I) and Reasoning (Section-II).

Results of four batches of AMS learning systems (an MBA training institute) at its Kapurthala Centre namely Microsoft, GE, Apple, and Compaq is given below in terms of percentiles in the English section (Section-I), Reasoning section (Section-II) and Overall (Aggregate of section I & II). [Table 1.1](#) shows the number of students who fell into each of four demarcated categories of percentile ranges:

The following additional information is available to Mr. Subhasis Mazumdar, CEO about the table:

1. In the above table, for each percentile range the higher end of the spectrum is included, while the lower end of the spectrum is not included. i.e. for the 60+ to 80 percentile range, those students who have a percentile of more than 60 and less than equal to 80 are included in this range
2. For all the batches shown above, the overall percentile secured by any student from any batch is always less than his percentile in any individual section unless specifically stated.
3. Each student of the Microsoft and Compaq batches has secured a lower percentile in English than in Reasoning.
4. Each student of the GE and Apple batches has secured a lower percentile in Reasoning than in English.

**Table 1.1**

|           | English |    |     |     | Reasoning |    |    |     | Overall |    |    |     |
|-----------|---------|----|-----|-----|-----------|----|----|-----|---------|----|----|-----|
|           | 0-      | 30 | 60  | 80  | 0 –       | 30 | 60 | 80  | 0 –     | 30 | 60 | 80  |
|           | 0-      | 30 | 60  | 80  | 0 –       | 30 | 60 | 80  | 0 –     | 30 | 60 | 80  |
|           | 30      | +  | +   | +   | 30        | +  | +  | +   | 30      | +  | +  | +   |
|           |         | TO | TO  | TO  |           | TO | TO | TO  |         | TO | TO | TO  |
|           |         | 60 | 80  | 100 |           | 60 | 80 | 100 |         | 60 | 80 | 100 |
| Microsoft | 40      |    |     |     | 12        | 36 | 32 | 32  | 20      | 48 | 28 | 36  |
| G.E.      | 36      | 48 | 56  | 40  | 38        | 82 |    |     |         | 82 | 50 | 32  |
| Apple     | 10      | 26 | 100 | 34  |           |    | 82 | 10  | 60      | 96 |    | 16  |
| Compaq    | 52      | 10 | 30  | 18  | 38        | 22 | 32 | 18  |         |    | 6  | 2   |

6. What is the difference between the minimum possible value of 30+ to 60 percentile in English for Microsoft batch and the minimum possible value of 60+ to 80 percentile in reasoning for the GE batch?
  - 12
  - 16
  - 24
  - 14
7. What is the difference between maximum possible number of students in 30+ to 60 for Compaq to the minimum possible numbers in the 0–30 percentile range for Compaq?
  - 50

- (b) 52
  - (c) 2
  - (d) 4
8. What is the sum of the minimum possible number of students who secured an overall percentile of 60+ to 80 category for Apple and the minimum possible number of students who secured an overall percentile in 0-30 category for Compaq?
- (a) 48
  - (b) 50
  - (c) 42
  - (d) 56
9. What is the sum of the maximum and minimum possible number of students in 60+ to 80 percentile category in Reasoning for GE?
- (a) 52
  - (b) 78
  - (c) 68
  - (d) 64

**Directions for Question 10 to 14** Answer the questions on the basis of the table and the pie-charts given below.

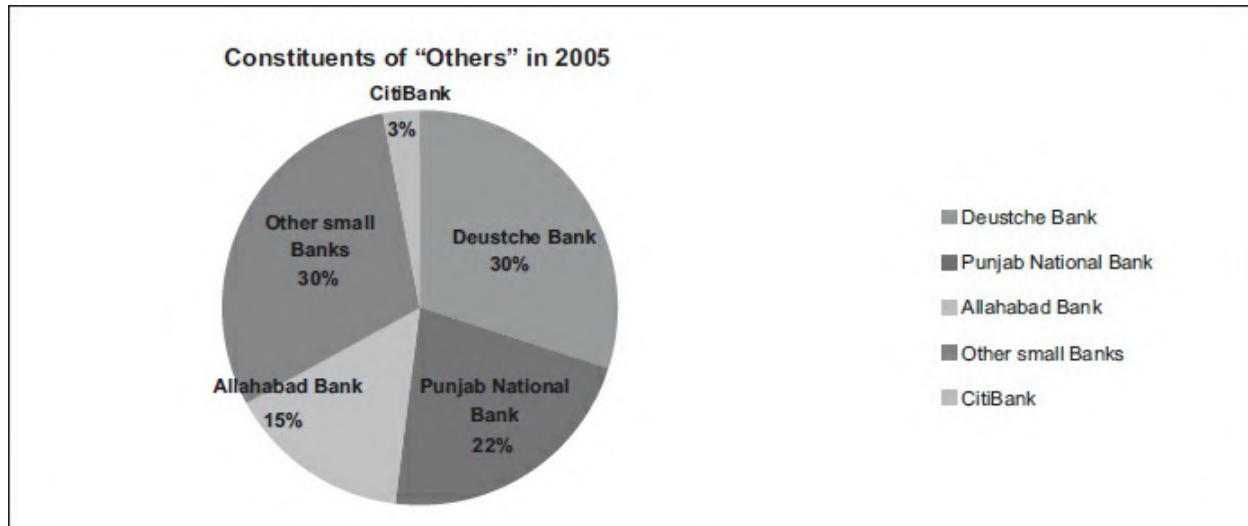
The following table gives the amount (in crores) of loan disbursed by banks in India during 2001-2005. The bank, which disburses the maximum amount in a particular year, is considered to be the market leader.

The pie-chart given on the next page shows the distribution of the loans disbursed by all the banks that are part of others in 2005

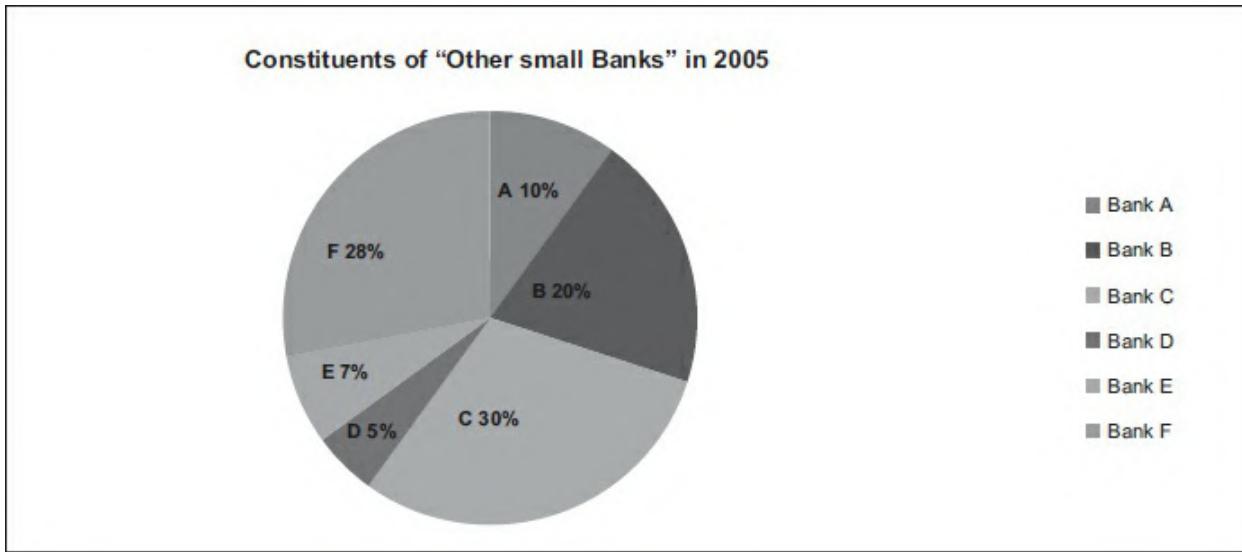
10. In 2002, all banks had the same percentage share in Housing Finance as their respective shares in loan disbursement. By what amount (approximately in crore INR) was the share of SBI Bank greater than the share of FBI, if the total Housing Finance market was Rs. 150 crore INR?
- (a) 14
  - (b) 3.6
  - (c) 20.26
  - (d) 5.45

11. Recession was round the corner and banks unaware of the global errors kept catering to increasing loan requirements of customers in 2006. Indian banking regulatory authorities realized something bad is inevitable and declared a notice that only those banks that have loans disbursed of more than 7 crore INR can continue their operations and rest should halt their operations by 1st January'2007 until next notice. How many banks had to halt their operations? (Assume the same figures and data for 2006 as for 2005 above)
- (a) 6  
 (b) 7  
 (c) 8  
 (d) 9

| Name of Bank | 2001 | 2002 | 2003 | 2004 | 2005 |
|--------------|------|------|------|------|------|
| SBI          | 80   | 92   | 112  | 143  | 167  |
| FBI          | 98   | 78   | 79   | 80   | 120  |
| CBI          | 82   | 88   | 82   | 82   | 82   |
| Bol          | 98   | 102  | 105  | 105  | 109  |
| Others       | 34   | 25   | 67   | 76   | 80   |
| Total        | 392  | 385  | 445  | 486  | 558  |



The pie-chart given below shows the distribution of the loans disbursed by “Other smaller banks” in 2005



- 12.** 2008 brought along recession with it and only 30% of the loans disbursed in 2007 were recovered in 2008. If loan disbursement had been aggressive and growing at the rate of 10% year by year since 2005 until 2007, what amount of loans (in crore INR) was not recovered by banks in 2008? (Assume 0 disbursements in the year 2008).

Round off the value to next integer.

- (a) 203
  - (b) 675
  - (c) 473
  - (d) 202
- 13.** Recession of 2008 was disastrous and all banks under category “Others” had to shut down due to bad recovery. This means no amount of loan they disbursed in 2007, was recovered by them in 2008. Also in 2008 the banks, which somehow managed to survive the blow, could not recover more than 50% of the loan disbursements made by them in 2007. What is the amount recovered in 2008 by all banks put together? (in crore INR)

- Consider data from the previous question
- Assume that the percentage share of loan disbursements by banks remained the same as in 2005

- (a) 97
- (b) 578

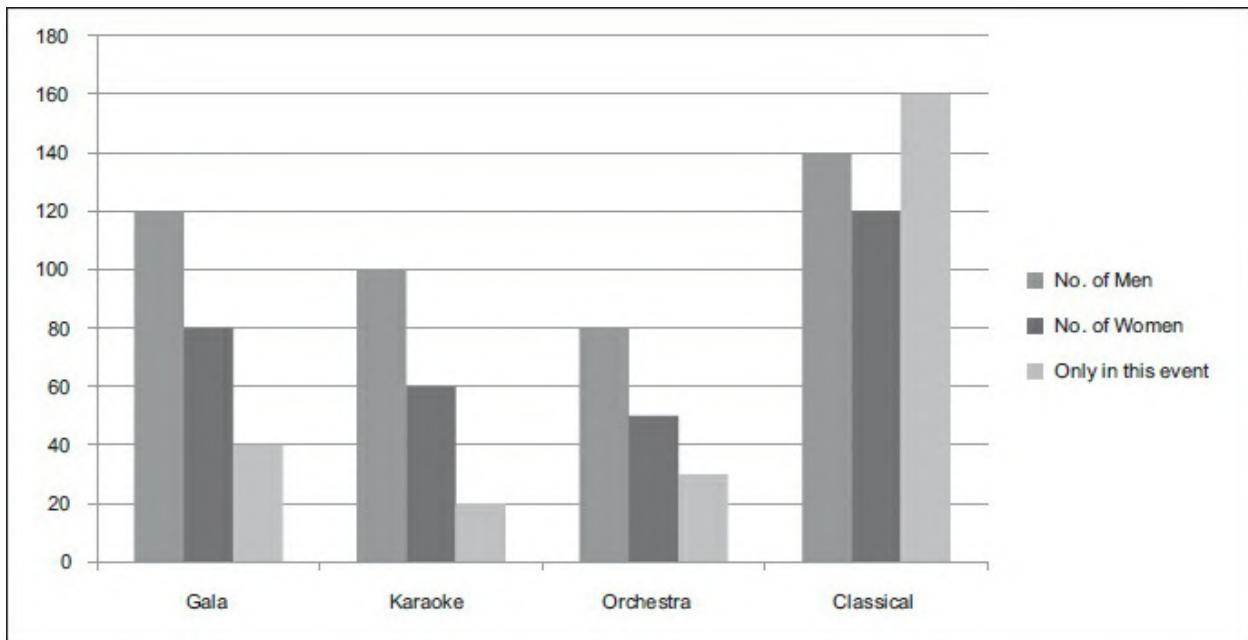
(c) 337.5

(d) 289

14. In the previous question, approximately what amount of loan disbursed in 2007 could not be recovered in 2008 at all? (in crore INR)
- (a) 386  
(b) 97  
(c) 289  
(d) 0

**Directions for Question 15 to 18** Answer the questions on the basis of information below.

Some singers participate in the National Singers meet 2016 in which there are only four events - Gala, Karaoke, Orchestra and Classical. The bar chart shows the number of men/women who participate in an event and the number of singers who participate only in that event.



All figures are multiples of 10.

15. What is the minimum number of men that can participate in National Singers meet 2016?
- (a) 80  
(b) 140

- (c) 120
  - (d) 160
16. What is the minimum number of women that can participate in National Singers meet 2016?
- (a) 80
  - (b) 140
  - (c) 120
  - (d) 160
17. What is the maximum number of men that can participate in National Singers meet 2016?
- (a) 335
  - (b) 310
  - (c) 160
  - (d) 440
18. What is the maximum number of women that can participate in National Singer meet 2016?
- (a) 310
  - (b) 210
  - (c) 250
  - (d) 260

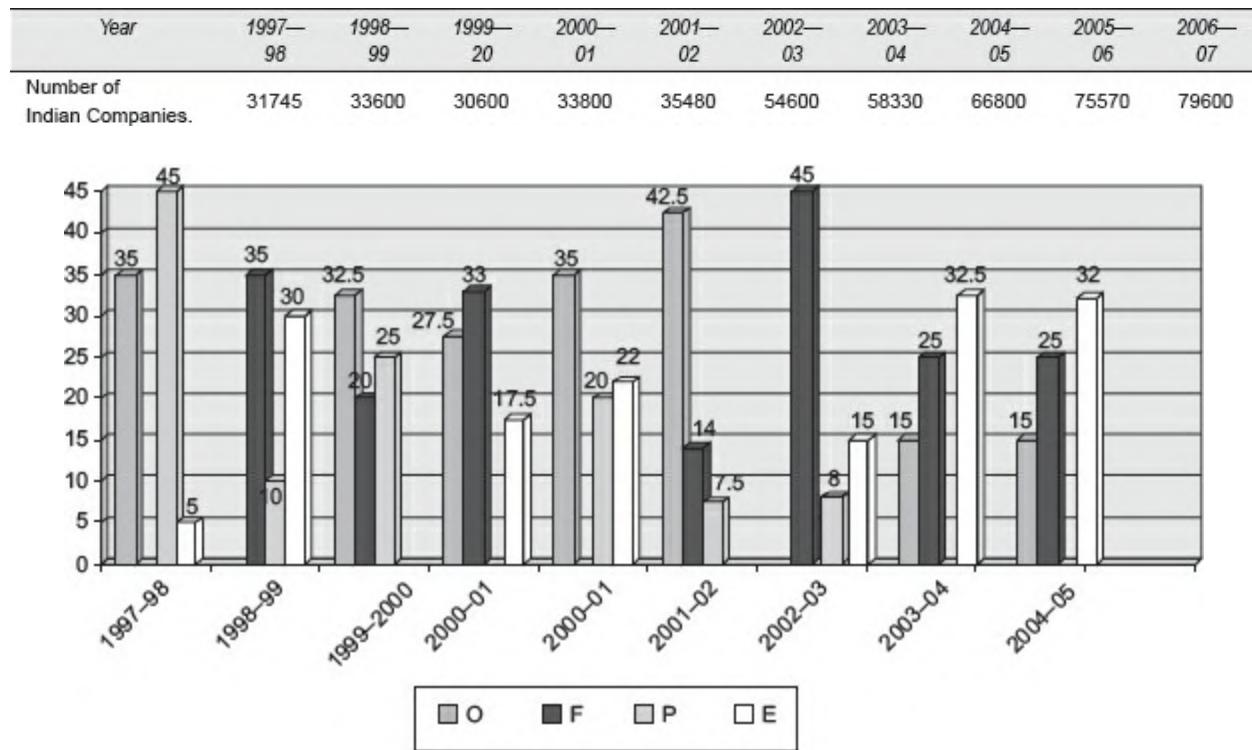
# 11 Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the following data ([Table 1.1](#)) to answer the questions that follow:

As per the JP Organ survey of the companies in India, the table that is given below shows the number of Indian companies and multinational companies from the year 1997 to 2007. Sources at JP Organ revealed that the total number of companies in the year 1997–98 were 1,76,800.

Assuming that all companies are into only particular business, the following bar graph ([Figure 1.1](#)) gives the percentage of all the companies in the various sectors, i.e. Oil (O), Food (F), Power (P), and Energy (E). It may be noted that companies are of either small scale, medium scale, or large scale.,

1. Find the ratio of the number of Indian companies who are into the Oil business in 1998–99 to that of those who are in the Power business in 2004–05:
  - (a) 75/167
  - (b) 83/162
  - (c) 76/167
  - (d) 85/162
2. If the total number of companies was increased by 15% in the year 1998–99 as compared to the previous year then find the number of multinational companies in the year 1998–99.
  - (a) 169720
  - (b) 1,71,580
  - (c) 1,71,570
  - (d) Data insufficient

**Table 1.1****Figure 1.1**

3. Find the number of Indian companies in the Oil business in the year 2002–03.
  - (a) 15702
  - (b) 16882
  - (c) 17472
  - (d) None of these
4. If in the year 2006–07 the number of companies who grew to become large scale companies was 79%, which is 8% more than that of the previous year and the number of small scale companies is 17% which is 9% less than that for the year 2005–06, then how many Indian companies were there apart from the small scale companies and the large scale companies, i.e. the medium scale?
  - (a) 2476
  - (b) 2474

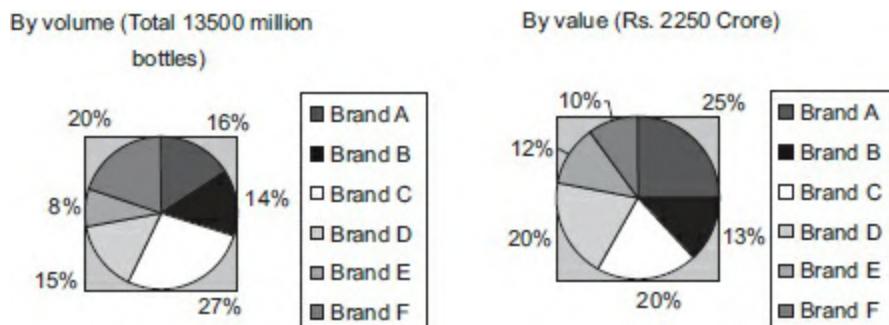
- (c) 2478
- (d) Data insufficient

**Directions for Questions 5 to 8:** Refer to the pie charts below and answer the questions that follow.

The pie charts (Figure 1.2) represent the sale of Cold drinks in the year 2007 for the company ABC Ltd.

5. The costliest brand of Cold Drinks in 2007 for the company ABC Ltd. was priced at:
  - (a) ₹ 2.6
  - (b) ₹ 2.7
  - (c) ₹ 2.8
  - (d) ₹ 2.9
6. Find the ratio of prices of the cheapest brand to the costliest brand for the company in 2007 is closest to:
  - (a) 4:15
  - (b) 4:13
  - (c) 2:15
  - (d) 2:17
7. If The manufacturing cost of a Cold Drink of Brand C was 93 paisa per bottle then what was the total profit of the company for the brand C?
  - (a) ₹ 97.47 crore
  - (b) ₹ 100 crore
  - (c) ₹ 104.8 crore
  - (d) ₹ 109.35 crore
8. Say the consumers of brand E change over to brand A and D in the ratio of 2:3 respectively because brand E suffered a loss and withdrew from the market then what will be the new percentage share of brand A in value sales? (approximately)
  - (a) 28%
  - (b) 29%
  - (c) 30%

(d) 31%



**Figure 1.2**

**Directions for Questions 9 to 12:** Answer the questions on the basis of the information and the data given below:

| Score | Cumulative Number of Students in Physics | Cumulative Number of Students in Chemistry | Cumulative Number of Students in Mathematics |
|-------|--|--|--|
| > 0   | 100                                      | 100  | 100  |
| > 10  | 82                                       | 75   | 69   |
| > 20  | 68                                       | 60   | 50   |
| > 30  | 52                                       | 50   | 40   |
| > 40  | 50                                       | 35   | 30   |
| > 50  | 30                                       | 25   | 20   |
| > 60  | 12                                       | 12   | 8  |
| > 70  | 5  | 7  | 4  |
| > 80  | 3  | 3  | 1  |
| > 90  | 2  | 1  | 0  |
| =100  | 1  | 0  | 0  |

For the purpose of the questions assume that a person who scores higher than another in Physics, would also score higher than that person in Chemistry as well as in Mathematics.

Scores of all students are in multiples of 10, unless otherwise stated.

The Indian institutes of technology conduct the Joint Entrance Examination (JEE) for admission to their under graduate engineering program every year. The three subjects that are tested are physics, chemistry, and mathematics. The following table gives the cumulative score of the students, i.e. if the cumulative number of students who got 99 marks is 90,

*then it means that a total of 90 students got less than 99 marks in a particular test. If the test takers are arranged in ascending/descending order for physics then it may be assumed that the arrangement for chemistry and mathematics are also same respectively. Also the overall score for a student is his total score in all the three examinations.*

9. If 50% of the students who took JEE cleared the cutoff of the test, then which of the following is the cutoff for each of the three tests? The cutoff is the minimum marks a student must get to pass in the examination
  - (a) 50 marks
  - (b) 60 marks
  - (c) 70 marks
  - (d) Cannot be determined
10. Find the number of students who scored more than 60 marks in each of the three sections.
  - (a) 5
  - (b) 6
  - (c) 7
  - (d) 4
11. What is the overall score of the topper of JEE?
  - (a) 240
  - (b) 250
  - (c) 260
  - (d) 270
12. Consider the following statements:-
  - (i). 2 students secured a minimum of 10 marks in each of the three examinations
  - (ii) 8 students secured 60 marks in each of the three examinations
  - (iii) Two students secured more than 70 marks in each of the three examinations
  - (iv) 10 students secured 0 marks in each of the three examinations
  - (v) The cutoff for the Mathematics exam is 90 marks

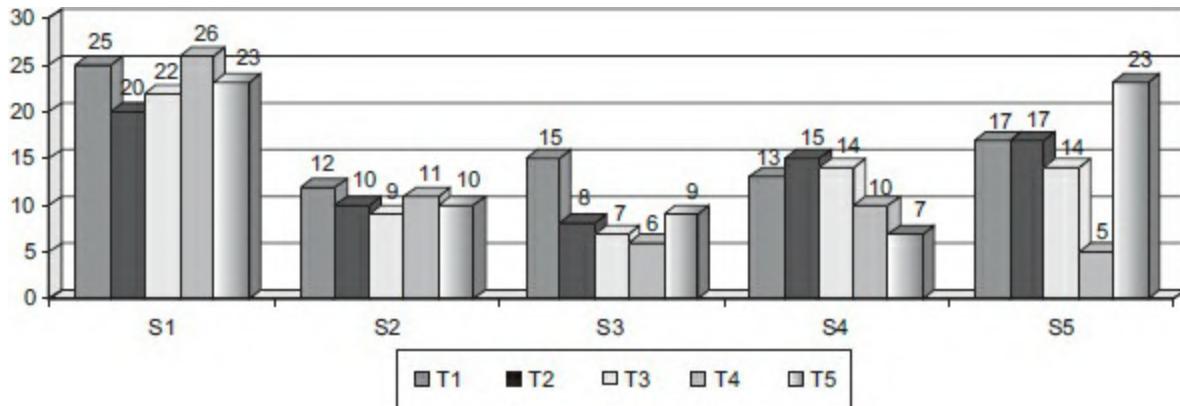
Which of the above statements is false?

  - (a) (i), (ii) and (iii)

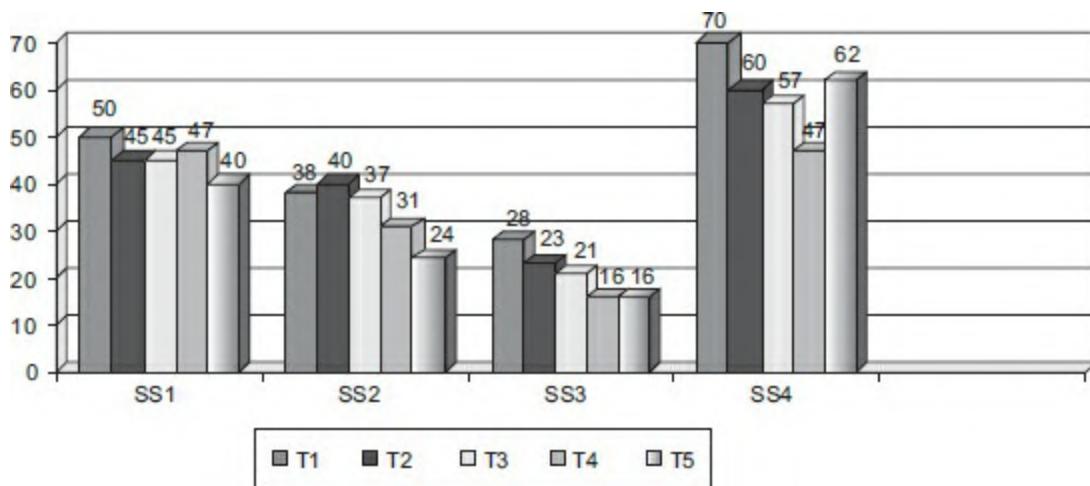
- (b) (ii), (iii) and (iv)
- (c) (i), (iv)
- (d) (i), (iii) and (iv)

**Directions for Questions 13 to 16:** Refer to the data given below ([Figures 1.4 \(a\)](#) and [1.4 \(b\)](#)) to answer the questions that follow:

Bar chart 1 ([Figure 1.4\(a\)](#)) gives the number of Transponders (T) in each Satellite (S) of the INSAT 2C geostationary satellite. Bar chart 2 ([Figure 1.4 \(b\)](#)) given below gives the number of Transponders in a Sister Satellites (SS). Each Sister Satellite is made up of a combination of satellites such that the number of satellites used for each sister satellite is not more than five. Each sister satellite can contain more than one satellite of the same type.



**Figure 1.4 (a)** Bar chart 1

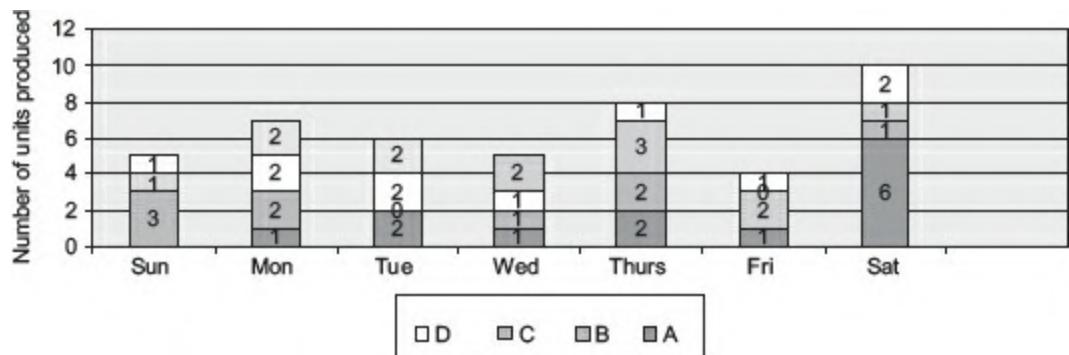


**Figure 1.4 (b)** Bar chart 2

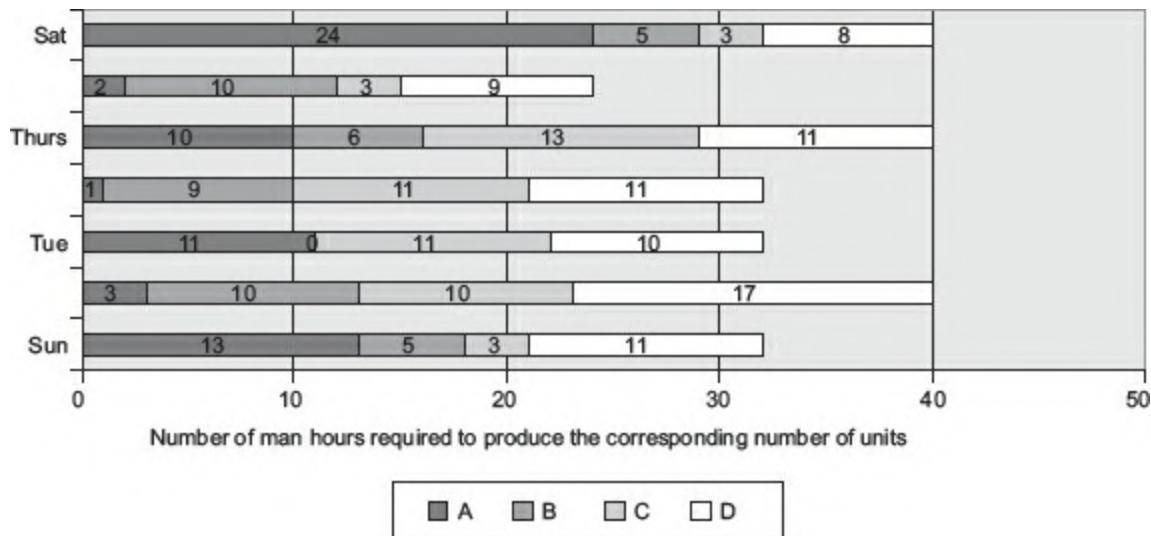
13. For a particular Transponder, if Sister Satellite 1 and Sister Satellite 2 are used then how many satellites are used in the transponder?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
14. What types of Satellites are used in Sister Satellite 3?
- (a) S3 and S5
  - (b) S3 and S4
  - (c) S2 and S5
  - (d) S1 and S2
15. In transponders consisting of SS3 and SS4, what is the total number of T2 used?
- (a) 79
  - (b) 80
  - (c) 81
  - (d) 83
16. If a particular system contains 63 T4s and less than 80 T5s. Which of these can be the possible combination of satellites used?
- (a) S2, S3, and S5
  - (b) S1, S2, and S5
  - (c) S2, S3, and S4
  - (d) Both (b) and (c) but not (a)

## 12 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information and the figures given below:



**Figure 1.1 (a)** Chart A



**Figure 1.1 (b)** Chart B

*McD is a leading fast food chain. It sells four fast food products, Veggie (A), Chicken (B), Salsa (C), and Fishy (D). 4, 5, 6, and 7 man-hours are respectively required to dish out the four products. McD Lucknow has 6 workers P, Q, R, S, T, and U and the working days are Sunday through Saturday, eight hours each. All the production started on Sunday and finished on Saturday. Also, once a worker took up a job, he did not leave it, transfer it, or do anybody else's job until his job was complete. Chart A ([Figure 1.1\(a\)](#)) given below gives the number of units produced on any given day and chart B ([Figure 1.1\(b\)](#)) gives the number of man hours required to complete the corresponding units of work on that particular day.*

*The following graphs are to be read as follows: Say for product A, we need to find the number of units produced on Sunday and the number of hours that went into producing it. Then chart A gives the number of units of A produced on Sunday, i.e. 3 and chart B gives the corresponding number of hours required to produce those 3 units, i.e. 13 man hours.*

*Since it is not humanly possible to work for all seven days, the following data gives the leave record of the six workers:*

| P   | Q     | R   | S   | T   | U   |
|-----|-------|-----|-----|-----|-----|
| Tue | Sun   | Mon | Sun | Tue | Wed |
| Fri | Thurs | Wed | Fri | Fri | Sat |

1. On which product did R work on Thursday if he worked only on product D on Saturday
  - (a) A and B
  - (b) A and D
  - (c) A and C
  - (d) Cannot be determined
  - (e) None of these
2. If P and T completed the production of units of A and B respectively at the end of Thursday then on which other product did T work on that day?
  - (a) A
  - (b) D
  - (c) B
  - (d) Cannot be determined

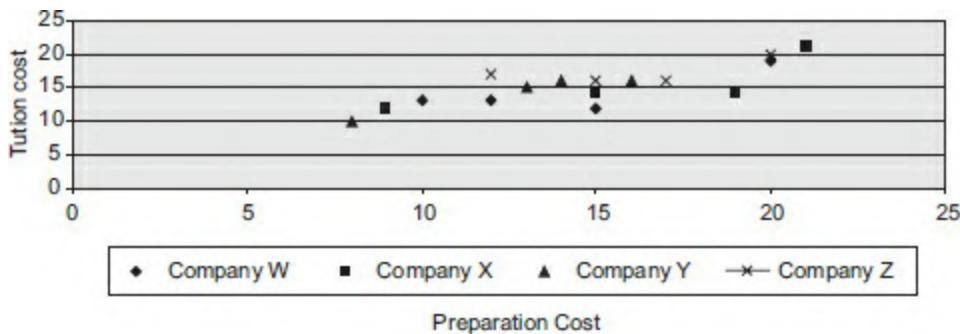
- (e) None of these
3. If Q did not work on product C on Tuesday then find the product(s) on which S worked on Monday. (You may use data from the previous question)
- (a) A and C
  - (b) C and D
  - (c) A and D
  - (d) Cannot be determined
  - (e) None of these
4. How many units in all did P manufacture in the given week (You may use data from the previous question)
- (a) 5
  - (b) 6
  - (c) 7
  - (d) 8
  - (e) None of these

**Directions for Questions 5 to 8:** Answer the following questions on the basis of the data and the line chart ([Figure 1.2](#)) given below:

There are four reputed coaching institutes of India that offer preparation classes for various MBA examinations. For each of these four institutes W, X, Y, and Z, the following graph gives the cost incurred by the institute (Preparation cost) in the study material that they provide to each of their students in ₹ With respect to the fees that they take from each student in ₹ (Tuition cost). The study material provided by each of these four institutes is in four subjects, i.e. Quant (E), English (F), Reasoning (G), and Data Interpretation (H) respectively. For each of the four study materials, the preparation cost is in ascending order

5. In which of the following ratios should coaching W prepare the units of products E, F, G, and H to make an overall profit? Assume the number of units prepared to be equal to the number of units sold to the students for each product
- (a) 3:1:5:7
  - (b) 5:6:8:2

- (c) 1:2:3:4  
 (d) 2:1:1:2
6. The company X prepared and sold 10, 20, 30, and 40 units of the respective products E, F, G, and H in some random order then its maximum overall profit could be?
- (a) ₹ 40  
 (b) ₹ 45  
 (c) ₹ 50  
 (d) ₹ 35
7. The difference between the total number of profit making products and the total number of products that incur a loss to the coaching institutes is
- (a) 5  
 (b) 4  
 (c) 3  
 (d) 2
8. If coaching Y sold a total of 100 units of all the products combined, it suffered a loss of Rs.20. Which of the following could have been the total number of units of products F and G sold by company Y?
- (a) 25  
 (b) 30  
 (c) 35  
 (d) 40  
 (e) None of these



**Figure 1.2**

**Directions for Questions 9 to 12:** Refer to the data in the table (Table 1.1) to answer the questions that follow:

Table 1.1 gives the number of Engineers and Doctors of several countries. Due to shortage of technology in various countries, countries often outsource professionals to other countries. In turn, the countries that are in shortage of technology and need services requisition these professionals from countries that have professionals in excess. If a country outsources because it has a surplus of talent, the country can outsource to only one country. The deficit of a certain country in talent can be fulfilled by requisitioning professionals from at the most three countries.

9. From which of the following countries does Bangladesh requisition doctors (if it is known that any country having a deficit of doctors is required to requisition from at least two countries)?
  - (a) Holland, India, and Japan
  - (b) Denmark and India
  - (c) Argentina and Holland
  - (d) Both (a) and (c)
10. To nullify its deficit in Engineers, how many countries does India requisition Engineers from?
  - (a) 4
  - (b) 3
  - (c) 2
  - (d) 0
11. If the country having the highest deficit in Doctors was to requisition, how many different possible countries will it have to requisition from?
  - (a) 4
  - (b) 5
  - (c) 6
  - (d) 7
12. Which of the following countries can requisition Doctors from maximum number of countries?
  - (a) Finland
  - (b) Kazakhstan

- (c) Bangladesh  
 (d) India

**Table 1.1**

| Country ↓  | Doctors Outsourced | Engineers Outsourced | Doctors Requisitioned | Engineers Requisitioned |
|------------|--------------------|----------------------|-----------------------|-------------------------|
| Egypt      | 57                 | 78                   | 48                    | 123                     |
| Germany    | 86                 | 83                   | 86                    | 67                      |
| Bangladesh | 56                 | 37                   | 86                    | 26                      |
| India      | 67                 | 87                   | 53                    | 122                     |
| Argentina  | 76                 | 64                   | 57                    | 64                      |
| Japan      | 52                 | 76                   | 47                    | 99                      |
| Holland    | 58                 | 66                   | 47                    | 43                      |
| Denmark    | 89                 | 54                   | 73                    | 46                      |
| Finland    | 79                 | 96                   | 104                   | 63                      |
| Kazakhstan | 37                 | 81                   | 56                    | 69                      |

\* The number of Doctors/Engineers mentioned in the table are in million.

**Directions for Questions 13 to 16:** Refer to the following data (Table 1.2) to answer the questions that follow:

The G8 is an association of South East Asian countries to resolve their trade disputes. Every year, the 24 countries elect their chairperson. For this, several rounds of voting are done, the details of which is given below:-

- (i) For the post of chairperson, only member countries of the G8 can nominate at the most one candidate per country
- (ii) For the post of chairperson for the year 2007–2008, four people, Audi, Boxer, Coffee, and Dimply, are contending
- (iii) In each round of voting, the candidate with the minimum number of votes is eliminated such that the person with the maximum votes at the last of the voting process is designated the chairperson of G8
- (iv) While voting, the member countries whose members are in the contention can caste a vote and for only one member in contention
- (v) A member country is eligible to vote for at the most two candidates in the entire voting process
- (vi) Candidates Audi and Boxer retain their votes from all the previous rounds as long as they were in contentions for the post of the chairperson
- (vii) 25% of those who voted for Coffee in round 1 voted for Boxer in round

**Table 1.2**

| Round | Total Votes | Minimum votes for |       | Maximum votes for |       |
|-------|-------------|-------------------|-------|-------------------|-------|
|       |             | Candidate         | Votes | Candidate         | Votes |
| 1     |             | D                 | 24    | A                 | 60    |
| 2     | 163         | C                 | 39    | B                 | 64    |
| 3     | 147         |                   |       |                   |       |

- (viii) Those who voted for Dimplly in round 1 voted for either Boxer or Coffee in round 2
- (ix) Half of those who voted for Coffee in round 1 voted for Boxer in round 3
- (x) All countries whose candidates are in contention voted for their own candidates as long as they were in contention

The following table gives some more information regarding the voting pattern in different rounds of voting that happened.

13. Which of the following statements is necessarily true?
- (i) 16 candidates who voted for Dimplly in round 1 voted for Coffee in round 2
  - (ii) Audi won the election in round 3 by a margin of 3 votes
  - (a) Only (i)
  - (b) Only (ii)
  - (c) Both of the above
  - (d) None of the above
14. How many countries who voted for Dimplly in round 1 voted for Boxer in round 2?
- (a) 8
  - (b) 7
  - (c) 9
  - (d) Cannot be determined
15. What is the number of votes cast for candidate Coffee in round 1?
- (a) 28
  - (b) 29
  - (c) 30

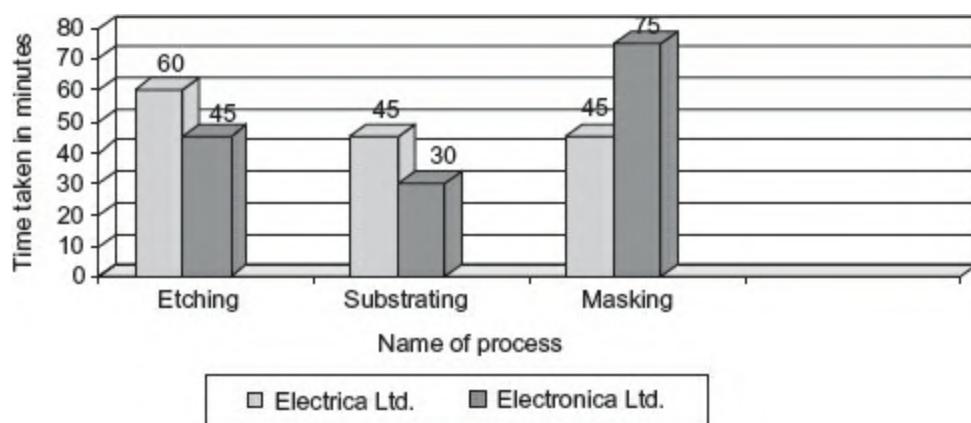
- (d) 32
16. Among the members who voted for Coffee in round 2 and were still eligible to vote in round 3, what percentage voted for Audi in round 3?
- (a) 64.8%
- (b) 66.7%
- (c) 65.9%
- (d) 65.2%

## 13 Mock Test Paper

**Directions for Questions 1 to 4:** From the data (Figure 1.1), derive the appropriate answers.

Mr. Sharma, a graduate in electronics engineering and an MBA from IIM Bangalore, decided to open an entrepreneurial venture. He decided to run an electronics workshop and manufacture Field effect transistors. The manufacturing required three simultaneous processes: Substrating, Masking, and Etching. Electronica Ltd and Electrica Ltd. gave orders of 15 units and 10 units per day respectively. The profit made by Mr. Sharma on 1 unit for Electronica Ltd. is ₹75 and for 1 unit of Electrica Ltd. is ₹100. The working hours were 0900 hours to 1700 hours. The workshop has two machines for Substrating, four for Masking, and three for Etching.

The bar chart (Figure 1.1) gives the time required for each machine per unit(in minutes)



**Figure 1.1**

1. After supplying both the companies, Mr. Sharma might conclude that:

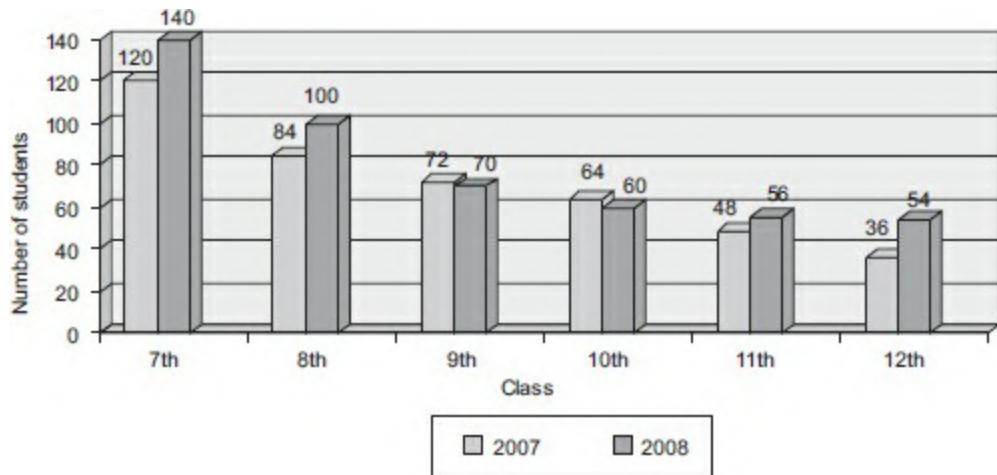
- (a) Mr. Sharma can make one more unit for Electrica Ltd.
- (b) Out of the two machines of process Substrating, one has an idle time of 30 minutes and the other has an idle time of 15 minutes
- (c) Machines of process Masking have no idle time left
- (d) Mr. Sharma can make two more units for Electronica Ltd.
- (e) None of the above conclusions can be drawn
2. Ignoring Mr. Sharma's commitments to Electrica Ltd., the maximum number of units that Mr. Sharma can make for Electronica Ltd. is:
- (a) 24
- (b) 25
- (c) 26
- (d) 27
- (e) 28
3. If Mr. Sharma has the flexibility to manufacture anyone of the two products, what is the maximum profit that he can make on any given day and for which product?
- (a) ₹ 2400, Electrica Ltd.
- (b) ₹ 2100, Electronica Ltd.
- (c) ₹ 1800, Electronica Ltd.
- (d) ₹ 2000, Electrica Ltd.
4. Mr. Sharma decided to install one more machine for each process. With the existing commitments, in order to maximise his profits, what should he produce so that he gets the best deal (Both the companies will levy no extra production)
- (a) 6 more units for Electronica Ltd. and 7 more units for Electrica Ltd.
- (b) 7 more units for Electronica Ltd. and 6 more units for Electrica Ltd.
- (c) 5 more units for Electronica Ltd.
- (d) 10 more units of Electrica Ltd.

**Directions for Questions 5 to 8:** Refer to the following data ([Figure 1.2](#)) to answer the questions that follow:

The following figure gives the number of students in St. Francis' college in

*the year 2007 and 2008 from class 7<sup>th</sup> to class 12<sup>th</sup>. It may also be noted that new students joined the school only in class 7<sup>th</sup> unless otherwise stated and no student leaves school before class 12<sup>th</sup>. Obviously, the students who failed in a particular class had to repeat the same class again.*

5. How many students in class 9<sup>th</sup> failed in the year 2007 if no students of class 11<sup>th</sup> failed in the 2007?
  - (a) 12
  - (b) 15
  - (c) 18
  - (d) 20
6. If it is known that the school was opened in the year 2007 itself and 14 students of class 10<sup>th</sup> failed in that year, what is the percentage increase / decrease in the number of new students joining the school from 2007 to 2008?
  - (a) 100/3 %
  - (b) 100/6%
  - (c) 100/9%
  - (d) 100/11%
7. If no student of class 11<sup>th</sup> failed in the year 2007, then what is the pass percentage of class 12<sup>th</sup> for the year 2007?
  - (a) 82 (1/3) %
  - (b) 81 (1/3) %
  - (c) 80 (1/3) %
  - (d) None of these
8. If no student of class 11<sup>th</sup> failed in the year 2007, then what is the total number of students of the school who failed in that year?
  - (a) 120
  - (b) 121
  - (c) 122
  - (d) 123



**Figure 1.2**

**Directions for Questions 9 to 12:** Refer to the given data ([Table 1.1](#)) to answer the questions that follow:

Prof. Sharma is the head of the department of Electronics and Communication Engineering at a reputed engineering college in India. He wanted to rank six students on the basis of their total marks obtained in engineering in their second, third, and fourth year such that the student with the higher total in all the three years combined got a higher rank. The following table ([Table 1.1](#)) gives the marks of the six students, A, B, C, D, E, and F in each of the three years and also the average of all the six students in a particular year. While compiling the results, Prof. Sharma noted that all the six students had marks that were distinct integers, different from each other in all the three years. Some cells in the following table have intentionally been left blank. All marks were out of 100.

**Table 1.1**

| Students   | Marks obtained in each term |                      |                      |
|------------|-----------------------------|----------------------|----------------------|
|            | 2 <sup>nd</sup> year        | 3 <sup>rd</sup> year | 4 <sup>th</sup> year |
| A          | 100                         |                      |                      |
| B          | 98                          | 96                   | 93                   |
| C          | 88                          | 99                   | 94                   |
| D          | 92                          |                      | 97                   |
| E          |                             | 87                   |                      |
| F          |                             | 91                   | 95                   |
| Average => | 91                          | 90                   | 93                   |

9. If the rank of A and D is the same then the difference in the score of E and F is:-
- (a) 2
  - (b) 3
  - (c) 4
  - (e) Cannot be determined
10. Which student among the following is ranked the lowest?
- (a) A
  - (b) F
  - (c) B
  - (d) E

**Additional information:** The score of E and F differ by 4 in the 2<sup>nd</sup> year.

11. If the total score of four students is equal then how many possible number of scores are there for all the six students?
- (a) 5
  - (b) 6
  - (c) 7
  - (d) None of these
12. If no two students are ranked the same then which of the following statements is true?
- (i) A can have possible 3 different total scores
  - (ii) B can have 3 possible different total scores
  - (iii) C can have 3 possible different total scores
  - (iv) D can have 3 possible different total scores
  - (v) E can have 3 possible different total scores
  - (a) (i), (ii) and (iii)
  - (b) (ii) and (iii)
  - (c) Only (i)
  - (d) (i), (iv) and (v)

**Directions for Questions 13 to 16:** Refer to the data in the table given below ([Table 1.2](#)) to answer the following questions:

Bankrupt Airlines started its new air route from North Pole to South Pole so

*that Eskimos from both worlds could exchange culture. Five aircrafts were dedicated to this noble cause. Bankrupt airlines outlined the following guidelines to the captains of these five aircrafts while they traversed from North Pole to South Pole:*

- (b) *A, B, C, D, E, F, G, H are the eight stop over points (cities) in between North Pole and South Pole where each of the five aircrafts stop for a fixed time as decided by Bankrupt airlines. The stop over time for the aircrafts might not be the same*
  - (c) *All the five aircrafts start from the North pole at the same time but may or may not reach the South pole at the same time*
  - (d) *Each of the five aircrafts take five different routes. No two aircrafts traverse the same route*
  - (e) *The table given above gives the time taken to traverse from one city to another in hours. All the aircrafts traveling on the same path have the same traversal time*
  - (f) *The time taken by an aircraft to traverse from North pole to South Pole is equal to the sum of the flying time in between various stop over points after starting from North pole and the sum of the stop over time in each stop over point*
13. If bankrupt airlines decides to have an equal stop over time in every intermediate stop over point of 2 hours each, then what is the difference in between the time taken to reach South Pole by the aircraft that reaches first and the one that reaches last?
- (a) 9 hours
  - (b) 10 hours
  - (c) 8 hours
  - (d) None of these
14. Bankrupt Airlines brought a more powerful aircraft than its existing fleet of aircrafts and as a result the travelling time in between city B and G was reduced to 3 hours. If the stop over time due to the new fleet of aircrafts be 7, 2, 0, 1, 1, 5, 1, 1 hours for each of the intermediate stop over cities A to H respectively, then which of the following statements stand true?
- (a) All the aircrafts reach South Pole at the same time

- (b) Three air routes have the same traversal time of 35 hours to reach the destination
- (c) Four air routes have a traversal time of 30 hours
- (d) None of these
- 

**Table 1.2**

|            |            | TO         |   |   |   |   |   |   |   |   |            |
|------------|------------|------------|---|---|---|---|---|---|---|---|------------|
|            |            | North pole | A | B | C | D | E | F | G | H | South pole |
| From       | North pole | -          | - | - | - | 6 | 8 | - | - | - | -          |
|            | A          | -          | - | - | - | - | - | - | - | - | 10         |
|            | B          | -          | - | - | - | 1 | - | - | 4 | - | -          |
|            | C          | -          | - | - | - | - | - | - | - | - | 8          |
|            | D          | -          | - | - | - | - | - | - | 3 | - | -          |
|            | E          | -          | - | - | - | - | - | - | - | 3 | -          |
|            | F          | -          | - | - | - | - | - | - | 6 | - | -          |
|            | G          | -          | - | - | 2 | - | - | - | - | - | -          |
|            | H          | -          | 4 | 3 | - | 4 | - | - | - | - | -          |
| South pole |            | -          | - | - | - | - | - | - | - | - | -          |

15. Bankrupt airlines decides to chart its traversal and stop over time in such a fashion such that all aircrafts reach South Pole in the same time. To this effect, if the stopover time of cities C, E, G, and H be 2 hours each, then what is the total time taken by any aircraft to traverse its path?
- (a) 32 hours  
 (b) 33 hours  
 (c) 34 hours  
 (d) None of these
16. Which of the following cannot be a stop over time at the eight cities respectively if exactly four aircrafts reach the South Pole simultaneously?
- (a) 3, 2, 0, 0, 1, 3, 4, 4  
 (b) 3, 2, 1, 0, 2, 5, 4, 4  
 (c) 5, 1, 4, 5, 1, 0, 4, 2  
 (d) None of these

## 14 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below ([Table 1.1](#)):

Twenty Indian states were chosen (A through T). The following table gives the difference in cities among any two states of India. It is assumed that the state has a unique, distinct number of cities.

1. How many states have more cities than each of states M and N or less cities than each of M and N?
  - (a) 14
  - (b) 15
  - (c) 16
  - (d) Cannot be determined
  - (e) None of these
2. Which of the following cannot be the total number of cities with states J, K, L, M and N together?
  - (a) 78
  - (b) 80
  - (c) 82
  - (d) Cannot be determined
  - (e) None of these
3. If state P has 15 cities, what is the total number of cities with states A and C put together?
  - (a) 51
  - (b) 52
  - (c) 53
  - (d) Cannot be determined

- (e) None of these
4. Which of the following groups can have 80 cities in total?
- (i) A, B, and C
  - (ii) P, Q, and R
  - (iii) G, H, and I
  - (iv) K, L, and M
  - (a) Both (i) and (ii)
  - (b) Both (ii) and (iv)
  - (c) Both (i) and (iii)
  - (d) Both (ii) and (iii)
  - (e) Both (iii) and (iv)
- 

**Table 1.11**

| A | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  | K  | L  | M  | N | O | P  | Q | R | S |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|----|---|---|---|
| B | 8  |    |    |    |    |    |    |    |    |    |    |    |    |   |   |    |   |   |   |
| C | 13 | 5  |    |    |    |    |    |    |    |    |    |    |    |   |   |    |   |   |   |
| D | 6  | 2  | 7  |    |    |    |    |    |    |    |    |    |    |   |   |    |   |   |   |
| E | 7  | 1  | 6  | 1  |    |    |    |    |    |    |    |    |    |   |   |    |   |   |   |
| F | 21 | 13 | 8  | 15 | 14 |    |    |    |    |    |    |    |    |   |   |    |   |   |   |
| G | 1  | 9  | 14 | 7  | 8  | 22 |    |    |    |    |    |    |    |   |   |    |   |   |   |
| H | 7  | 15 | 20 | 13 | 14 | 28 | 6  |    |    |    |    |    |    |   |   |    |   |   |   |
| I | 9  | 1  | 4  | 3  | 2  | 12 | 10 | 16 |    |    |    |    |    |   |   |    |   |   |   |
| J | 12 | 4  | 1  | 6  | 5  | 9  | 13 | 19 | 3  |    |    |    |    |   |   |    |   |   |   |
| K | 5  | 3  | 8  | 1  | 2  | 16 | 6  | 22 | 4  | 7  |    |    |    |   |   |    |   |   |   |
| L | 2  | 10 | 15 | 8  | 9  | 23 | 1  | 5  | 11 | 14 | 7  |    |    |   |   |    |   |   |   |
| M | 11 | 3  | 2  | 5  | 4  | 10 | 12 | 18 | 2  | 1  | 6  | 13 |    |   |   |    |   |   |   |
| N | 19 | 11 | 6  | 13 | 12 | 2  | 20 | 26 | 10 | 7  | 14 | 21 | 8  |   |   |    |   |   |   |
| O | 20 | 12 | 7  | 14 | 13 | 1  | 21 | 27 | 11 | 8  | 15 | 22 | 9  | 1 |   |    |   |   |   |
| P | 17 | 9  | 4  | 11 | 10 | 4  | 18 | 24 | 8  | 5  | 12 | 19 | 6  | 2 | 3 |    |   |   |   |
| Q | 27 | 19 | 14 | 21 | 20 | 4  | 28 | 34 | 18 | 15 | 22 | 28 | 16 | 8 | 7 | 10 |   |   |   |
| R | 25 | 17 | 12 | 19 | 8  | 4  | 26 | 32 | 16 | 13 | 20 | 27 | 14 | 6 | 5 | 8  | 2 |   |   |
| S | 23 | 15 | 10 | 17 | 16 | 2  | 24 | 30 | 14 | 11 | 18 | 25 | 12 | 4 | 3 | 6  | 4 | 2 |   |
| T | 22 | 14 | 9  | 16 | 15 | 1  | 23 | 29 | 13 | 10 | 17 | 24 | 11 | 3 | 2 | 5  | 5 | 3 |   |

For example, the difference in between the number of cities of states C and D is 7

**Directions for Questions 5 to 8:** Answer the questions on the basis of the information given below ([Table 1.2](#)):

In the six nation mini world cup football, each country played another country exactly once. The table given below gives the position of the countries with respect to their total points, i.e. the team with maximum points is ranked first. Each win gets a team 3 points, a draw gives 1 point while a

loss gives 0 points. It is also known that Country C beat country D and no two teams finished with the same number of points. Some of the cells have been intentionally kept blank.

**Table 1.2**

| Position | Country | Won | Draw | Lost | Goals For | Goals Against | Total Points |
|----------|---------|-----|------|------|-----------|---------------|--------------|
| 1        | A       |     |      |      | 17        | 5             | 15           |
| 2        | B       |     |      |      | 9         | 6             | 10           |
| 3        | C       |     |      |      |           | 2             | 8            |
| 4        | D       |     |      |      | 2         | 5             |              |
| 5        | E       |     |      |      | 7         | 11            | 2            |
| 6        | F       |     |      |      | 8         | 16            |              |

5. Consider the following statements:
  - (i) The total points of team F are 1
  - (ii) The total points of team D are 5
  - (iii) The difference between the total points of team D and team F is 6
 Which of the above statements cannot be determined?
  - (a) (i) and (iii)
  - (b) (i) and (ii)
  - (c) (ii) and (iii)
  - (d) All of the above
  - (e) None of these
6. Consider the following statements:-  
 (i) Team B and C have had the same number of losses  
 (ii) The difference between the team with the highest number of losses and that with the least number of losses is 5  
 (iii) Team E has had 4 losses  
 Which of the above is false?  
 (a) (i) and (iii)  
 (b) (i) and (ii)  
 (c) (ii) and (iii)  
 (d) All of the above  
 (e) None of these
7. Consider the following statements:-  
 (i) Two teams have the same number of wins as the number of losses

- (ii) The number of wins, draws, and losses for team D cannot be determined
- (iii) The number of draws of team C and E each is two more than the number of draws of team B and F each
- Which of the above statement is true?
- (a) (i) and (iii)
  - (b) Only (ii)
  - (c) (ii) and (iii)
  - (d) All of the above
  - (e) None of the above

8. Consider the following statements:-

- (i) The number of wins of at the most two teams is the same
- (ii) The difference in between the number of wins of team A and C is 3
- (iii) The difference in between the number of draws of B and losses of E is 0
- (iv) The goals for team C is more than 2 but less than 9
- (v) The product of the number of wins of C and losses of team D is an even number

If the above statement are True (T), False (F), or Cannot Be Determined (CBD) then match the appropriate statement to its condition

- (a) (i) –T, (ii) – F, (iii) – CBD, (iv) – CBD, (v) – T
- (b) (i) – F, (ii) – F, (iii) – T, (iv) – CBD, (v) – T
- (c) (i) – CBD, (ii) – T, (iii) – T, (iv) – F, (v) – F
- (d) (i) –T, (ii) – CBD, (iii) – T, (iv) – T, (v) – F
- (e) (i) – CBD, (ii) – T, (iii) – F, (iv) – CBD, (v) – T

**Directions for Questions 9 to 12:** Refer to the given data ([Table 1.3](#)) to answer the questions given below. The following table gives the performance of the players of the team Cuppy Vs the team Cake in the world cup cricket 2007. The first column of the table ([Table 1.3](#)) gives the name of the bowler of the Cake team vs the Batsman of the Cuppy team who was facing them.

To interpret the above table, the following guidelines *may be used*: -

*For ZK vs AS:*

$$\text{Number of balls faced by AS} = 9+1 = 10$$

$$\text{Score of AS} = 1*4 = 4$$

$$\text{Strike rate of AS} = \text{score / balls} * 100 = 4/10*100 = 40\%$$

*AS was dismissed by ZK and RS in two innings and the modes of dismissal were Lbw and Caught respectively*

**Table 1.3**

| Bowler of team | Cake Vs. Batsman of team Cuppy | 0s | 1s | 2s | 3s | 4s | 6s | Dismissal |
|----------------|--------------------------------|----|----|----|----|----|----|-----------|
| ZK Vs. KP      |                                | 15 | 0  | 0  | 0  | 1  | 0  | Lbw       |
| RP Vs. AC      |                                | 16 | 5  | 2  | 1  | 0  | 0  |           |
| RS Vs. IB      |                                | 12 | 3  | 1  | 1  | 3  | 0  |           |
| AK Vs. AC      |                                | 37 | 2  | 0  | 0  | 0  | 1  | Bowled    |
| RS Vs. KP      |                                | 4  | 2  | 0  | 0  | 1  | 1  | Bowled    |
| ZK Vs. MV      |                                | 14 | 1  | 2  | 0  | 1  | 0  | Caught    |
| ST Vs. IB      |                                | 7  | 1  | 2  | 0  | 1  | 1  |           |
| SS Vs. MV      |                                | 6  | 0  | 1  | 0  | 0  | 1  | Bowled    |
| SG Vs. PC      |                                | 2  | 3  | 0  | 0  | 0  | 0  |           |
| SS Vs. IB      |                                | 12 | 2  | 0  | 2  | 0  | 0  | Lbw       |
| SS Vs. KP      |                                | 5  | 0  | 0  | 0  | 1  | 0  |           |
| ZK Vs. PC      |                                | 16 | 2  | 1  | 0  | 1  | 1  | Caught    |
| ZK Vs. IB      |                                | 2  | 0  | 1  | 0  | 0  | 0  |           |
| SS Vs. AC      |                                | 25 | 2  | 3  | 0  | 2  | 0  |           |
| SS Vs. PC      |                                | 9  | 1  | 0  | 0  | 0  | 0  | Bowled    |
| RS Vs. AS      |                                | 4  | 0  | 0  | 1  | 0  | 0  | Caught    |
| SG Vs. IB      |                                | 5  | 0  | 1  | 0  | 0  | 0  |           |
| RS Vs. PC      |                                | 10 | 3  | 2  | 2  | 3  | 0  |           |
| SG Vs. AC      |                                | 16 | 1  | 2  | 0  | 1  | 0  | Lbw       |
| ZK Vs. AC      |                                | 15 | 1  | 0  | 1  | 3  | 0  |           |
| AK Vs. IB      |                                | 3  | 2  | 1  | 0  | 0  | 0  | Caught    |
| ZK Vs. AS      |                                | 9  | 0  | 0  | 0  | 1  | 0  | Lbw       |

9. For how many batsmen-bowler combinations is the strike rate equal to 125%?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
  - (e) None of these
10. Which batsman of the Cuppy team scored the maximum runs?
  - (a) AS
  - (b) AC

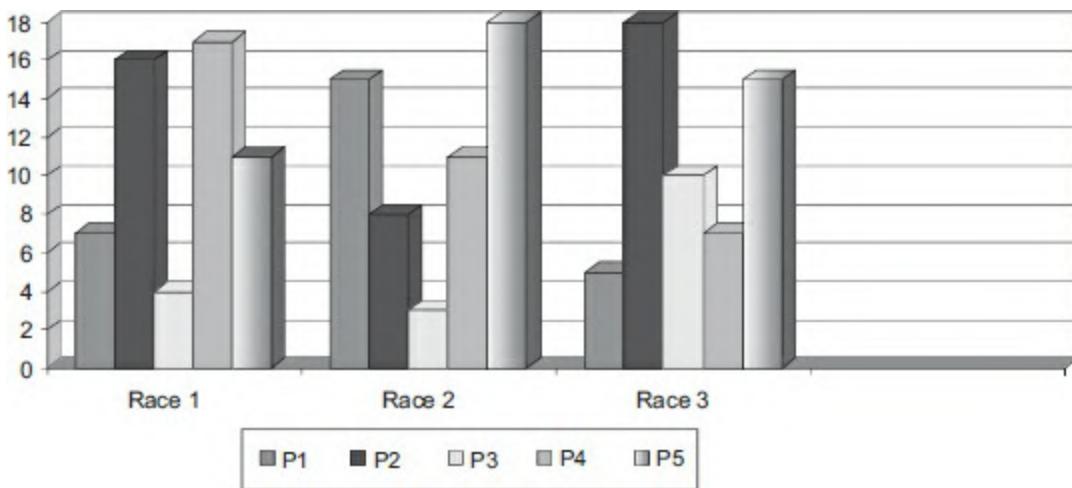
- (c) MV
  - (d) KP
  - (e) IB
11. Let  $x$  = number of batsmen a bowler has bowled to as a percentage of the total runs given by a bowler, then what is the percentage difference among the bowlers with the highest value of  $x$  and lowest value of  $x$ ?
- (a) 14.76%
  - (b) 16.32%
  - (c) 16.26%
  - (d) 16.13%
  - (e) 16.84%
12. Which of the following bowlers gave away the maximum number of runs to all the six batsmen put together?
- (a) AK
  - (b) ZK
  - (c) ST
  - (d) RS
  - (e) SG

**Directions for Questions 13 to 16:** Answer the questions based up on the information given below ([Figure 1.1](#))

Mr. Sharma's home was full of rats. The rat kingdom consisted of five provinces (Mr. Sharma's five rooms in his home). The Rat kingdom decided to have a rat race to decide who the fastest rat was. As per the rat rules, the fastest rat was the heir to the throne of the rat king. Ten rats were called from the five different provinces in Mr. Sharma's home to contest for the race. The ten rats were given the tag of R1, R2, R3, and so on till R10. Similarly the province that they belonged to was tagged as P1, P2, P3, P4, and P5. Rat 1, 2 belonged to P1, rat 3, 4 belonged to P2, and so on till P5. A total of three races were held. The rats that finished 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and so on till 10<sup>th</sup> were rewarded 10, 9, 8, and so on till 1 point respectively in every race. No two rats got the same points in any race. The total of all the three races for the two rats of each province is shown in the bar chart above:-

13. Which of the following rats might have finished third in race 1?

- (a) R7
- (b) R8
- (c) R9
- (d) Either of (a) or (b)



**Figure 1.1**

14. If in race 1, R1 finished before R5 but after R6 while R3 finished before R9 but after R10 then which of the following statements is definitely false?
- (i) R1 secured 8<sup>th</sup> position
  - (ii) R2 secured 7 points
  - (iii) R3 secured 5<sup>th</sup> position
  - (iv) R4 secured 9 points
  - (v) The winner of race 1 was R5
  - (a) (i), (ii) and (iv)
  - (b) (i), (ii) and (iii)
  - (c) (i), (ii) and (v)
  - (d) All but iii
15. Which of the following statements is true? (Take into consideration the data from the previous question.)
- (a) The exact position of R7 cannot be determined
  - (b) The exact points secured by R8 cannot be determined

- (c) Both of the above
  - (d) None of the above
16. If no rat finished at the same position in any of the three races then which of the following statements is true?
- (a) R6 finished 9<sup>th</sup> in race 2 while R5 finished 8<sup>th</sup> in race 1
  - (b) R1 finished 6<sup>th</sup> in race 1 while R5 finished 4<sup>th</sup> in race 3
  - (c) R5 finished 10<sup>th</sup> in race 1 while R6 finished in race 3
  - (d) Both (a) and (b)

## 15 Mock Test Paper

**Directions for Questions 1 to 4:** On the basis of the information given below ([Table 1.1](#)), answer the questions that follow:

The Industry Today group reviews and ranks the companies in India on the basis of twenty parameters. These parameters are ranked Good (G), Satisfactory (Y), and Below satisfactory (B). There are six industries it reviewed and rewarded them 3 points for Good, 2 for Satisfactory, and 1 for Below satisfactory. It also awarded them total points which were the sum of the points obtained for each of Good (G), Satisfactory (Y), and Below satisfactory (B) points. The ranking of the industries was done in descending order of their total points. If the total points were equal then a higher rank was given to the industry with higher ‘Good’ points. If the ‘Good’ points were also equal then ranking was done on the basis of ‘Satisfactory’ points. Higher the points meant better the rank. Some cells are intentionally left blank. For each question, you can use the data of the previous questions.

**Note:** Each Industry might also be rated poor, and a poor rating would lead to 0 points.

---

**Table 1.1**

| Rank | Industry | Good | Satisfactory | Below Satisfactory | Total |
|------|----------|------|--------------|--------------------|-------|
| 3    | C        | 4    |              | 5                  |       |
| 1    | A        | 6    |              |                    | 24    |
| 5    | E        | 3    |              |                    | 19    |
| 4    | D        | 2    |              | 5                  |       |
| 2    | B        |      | 5            | 2                  |       |
| 6    | F        |      | 1            |                    |       |

1. Which of the following is the total points scored by Industry B?

  - (a) 19
  - (b) 24
  - (c) 23
  - (d) Either of (a) or (c)
2. If D has 6 satisfactory ratings, how many satisfactory ratings did C have?

  - (a) 2
  - (b) 3
  - (c) 4
  - (d) Either (a) or (b)
3. If you were to build a table for the possible ways in which the points structure for the situation described with respect to the number of Good, Satisfactory and Below Satisfactory ratings could be allotted to the first 5 ranked industries, how many possibilities exist for building the table between A to E?

  - (a) 48
  - (b) 84
  - (c) 96
  - (d) 192
4. Which of the following statements is definitely true?

  - (a) The Satisfactory points won by C cannot be determined
  - (b) The below satisfactory points of D can be determined
  - (c) The Satisfactory points of D cannot be determined
  - (d) Both (a) and (c)

**Directions for Questions 5 to 8:** On the basis of the information given below ([Table 1.2](#)), answer the questions that follow:

A railway traffic scheduler has to schedule train timings from 0800 hrs from Lucknow to Pune, Kanpur, Agra, and back. The rules for the railway signaling are as given below:-

- (i) No train arrives at Lucknow or departs on days 1/3/5/7 at 0845 hrs apart from train number AMS005

- (ii) The train from the same origin and to the same destination should be maintained with a difference of at least one hour
- (iii) There is only one train arriving or departing at 1215 hrs. If we go directly from Lucknow to Kanpur, the time taken is less than two hours but more than one hour.
- (iv) Train number AMS008 reaches Lucknow after train number AMS006 and before train number AMS011
- (v) Time taken for a train to travel between any two cities is the same in both directions

*Due to a technical snag, some data was lost from the railway traffic scheduler and the following table could be extracted from the computer:*

**Table 1.2**

| Train number | Origin  | Destination | Via       | Departure | Arrival | Time taken in hours | Days operated |
|--------------|---------|-------------|-----------|-----------|---------|---------------------|---------------|
| AMS008       | Kanpur  | Lucknow     | Jaipur    | 0530      |         |                     | Daily         |
| AMS001       | Lucknow | Kanpur      | Jaipur    | 0800      |         |                     | Daily         |
| AMS015       | Kanpur  | Lucknow     | Udaipur   | 0635      |         | 3:55                | Daily         |
| AMS003       | Pune    | Lucknow     | Raipur    | 0415      | 0830    | 4:15                | Daily         |
| AMS006       | Agra    | Lucknow     | Bangalore | 0555      | 0900    | 3:05                | Daily         |
| AMS022       | Lucknow | Agra        | Hyderabad | 1245      | 1630    | 3:45                | Daily         |
| AMS009       | Lucknow | Agra        | Bangalore | 0945      | 1250    | 3:05                | Daily         |
| AMS010       | Lucknow | Pune        | Nagpur    | 1000      | 1405    | 4:05                | Daily         |
| AMS002       | Lucknow | Agra        | —         | —         | 1000    | —                   | 1/3/5/7       |
| AMS007       | Pune    | Lucknow     | —         | —         | 0930    | —                   | 1/3/5/7       |
| AMS011       | Agra    | Lucknow     | —         | —         | 1015    | —                   | 1/3/5/7       |
| AMS012       | Lucknow | Kanpur      | —         | —         | 1125    | —                   | 2/4/6         |
| AMS004       | Kanpur  | Lucknow     | —         | —         | 0815    | —                   | 2/4/6         |
| AMS014       | Lucknow | Pune        | —         | —         | 13:35   | —                   | 1/3/5/7       |
| AMS016       | Pune    | Lucknow     | —         | 0810      | —       | —                   | 2/4/6         |
| AMS018       | Lucknow | Kanpur      | Udaipur   | 1130      | 1525    | 3:55                | Daily         |
| AMS005       | Lucknow | Pune        | —         | 0845      | —       | —                   | 2/4/6         |
| AMS019       | Lucknow | Pune        | Raipur    | 1200      | 1615    | 4:15                | Daily         |
| AMS020       | Agra    | Lucknow     | —         | 1030      | —       | —                   | 2/4/6         |
| AMS013       | Agra    | Lucknow     | Hyderabad | 0730      | 1115    | 3:45                | Daily         |
| AMS021       | Pune    | Lucknow     | Nagpur    | 0825      | 1230    | 4:05                | Daily         |
| AMS023       | Kanpur  | Lucknow     | —         | 1105      | —       | —                   | 1/3/5/7       |
| AMS017       | Lucknow | Agra        | —         | 1100      | —       | —                   | 2/4/6         |
| AMS024       | Lucknow | Kanpur      | —         | 1300      | —       | —                   | 2/4/6         |

1-Monday 2-Tuesday 3-Wednesday 4-Thursday 5-Friday 6-Saturday 7-Sunday

*Railway traffic control data sheets tell that at the Lucknow station the time difference between any two arrivals/departures or in between any arrival and*

*departure is 15 minutes.*

5. At what time will the train from Lucknow to Kanpur via Jaipur reach its destination?
  - (a) 1000 hrs
  - (b) 1145 hrs
  - (c) 1130 hrs
  - (d) 1200 hrs
  - (e) Cannot be determined
6. What time the train AMS017 from Lucknow shall reach Agra?
  - (a) 1405 hrs
  - (b) 1145 hrs
  - (c) 1245 hrs
  - (d) 1300 hrs
  - (e) Cannot be determined
7. When does train number AMS012 depart from its place of origin?
  - (a) 0830 hrs
  - (b) 0845 hrs
  - (c) 0930 hrs
  - (d) None of these
8. Find out the time when train number AMS016 from Pune reaches Lucknow.
  - (a) 0945 hrs
  - (b) 1005 hrs
  - (c) 1030 hrs
  - (d) 1045 hrs

**Directions for Questions 9 to 12:** Refer to the data ([Tables 1.3 \(a\)](#) and [1.3\(b\)](#)) to answer the questions:

*Bell computers manufacture computers and peripherals. Due to their latest induction into the Indian market, they have just one showroom where they sell their products. It may be noted that not all computers manufactured are put for sale in the showroom and not all computers that are put in the showroom are sold. If a computer is not sold in a particular month then it*

continues to be displayed in the showroom until it is sold out. [Table 1.3 \(a\)](#) given below gives the partial data from the month of January through September.

**Table 1.3 (a)**

| Month | Computers Manufactured | Computers put in Showroom | Computers Sold | Computers Unsold |
|-------|------------------------|---------------------------|----------------|------------------|
| Feb   | 1478                   |                           | 1562           | 268              |
| Sept  | 1753                   |                           | 1440           |                  |
| Aug   | 1545                   |                           |                |                  |
| May   |                        | 2182                      |                |                  |
| Jan   | 1563                   | 1563                      |                |                  |
| June  | 1467                   |                           |                |                  |
| Mar   |                        | 1421                      |                | 373              |
| July  | 1254                   |                           | 1077           |                  |
| Apr   | 1496                   |                           |                | 459              |

**Table 1.3 (b)**

| Month of manufacture of computer | Months in which Computers are Sold |      |     |      |      |      |      |      |      |  |
|----------------------------------|------------------------------------|------|-----|------|------|------|------|------|------|--|
|                                  | Jan                                | Feb  | Mar | Apr  | May  | June | July | Aug  | Sept |  |
| Jan                              | 1231                               |      | 136 | 19   |      | 1    | #    | #    | #    |  |
| Feb                              | —                                  | 1389 |     | 41   | 4    | 3    |      | 2    | 1    |  |
| Mar                              | —                                  | —    | 875 |      | 86   | 49   | 23   | 6    | #    |  |
| Apr                              | —                                  | —    | —   | 1236 | 131  | 78   | 26   | 21   | 3    |  |
| May                              | —                                  | —    | —   | —    | 1548 | 107  | 45   | 17   | 0    |  |
| June                             | —                                  | —    | —   | —    | —    | 1353 | 9    | 0    |      |  |
| July                             | —                                  | —    | —   | —    | —    | —    | 973  | 146  | 63   |  |
| Aug                              | —                                  | —    | —   | —    | —    | —    | —    | 1327 | 79   |  |
| Sept                             | —                                  | —    | —   | —    | —    | —    | —    | —    | 1243 |  |

The table given below ([Table 1.3 \(b\)](#)) gives the sales figures from January through September with respect to its month of manufacture. A '#' symbol in the table indicates that the number of computers remain to be sold in that particular month as the stock has been exhausted in an earlier month. The table ([Table 1.24\(b\)](#)) has partial data.

9. What is the number of unsold computers in the outlet after April?
  - (a) 777
  - (b) 780
  - (c) 782
  - (d) Cannot be determined
  - (e) None of these
10. If the selling price of one computer in the month of its manufacture is ₹

500, and it increases by 10% every month thereafter due to inflation; what is the revenue earned from the sales of computers in April?

- (a) 718140
  - (b) 718142
  - (c) 718136
  - (d) 718149
  - (e) 718149.5
11. How many computers manufactured in Jan. were sold in May?
- (a) 23
  - (b) 17
  - (c) 26
  - (d) 19
  - (e) None of these
12. How many computers manufactured in Feb remained unsold in Mar?
- (a) 71
  - (b) 64
  - (c) 68
  - (d) 52
  - (e) 48

**Directions for Questions 13 to 16:** Refer to the data given below ([Figure 1.1 \(a\)](#) and [1.1 \(b\)](#)) and answer the questions that follow:

The world cup Hockey tournament is being played between four teams; there are a total of two rounds in the game. In each round a particular team plays one match with each of the opponents. The points that a team receives in the match is as given below:

A win gives 3 points

A draw gives 1 point to each of the contesting teams

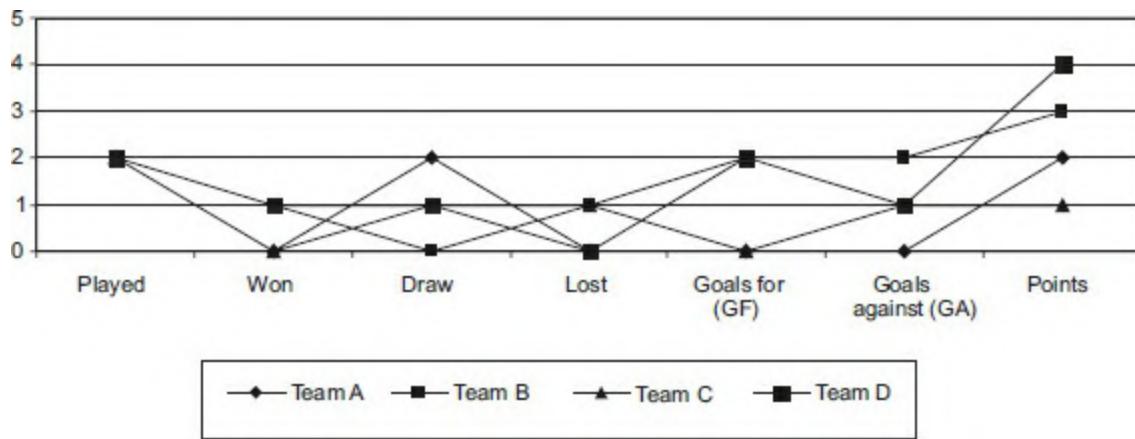
No points are given for a loss

The line chart below ([Figure 1.1 \(a\)](#)) gives the data of the four matches played in the first round

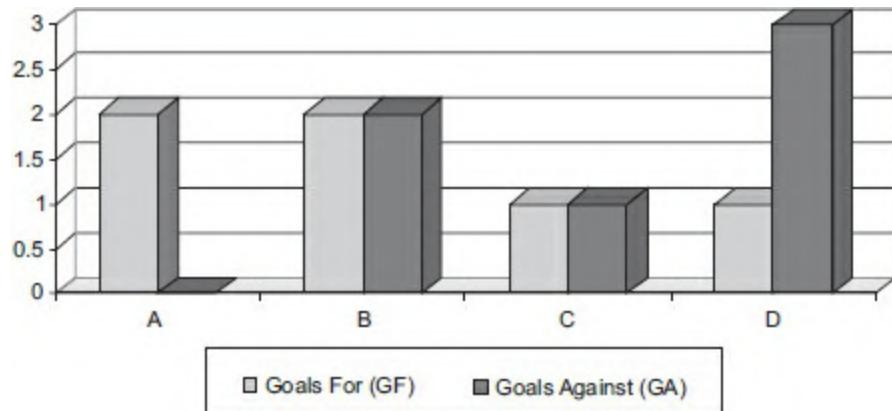
The remaining matches of the first round resulted in a draw

The bar graph given below ([Figure 1.1 \(b\)](#)) gives the data of the goals

*made in the matches played in the second round*



**Figure 1.1 (a)**



**Figure 1.1 (b)**

*The following gives some information regarding the results of the matches played in the second round*

- (1) *C played one match against B and the result was a draw*
  - (2) *B won only one match*
  - (3) *A did not win the match against D.*
  - (4) *D lost two of the matches that it played*
  - (5) *A had 10 points at the end of the second round*
- 13.** Which of the following could be the fifth match played in the first round of the tournament?
- (a) A Vs C

- (b) C Vs D
  - (c) B Vs C
  - (d) B Vs D
14. How many matches did C win in the second round?
- (a) 1
  - (b) 2
  - (c) 3
  - (d) 4

**Additional Information** When the comparisons of the goals of the teams after the tournament were made, then the following information was obtained:

A had three goals for, B had 5, C had 1, and D had 3 while in term of goals against, A had 1, B had 2, and D had 4.

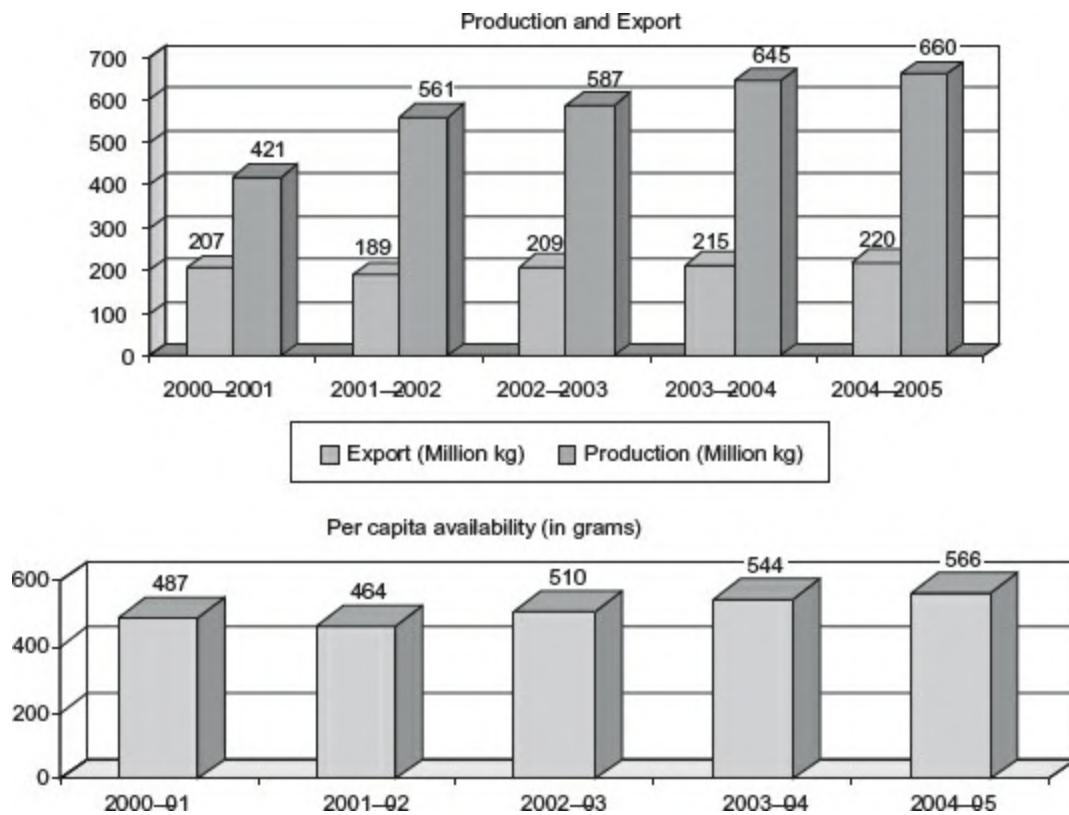
15. What was the score A had 1, B had 5, C had 2 and D had 4.in the first round?
- (a) 0–0
  - (b) 1–1
  - (c) 2–2
  - (d) Cannot be determined
16. If the goal comparison after the tournament is the same as in the above question, then which team has stood third? For the teams having the same points, the team with the minimum GA holds the higher position
- (a) A
  - (b) B
  - (c) C
  - (d) D

## 16 Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the graphs given below (Figure 1.1) and answer the questions that follow.

**Note:** Productivity of wheat in India = Total wheat production / Area under wheat production

1. The population of India in 2003–04 was:
  - (a) 750 million
  - (b) 770 million
  - (c) 790 million
  - (d) 800 million
2. Say the area under production was reduced by 10% in 2004–05 as compared to that of 2003–04 then the rate of increase/decrease in the productivity of wheat in 2004–05 was:
  - (a) 13% decrease
  - (b) 14% decrease
  - (c) 13.2% increase
  - (d) 13.6% increase
3. The ratio of the average wheat that is exported to that of the wheat produced from 2000–01 to 2004–05 is:
  - (a) 0.30
  - (b) 0.32
  - (c) 0.36
  - (d) 0.38



**Figure 1.1** Wheat Production in India

4. The average of per capita availability of wheat in the given period was:
  - (a) 514 gm
  - (b) 469 gm
  - (c) 501 gm
  - (d) 536 gm

**Directions for Questions 5 to 9:** Refer to the following table (Table 1.1) to answer the questions that follow.

Time division multiple access is often used as a method to divide a minute of occupancy time of a CDMA communication link to process  $N$  number of mobile users queued. An engineer decides to come out with a few conclusions regarding the performance of the CDMA communication link. He finds out from the technical sheets that each minute is equally divided into five slots and each user occupies one time slot to connect his call. To connect one user to another, each user is connected to a slot. Users 1,2,3,4, and 5 are the hosts of the slots 1,2,3,4, and 5 respectively. The algorithm that CDMA

communication link follows is given below:-

1. For each slot during the first second, the link checks if the host of that slot has a job.
2. If the host has a job, the link is left idle for the next second
3. If no job is there then the link checks for the pending jobs of some other user
4. The pending job will be processed according to the priority of the users, i.e. user 1 has the highest priority while user 5 has the lowest priority

A job is defined as the actual time used by host to complete his job, i.e. the time beyond the first two seconds of any slot that are used by the communication link to check whether an active host exists or there is a pending host. Only one job is done in one time slot. The engineer gathers the following statistics ([Table 1.1](#)) from the computer's memory:

**T:** Time at which the user asks for a connection to be established

**S:** Actual time needed in seconds by the host to complete the job, i.e. the time beyond the first two seconds

5. If the CDMA communication link is idle before job 1 is given to it, then in which of these slots will the job of user 3 will be finished if no jobs by user 2 are given as yet
  - (a) Slot 1
  - (b) Slot 2
  - (c) Slot 3
  - (d) Slot 4

**Table 1.1**

| Computers | JOB 1   |    | JOB 2   |    |
|-----------|---------|----|---------|----|
|           | T       | S  | T       | S  |
| User 1    | 7:59:58 | 10 | 9:02:10 | 20 |
| User 2    | 8:00:08 | 13 | 9:02:27 | 13 |
| User 3    | 8:00:07 | 32 | 9:02:29 | 31 |
| User 4    | 8:00:06 | 18 | 9:02:47 | 10 |
| User 5    | 8:00:22 | 11 | 9:02:13 | 15 |

6. Which of the following users did not get access to any of the slots in the first minute of job 2?

- (a) User 2
  - (b) User 3
  - (c) User 4
  - (d) User 5
7. Which of these users completes its job utilising only the slots assigned to him in job 2?
- (a) User 2
  - (b) User 3
  - (c) User 4
  - (d) No user
8. Of all the slots required for the completion of job 2, for how much time was the link idle?
- (a) 53 seconds
  - (b) 54 seconds
  - (c) 55 seconds
  - (d) Cannot be determined

**Directions for Questions 9 to 12:** Refer to the following data ([Table 1.2](#)) to answer the questions that follow:

In a dog show, 20 dogs were made to sit in a row facing north for people to view. Each dog was given a tag number 1 through 20 and was supposed to be called by the same number as the number on its tag. The owners of the dogs were told the name (or tag number) so that they could recognise their dog after the show. However, the curator messed up with the tags and now every dog has a different tag than what the name of the dog is. The following table could be ([Table 1.2](#)) drawn by the curator at the end of the show. A (+x) suggests that the dog with a particular tag is sitting x places to the left of the dog with the same name and a (-y) suggests that the dog with a name is sitting to the y places to the left of the dog with its tag.

As an example, consider row 1, column 1. A +6 suggests that the dog with name 1 is seated 6 places to the right of the dog having the tag 1 on him.

---

**Table 1.2**

| Name of dog | Tag number |     |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
|-------------|------------|-----|-----|----|-----|---|-----|----|----|----|----|----|----|----|----|----|-----|-----|----|----|
|             | 1          | 2   | 3   | 4  | 5   | 6 | 7   | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17  | 18  | 19 | 20 |
| 1           | +6         | +3  | -13 |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 2           |            |     |     | -9 | -   | - |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 3           |            |     |     |    |     |   | -3  | -7 | -  |    |    |    |    |    |    |    |     |     |    |    |
| 4           |            |     |     |    |     |   |     |    |    | +7 | +9 | +6 | +3 |    |    |    |     |     |    |    |
| 5           |            |     |     | -5 |     |   |     |    |    |    |    |    |    |    |    |    | -13 | -11 |    |    |
| 6           |            | +4  |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    | -6 |
| 7           |            |     |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    | +3 |
| 8           |            |     |     |    |     |   | -4  |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 9           |            |     |     |    |     |   |     | -8 |    |    |    |    |    |    |    |    |     |     |    |    |
| 10          |            |     | -6  |    |     |   |     |    |    | +6 |    |    |    |    |    |    |     |     |    |    |
| 11          |            |     |     |    | -11 |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 12          |            |     |     |    |     |   |     |    |    |    |    |    |    |    |    |    | -7  | -17 |    |    |
| 13          | +2         |     |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 14          |            |     |     |    |     |   | -13 |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 15          |            |     |     |    |     |   |     | +2 |    |    |    |    |    |    |    |    |     |     |    | +1 |
| 16          |            | 0   |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 17          |            | +15 |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 18          |            |     |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 19          | +16        |     |     |    |     |   |     |    |    |    |    |    |    |    |    |    |     |     |    |    |
| 20          |            |     | +3  |    |     |   |     |    | -1 |    |    |    |    |    |    |    |     | +6  |    |    |

**Example:** The dog with name 20 is sitting +3 places (that is 3 places right) to the dog that is labelled with the tag 4

9. How many dogs are seated to the left of 16?

- (a) 11
- (b) 12
- (c) 13
- (d) None of these

10. Consider the following statements:

- (i) The dog named 13 has tag 10 on him
- (ii) The dog with tag 14 is seated in position 7
- (iii) The dog with name 1 is tagged 7
- (iv) The dog with tag 1 is seated in position 1
- (v) The dog with name 8 has a tag 7 and is seated in position 13

Which of the above statements is true?

- (a) All of the above
- (b) None of these
- (c) Cannot be determined
- (d) (iv) and (v)
- (e) All but (iv) and (v)

11. The dog tagged 4 has which dog seated to the right of him (name) and what is his tag number and position? (name-tag-position)
- (a) 17-18-16
  - (b) 18-17-16
  - (c) 17-19-16
  - (d) Cannot be determined
  - (e) None of these
12. Consider the following statements:
- (i) The dog with tag 6 is seated 6 places left to the dog with name 14.
  - (ii) The dog with name 13 is seated two places right of the dog with tag 15.
  - (iii) The difference in the tags of the dog seated in position 18 and the dog with name 5 is 6.
  - (iv) The dogs with name 12 and 17 have the same tag number as their position number.
  - (v) The dog with tag 7 is 8 places right of the dog with name 8.
- Which of the above is true?
- (a) (i), (iii), and (v)
  - (b) (ii), (iv), and (v)
  - (c) (i), (iii), and (iv)
  - (d) None of these

**Directions for Questions 13 to 16:** Refer to the following data (Table 1.3) to answer the questions that follow. The financial detail of 12 Indian companies is listed below in the following table. The details have been obtained from the Department of Commerce, Government of India for the year 2007–08. Each of the 12 companies belongs to one of the sector of Polyester industry, Agriculture industry, Machinery industry, or Communication industry. It is also known that there are at least two companies in each industry mentioned above out of the 12 companies. All the values except Liquidity Ratio are in ₹crore.

The following information was also found from the Department of Commerce, Government of India:

- (i) For any two Communication industry based companies A and B, if the

*liquidity ratio of A is less than B then the net profit of A is more than B*

**Table 1.3**

| Company | Expenditure | Liquidity | Other Incomes | Net Profit | Sales |
|---------|-------------|-----------|---------------|------------|-------|
| 1       | 6230        | 1.80      | 740           | 1020       | 7820  |
| 2       | 5840        | 1.40      | 1100          | 480        | 6200  |
| 3       | 4790        | 1.75      | 920           | 450        | 5490  |
| 4       | 3680        | 1.45      | 1130          | 550        | 4500  |
| 5       | 1980        | 1.73      | 980           | 800        | 2100  |
| 6       | 2790        | 1.40      | 380           | 350        | 5800  |
| 7       | 3800        | 1.48      | 1350          | 950        | 3800  |
| 8       | 2140        | 1.44      | 1020          | 850        | 3420  |
| 9       | 2680        | 1.62      | 1240          | 180        | 6400  |
| 10      | 4230        | 1.36      | 650           | 720        | 4500  |
| 11      | 2200        | 1.75      | 940           | 525        | 3680  |
| 12      | 5460        | 1.33      | 1460          | 650        | 6500  |

- (ii) For every Communication industry based company, the ‘other incomes’ is more than ₹1000 crore
  - (iii) For any two Agriculture industry based companies A and B, if the expenditure of A is less than B then the Liquidity ratio of A is more than B
  - (iv) For every Agriculture industry based company, the net profit is more than ₹700 crore
  - (v) For any two Machinery industry based companies A and B, if the sales of A is more than B then the ‘other incomes’ of A is less than B
  - (vi) For every Machinery industry based company, the Liquidity ratio is more than 1.6
  - (vii) For any two Polyester industry based companies A and B, if the ‘other incomes’ of A is more than B then the net profit of A is more than B
  - (viii) For every Polyester industry based company, the sales is more than ₹5000 crore
13. Say if there are four companies in industry X then which among the following could be X?
- Agriculture and Communication
  - Polyester and Agriculture
  - Polyester and Machinery
  - Cannot be determined
14. Consider the following statements:

- (i) Company 3 is either machinery or Agriculture based industry
- (ii) Companies 7 and 11 are Agriculture based companies
- (iii) It cannot be decided which industry does company 5 belong to
- (iv) Communication industry for certain has companies 2, 8, and 9
- (v) It cannot be decided for certain which industry do companies 3, 5, and 6 fall into

Which of the following combinations is correct?

- (a) (i) – true, (ii) – false, (iii) – false, (iv) – true, (v) – true
- (b) (i) – false, (ii) – false, (iii) – true, (iv) – false, (v) – true
- (c) (i) – false, (ii) – false, (iii) – true, (iv) – true, (v) – false
- (d) None of these

15. If all the four industries have the same number of companies then which of the following statements is true?

- (i) 3 is a Polyester company
- (ii) 5 is a Machinery company
- (iii) 12 is a communication company
- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) All of the above
- (d) None of these

16. Which among the following is a communication industry based company?

- (a) 9
- (b) 10
- (c) 11
- (d) None of these

## 17 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below:

Mr. Arun Sharma, the CEO of AMS Centre for Management Studies, wished to find some details regarding ten students who took coaching at his institute. For the purpose of CAT, each of the 10 students appeared in a mock paper called NATCAT consisting of four sections, English, Quant, DI, and Reasoning. Apart from this, Mr. Sharma also graded the students on the basis of their GD/PI sessions. The following table ([Table 1.1](#)) gives the details of the relevant data.

Due to computers overload certain errors have crept into the above table in the grades and marks. The following information is also known so that Mr. Sharma can retrieve the original, correct data:-

- (i) All marks are whole numbers and the maximum marks possible in any subject is 100
  - (ii) There are only 4 grades — A, B, C, and D — that the students got
  - (iii) If a student got a C grade in GD/PI or scored less than 50 marks in English then he got more than 60 marks in DI
  - (iv) If a student got more than 80 marks in DI, he got a B grade.
  - (v) If a student got a A grade in GD/PI then he scored less than 50 marks in quant, more than 50 marks in reasoning and less than 70 marks in English.
1. What are the minimum number of errors that crept into the table?
- (a) 5
  - (b) 6
  - (c) 7

- (d) None of these
2. If all the grades mentioned in the above table are correct for all students and also the least possible number of mistake have occurred while tabulating the marks then the total marks scored by C in all the four sections together can be at maximum
- 275
  - 280
  - 285
  - Cannot be determined
3. What is the least possible total score of any student in all the four sections put together? (You may use data from the previous questions, if needed)
- 160
  - 200
  - 150
  - 141

**Table 1.1**

| Name of student | Grade in GD/PI | Marks obtained in |       |    |           |
|-----------------|----------------|-------------------|-------|----|-----------|
|                 |                | English           | Quant | DI | Reasoning |
| A               | C              | 10                | 40    | 20 | 30        |
| B               | B              | 40                | 50    | 30 | 70        |
| C               | A              | 60                | 40    | 88 | 50        |
| D               | B              | 70                | 50    | 60 | 60        |
| E               | A              | 50                | 80    | 70 | 40        |
| F               | B              | 80                | 30    | 90 | 40        |
| G               | B              | 40                | 50    | 80 | 70        |
| H               | C              | 40                | 60    | 50 | 80        |
| I               | A              | 40                | 30    | 60 | 50        |
| J               | C              | 90                | 85    | 40 | 90        |

4. At the most how many students could have scored more than 320 marks as their grand total? (You may use data from the previous questions, if needed)
- 1
  - 2
  - 3

- (d) Cannot be determined

**Directions for Questions 5 to 9:** Refer to the data given below to answer the questions that follow:

Two Physicists, Mr. Nerdy and Mr. Geeky, have recently discovered four new sub atomic particles. They decide to name these particles Atron, Btron, Ctron, and Dtron. While discovering them they also found that the mean life (the time over which the sub atomic particle is in stable state) was probabilistically distributed and could be at best 100 nano seconds (ns) and at the minimum 0 nano seconds.

Mr. Nerdy and Mr. Geeky recorded the following data in their log book:

- (a) The expected mean life of the four particles Atron, Btron, Ctron and Dtron is 60, 90, 80, and 75 nano seconds respectively
- (b) Upon observation it was found that the mean life of either of Atron or Btron is 10% higher than the expected results
- (c) Similarly, upon observation it was found that the mean life of either of Ctron or Dtron is 20% higher than the expected results
- (d) Also, the observed results of the mean life of one of the sub atomic particles is 10% lower than the expected mean life and of another sub atomic particle is 20% less than the expected

Expected mean life is the mean life that the two Physicists expect from their prior knowledge without performing any experiments. Practical mean life is the mean life obtained upon performing practical experiments

5. If the sum of the practical mean life of Btron and Ctron is 195 nano seconds, then the sum of the mean life of all the four sub atomic particles cannot be:
  - (a) equal to 310 ns
  - (b) less than 310 ns
  - (c) more than 310 ns
  - (d) None of the above
6. If the sum of the mean life of all the four sub atomic particles is 309 ns then which of the following statements is definitely true?
  - (i) The practical mean life of Atron is more than its expected mean life

- (ii) The practical mean life of Btron is less than its expected mean life
  - (iii) The practical mean life of Ctron is more than its expected mean life
  - (iv) The practical mean life of Dtron is less than its expected mean life
- (a) (i), (ii), and (iv)
  - (b) (ii), (iii), and (iv)
  - (c) (i), (iii), and (v)
  - (d) None of these
7. A new study revealed that when the four sub atomic particles are subjected to radiation then the sum of their expected mean life increases or decreases by 20%. What is the maximum difference of the sum of the new mean life and the sum of the old expected life?
- (a) 60.5
  - (b) 62.5
  - (c) 66.5
  - (d) Cannot be determined
8. If the practical mean life of two out of the four sub atomic particles is the same then which of the following statements is definitely true?
- (i) The practical mean life of Atron is 66 ns
  - (ii) The practical mean life of Btron is 66 ns
  - (iii) The practical mean life of Ctron is 72 ns
  - (iv) The practical mean life of Dtron is 90 ns
  - (v) The sum of the practical mean life of all the four sub atomic particles is 301.5 ns
- (a) All but (i) and (ii)
  - (b) All but (i), (ii), and (iii)
  - (c) All but (ii) and (v)
  - (d) Cannot be determined

**Directions for Questions 9 to 12:** Refer to the data given below and answer the questions that follow:

Summer beverages manufacture cold drinks named Pep, Miran, Fant,

*Slic, Dewy, Cok, Sprit, and 12 other miscellaneous drinks. The sales volumes of 5 top ranking cold drink products which belong to Fant, Slic, Pep, Sprit, and Dewy for the year 2006–07 were 5500, 13000, 18000, 16000, and 7500 respectively and that contributed to 75% of the total sales volume.*

*The sales in the next fiscal year hiked spectacularly by 56.25%. Slic contributed to 10.8% of the total sales volume in 2007–08. Pep, Dewy, Miran, and Cok contributed 14%, 4%, 16.8%, and 14.4% of the total sales volume in 2007–08. The sales mentioned above are for the top five rated products in the year 2007–08. In 2006–07, the sales of the miscellaneous categories was 15% of the total sales*

9. If the increase in the sales of Miran in the year 2007–08 is 400% with respect to the previous year then what is the rank of Cok in the year 2006–07? (Consider the sales of the number of miscellaneous categories are equal)
  - (a) 6<sup>th</sup>
  - (b) 7<sup>th</sup>
  - (c) 8<sup>th</sup>
  - (d) 9<sup>th</sup>
10. If the products for the two years combined are ranked in the decreasing order of their sales, which of these products would rank 6<sup>th</sup>? (The products in the miscellaneous category were not among the top 7 for both the years)
  - (a) Sprit
  - (b) Dewy
  - (c) Fant
  - (d) Slic
11. In the above ranking which of these would rank 5<sup>th</sup>
  - (a) Miran
  - (b) Cok
  - (c) Sprit
  - (d) Cannot be determined
12. In the year 2006–07, if the sales of Miran ranked 6<sup>th</sup> then the sales of Cok in that year would be? (Consider sales of number of products in the miscellaneous category are equal)

- (a) Greater than 4000
- (b) More than 1000 but less than 4000
- (c) 4000
- (d) None of these

**Directions for Questions 13 to 16:** Answer the questions on the basis of the information given below:

*Mindworkzz Centre for Management Studies has three branches in India, i.e. at Patna, Lucknow, and Jamshedpur. The number of faculty members in each centre may vary depending upon the intake capacity of students. The following information was obtained from reliable sources:-*

- (i) At times, a specialist of a subject of one city may visit a centre at another city to teach for a few days. Each faculty teaches at at least one city and may or may not teach at another city.
  - (ii) Some of the faculty members are teaching at exactly two centres and the number for various possible combinations is in the ratio of 1:2:3 respectively (in the same order of the centre mentioned above) Patna+Lucknow corresponds to 1 ... Patna+Jamshedpur; Lucknow+Jamshedpur (in some random order) correspond to 2 and 3.
  - (iii) 10 faculty members teaching at Patna centre are also teaching at a minimum of one other centre.
  - (iv) 24 Faculty members teach at the Patna centre
  - (v) The number of faculty members in Lucknow alone is twice the number of those who visit all the three cities to teach their respective specialisations.
  - (vi) Number of faculty members teaching at Jamshedpur centre alone is four more than the number of faculty members teaching at all the three centres.
- 13.** Based upon the information given above, how many total faculty members are employed at Mindworkzz?
- (a) 43
  - (b) 44
  - (c) 45
  - (d) 48

14. Which of the following additional information will enable us to find the exact number of faculty members involved in each centre?
- (i) Six faculty members teach at all the three centre.
  - (ii) Twenty one teachers work at Lucknow centre.
  - (iii) Twenty one teachers work at Jamshedpur centre.
  - (a) (i) and (ii)
  - (b) (i) and (iii)
  - (c) (ii) and (iii)
  - (d) (i), (ii), and (iii)

**Additional information** Due to over burden on faculty members it was decided by the Mindworkzz management that every faculty could teach at at the most at two centers. Hence any faculty who was associated with all the three cities had his duties withdrawn from exactly one of the centre (randomly or as decided by the management) and reinstated with responsibilities of two centres only. The number of teachers withdrawn from Lucknow centre are two less than the number that are withdrawn from the Patna centre which again is two less than the number withdrawn from the Jamshedpur centre. It is also known that the number of people working at Patna and Jamshedpur only is greater than the number working at Patna and Lucknow only.

15. Which of the following statements is/are definitely false
- (a) Number of faculty members working at Patna centre is less than 15
  - (b) Number of faculty members working at Jamshedpur centre is more than 23
  - (c) Both of the above
  - (d) None of these
16. In addition to the previous question, some new faculty members were inducted into the Mindworkzz team who joined only one center. They were distributed across the three centers in such a fashion that after the distribution, the number of faculty members at all the three centres became identical. What is the minimum number of faculty members required to satisfy the given condition?

- (a) 4
- (b) 6
- (c) 2
- (d) None of these

## 18 Mock Test Paper

**Directions for Questions 1 to 4:** Refer to the data given below to answer the questions that follow:

The World Health Organization recently conducted a research to find the most hazardous cities in the world in terms of pollution. The three kinds of pollution under consideration were air, water, and sound pollution. In its research drive in India, WHO initially shortlisted ten urban cities that had the highest levels of pollution in stage 1. WHO gave these cities tokens on the basis of the level of pollution in them for each of the three variables, i.e. air, water, and sound pollution. The pollution level in either variables could be one of “Ultra Hazard Level” (UHL), “Medium Hazard Level” (MHL), and “Low Hazard Level” (LHL). A total of four tokens were given to each city in stage 1 and a total of three tokens were given to each city in stage 2. There are ‘Token Points’ associated with each token. A UHL token is worth 5 token points, a MHL token is worth 2 token points, and a LHL token is worth 0 token points. Each city could be given more than one token of UHL, MHL, or LHL for any of the three variables depending upon the gravity of the situation as decided by the scientists at WHO. Obviously, the city with the maximum number of token points was the most polluted. The four cities with the highest levels of pollution in stage 1 were then again taken into consideration in stage 2. A reevaluation was done and again the same token system was followed. However the tokens from the first stage did not carry forward to the second stage. At the end of the research, the city with the highest number of token points was declared the most hazardous city of India.

Table 1.1 was made available by the scientists at WHO and gives the number of tokens given to the various cities (some cells have intentionally been left blank):

**Table 1.1**

| City           | Number of<br>UHL tokens | Number of<br>MHL tokens | Number of<br>LHL tokens |
|----------------|-------------------------|-------------------------|-------------------------|
| <i>Stage 1</i> |                         |                         |                         |
| A              |                         |                         | 2                       |
| B              |                         |                         | 1                       |
| C              |                         | 1                       |                         |
| D              | 0                       |                         |                         |
| E              |                         | 3                       |                         |
| F              |                         | 3                       |                         |
| G              |                         |                         | 0                       |
| H              |                         |                         | 2                       |
| I              | 0                       |                         |                         |
| J              |                         |                         |                         |
| <i>Stage 2</i> |                         |                         |                         |
| City 1         | 0                       |                         |                         |
| City 2         |                         |                         |                         |
| City 3         |                         |                         | 1                       |
| City 4         |                         | 3                       |                         |

Further, the following information was also provided:-

- (i) In stage 1, City A through E got a total of 7, 0, 12, 17, and 11 token points (data not necessarily in the same order as the cities listed)
  - (ii) Similarly in stage 1 itself, cities F through J received 4, 20, 6, 9, and 7 token points (data not necessarily in the same order as the cities listed)
  - (iii) The cities that secured 11, 17, 12, and 20 token points in stage 1 were the ones to move onto stage 2 of the research and secured 7, 2, 6, and 12 token points respectively
1. Which of the following cities was declared the second most hazardous city in India?
    - (a) A
    - (b) E
    - (c) I
    - (d) C
  2. Which city was ranked ninth in pollution level after the first stage?
    - (a) B
    - (b) D
    - (c) F
    - (d) None of these

3. Which city was declared the most hazardous city of India?
- (a) E
  - (b) G
  - (c) H
  - (d) Cannot be determined
4. Consider the following statements:
- (i) In stage 1, the number of cities which had token points greater than 10 were equal to the number of cities that token points less than 10
  - (ii) The total number of UHL tokens points in stage 1 is 65
  - (iii) The number of MHL tokens in stage 1 is equal to the UHL tokens given in the same stage
  - (iv) City D is the least polluted city in India among the cities taken into consideration by WHO
  - (v) In stage 1, the number of MHL tokens of the first five cities is more than the number of LHL tokens of the last five cities (order as given in the table above)

Which of the above statements is/are false?

- (a) (ii) and (v)
- (b) (i), (ii), (iv), and (v)
- (c) (i), (ii), and (iii)
- (d) (i), (iii), and (v)

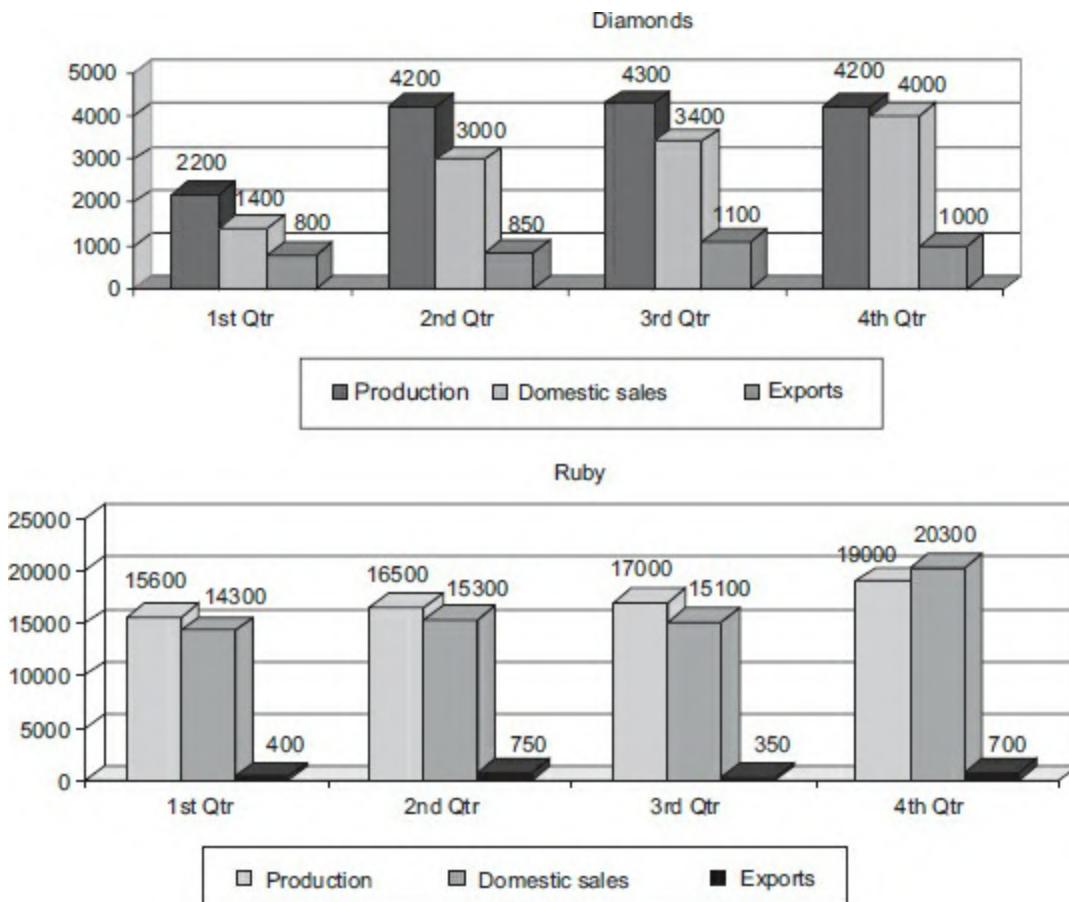
**Directions for Questions 5 to 8:** Answer the questions based on the information given below.

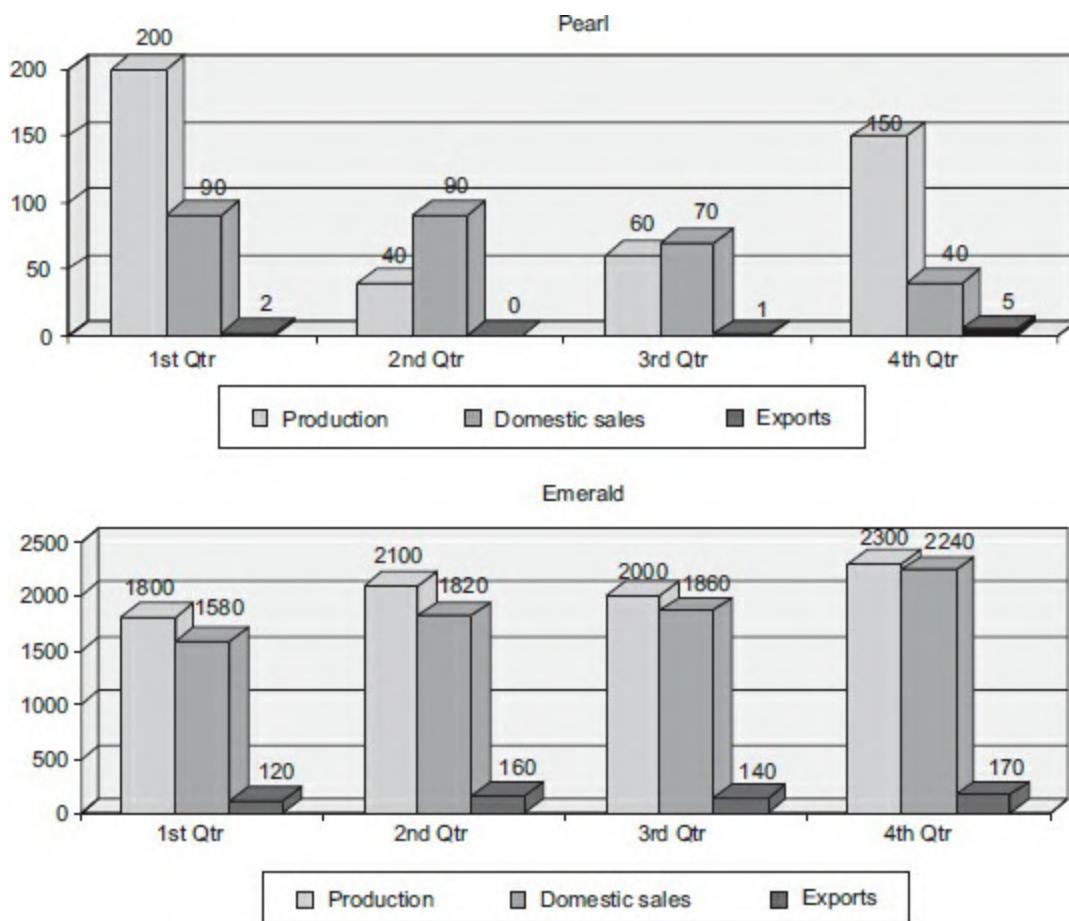
India is known around the world for its large reserves of precious stones. India mainly produces four precious stones, Diamond, Ruby, Pearl, and Emerald. The number of units of production, domestic sales and exports for each of the precious stones is given in the following bar chart ([Figure 1.1](#)) for the four quarters of the fiscal year 2019-20.

For these questions, all ratios have to be calculated till the second digit after decimal.

5. The ratio of total sales (Exports + Domestic) to total production is minimum for:

- (a) Diamond  
 (b) Ruby  
 (c) Pearl  
 (d) Emerald
6. Which among the following shows the maximum percentage increase in the ratio of total sales to production for a given particular quarter over the last quarter
- (a) Diamond: 2<sup>nd</sup> Quarter to 3<sup>rd</sup> Quarter  
 (b) Pearl: 1<sup>st</sup> Quarter to 2<sup>nd</sup> Quarter  
 (c) Emerald: 3<sup>rd</sup> Quarter to 4<sup>th</sup> Quarter  
 (d) Ruby: 1<sup>st</sup> Quarter to 2<sup>nd</sup> Quarter





**Figure 1.1**

7. Consider the following statements:

- The ratio of the Total sales to production for Emerald for the first and second quarter is the same
- The percentage decrease in the ratio of the Total sales to production for Diamonds is 10%
- None of the Precious stones have shown a continuous increase/decrease in ratio of the Total sales to production over all the four quarters

Which of the above statements is true?

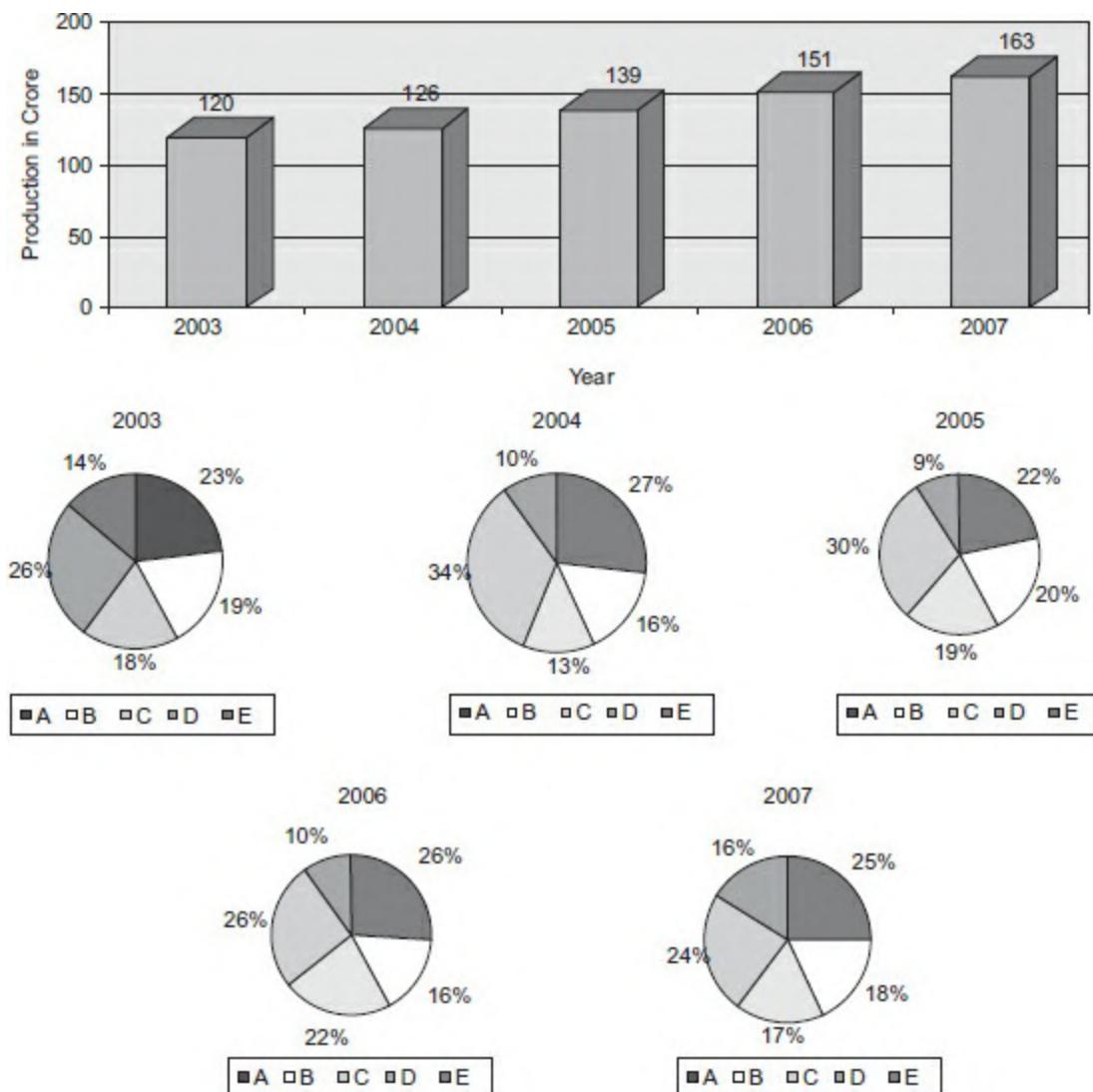
- (i) and (ii)
- (ii) and (iii)
- All of these
- (i) and (iii)

8. If the revenue generated from the domestic sales is twice that of the exports for all the precious stones in the 4<sup>th</sup> Quarter then the ratio of the per unit price for exports to that of domestic sales is the maximum for:
- (a) Diamonds
  - (b) Ruby
  - (c) Pearl
  - (d) Emerald

**Directions for Questions 9 to 12:** Refer to the following graph and pie chart ([Figure 1.2](#)) to answer these questions:

Given here is the data of the company AMS Ltd. The company publishes five books. The productions in its entire array of five books (in ₹ Crore). Quant (A), DI (B), Reasoning (C), English (D), and General awareness (E) and its total turnover over a period of five years (from 2003 to 2007) is shown in the bar charts. The distribution of the turnover for each year, for each of the five products is shown in the pie charts (as %) ([Figure 1.2](#)).

9. If we assume that the book on English maintained y% share on an average every year in the company's productions then what is the value of y?
- (a) 26%
  - (b) 27%
  - (c) 28%
  - (d) Cannot be determined
  - (e) None of these
10. If for two consecutive years, the highest growth in percentage terms of the company's productions between two successive years be b% then the average compounded annual growth rate over the given period is c% then what is the value of the difference between the two is:
- (a) 2.35%
  - (b) 2.40%
  - (c) 2.30%
  - (d) 2.75 %



**Figure 1.2**

11. How much more is the combined production of Quant and Reasoning books in 2006 to that of the combined turnover of DI and English in 2007.
  - (a) Rs. 3.9 cr.
  - (b) Rs. 3.8 cr.
  - (c) Rs. 4.5 cr.
  - (d) Rs. 4 cr.
12. Which of the following is not true?
  - (a) For the given 5 year period the average of the production of the

- company is more than the third years production
- B's production has been fluctuating in the given period
  - The maximum percentage increase in the turnover of the individual of products is 72% in between any two consecutive years
  - None of these

**Directions for Questions 13 to 16:** Answer the questions on the basis of the information given below:

The following table gives the time in minutes taken by five people, Adam, Barbie, Chandler, Dopey, and Estella, to complete five different questions in data interpretation, 1, 2, 3, 4, and 5. Any person can do any of the above mentioned questions but one person can do only one question.

---

**Table 1.2**

|          | Question |    |    |    |    |
|----------|----------|----|----|----|----|
|          | 1        | 2  | 3  | 4  | 5  |
| Adam     | 38       | 44 | 29 | 57 | 28 |
| Barbie   | 31       | 42 | 53 | 24 | 39 |
| Chandler | 42       | 53 | 51 | 27 | 36 |
| Dopey    | 25       | 36 | 38 | 33 | 49 |
| Estella  | 38       | 39 | 41 | 47 | 45 |

- If no two persons can work simultaneously and there is no time gap in between two consecutive work sessions, then how much time will it take to complete all the questions in the worst case?
  - 4 hr 10 min
  - 4 hr 15 min
  - 4 hr 20 min
  - Cannot be determined
- Keeping all the conditions of the above question same, how little time will be taken to complete the five questions in the best case?
  - 2 hr 31 min
  - 2 hrs 33 min.
  - 2 hr 35 min

(d) Cannot be determined

**Additional information** Different people can solve different questions simultaneously with the same efficiency but every student can solve only one question at a given time

15. What is the minimum working time required to the closest minute to complete all the questions if all the students start together?
- (a) 20 min
  - (b) 25 min
  - (c) 30 min
  - (d) Cannot be determined
16. If only three out of the five people do the five questions, what is the minimum time taken to complete the questions. Use data from the previous questions if necessary (approximately)
- (a) 40 min
  - (b) 45 min
  - (c) 51 min
  - (d) 55 min

## 19 Mock Test Paper

**Directions for Questions 1 to 2:** Answer the questions that follow the given information.

Rohit, Shyam, Karan, and Manish are four friends. They travel all around the world and collect stamps of different countries. Once when they all were in US, they decided to identify facts about the collections. These are the facts they have claimed during the conversation,

Rohit said, “We have collected 200 stamps altogether.”

Shyam said, “None of us have collected less than 20 stamps.”

Karan said, “Each of us has collected an even number of stamps.”

Together, all of them said, “Each one of us has collected a different number of stamps.”

1. The friend who collected the most number of stamps could not have exceeded:
  - (a) 134
  - (b) 132
  - (c) 130
  - (d) 120
2. One of the four friends collected 116 stamps and he was not Shyam. If Karan collected two more than double the number collected by Manish, then how many stamps did Shyam collect?
  - (a) 20
  - (b) 22
  - (c) 24
  - (d) Indeterminable

**Directions for Questions 3 to 7:** 12 Hockey teams participated in a tournament. These teams were equally distributed into 2 pools, A and B. In the 1<sup>st</sup> round, each team played a match against all the other teams in the same pool. Top 3 teams with highest average (from both the pools) went to the next round, where all the six teams played against each other once. Again the top 3 teams with highest overall average (for the first 10 games played in the two rounds) qualified to the finals. In the final round, all the 3 teams played against each other and the team with the highest average overall was declared the winner.

**Scoring:** A win earns 4 points, loss earns -2, and a tie will result in 2 each.

**Average** = Total points/Number of matches.

Also, the winner of the tournament won both its matches in the finals and the total points earned by all the teams (played in the second round) after second round are 110.

The following table shows the points tally

3. Which 2 teams do not play against each other in the finals?
  - (a) A1, B2
  - (b) A1, B6
  - (c) A5, B2
  - (d) B2, B6
4. Find the number of matches won by A2 and A4.
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 3

| Teams   | A1   | A2 | A3 | A4 | A5  | A6  | B1   | B2    | B3  | B4  | B5  | B6   |
|---------|------|----|----|----|-----|-----|------|-------|-----|-----|-----|------|
| Total   | 28   | 0  | 10 | 0  | 16  | 6   | -6   | 26    | 6   | 12  | 4   | 14   |
| Average | 2.33 | 0  | 1  | 0  | 1.6 | 1.2 | -1.2 | 2.166 | 1.2 | 1.2 | 0.8 | 1.16 |

5. How many points did the second runner up earn in the finals?
  - (a) -4
  - (b) 2
  - (c) 4
  - (d) 0

6. After round 2, the highest average of any team can be
  - (a) 2
  - (b) 2.4
  - (c) 2.6
  - (d) 2.8
7. The first runner up of the tournament was
  - (a) A1
  - (b) B2
  - (c) B6
  - (d) B4

**Directions for Questions 8 to 12:** Nine horses participated in a horse tournament. Five races were held in this tournament. The winner of a race gets 5 points, 2nd gets 3, and the 3rd gets 1.

1. The table gives the points tally at the end of the races.

| Horse  | A | B | C | D | E | F | G | H  | I |
|--------|---|---|---|---|---|---|---|----|---|
| Points | 5 | 5 | 8 | 2 | 5 | 6 | 4 | 10 | 0 |

One race is held between five horses. The first race is held among the first 5 horses from the left in the above table. In the next race, out of these horses, A drops out of the race and a new horse F enters into the race. In the next race, B drops out and G enters and so on. It is also given that H is the only horse that scored in 2 consecutive races.

8. What was the position of horse F in race 4?
  - (a) 4<sup>th</sup>
  - (b) 2<sup>nd</sup>
  - (c) 3<sup>rd</sup>
  - (d) 1<sup>st</sup>
9. What is the ratio of the points scored by G and E in race 5?
  - (a) 1:3
  - (b) 3:1
  - (c) 1:5
  - (d) Cannot be determined

10. The first 3 rankers of race 3 are:
- C,E,G
  - D,E,F
  - C,G,E
  - Either (a) or (c)
11. D could have come third in which of the following races?
- Race 1
  - Race 3
  - Race 4
  - Race 5
12. Suppose C had 6 points and E had 7 points while the points of the rest of the horses remain unchanged. Then E could have come second in ...
- One race
  - Two races
  - At most one race
  - At most two races

**Directions for Questions 13 to 16:** Refer to the data and the two tables given below ([Tables 1.1\(a\)](#) and [1.1\(b\)](#)) and answer these questions.

*People of the Hippie land have their Olympics called “Hippie”. Hippie consists of four tournaments, namely the HI-HI, HE-HE, HA-HA, and HO-HO. Each of these four tournaments contain one or more of the several games A, B, C ... M. [Table 1.1 \(a\)](#) gives the individual points scored by the players in the respective games in the year 2007. Points which a player secures in a particular given tournament are of the rounds up to which the player has reached.*

*[Table 1.1 \(b\)](#) gives the total prize money and the points awarded to each level in the various tournaments.*

*The rules for the sharing of the prize money are that the prize money of any tournament is distributed in the ratio 20:14:18:20 among the winners, the runner-up, two semifinalists, and four quarter finalists. The two semifinalists get an equal amount of money and same goes for the quarterfinalists as well. Each match is played between only two players and there is no draw in any of the matches. Winners of R64 play R32, winners of*

*R32 play R16 and so on and so forth; winners of semifinals play in the final.*

**W:** Points awarded to the winner of the tournament

**F:** Points awarded to the runner up of the tournament

**SF:** Points awarded to the loser in semifinals, i.e semifinalist

**QF, R16, R32, and R64** are the points awarded to the players who lost in the quarter finals, round of 16, round of 32, and round of 64. All the tournaments are played with 64 players at the starting of the tournament

**Table 1.1 (a)**

|         | H   | F  | B   | L   | A   | D  | I   | E  | J  | K   | C   | G   | M   |
|---------|-----|----|-----|-----|-----|----|-----|----|----|-----|-----|-----|-----|
| Scrooge | 50  | 12 | 15  | 45  | 50  | 5  | 7   | 1  | 5  | 50  | 7   | 30  | 1   |
| Shaggy  | 0   | 12 | 7   | 1   | 15  | 27 | 25  | 12 | 1  | 1   | 15  | 30  | 25  |
| Mickey  | 140 | 1  | 45  | 1   | 90  | 5  | 1   | 3  | 42 | 1   | 1   | 7   | 45  |
| Johny   | 0   | 3  | 7   | 15  | 7   | 15 | 25  | 3  | 1  | 7   | 7   | 140 | 1   |
| Scooby  | 0   | 1  | 25  | 0   | 50  | 3  | 70  | 22 | 0  | 140 | 45  | 1   | 0   |
| Bluto   | 7   | 1  | 15  | 100 | 30  | 60 | 100 | 50 | 1  | 15  | 70  | 200 | 100 |
| DD      | 30  | 22 | 15  | 15  | 30  | 42 | 1   | 35 | 5  | 50  | 7   | 30  | 1   |
| Donald  | 0   | 5  | 15  | 70  | 7   | 1  | 1   | 5  | 3  | 15  | 15  | 1   | 70  |
| Dukey   | 200 | 50 | 100 | 0   | 90  | 1  | 0   | 1  | 60 | 200 | 100 | 90  | 0   |
| Dexter  | 90  | 0  | 70  | 0   | 140 | 15 | 1   | 0  | 27 | 90  | 15  | 0   | 0   |
| Scrappy | 50  | 5  | 15  | 25  | 15  | 15 | 1   | 22 | 15 | 15  | 7   | 15  | 1   |
| Simpson | 7   | 35 | 1   | 15  | 50  | 27 | 15  | 5  | 15 | 7   | 1   | 90  | 25  |
| Jetson  | 15  | 22 | 7   | 0   | 200 | 15 | 0   | 7  | 27 | 0   | 7   | 30  | 0   |

**Table 1.1 (b)**

| Name of Tournament | R 16 | R 32 | R 64 | QF | SF | F   | W   | Prize  |
|--------------------|------|------|------|----|----|-----|-----|--------|
| HO-HO              | 5    | 3    | 1    | 12 | 22 | 35  | 50  | 17,700 |
| HE-HE              | 15   | 7    | 1    | 25 | 45 | 70  | 100 | 36,000 |
| HI-HI              | 30   | 15   | 7    | 50 | 90 | 140 | 200 | 72,000 |
| HA-HA              | 5    | 3    | 1    | 15 | 27 | 42  | 60  | 21,600 |

13. The total prize money earned by runners up in all the tournaments is:

- (a) 106283
- (b) 106280
- (c) 106286
- (d) 106289

14. Which of the following players have possibly played against each other in the quarter finals of the tournament in which the K game is played?

- (a) Scrooge and DD
  - (b) Dexter and Scrooge
  - (c) Dupey and Scooby
  - (d) Scrappy and Simpson
15. What is the total prize money earned by Donald from all the given tournaments?
- (a) 12000
  - (b) 13000
  - (c) 11000
  - (d) 14000
16. Which of the following is a possible combination for the semifinals of the given tournament?
- (a) Dexter and Jetson in I
  - (b) DD and Shaggy in F
  - (c) Scrooge and Jetson in H
  - (d) Bluto and Scooby in C

## 20 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below.

The following table ([Table 1.1](#)) shows the seedings of different tennis players before the start of the World Tennis Cup tournament in the year 2090

**Table 1.1**

| Player        | Seeding |
|---------------|---------|
| Federer (Fed) | 1       |
| Nadal (Nad)   | 2       |
| Sampras (Sam) | 3       |
| McEnroe (Mc)  | 4       |
| Lendl (Ldl)   | 5       |
| Agassi (Aga)  | 6       |
| Leander(Lee)  | 7       |
| Roddick (Rod) | 8       |
| Becker (Beck) | 9       |
| Edberg (Ed)   | 10      |
| Connors (Con) | 11      |
| Stich (Sti)   | 12      |

**Note:** In the above table, Seed 1 is the favourite

**Note:**

- (i) The tournament is a single round robin format. Each player plays the other exactly once.

| Vs   | Fed    |        |        |        |        |        |        |       |       |       |        |
|------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|
| Nad  | Thwack | Nad    |        |        |        |        |        |       |       |       |        |
| Sam  | Thwack | Shack  | Sam    |        |        |        |        |       |       |       |        |
| Mc   | Shack  | Brick  | Thwack | Mc     |        |        |        |       |       |       |        |
| Ldl  | Brick  | Thwack | Shack  | Track  | Ldl    |        |        |       |       |       |        |
| Aga  | Shack  | Brick  | Thwack | Shack  | Track  | Aga    |        |       |       |       |        |
| Lee  | Thwack | Thwack | Track  | Thwack | Track  | Thwack | Lee    |       |       |       |        |
| Rod  | Brick  | Track  | Shack  | Thwack | Track  | Thwack | Shack  | Rod   |       |       |        |
| Beck | Track  | Thwack | Brick  | Track  | Thwack | Track  | Shack  | Brick | Beck  |       |        |
| ED   | Brick  | Thwack | Track  | Thwack | Thwack | Brick  | Track  | Shack | Brick | ED    |        |
| Con  | Brick  | Thwack | Track  | Shack  | Thwack | Brick  | Shack  | Track | Track | Shack | Con    |
| Sti  | Thwack | Shack  | Thwack | Shack  | Shack  | Track  | Thwack | Shack | Brick | Track | Thwack |

**Figure 1.1** Result of all the matches played in the Honda World Cup Tennis Cup (In the year 2090)

- (ii) The table gives the matches played in their reverse chronological order. That is, the match at the top left corner was the last match of the tournament, while the second last and the third last matches were both played by Sampras against Federer and Nadal respectively. Further, the fourth match was played by McEnroe against Federer and so on till the first match of the tournament, which was played by Stich against Connors.
- (iii) The outcome of a match is considered as a  
 Thwack — if the lower seed wins in straight sets.  
 Shack — if the lower seed wins in three sets (i.e. loses one set)  
 Brick — if the higher seed wins in straight sets.  
 Track — if the higher seed wins in three sets (i.e. loses one set)  
 These four are the only possible outcomes of any match.  
 The final of the tournament is played between the two players with the maximum number of points. In case of a tie, the player with the maximum number of wins qualifies. If there is still a tie, the player with the maximum number of straight set wins qualifies.
- (iv) Players are awarded points as follows:

- (a) For every match won in straight sets, the winner gets 5 points while the loser gets 0 points.
- (b) For every match won in 3 sets, the winner gets 4 points while the loser gets 1 point.
1. Who among the following won the least number of matches in the tournament?
- (a) Federer  
(b) Nadal  
(c) Sampras  
(d) Lendl  
(e) Agassi
2. What is the total number of points scored by Agassi in the series?
- (a) 21  
(b) 31  
(c) 32  
(d) 36
3. Between which two players is the final of the tournament played?
- (a) Stich-Agassi  
(b) Stich- Roddick.  
(c) Stich-Becker  
(d) Agassi-Becker
4. The player who ended up with the least points is?
- (a) Nadal  
(b) McEnroe  
(c) Connors  
(d) Leander

**Directions for Questions 5 to 8:** Refer to the data below ([Table 1.2](#)) to answer the questions that follow.

The number of matches won by the top six cricket playing nations in the world against each other in both India and abroad is given in the following table. The numbers in the table show the number of matches the respective team won against each other while being at home or away from home. Also

*note that no match has ended in a draw.*

**Table 1.2**

| Country<br>↓ |      | Country played against (total number of matches played at home) |          |         |         |          |         |
|--------------|------|---|----------|---------|---------|----------|---------|
|              |      | Aus (85)  | Ind (90) | NZ (70) | SA (80) | Pak (85) | SL (89) |
| Aus          | Home | X   | 15       | 20      | 5       | 3        | 15      |
|              | Away | X   | 25       | 18      | 12      | 1        | 25      |
| Ind          | Home | 20  | X        | 12      | 23      | 6        | 8       |
|              | Away | 12  | X        | 28      | 15      | 32       | 9       |
| NZ           | Home | 15  | 8        | X       | 22      | 6        | 9       |
|              | Away | 13  | 20       | X       | 11      | 23       | 15      |
| SA           | Home | 12  | 7        | 3       | X       | 32       | 21      |
|              | Away | 8   | 19       | 16      | X       | 11       | 9       |
| Pak          | Home | 8   | 23       | 19      | 8       | X        | 12      |
|              | Away | 5   | 15       | 21      | 9       | X        | 13      |
| SL           | Home | 21  | 17       | 6       | 12      | 13       | X       |
|              | Away | 13  | 12       | 12      | 19      | 22       | X       |

5. A neutral ground is one where both the teams participating against each other are not on their respective home grounds. For at least how many matches did NZ won against SA on a neutral ground?
  - (a) 5
  - (b) 6
  - (c) 7
  - (d) Cannot be determined
6. Consider the following statements:
  - (i) Aus has had 27 losses at home ground
  - (ii) The number of losses Ind has had at home is 12 more than the losses NZ has had at home
  - (iii) The number of wins and number of losses of SL differ by 49
  - (iv) The number of losses NZ has had at home is twice the number of losses SA has had at home

Which of the above statements is true?

  - (a) (i), (ii), and (iii)
  - (b) (i) and (iii)
  - (c) (i) and (iv)
  - (d) Cannot be determined

7. How many matches in between NZ and Pak were played on neutral ground, if it is known that for any match played at NZ or Pak, the team of that country is one of the participating teams?
- (a) 11
  - (b) 12
  - (c) 13
  - (d) 19
8. Find the maximum number of teams possible that have won all their matches played in Aus and against Aus, if no matches are played in Aus without Aus being one of the contending teams
- (a) 0
  - (b) 1
  - (c) 2
  - (d) None of these

**Directions for Questions 9 to 12:** Answer the questions on the basis of the information given below:

Five cricket teams are playing against each other. Each team played with the other team at the most once and no match has ended in a draw. The following rules are applicable to the game:

- (i) Each of the two participating teams put an equal amount of money in before the match. The team that wins the match takes away the total money that was put before the match while the looser gets nothing.
- (ii) The total money won by any team at the end of all the matches is called the teams GAIN while the money lost by a team is called its LOSS.
- (iii) No two teams won or lost the same number of matches.
- (iv) For any team, the money put in before the match for any two matches is different.
- (v) Team E won Rs. 17 against A and the total money involved in the match of C and D is Rs. 4.
- (vi) The GAIN of A is equal to the LOSS of D.
- (vii) The amount of money chipped in by any team is an integral amount in rupees and is not less than Rs. 4 or greater than Rs. 21.
- (viii) The sum of all the money put in by each of the five teams is 55, 37, 40,

*55, and 53 respectively*

- (ix) *Neither the GAIN of any team that won at least one match nor the LOSS of any team that lost at least one match is less than Rs. 20 or more than Rs. 40.*
- (x) *The number of matches won by D is equal to the number of matches lost by A. Similarly the number of matches lost by C is more than the number of matches lost by D.*
9. The total money involved in the match in between B and C is?
- (a) 6
  - (b) 7
  - (c) 8
  - (d) Cannot be determined
  - (e) None of these
10. The team that won the maximum number of matches is
- (a) B
  - (b) C
  - (c) D
  - (d) Cannot be determined
  - (e) None of these
11. What is the total monetary loss of team A?
- (a) Rs. 35
  - (b) Rs. 36
  - (c) Rs. 37
  - (d) Cannot be determined
  - (e) None of these
12. The team that won the same number of bets as it lost is?
- (a) A
  - (b) B
  - (c) D
  - (d) Cannot be determined
  - (e) None of these

**Directions for Questions 13 to 16:** Refer to the data given below

(Table 1.3) to answer the following questions.

*The timetable of the second semester students of the year 2006 of an engineering institute is given*

**Table 1.3**

| Code of course | Room | L&T      | Lab slots<br>slots | (Lecture)<br><i>L</i> | (Tutorial)<br><i>T</i> | (Practical)<br><i>P</i> | Credits |
|----------------|------|----------|--------------------|-----------------------|------------------------|-------------------------|---------|
| MA009          | 214  | 5a,5b,5c |                    | 2                     | 1                      | 0                       | 8       |
| MA006          | 213  | 4a,4b,4c |                    | 2                     | 1                      | 0                       | 6       |
| SI001          | 164  | 2a,2b,2c |                    | 3                     | 1                      | 0                       | 8       |
| MA002          | 213  | 3a,3b,3c |                    | 2                     | 1                      | 0                       | 6       |
| CS002          | CSE  | —        | 9b,8b,7b           | 0                     | 1                      | 3                       | 5       |
| MA001          | 213  | 2a,2b,2c |                    | 3                     | 1                      | 0                       | 8       |
| MA014          | 215  | 2a,2b,2c |                    | 3                     | 10                     | 0                       | 8       |
| SI003          | 113  | 1a,1b,1c |                    | 2                     | 1                      | 0                       | 6       |
| MA007          | 216  | 1a,1b,1c |                    | 2                     | 1                      | 0                       | 6       |
| SI002          | 105  | 3a,3b,3c |                    | 3                     | 1                      | 0                       | 8       |
| MA008          | 216  | 6a,6b,6c |                    | 3                     | 1                      | 0                       | 8       |
| MA010          | 214  | 6a,6b,6c |                    | 2                     | 1                      | 0                       | 6       |
| MA011          | 215  | 5a,5b,5c |                    | 2                     | 1                      | 0                       | 8       |
| SI004          | 113  | 2a,2b,2c |                    | 3                     | 1                      | 0                       | 8       |
| MA004          | 214  | 1a,1b,1c |                    | 2                     | 1                      | 0                       | 6       |
| MA015          | 215  | 1a,1b,1c |                    | 3                     | 0                      | 0                       | 6       |
| EE001          | EED  | 4a,4b,4c |                    | 2                     | 1                      | 0                       | 6       |
| SI005          | 113  | 3a,3b,3c |                    | 2                     | 1                      | 0                       | 6       |
| MA012          | 113  | 6a,6b,6c |                    | 2                     | 1                      | 0                       | 6       |
| SI006          | 113  | 5a,5b,5c |                    | 2                     | 1                      | 0                       | 8       |
| MA005          | 213  | 5a,5b,5c |                    | 3                     | 1                      | 0                       | 8       |
| MA013          | 113  | 4a,4b,4c |                    | 2                     | 1                      | 0                       | 6       |
| SI007          | CSE  | —        | 7a,8a,9a           | 0                     | 0                      | 3                       | 3       |
| CS001          | CSE  | —        | 7a,8b,9a           | 0                     | 1                      | 3                       | 5       |
| MA003          | 214  | 4a,4b,4c |                    | 2                     | 1                      | 0                       | 6       |

Here the day slot *a, b, c* indicates 3 days in a week. The courses for which student opt must not clash with each other. Columns *L, T, and P* give the number of contact hours per week for each of Lecture, Tutorials, and Practicals. Columns credits indicate the number of credits given for each course. The structure of the academics is such that out of the above 25 courses, 3 are lab courses. A student taking admission in the institute has to choose 7 courses of which at least one will be a lab course. *L* and *T* slots are given by *AB* where *A* indicates the time slot and *B* indicates the day (Example.: 2*a* indicates a time slot 2 and day *a*)

13. Ms. Dumbo wants to take the maximum possible number of lab courses, how much minimum credit can be earned in a given particular semester?

- (a) 37
  - (b) 38
  - (c) 39
  - (d) 40
14. Mr. Weirdo takes MA012, MA004, and MA003 along with two lab courses, so which of the following two courses can he not take simultaneously?
- (a) MA007 and SI003
  - (b) SI001 and MA009
  - (c) SI001 and MA011
  - (d) MA009 and SI007
15. Mr. Fool selects his courses with a minimum number of contact hours per week, so find the minimum number of contact hours the student needs to attend.
- (a) 22 hrs
  - (b) 23 hrs
  - (c) 24 hrs
  - (d) 25 hrs
16. Mr. Dodo has taken MA004, MA001, MA002, MA006, MA005, MA008, and SI007. What will be true about him?
- (a) He has to attend a total of 24 hrs per week
  - (b) He will earn 45 credits
  - (c) He has to attend 15 hrs of lecture per week
  - (d) All of the above

## 21 Mock Test Paper

**Directions for Questions 1 to 4:** Six students ( $A, B, C, D, E$ , and  $F$ ) of a class get difficult scores in an aptitude examination based on the CAT. It is known that the scores were in the order  $A > B > C > D > E > F$ .

It is also known that when seven teachers of their school were quizzed about the totals, they had this to say:

The English Teacher said: "Exactly five of them scored a total of 232."

The Math Teacher said: "Exactly five of them scored a total of 238."

The Biology Teacher said: "Exactly five of them scored a total of 244."

The Geography Teacher said: "Exactly five of them scored a total of 245."

The Marathi Teacher said: "Exactly five of them scored a total of 250."

The Hindi Teacher said: "Exactly five of them scored a total of 256".

The History Teacher said: "Exactly five of them scored a total of 235"

It is known that exactly one of the seven teachers is lying about the total of five of the six students. Based on this information, try to answer the following questions:

1. The difference between the highest and the lowest score is:

- (a) 21
- (b) 24
- (c) 18
- (d) Cannot be determined

2. The second highest score is:

- (a) 55
- (b) 56
- (c) 55 or 56

- (d) Cannot be determined
3. Which of the following is the least possible score?
- (a) 34
  - (b) 35
  - (c) 37
  - (d) Cannot be determined
4. If it is known that the sum of the two lowest scores is 80, then which of these could be the sum of two of the scores?
- (a) 93
  - (b) 104
  - (c) 112
  - (d) 102

**Directions for Questions 5 to 8:** A jailor decided to play a game with five of his prisoners who were extremely adept at logical analysis.

The prisoners were Aristotle, Bach, Coutin, Dell, and Einstein. He gave them each a box of money and announced, "Each of you have received a box of currency. All boxes look identical from outside." The jailor then asked each prisoner to secretly open the boxes and look at the currency inside. He then said, "Three of you have a box containing Indian Rupees, two of you have a box containing US Dollars. I shall now give each one of you a chit containing information about the box of exactly one other person." He did so and asked them to open the chit and see the information provided to them. "No one of you will be able to tell the exact currency of any third prisoner," he then said and further announced, "Bach has a box containing Indian Rupees." Aristotle immediately said, "I know the currency of all 5 people." On hearing this Einstein also said, "So do I, now."

**Assume:** A prisoner speaks up as soon as he is able to deduce the currency of all five prisoners.

Answer the following questions:

5. Apart from Bach, the prisoners with Indian currency were:
- (a) Einstein and dell
  - (b) Aristotle and Einstein
  - (c) Coutin and Dell

- (d) None of these
6. The prisoners given US Dollars were:
- Coutin and Dell
  - Dell and Einstein
  - Aristotle and Einstein
  - None of these
7. Whose currency was written in the chit Aristotle received?
- Bach
  - Einstein
  - Dell
  - None of these
8. Einstein did not receive a chit containing the currency of.
- Aristotle
  - Bach
  - Dell
  - Coutin

**Directions for Questions 9 to 13:** There are 16 boxes in a grid. Each of the 16 boxes has a number as shown below. The value of the box is the number on the box.

Four friends Amar, Biren, Chandan, and Deepak are playing a game, where the objective is to make the maximum addition of the boxes. Every person has exactly 4 boxes with him at all points of time.

|   | 1  | 2  | 3  | 4  |
|---|----|----|----|----|
| A | 22 | 12 | 30 | 6  |
| B | 10 | 16 | 24 | 20 |
| C | 32 | 2  | 28 | 14 |
| D | 18 | 4  | 26 | 8  |

- Amar did not own any of the boxes in the A-row.
- Biren's highest number is A-3.
- B-2 and C-1 belong to someone other than Chandan.
- Chandan doesn't own any of the boxes in the 1-column.
- In the last round of the game, Amar traded 4-B for B-1.
- D-2, A-2, and D-3 all belong to the same player.

7. C-1, B-3, and D-4 all belong to the same player.
8. Deepak's score was 8 higher than Biren's.
9. Amar has just one box in the B-row, which is B-1.
10. Biren has three boxes in the A-row.

*Based on the information above answer the questions which follow with respect to the end of the game.*

9. Who has the lowest total?
  - (a) Amar
  - (b) Biren
  - (c) Chandan
  - (d) Insufficient Information
10. To whom does C-4 belong at the end of the game?
  - (a) Amar
  - (b) Biren
  - (c) Chandan
  - (d) Deepak
11. What is the difference between the total of Deepak and Chandan?
  - (a) 4
  - (b) 8
  - (c) 18
  - (d) Cannot be determined
12. Which of the following could be Amar's total at the end of the game?
  - (a) 58
  - (b) 50
  - (c) 76
  - (d) All the three are possible
13. Who has the DI Box at the end of the game?
  - (a) Amar
  - (b) Biren
  - (c) Chandan
  - (d) Deepak

**Directions for Questions 14 to 15:** A computer assembly unit

*produces computers. The production of the factory over one week is provided in the data given below.*

| Mon | Tues | Wed | Thurs | Fri | Satur | Sun |
|-----|------|-----|-------|-----|-------|-----|
| 128 | 156  | 64  | 150   | 72  | 150   | 120 |

*The finished goods are transported to the market using a truck capacity carrying 500 computers at one time. The initial starting stock was of 50 computers. The cost of keeping stock of 1 computer for 1 night is £5. The cost of hiring the truck is £1000.*

14. If the total cost has to be minimised, on which day should the company hire the truck?
  - (a) Tuesday, Thursday, and Saturday
  - (b) Tuesday, Friday, and Sunday
  - (c) Tuesday and Saturday
  - (d) None of these
15. What is the minimum total cost for the week?
  - (a) £ 4000
  - (b) £ 4270
  - (c) £ 5170
  - (d) £ 4170

## 22 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below ([Table 1.1](#))

The Indian cricket team had just finished a five-match one day series with Australia. The team management was assessing the performance of the top five batsmen in the series—Sachin, Viru, Rahul, Laxman, and Jaffer. All these batsmen played each of the five matches and each of them was out in each of the five innings they played in.

In a departure from tradition each of the five matches was played for 100 overs per team.

The table below ([Table 1.6](#)) gives the names of three highest scoring batsmen in that match, along with their respective scores, mentioned in the brackets alongside. The last column gives the percentage of the total team score made by the given three players together.

The team management has devised the following two indices to judge the performance of each player:

- I. The Median Index (M.I.), which is the middle number, if all the five scores of the concerned player in the series are arranged in the increasing order.
- II. The Differential Index (D.I.), which is the difference between the highest and the lowest scores of the concerned player in the series.

Further, it is also observed that in any match, the scores of no two players who batted are equal.

1. Which of the players had the lowest value of M.I. for the series?
  - (a) Sachin
  - (b) Jaffer

- (c) Laxman  
 (d) Rahul  
 (e) Viru
2. Sachin and Rahul together accounted for at most what percentage of India's total score in the series, approximately?
- (a) 35  
 (b) 52  
 (c) 40  
 (d) 35  
 (e) 45
3. The exact value of M.I. can be calculated for how many of the given players?
- (a) 0  
 (b) 3  
 (c) 4  
 (d) 5  
 (e) 2
4. Among the players mentioned, who can have the lowest value of D.I. in the series?
- (a) Only Sachin, Rahul, Laxman, or Jaffer  
 (b) Only Jaffer, Rahul, or Laxman  
 (c) Only Jaffer or Laxman  
 (d) Only Jaffer, Laxman, or Sachin  
 (e) Only Jaffer

**Table 1.1**

| Match | Highest      | Second highest | Third highest | Percentage of total score |
|-------|--------------|----------------|---------------|---------------------------|
| 1     | Sachin (194) | Viru (126)     | Rahul(112)    | 80                        |
| 2     | Laxman (170) | Jaffer (130)   | Sachin(60)    | 75                        |
| 3     | Viru(250)    | Jaffer (124)   | Laxman (74)   | 70                        |
| 4     | Laxman (154) | Sachin(124)    | Jaffer (96)   | 85                        |
| 5     | Rahul (160)  | Viru (144)     | Sachin (120)  | 80                        |

**Directions for Questions 5 to 9:** Prof. Qazi takes a Maths test once a week. There are five students in his class whose names start with the letter A

viz: Arun, Amit, Ankur, Amritesh, and Arjit. Unfortunately, he forgets to record some of the scores of these students. All scores are out of 200. Find the missing numbers in [Table 1.2](#) and answer the questions that follow.

Besides, we also know that Prof. Qazi grades his students according to their average score as under:

| <b>Grade</b> | <b>Score</b> |
|--------------|--------------|
| A            | 60 % plus    |
| B            | 56–60%       |
| C            | 50–55%       |
| D            | Below 50%    |

---

**Table 1.2**

|          | 1  | 2   | 3   | 4   | 5   | 6   | 7  | 8  | 9   |
|----------|----|-----|-----|-----|-----|-----|----|----|-----|
| Arun     | 92 | 110 | 174 | 66  | 148 | 76  | 80 |    | 190 |
| Amit     | 96 | 120 |     | 102 | 170 | 92  | 74 | 38 | 170 |
| Ankur    | 76 | 140 | 180 |     | 200 | 96  | 76 | 40 | 194 |
| Amritesh | 76 |     | 186 | 98  | 186 | 100 | 92 | 40 | 200 |
| Arjit    | 84 | 132 | 168 | 88  | 168 |     | 76 | 40 | 196 |

1. Amit's missing score is equal to the average score of the topper (who is not Ankur).
2. The total of all the scores is 5252
3. Ankur got 70% in test 2. Amritesh got 1% less
4. The missing score on test 8 is 54 and on test 6 it is 110.
5. Who is the topper amongst these students?
  - (a) Arun
  - (b) Amit
  - (c) Arjit
  - (d) Amritesh
  - (e) Ankur
6. If an A grade gets 4 points and a B grade gets 3 points, a C gets 2 and a D gets 1 point, what is the grade point average of the class (approximately)?
  - (a) 2.6

- (b) 1.5
  - (c) 1.2
  - (d) 2.3
  - (e) 1.4
7. The least difference between any two missing scores is:
- (a) 14
  - (b) 24
  - (c) 20
  - (d) 44
  - (e) None of these
8. Who is ranked in the middle amongst these students?
- (a) Arun
  - (b) Amit
  - (c) Ankur
  - (d) Amritesh
  - (e) Arjit

**Directions for Questions 9 to 13:** The diagram below shows the letters A, B, C, & D, each of which is surrounded by eight numbers (each different). The eight numbers around each of the four letters can be ‘flipped over’ the letter itself either horizontally or vertically.

|   |   |   |    |    |    |    |    |    |
|---|---|---|----|----|----|----|----|----|
| 1 | 4 | 6 | 9  | 11 | 14 | 16 | 19 | 21 |
| 2 | A | 7 | B  | 12 | C  | 17 | D  | 22 |
| 3 | 5 | 8 | 10 | 13 | 15 | 18 | 20 | 23 |

Thus, if we were to flip this diagram vertically around B, the figure would become:

|   |   |    |    |   |    |    |    |    |
|---|---|----|----|---|----|----|----|----|
| 1 | 4 | 11 | 9  | 6 | 14 | 16 | 19 | 21 |
| 2 | A | 12 | B  | 7 | C  | 17 | D  | 22 |
| 3 | 5 | 13 | 10 | 8 | 15 | 18 | 20 | 23 |

Arjit, a naughty boy, flips over the original diagram around the letters A, B, C, ... D in the order vertically, horizontally, horizontally, ... vertically. From the final position obtained, answer the questions that follow:

9. How many numbers will not change their position?
- (a) 5
  - (b) 3
  - (c) 7

- (d) 8
  - (e) None of these
10. Into the position of which number will the number 17 go?
- (a) 12
  - (b) 22
  - (c) 18
  - (d) 7
  - (e) None of these
11. The highest percentage numerical loss is exhibited by which position?
- (a) 3<sup>rd</sup> column 3<sup>rd</sup> row
  - (b) 5<sup>th</sup> column 1<sup>st</sup> row
  - (c) 6<sup>th</sup> column 3<sup>rd</sup> row
  - (d) 4<sup>th</sup> column 2<sup>nd</sup> row
  - (e) None of these
12. How many positions have exhibited an absolute change of 1 in their numerical value?
- (a) 2
  - (b) 3
  - (c) 4
  - (d) 6
  - (e) 5
13. The increase in the sum of the number around C is:
- (a) 15
  - (b) 12
  - (c) 9
  - (d) 10
  - (e) None of these

## 23 Mock Test Paper

**Directions for Questions 1 to 4:** Answer the questions on the basis of the information given below:

The President of Nicaragua is elected through a special system, which consists of several rounds of voting by the representatives of the different state legislatures.

For the President's post, only member states can nominate candidates (and each member state can nominate a maximum of 1 candidate per state.)

Four candidates—Amarjeet Singh, Birender Singh, Charanjeet Singh, and Daler Singh (Denoted as A,B,C, and D respectively in the table below)—are in the fray.

In each round of voting, the candidate getting the least number of votes is eliminated. The President elected is the person getting the maximum number of votes in the final round of voting. While voting, in each round, each of the eligible member states has to vote for exactly one candidate in contention. But the states whose nominees are in contention are eligible to vote only as long as their nominees are still in the fray.

The following table ([Table 1.1](#)) shows some of the information regarding the voting pattern in the different rounds of voting that happened:

1. A member state is eligible to vote for at most two candidates in all the rounds combined. This means (in other words) that if a member state has voted for 2 different candidates in the first 2 rounds and none of these two candidates is in contention in round 3, then that state is ineligible to vote as it is not allowed to vote for a third candidate.
2. A and C retained their votes from all previous rounds as long as they were in contention.

3. 25% of those who voted for D in round 1, voted for C in round 2.
  4. Those who voted for B in round 1, voted for either C or D in round 2.
  5. 50% of those who voted for D in round 1, voted for C in round 3.
  6. All states whose nominees are in contention voted for their nominees as long as they were in contention. i.e. there was no cross voting.
- 1.** What is the number of votes cast for C in round 1?
- (a) 78
  - (b) 82
  - (c) 74
  - (d) 70
  - (e) None of these
- 2.** How many voters who voted for candidate D in round 1, voted for candidate C in round 2?
- (a) 7
  - (b) 10
  - (c) 8
  - (d) 9
  - (e) None of these
- 3.** Among the members who voted for D in round 2 and were still eligible to vote in round 3, what percent voted for A in round 3?
- (a) 68.5
  - (b) 95.2%
  - (c) 66.68
  - (d) 65.2%.
  - (e) 79.5

**Table 1.1**

| Round | Total votes | Maximum votes for |       | Minimum votes for |       |
|-------|-------------|-------------------|-------|-------------------|-------|
|       |             | Candidate         | Votes | Candidate         | Votes |
| 1     |             | A                 | 90    | B                 | 24    |
| 2     | 223         | C                 | 94    | D                 | 39    |
| 3     | 207         |                   |       |                   |       |

- 4.** Which of the following statements must be true?

- I. Candidate A won the election in round 3 by a margin of three votes.
- II. 16 candidates who voted for B in round 1, voted for D in round 2.
  - (a) Only II
  - (b) neither I nor II
  - (c) Both I and II
  - (d) Only I
  - (e) Cannot be determined

**Directions for Questions 5 to 6:** *Crap is a popular game in which you throw a pair of dice one or more times until you either win or lose.*

*There are two ways to win in this game. You can throw the dice once and obtain a score of 7 or 11 in the first throw, or you can obtain a 4, 5, 6, 8, 9, or 10 on the first throw and repeat the same score on the subsequent throw before you obtain a 7.*

*There are two ways to lose. You can throw the dice once and obtain a 2, 3 or 12, or you can obtain a 4, 5, 6, 8, 9, or 10 on the first throw and then obtain a 7 on a subsequent throw before you have repeated your original score.*

- 5. What is the probability that a person wins on the 2<sup>nd</sup> throw?
  - (a) 100/1296
  - (b) 50/1296
  - (c) 100/216
  - (d) 50/216
  - (e) None of these
- 6. What is the probability that a person loses on the 2<sup>nd</sup> throw?
  - (a) 100/1296
  - (b) 120/1296
  - (c) 144/1296
  - (d) 72/1296
  - (e) None of these

**Directions for Questions 7 to 11:** Three persons A, B, and C play the game continuously without knowing the exact rules. They obtain a set of 10 scores as given below:

$$A = \{6, 4, 10, 9, 8, 6, 7, 12, 9, 2\}$$

$$B = \{8, 5, 7, 12, 6, 3, 2, 9, 8, 3\}$$

$$C = \{2, 7, 3, 12, 7, 6, 5, 4, 6, 3\}$$

Later on, they are told the exact rules. Now they count their wins or losses. If they win or lose at any of the score obtained, they consider it as end of one game and again start counting wins or losses from the next score. For example if a person D scores 7 in the first score he wins and counts it as the end of one game. In the entire set of 10 scores if he wins 2 times and loses 3 times with the final win or loss at the 10th score he considers it as 5 game. In case the last game does not decide a win or a loss, then the last unfinished game is terminated at the tenth throw and the number of games is incremented by 1.

7. Which of the following statement/s is/are correct?
  - (i) A is the first person to win on any of the score.
  - (ii) B is the first person to lose on any of the score.
  - (iii) C has a maximum number of losses.
    - (a) Only (iii)
    - (b) (i) and (ii)
    - (c) (ii) and (iii)
    - (d) All
    - (e) None of these
8. Who plays the maximum number of games?
  - (a) A
  - (b) B
  - (c) C
  - (d) Both A and B have played the maximum number of games
  - (e) Both A and C have played the maximum number of games
9. How many times does A lose in the entire game?
  - (a) 1
  - (b) 2

- (c) 3
  - (d) 4
10. For C, the number of losses minus the number of wins is
- (a) 1
  - (b) 0
  - (c) 3
  - (d) 2
  - (e) None of these
11. How many games are played overall by all three combined?
- (a) 6
  - (b) 7
  - (c) 12
  - (d) 10
  - (e) 14

**Directions for Questions 12 to 16:** There is a method of ascription known as Caeser cipher: if a letter in the plain text is the  $N$ th letter in the alphabet, it is replaced by the  $(N + K)$ th letter in the alphabet where  $K$  is some fixed integer. (Caeser used  $K=3$ ). The table below shows how a message is encrypted using this method with  $K=1$

Plain text : ATTACK AT DAWN

Cipher text : BUUBDLABUAEBXO

One way to make this type of message more difficult is to use more than one table. An extension of Caeser cipher is called the Vigenere cipher: in this a small repeated key is used to determine the value of  $K$  for each letter. At each step the key letter index is added to the plain text letter index to determine the cipher text letter index. One simple example with the key ABC, is encrypted as below:

Key : ABCABCABCABCAB

Plain text : ATTACK AT DAWN

Cipher text : BVWBENBCWBFDXP

12. A message, “WE ARE ONE”, is encrypted in Caeser cipher with  $K=$

- 3. Which of the following represents the encrypted message?
- (a) ZHDDUHDRQH
  - (b) TBXXYOBXLKB
  - (c) VDZQDZNPD
  - (d) TBXXOBXMKB
  - (e) TBXXOBXLKB
13. A French term, CARTE BLANCHE, is encrypted in the Vigenere cipher with the key, “ABCDABCD..” Which encrypted message represents that French word?
- (a) DCUXFCEPBPFLE
  - (b) DCUXEBFPCQGLE
  - (c) DCUXDBEQCPFLE
  - (d) DCUXFCEPBFLG
  - (e) None of these
14. If two key types, ABC and ABCD in Vigenere cipher are added to make a new key type, which encrypted message will represent “SECRET” [hint : (B+B=D)]
- (a) UJKWHY
  - (b) UIIVGY
  - (c) UIIWGY
  - (d) None of these
  - (e) UIIVGX
15. A message is encrypted with the table as given
- |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| T | H | E | Q | U | I | C | K | R | O | W | N | F | X | J | M | P | D | V | R | L | A | Z | Y | G | B |
- What will be the encrypted message for “ATTAC AT DAWN”?
- (a) HVVHOTHPTQHAF
  - (b) HVVHOTHVTQHBF
  - (c) HVVHOTHVTQHAF
  - (d) HVVHOTNVTQBHG
  - (e) None of these
16. In Vigenere cipher if two keys ABCD and ABCDE are added to make

a new key, what will be the new key?

- (a) BDFHE
- (b) BDEHE
- (c) BDFHG
- (d) BDFFE
- (e) None of these

## 24 Mock Test Paper

**Directions for Questions 1 to 4:** Answer these questions on the basis of the information given below ([Table 1.1](#)).

In the recent past, the world has witnessed a mass transition to ATM enabled services. The following table shows the costs incurred by any bank, in Rupees per transaction, when a customer of that bank uses an ATM of any of the banks.

For example, when ABN AMRO customer uses an ABN AMRO ATM, then the cost incurred by ABN AMRO is ₹9 per transaction. When he uses a Bank of Baroda ATM, the cost incurred by ABN AMRO is ₹30 per transaction and when he uses a Canara Bank ATM, the cost incurred by ABN AMRO is ₹36 per transaction.

1. If in a particular month in 2008, the customers of ABN AMRO bank made a total of 3 million ATM transactions of which 75 per cent were transacted through ABN AMRO's own ATMs and the remaining through Dena Bank ATMs then what is the total expenditure incurred on ATM transactions by ABN AMRO in that month?
  - (a) ₹ 5.3 million
  - (b) ₹ 12.25 million
  - (c) ₹ 28.5 million
  - (d) Rs.33.75 million
  - (e) Cannot be determined
2. After the alliances are formed, for how many banks is it still profitable to use their own ATMs instead of another bank's ATM?
  - (a) 3
  - (b) 7

- (c) 5  
 (d) 4  
 (e) 6

**Table 1.1**

| ATM Of →<br>Customer<br>Of ↓ | ABN<br>AMRO | Bank of<br>Baroda | Canara<br>Bank | Dena<br>Bank | Eastern<br>Cooperative<br>Bank | Federal<br>Bank | Gujarat<br>Cooperative<br>Bank | HDFC<br>Bank | ICICI<br>Bank | J & K<br>Bank |
|------------------------------|-------------|-------------------|----------------|--------------|--------------------------------|-----------------|--------------------------------|--------------|---------------|---------------|
| ABN AMRO                     | 9           | 30                | 36             | 18           | 24                             | 45              | 60                             | 18           | 45            | 60            |
| Bank of Baroda               | 36          | 6                 | 63             | 21           | 27                             | 57              | 33                             | 42           | 51            | 66            |
| Canara Bank                  | 48          | 30                | 15             | 42           | 30                             | 42              | 27                             | 51           | 57            | 54            |
| Dena Bank                    | 21          | 36                | 48             | 18           | 33                             | 54              | 48                             | 63           | 24            | 42            |
| Eastern Cooperative Bank     | 24          | 30                | 42             | 60           | 12                             | 48              | 33                             | 15           | 54            | 24            |
| Federal Bank                 | 66          | 33                | 36             | 24           | 51                             | 24              | 36                             | 24           | 33            | 42            |
| Gujarat Cooperative Bank     | 39          | 24                | 36             | 39           | 66                             | 51              | 33                             | 75           | 39            | 60            |
| HDFC Bank                    | 33          | 27                | 36             | 42           | 48                             | 66              | 48                             | 24           | 72            | 39            |
| ICICI Bank                   | 84          | 48                | 51             | 66           | 66                             | 69              | 51                             | 54           | 48            | 45            |
| J & K Bank                   | 42          | 42                | 51             | 30           | 51                             | 81              | 42                             | 39           | 33            | 27            |

\* Transaction costs (*Transaction costs\** in Rs.) from January 2008 to June 2008.

From the month of July 2008 onwards, the banks in list formed two alliances — **RUMMY** and **KITTY**, where Dena Bank and Eastern Cooperative Bank are part of the RUMMY alliance while the remaining banks belong to the KITTY alliance. Members of the RUMMY alliance get a 25% discount on transaction costs incurred for all transactions among themselves and similarly members of KITTY alliance get a 20% discount on all transactions among themselves.

Transaction costs among members belonging to RUMMY alliance and those belonging to KITTY alliance continue as per the above (i.e. without any discounts).

3. If in June 2008, ICICI Bank incurred a total expenditure of ₹ 252 lakh on account of its customers transacting through ATMs and of this, 50 per cent was on account of transactions through ICICI Bank ATMs then what is the maximum possible number of ATM transactions by the customers of ICICI Bank in June 2008?
  - (a) 6.1 lakh
  - (b) 12.5 lakh
  - (c) 7.3 lakh
  - (d) 63 lakh
  - (e) None of these
4. If in the month of March 2008, all the banks had an equal number of transactions each through their own ATMs then which bank would incur the maximum additional expenditure in case its ATMs were

blocked by a computer virus in March 2008 and its customers transacted through the ATMs of the next cheapest alternative bank?

- (a) ABN AMRO
- (b) Bank of Baroda
- (c) ICICI Bank
- (d) Eastern Cooperative Bank
- (e) None of these

**Directions for Questions 5 to 8:** Answer the questions on the basis of the information given below ([Table 1.2](#)).

The following is the table of points drawn at the end of all the matches in a six-nation Football Tournament, in which each country played with every other country exactly once. The table gives the positions of the countries in terms of their respective total points scored (i.e in the decreasing order of their total points). Each win was worth three points, each draw one point, and there were no points for a loss. Due to a problem with the computer in which the data was stored, some of the data went missing. A computer expert was called in to retrieve the data but he was only partially successful. The table below ([Table 1.2](#)) gives the information that was retrieved by the computer expert. The results of none of the individual matches are known except that Spain beat England and no two teams finished with the same number of points.

5. Which of the following matches was a draw?
  - (a) England vs Brazil
  - (b) England vs France
  - (c) Cameroon vs France
  - (d) Brazil vs France
  - (e) Cameroon vs Brazil
6. The total number of points won by England is
  - (a) 7
  - (b) 4
  - (c) 1
  - (d) 6

- (e) cannot be determined
7. The total number of goals scored in the match between Brazil and Spain is
- 1
  - 9
  - 0
  - 6
  - (e) cannot be determined
8. The number of goals scored by Argentina against England is at most
- 2
  - 3
  - 4
  - 5
  - (e) cannot be determined

**Table 1.2**

| Position | Country   | Won | Drawn | Lost | Goals For | Goals Against | Total Points |
|----------|-----------|-----|-------|------|-----------|---------------|--------------|
| 1        | Argentina |     |       |      | 17        | 5             | 15           |
| 2        | Brazil    |     |       |      | 9         | 6             | 10           |
| 3        | Spain     |     |       |      | 2         |               | 8            |
| 4        | England   |     |       |      | 2         | 5             |              |
| 5        | France    |     |       |      | 7         | 11            | 2            |
| 6        | Cameroon  |     |       |      | 8         | 16            |              |

**Directions for Questions 9 to 12:** In a target shooting competition, the target has ten circles. The innermost circle is called the bull's eye (and has 10 points associated with it.), the next circle has 9 points, the third 8, and so on till the outermost which has 1 point. No points are awarded for shooting outside the ten circles.

Each round of shooting consists of two shots. The following rules apply for awarding bonus points.

- In case of a shot hitting the bull's eye, the shooter is awarded as many points as he scores in the next 2 shots. If less than two shots are left in the day, the bonus points will only be for the shots left.

These bonus points are called primary bonus point.

- (2) In case, the total in a given round is  $> 10$ , the shooter is awarded as many bonus points as the first shot in the next round. In case there is no round left no bonus points are awarded. These are called secondary bonus points.
- (3) The total for the competition is the sum of points of all rounds of shooting plus the primary bonus points plus the secondary bonus points. The shooter with highest total score wins gold medal.

Three shooters Rathore, Russell, and Bindra took part in the competition for Olympic Gold. Details to their scores are provided below.

Read the data and information provided below carefully and try to answer the questions.

| Round   | Rathore | Russell | Bindra |
|---------|---------|---------|--------|
| First   | 10/?    | 8/3     | 8/5    |
| Second  | ?/3     | ?/10    | 9/?    |
| Third   | 9/1     | 6/4     | 7/2    |
| Fourth  | 10/?    | 3/10    | 6/5    |
| Fifth   | 4/5     | ?/6     | 4/?    |
| Sixth   | 10/0    | 4/7     | 3/3    |
| Seventh | 2/8     | 2/8     | 9/2    |

None of the three missing scores of Rathore was less than 4.

The following additional information was available

|         | Primary bonus points | Secondary Bonus points |
|---------|----------------------|------------------------|
| Rathore | 23                   | >13 ... <22            |
| Russell | <22                  | 22                     |
| Bindra  | 15                   | >20                    |

- Russell gets 4 secondary bonus points in the fifth round.
  - Neither of the two missing scores for Russell is zero.
  - Rathore hit a 5 in the second of the fourth round.
  - None of three missing scores of Rathore was less than 4.
9. The difference between the shooters (in total points) who came first and last was
- 2 points
  - 5 points
  - 7 points

- (d) Indeterminate
10. What is the value of the total number of bonus points scored by Russell?
- (a) 43  
(b) 42  
(c) 41  
(d) Indeterminate
11. The highest total of missing values was for
- (a) Rathore  
(b) Russell  
(c) Bindra  
(d) Indeterminate
12. Who won the competition?
- (a) Rathore  
(b) Russell  
(c) Bindra  
(d) Indeterminate

**Directions for Questions 13 to 16:** A few friends meet each morning for tea. For one of them, it's only the first of eight cups while for another it is the only cup. The following information is available:

1. Amit uses three times as many sugar cubes as the person who drinks four cups.
2. Three friends use no milk—one of them is the one who used 4 sugar cubes.
3. Someone other than Ritesh drinks one tea cup a day without milk and without sugar.
4. Vandana uses both milk and sugar.
5. Ritesh, uses no milk and uses half as many sugars as the person who drinks twice as many cups as he does.
6. Bharat has no milk in his tea.
7. Ben drinks two more cups than Amit but Amit uses two more sugar cubes than Ben.

8. The number of cups consumed include 1, 4, 5, 6, and 8 while the number of cubes is 0, 1, 2, 4, and 6.
13. How many cups does Ritesh drink?
- (a) 1
  - (b) 4
  - (c) 5
  - (d) None of these
14. Who drinks the largest number of tea cups?
- (a) Ritesh
  - (b) Amit
  - (c) Ben
  - (d) None of these
15. Which of these is not a combination of cups and sugar cubes?
- (a) 4, 2
  - (b) 5, 4
  - (c) 1, 0
  - (d) 8, 4
16. The highest sugar consumption per cup consumed is for?
- (a) Amit
  - (b) Ritesh
  - (c) Vandana
  - (d) Bharat

## 25 Mock Test Paper

**Directions for Questions 1 to 2:** Answer the questions on the basis of the information given ([Table 1.1](#)):

In the recently played Twenty20 tournament, 6 teams participated. The schedule of the tournament was such that every team had to play every other team 12 times. Points were awarded for W (Wins), L (Loss), and T (Tie). The following chart gives the number of matches won, lost, and tied by different teams.

**Table 1.1**

| Team         | W  | L  | T  |
|--------------|----|----|----|
| India        | 26 | 30 | 04 |
| Pakistan     | 14 | 36 | 10 |
| Sri Lanka    | 24 | 30 | 06 |
| South Africa | P  | Q  | R  |
| Bangladesh   | 20 | 32 | 08 |
| Canada       | 18 | 30 | 12 |

- How many W, L, and T combinations are possible for team SOUTH AFRICA?
  - 3
  - 4
  - 1
  - 2
  - None
- If 5 points are awarded for each win, -3 points for each loss, and 2 points for each tie, then what is the maximum possible difference between the third team and the second last team, if we will rank them

according to their points in descending order?

- (a) 14
- (b) 12
- (c) 13
- (d) 15
- (e) None of these

**Directions for Questions 3 to 6:** Answer the questions on the basis of the information given below.

There is a group of 200 students, where each student studies one or more of the three subjects among Aeronautics, Biotechnology, and Cryogenics. The number of students studying Cryogenics is more than the number of students studying Aeronautics, which, in turn, is more than the number of students who study Biotechnology, which, in turn, is more than the number of students who study exactly two of the three subjects, which, in turn, is more than the number of students who study all the three subjects. It is known that at least one student studies all the three subjects.

3. What is the maximum number of students who study Biotechnology?

- (a) 166
- (b) 165
- (c) 150
- (d) 149

4. What is the minimum number of students who study Biotechnology?

- (a) 67
- (b) 68
- (c) 69
- (d) 70

5. If it is known that exactly half the students study Cryogenics, what is the maximum number of students who study all the three?

- (a) 30
- (b) 31
- (c) 32
- (d) 33

6. What is the maximum number of students who study only Aeronautics?
- 100
  - 99
  - 98
  - 97

**Directions for Questions 7 to 11:** Five students at AMS Learning Systems' Mindworkz program were put through a rigorous testing schedule in their preparation for the tough CAT paper. The students were Aroon, Baroon, Caroon, Daroon, and Earon. They took a total of 60 tests, where each test was taken by all the five students. The tests were organised in groups of ten tests each and a consolidated position board was maintained and updated after every ten tests. In any test, the student who secured the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup>, ranks got 8, 6, 4, 2, and 0 points respectively.

**Table 1.2**

| End of the first | Person |        |        |        |       |
|------------------|--------|--------|--------|--------|-------|
|                  | Aroon  | Baroon | Caroon | Daroon | Earon |
| 10 tests         | 60     | 60     | 40     | 20     | 20    |
| 20 tests         | 100    | 110    | 110    | 40     | 40    |
| 30 tests         | 150    | 170    | 130    | 60     | 90    |
| 40 tests         | 190    | 200    | 200    | 80     | 130   |
| 50 tests         | 240    | 240    | 220    | 140    | 16    |
| 60 tests         | 300    | 260    | 260    | 180    | 200   |

The testing system was structured in such a way that no two persons would secure the same rank in any test. Also no student scored the same number of points in any three consecutive tests.

The following table (Table 1.2) shows the consolidated position board in terms of the points scored by each of the five students at the end of each set of ten tests from the beginning.

7. At least how many times did Aroon secure the 1<sup>st</sup> rank in the 60 tests?
- 2

- (b) 3
  - (c) 4
  - (d) 5
  - (e) None of these
8. If Caroon secured 2<sup>nd</sup> rank exactly three times in the first 20 tests, at most how many times did he secure 3<sup>rd</sup> rank in the first 20 tests?
- (a) 9
  - (b) 10
  - (c) 11
  - (d) 12
  - (e) None of these
9. At most how many times did Daroon secure the last rank in the 60 tests?
- (a) 31
  - (b) 32
  - (c) 35
  - (d) 34
  - (e) None of these
10. At least how many times did Daroon secure the last rank in the 60 tests?
- (a) 6
  - (b) 7
  - (c) 8
  - (d) 9
  - (e) None of these
11. At least how many times did Earon secure 2<sup>nd</sup> rank in the first 30 tests, if he got two pointers exactly two times in each of the first, second, and third sets of ten tests each?
- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
  - (e) None of these

**Directions for Questions 12 to 14:** (1) Nine years from now Amit will be twice as old as Vishal was when Vikas was nine times as old as Amit.

(2) Eight years ago, Vikas was half as old as Vishal will be when he is one year older to Amit will be at the time when Vikas will be five times as old as Amit will be two years from now.

(3) When Amit was one year old, Vikas was three years older to what Amit will be when Vishal is three times as old as Vikas was six years before the time when Vishal was half as old as Amit will be when Vikas will be ten years older to Vikas was when Vishal was one third as old as Amit will be when Vikas will be three times as old as he was when Vishal was born.(Assume all ages are whole nos.)

12. How old is Amit?

- (a) 3
- (b) 7
- (c) 4
- (d) Cannot be determined

13. How old is Vishal?

- (a) 8
- (b) 14
- (c) 3
- (d) Cannot be determined

14. How old is Vikas?

- (a) 4
- (b) 3
- (c) 15
- (d) Cannot be determined

**Directions for Questions 15 to 17:** On the island of Gibraltor, the Indian Air Force has installed an airbase. The Gibraltor island being the only island on the sea filled Kryptol planet, all planes make sorties & come back. One fine day, Air Chief Marhsal Chitnis decided that one plane had to fly across the planet to see the amount of wear & tear on the plane caused by flying non stop across the planet. But since the fuel capacity of all the planes is such that the plane can only fly halfway across the planet he has hired the

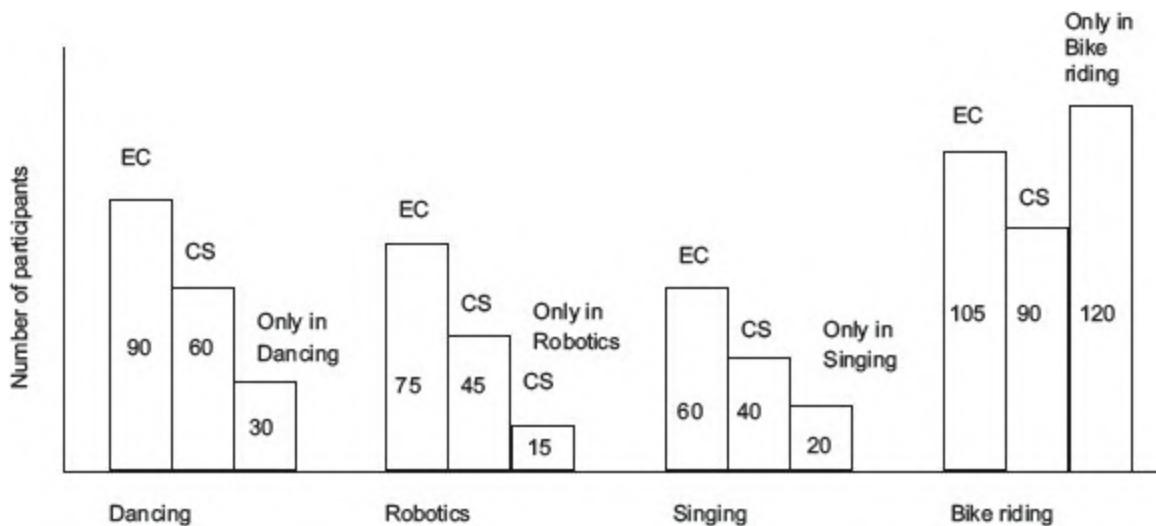
*great logician Sherry to advise him. Sherry learns that all planes have the facility to be refueled in mid air by another plane. Help Sherry answer the following questions assuming that all planes have to be safely back.*

15. The minimum number of planes required to help complete one full round across the world for a plane which starts flying clockwise is:
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
16. The minimum number of flights required to help complete one full round across the world for a plane which starts flying clockwise is:
  - (a) 4
  - (b) 5
  - (c) 6
  - (d) 7
17. What is the minimum number of planes required to be sent from the Gibraltor island base anticlockwise to meet the incoming planes coming into the base clockwise?
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) Any of these

## 26 Mock Test Paper

**Directions for Question 1 to 3:** In Encore, there were four events organized by the institute Dancing, Robotics, Singing, Bike riding. The graph given below shows the number of students of two different disciplines-EC and CS who participated in an event and number of students who participated only in that event.

1. What can be the minimum number of students of EC branch who participated in Encore?
  - (a) 100
  - (b) 120
  - (c) 110
  - (d) Cannot be determined.
2. What can be the maximum number of students of EC branch who participated in Encore?
3. The Minimum number of CS students who participated in Encore.



**Directions for Question 4 to 8:** Eight mobile companies A, B, C, D, E, F, G and H sell their mobile phones in one or more countries among 5 different countries P, Q, R, S and T.

Two companies are said to be competitors of each other, if there is at least one country where both companies sell their mobile phones. The following table provides information about the number of competitors of seven of these eight companies (from B to H).

| Company | Number of competitors |
|---------|-----------------------|
| B       | 3                     |
| C       | 1                     |
| D       | 6                     |
| E       | 4                     |
| F       | 7                     |
| G       | 6                     |
| H       | 3                     |

4. Which of the following statement is correct?
  - (a) A has more competitors than D.
  - (b) A has more competitors than E.
  - (c) A has more competitors than B
  - (d) Cannot be determined.
5. Find the average number of competitors per company.
6. The maximum number of companies selling their mobile phones in one country is?
7. The maximum number of countries in which company C sells its mobile phones.
8. In the previous question if country P has highest number of competitors then maximum possible value of number of mobile companies in country P is = ?

**Directions for questions 9 to 12:** Answer the questions on the basis of the information given below.

The following tables show the batting performance of the Indian Cricket Team in the final match of the Asia Cup 2008. [Table A](#) gives the runs scored by the 11 batsmen and the order in which they appeared in the batting line up. [Table B](#) indicates the score of the team at the fall of each wicket (from 1 to 10).

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**Table A**

| S. No. | Batsman   | Runs Scored |
|--------|-----------|-------------|
| 1      | Sachin    | 40          |
| 2      | Sehwag    | 29          |
| 3      | Gautam    | 11          |
| 4      | Yuvraj    | 0           |
| 5      | Kohli     | 25          |
| 6      | Dhoni     | 6           |
| 7      | Raina     | 18          |
| 8      | Harbhajan | 5           |
| 9      | Ashwin    | 1           |
| 10     | Bhuvi     | 10          |
| 11     | Zaheer    | 5           |

---

**Table B**

| Fall of wickets | Total score |
|-----------------|-------------|
| 1               | 35          |
| 2               | 54          |
| 3               | 62          |
| 4               | 87          |
| 5               | 97          |
| 6               | 122         |
| 7               | 128         |
| 8               | 133         |
| 9               | 144         |
| 10              | 150         |

The batsmen came on the field as per the order given in [table A](#). E.g. Sachin and Sehwag opened the innings and if any one of them gets out, the no. 3

batsman (Gambhir) took his place. It is known that Kohli was the sixth wicket to fall.

9. How many batsmen lost their wickets between Sachin's and Dhoni's dismissal?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 3
10. How many runs were scored by the batsman who was the 7th to be dismissed?
  - (a) 1
  - (b) 8
  - (c) 5
  - (d) Cannot be determined
11. Any run which is not scored by the batsman but credited to the batting team's score (because of any error of fielding side) can be considered as extra run. Find the total extra runs given to the Indian team.
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) Cannot be determined.
12. If India's total comprised only 'Singles', 'Doubles' and 'Sixes', then find the maximum number of sixes scored by India.

**Directions for questions 13 to 16:** An investigation was conducted on the total grain produced by the farmers of two different villages—A and B. The result of the investigation is represented in the following table:

| Range of production ( $p$ ) (in tons) | Number of farmers of village A | Number of farmers of village B |
|---------------------------------------|--------------------------------|--------------------------------|
| $p < 20$                              | 5 (900-1500)                   | 4 (1100-1500)                  |
| $20 \leq p < 28$                      | 8 (700-1100)                   | 7 (750-1400)                   |
| $28 \leq p < 36$                      | 10 (600-900)                   | 11 (700-1100)                  |
| $36 \leq p < 44$                      | 6 (450-750)                    | 6 (600-1000)                   |
| $44 \leq p < 60$                      | 3 (400-600)                    | 4 (500-800)                    |

In the above table, for every range of production the value inside the bracket in each cell gives the minimum and the maximum area (in square meters) of the farms of any farmer in the corresponding village (i.e. village A and B) in that production range. For example the 3<sup>rd</sup> column of the first row shows that there are 4 farmers in village B with a production less than 20 tons and of these four farms, the minimum area was 1100 square meters and the maximum area was 1500 square meters.

13. The minimum number of farmers with farm area not more than 1000 square meters but the production capacity less than 30 tons is?
14. Any farm with a production whose numerical value was not less than 0.04 times of the numerical value of its area was termed to be ‘fertile’. The maximum total number of fertile farms in the two villages is?
15. Find the maximum possible number of farmers of village B with the farm area of more than 750 square meters and production of more than 34 tons.
16. Find the maximum possible value of the average production of all the farmers.

## 27 Mock Test Paper

**Directions for Question 1 to 5:** The following table gives us the information about the weight carried by the six tourists Aman, Binay, Charu, Dinesh, Ervin and Fahim at four different airports Mumbai, Delhi, Chennai and Bangalore. Maximum permissible weights in these airports are  $40a$ ,  $50b$ ,  $60c$  and  $80d$  respectively, where  $a, b, c, d$  are real numbers. It is also given that weight carried by Aman at the Mumbai airport is not less than that carried by him at the Delhi or Chennai airports but not more than that carried by him at the Bangalore airport. This holds true for the weights carried by Binay, Charu, Dinesh, Ervin and Fahim.

1. If Aman carried equal weights at the Delhi and Chennai airports, then find the ratio of weight carried by Aman at the Delhi airport and weight carried by Charu at the Chennai airport.
2. A passenger is said to be a light weight carrying passenger, if he carried 30% or less weight of the maximum permissible weight at that airport. Out of these six passengers how many passengers are considered as light weight group passenger in at least two airports?
3. If Dinesh carried 30 kg weight at the Bangalore airport, then the maximum possible weight that Aman could carry at the Mumbai airport is = \_ kg.

|        | Mumbai | Delhi | Chennai | Bangalore |
|--------|--------|-------|---------|-----------|
| Aman   | 10a    | 20b   | 8c      | 25d       |
| Binay  | 20a    | 10b   | 16c     | 15d       |
| Charu  | 25a    | 15b   | 20c     | 20d       |
| Dinesh | 10a    | 18b   | 25c     | 30d       |
| Ervin  | 20a    | 32b   | 10c     | 10d       |
| Fahim  | 30a    | 12b   | 20c     | 35d       |

4. The difference between the weight carried by Binay at the Mumbai

and the Delhi airports is D.

How many passengers (among these six passengers) definitely carried lesser weight than D at the Delhi airport?

5. If the value of D, mentioned in the previous question was equal to 120, then how many passengers definitely carried a weight less than 75 kg at the Delhi airport?

**Directions for questions 6 to 8:** The following table gives the partial information about the marks obtained by 5 students in the four different sections of CAT 2015 exam. Each column has two missing values. It is also given that none of these two missing values is more than 10% of the total score of all the five students for the QA and DI sections. Similarly, for the LR sections none of the two missing values is less than 10% or greater than 15% of the total score of all the five students. For the DI section, the missing values are not less than 10% and not greater than 14% of the total score of all the five students.

| Name of student | QA         | LR         | DI         | VA         |
|-----------------|------------|------------|------------|------------|
| Pulkit          |            | 100        |            | 63         |
| Qasim           | 98         | 55         |            | 62         |
| Rohan           |            |            | 110        |            |
| Sameer          | 72         | 85         | 30         | 65         |
| Taskin          | 70         |            | 80         |            |
| <b>Total</b>    | <b>280</b> | <b>320</b> | <b>270</b> | <b>250</b> |

6. The students are ranked A to E according to the total marks obtained by them in CAT-2015 exam, with the highest scorer getting rank A. If marks of all the students are different, then how many students are there whose ranks can be exactly determined?
7. If the absolute difference between the total marks scored by Pulkit and Rohan is the minimum possible, then what is the absolute difference between the total marks scored by Taskin and Qasim?
8. Find the maximum possible percentage contribution of Pulkit in the total score of all the five students in the CAT-2015 paper.

**Directions for questions 9 to 12:** The following table gives some information about the points scored by Sudhir in five different CAT Mock

tests (from 1 to 5). The question paper is of objective type.

| Mock Tests | Total number of problems | Attempted problems | Correct attempts | Incorrect attempts | Total score |
|------------|--------------------------|--------------------|------------------|--------------------|-------------|
| 1          | 60                       |                    |                  |                    |             |
| 2          | 70                       | 58                 |                  |                    |             |
| 3          | 70                       | 34                 |                  | 12                 |             |
| 4          | 80                       |                    |                  |                    | 132         |
| 5          | 90                       |                    | 60               |                    |             |

It is also known that:

1. For every correct answer Sudhir gets 6 marks and for every incorrect attempt he loses 2 marks. He loses 1 mark for every unattempted problem.
2. Sudhir's total marks in test 3 is  $\frac{1}{2}$  of his marks in test 1.
3. The number of incorrect attempts in test 4 is  $\frac{1}{6}$ th of his incorrect attempts in all the tests and is twice of that in test 1.
4. In all the tests together, Sudhir attempted total 250 problems and scored 804 marks.
9. Find the total marks scored by Sudhir in Mock test 1.
10. Find the total marks Sudhir lost in test 2 because of unattempted problems.
11. Find the total marks scored by Sudhir in Mock test 5.
12. If passing marks for any of these five mock tests is 140, then in how many tests Sudhir scored more than passing marks?

## 28 Mock Test Paper

**Directions for Questions 1 to 4:** The IIT-JEE 2035 exam consists of six different exams. **Table A** gives the information regarding the percentage distribution of 2 marks and 4 marks questions in IIT JEE 2035 exams and **table B** gives the marks distribution of Piyush in the IIT JEE 2035 exam. There were a total of 1000 questions asked in the exam and there was no negative marking for any wrong answer. There are a total of 160 questions asked in the Chemistry I section.

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**Table A: Percentage distribution of 2 marks and 4 marks questions among different sections in IIT JEE 2035:**

| Section      | 2 marks questions | 4 marks questions |
|--------------|-------------------|-------------------|
| Math I       | 20                | 15                |
| Math II      | 20                | 30                |
| Chemistry I  | 15                | 20                |
| Chemistry II | 10                | 5                 |
| Physics I    | 20                | 10                |
| Physics II   | 15                | 20                |

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**Table B: Marks obtained by Piyush in different sections:**

| Subject      | Marks |
|--------------|-------|
| Math I       | 60    |
| Math II      | 180   |
| Chemistry I  | 240   |
| Chemistry II | 120   |
| Physics I    | 300   |

1. Find the maximum 2 marks questions attempted by Piyush.
2. If all the questions are objective type and Piyush forgot to fill the options of 2 marks questions in the OMR sheet and he just filled only the options of 4 marks questions, then find the minimum percentage marks he got in the exam?
3. Find the minimum number of questions that Piyush could attempt in Chemistry II?
4. If Piyush attempted ‘ $x$ ’ 4 marks questions correctly in Chemistry II and he also attempted ‘ $y$ ’ 4 marks questions in Physics II, then which of the following options is correct? Assume he solved the minimum number of questions in both sections.
  - (a)  $x < y$
  - (b)  $x > y$
  - (c)  $x = y$
  - (d)  $x \geq y$

**Directions for questions 5 to 8:** The IIM Lucknow management was assessing the performance of the top five students in last five class tests. Abhay, Balwinder, Chetan, David and Faraz are the top five students of the class. For each of the five tests, the table below gives the names of the three highest scoring students in that test, along with their respective scores in that test, mentioned in the brackets alongside. The last column gives the percentage of the total class score made by the given three students together. The management also observed that in a particular test the scores of no students are equal. There are a total 10 students in the class.

The college management has the following two parameters to judge the performance of each student:

1. Consistency value (C.V.) which is the median of all the five scores of the concerned student.
2. Intelligence value (I.V.) which is the sum of the highest and the lowest scores of the concerned student.

| Test | Highest Marks  | Second highest marks | Third highest marks | Percent-age of total score |
|------|----------------|----------------------|---------------------|----------------------------|
| 1.   | Abhay (90)     | Balwinder (55)       | Chetan (58)         | 70                         |
| 2.   | David (60)     | Faraz (56)           | Abhay (40)          | 65                         |
| 3.   | Balwinder (75) | Faraz (52)           | David (27)          | 70                         |
| 4.   | David (66)     | Abhay (54)           | Faraz (36)          | 65                         |
| 5.   | Chetan (70)    | Balwinder (62)       | Abhay (50)          | 70                         |

5. Which of the following student had the highest value of C.V.?
  - (a) Chetan
  - (b) David
  - (c) Abhay
  - (d) Balwinder
6. The exact value of C.V. can be calculated for many of the given five students?
7. Which of the students cannot have the lowest value of I.V. in the five tests?
  - (a) Balwinder
  - (b) Chetan
  - (c) David
  - (d) None of these
8. In the given five tests Balwinder and Chetan together accounted for at most what percentage of the total score of the class?
  - (a) 31.2
  - (b) 39.36
  - (c) 34.5
  - (d) 33.6

**Directions for questions 9 to 11:** During commando training in NSG a recruit has to complete 12 stages successfully, O to Z. The following table gives the time required to complete each stage, and the necessary stages that should be completed before that stage can be started.

| <i>Stages</i> | <i>Stages required to be completed before starting the stage</i> | <i>Time required to complete the stage (in months)</i> |
|---------------|--|--|
| O             | None   | 4  |
| P             | O  | 15   |
| Q             | O  | 12   |
| R             | Q  | 9  |
| S             | P, R   | 2  |
| T             | P  | 3  |
| U             | T  | 5  |
| V             | S  | 7  |
| W             | R  | 9  |
| X             | U, V   | 17   |
| Y             | V, W   | 11   |
| Z             | Y  | 7  |

Any stage cannot be stopped before its completion once it is started. However it is possible that the recruit can be trained under more than one stage simultaneously.

A recruit is said to be trained if all the 12 stages (from O to Z) are completed. Assume that the training started on 1 January, 2022.

9. Stage X cannot be started before
  - (a) November, 2024
  - (b) October 2024
  - (c) September, 2024
  - (d) December, 2024
10. After completing stage S, at least how many more months are required to complete the training?
11. If the training is to be completed in least possible number of months, then after the completion of stage T, at least how many more months are required to complete the training?

**Additional information for questions 12 to 13:** After completing the above mentioned training, the recruits have to undergo another two training sessions (Session M and Session N) same as the above training but this time no stage could be implemented simultaneously at a time in both the trainings.

12. What is the least time required, from the start of these new trainings, to complete the stage U in both the training sessions M & N??
13. What is the least time required, from the start of these new trainings, to complete the stage R in both the trainings?

**Directions for questions 14 to 16:** Answer the questions on the basis of the information given below.

In the data given below, **Table-A** indicates the number of movies watched by six students in three different multiplexes – PVR, Big Cinemas and INOX. **Table-B** shows the number of movies of each of the six genres in these three multiplexes. It is also known that:

- The person who watched exactly one horror movie in INOX had also watched horror movies in PVR and Big Cinemas.
- D did not watch a Sci-fi movie in Big Cinemas.
- From among A, D and F exactly two people watched the same type of movie(s) in Big Cinemas and INOX as they watched in PVR.
- In any given multiplex, each of them watched only one type of movie.

**Table A**

| Name | PVR | BIG CINEMAS | INOX |
|------|-----|-------------|------|
| A    | 4   | 4           | 1    |
| B    | 2   | 1           | 2    |
| C    | 2   | 1           | 4    |
| D    | 1   | 1           | 1    |
| E    | 2   | 1           | 1    |
| F    | 2   | 2           | 1    |

**Table B**

| Genre       | PVR | BIG CINEMAS | INOX |
|-------------|-----|-------------|------|
| Action      | 2   | 0           | 0    |
| Sci-Fi      | 2   | 2           | 0    |
| Comedy      | 4   | 4           | 1    |
| Dance based | 2   | 2           | 1    |
| Romance     | 1   | 1           | 1    |
| Horror      | 2   | 1           | 7    |

14. For how many students can the number of movies watched of each type be conclusively determined?
15. What can be the maximum number of dance based movies watched by F in all the three multiplexes collectively?
16. Who watched horror movies in all the three multiplexes?
- (a) D
  - (b) E
  - (c) E or F
  - (d) D or E

## 29 Mock Test Paper

**Directions for questions 1 to 5:** In a high school exam the rank of the candidate is decided on the basis of his score in each of the four subjects – Physics, Chemistry, Biology and Maths. The weightage of these subjects in the final result is 20%, 40%, 20% and 20% respectively. The following are the scores and the rank of the ten students of the class.

| Name | Physics | Chemistry | Biology | Maths | Total | Rank |
|------|---------|-----------|---------|-------|-------|------|
| A    | 40      | 45        | 45      |       |       | 10   |
| B    | 70      | 65        |         | 60    | 62    | 7    |
| C    | 60      | 60        | 80      | 85    | 69    | 5    |
| D    | 45      |           | 75      | 90    |       | 1    |
| E    | 55      | 75        | 55      | 60    | 64    | 6    |
| F    | 70      | 65        | 80      | 95    | 75    | 2    |
| G    | 50      | 45        | 55      |       |       | 8    |
| H    | 75      | 50        |         | 85    |       | 4    |
| I    | 45      | 40        | 60      | 70    | 51    | 9    |
| J    | 65      | 65        | 75      |       | 72    | 3    |

The maximum possible score for each subject was 100 and the maximum marks any of these ten students obtained in any subject was 95. If two or more students got the same total marks then they are all awarded the same rank.

- Find the marks scored by B in Biology?
- If the score obtained by G in Maths was ‘p’ then which of the following is a possible value of p?
  - 45
  - 72
  - 60
  - 54

3. The minimum number of students who scored less than H in Biology?
4. Maximum possible marks obtained by D is?
5. How many students definitely obtained more marks than A in Maths?

**Directions for questions 6 to 8:** Answer the following questions on the basis of information given below:

The following table shows the marks obtained by four students in Gate exam from 2012 to 2014. The four students Ajay, Mohanish, Peter and Faraz are disguised as P, Q, R and S not necessarily in the same order.

|             | P   | Q   | R   | S   |
|-------------|-----|-----|-----|-----|
| Gate-2012   | 94  |     | 102 | 106 |
| Gate-2013   |     | 124 | 118 | 20  |
| Gate-2014   | 144 | 50  | 56  |     |
| Total marks | w   | x   | y   | z   |

**It is also known that:**

1. The maximum possible marks in each Gate exam were 150.
2. Ajay's total score is more than Peter's total score.
3. Ajay scored the lowest marks in Gate-2012 and Faraz scored the highest marks in Gate-2013 among the four students.
4. In each Gate exam, a correct answer carried +6 marks and an incorrect answer carried – 2 mark.
5. Mohanish's total score is less than Peter's total score.
6. P's total score is a multiple of 12.
  - (a) 101
  - (b) 97
  - (c) 98
  - (d) 100
7. What is the name of the person disguised as Q?
  - (a) Ajay
  - (b) Faraz
  - (c) Peter
  - (d) Mohanish

8. How many different values are possible for ‘w’?
- 7
  - 8
  - 9
  - 15

**Directions for questions 9 to 11:** The table given below shows the total budget of the four defence research projects released in the year 2022 and the fee charged per project by eight foreign scientists. Each of the eight scientists has worked in exactly two of the four projects. The table also gives partial information about the scientist who has worked in a particular project. It is known that the total fee paid to the scientists who have worked in a particular project is exactly  $1/8^{\text{th}}$  of the total budget of that project.

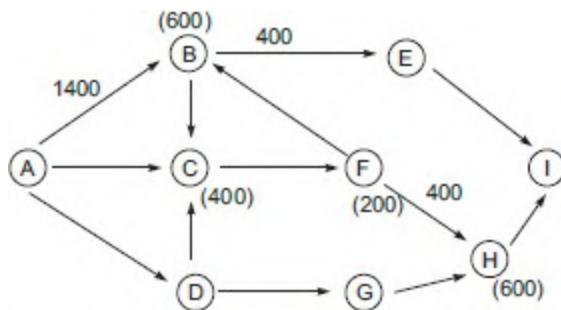
|                                 | Fee per<br>project<br>(in Crore Rs.) | A   | B   | C   | D   |
|---------------------------------|--------------------------------------|-----|-----|-----|-----|
| Total Budget (in<br>Crores Rs.) |                                      | 352 | 288 | 384 | 576 |
| P                               | 20                                   |     | Y   |     |     |
| Q                               | 16                                   |     | Y   |     |     |
| R                               | 10                                   | Y   | N   | N   | Y   |
| S                               | 12                                   |     |     | Y   |     |
| T                               | 12                                   |     |     | Y   |     |
| U                               | 10                                   |     |     |     |     |
| V                               | 14                                   |     |     |     | Y   |
| W                               | 6                                    | Y   |     |     |     |

Y Scientist worked on that project, N Scientist did not work on that project.

9. What is the absolute difference (in crores of rupees) in the total budgets of the projects in which P has worked and the total budgets of the projects in which both S and T have worked?
10. In which of the following projects has S worked definitely?
- B
  - D
  - A

- (d) Either A or D
11. Which scientist has not worked with R in any of the four projects in the year 2022?
- A
  - U
  - V
  - W

**Directions for questions 12 to 16:** The diagram given below is a connector network for current supply between nine electrical nodes A, B, C, D, E, F, G, H and I. The current carried in some of the connectors and the requirement of some of the nodes is also mentioned. Electricity is only supplied from node A – It is the source node and it does not have any requirement of its own but it supplies the requirement of all the other nodes.



The following information is also known:

1. The maximum capacity of any connector between 2 nodes is 2000 amperes.
  2. No two connectors directly connected to the same node carry the same amount of current.
  3. The current transfer through none of the above connectors shown is zero.
  4. The current requirement at any node except nodes A and I is equal to the current transported by exactly one of the connectors directly connected to it.
12. Find the current requirement at the node E?
13. What is the amount of current in the connector F-B?
14. What is the amount of current in the connector D-C?

15. What is the total requirement that should be supplied by C?
16. What is the amount of current in the connector F-H?

## 30 Mock Test Paper

**Directions for questions 1 to 5:** In a science quiz of a school five students were asked to name the noble prize winners in physics from 2010 to 2014. As the anchor gave them a hint that the winners for the five years were Alex, Bob, Chris, Denial and Elina not necessarily in that order. After getting the hint the contestants gave their respective orders as follows:

| Students | 2010  | 2011   | 2012  | 2013   | 2014   |
|----------|-------|--------|-------|--------|--------|
| Pulkit   | Chris | Denial | Alex  | Elina  | Bob    |
| Qasim    | Bob   | Chris  | Alex  | Denial | Elina  |
| Rahim    | Chris | Denial | Alex  | Bob    | Elina  |
| Sahir    | Elina | Alex   | Chris | Bob    | Denial |
| Taufiq   | Bob   | Chris  | Alex  | Elina  | Denial |

If a student names the winner of all the five years correctly then he will get 100 marks. If a student names the winner of only k years correctly (where  $k < 5$ ), he will get  $10k + 10$  marks. Further, it was found that each of the student got different marks.

1. Which of the following could be the winner of 2010 physics noble prize?
  - (a) Bob
  - (b) Alex
  - (c) Denial
  - (d) Elina
2. Which of the following students can get 100 marks in the quiz?
  - (a) Pulkit
  - (b) Rahim
  - (c) Sahir
  - (d) Taufiq

3. Who won the physics noble prize in 2012?
  - (a) Chris
  - (b) Alex
  - (c) Bob
  - (d) Either (a) or (b)
4. How many students predicted the winner of 2011 correctly?
5. What is the maximum possible difference between the marks scored by Pulkit and Sahir?

**Directions for questions 6 to 8:** In the biggest school in Bertfordshire, the teachers follow a particularly peculiar academic process in awarding marks in practical exams based on the marks one has got in a paired theory paper. One of the pairings they have is for the theory marks of thermal physics and the practical marks of thermodynamics. **Table A** provides data about the theory marks in thermal physics and the corresponding increase in the practical marks in thermodynamics. **Table B** gives the marks in viva of thermodynamics and its corresponding marks in the practical of thermodynamics and corresponding and the associated average marks in the IQ test of the student. **Table C** gives us the grades of the students and their corresponding marks in the practical of thermodynamics.

**Table: A**

| Theory marks in exam of thermal physics | Increase in the practical marks in thermodynamics |
|---|---|
| 1-10                                    | 2   |
| 11-20                                   | 3   |
| 21-30                                   | 2   |
| 31-40                                   | 4   |
| 41-50                                   | 1   |
| 51-60                                   | 3   |
| 61-70                                   | 2   |
| 71-80                                   | 4   |
| 81-90                                   | 2   |
| 91-100                                  | 1   |

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**Table: B**

| <i>Marks in viva of thermodynamics</i> | <i>Practical marks in thermodynamics</i> | <i>Marks in IQ test</i> |
|--|--|-------------------------|
| 0                                      | 12                                       | 0                       |
| 1                                      | 15                                       | 1                       |
| 2                                      | 17                                       | 3                       |
| 3                                      | 21                                       | 4                       |
| 4                                      | 22                                       | 5                       |
| 5                                      | 25                                       | 6                       |
| 6                                      | 27                                       | 7                       |
| 7                                      | 31                                       | 9                       |
| 8                                      | 33                                       | 10                      |
| 9                                      | 34                                       | 11                      |

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**Table: C**

| <i>Practical marks in thermodynamics</i> | <i>Grade</i> |
|--|--------------|
| 12                                       | A            |
| 15                                       | B            |
| 17                                       | C            |
| 21                                       | D            |
| 22                                       | E            |
| 25                                       | F            |
| 27                                       | G            |
| 31                                       | H            |
| 33                                       | I            |
| 34                                       | J            |

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Practical marks in thermodynamics is 10 for 0 marks in theory exam of thermal physics. If theory marks in thermal physics is greater than 0 the practical marks is calculated according to the [table A](#).

6. If the marks in theory exam of thermal physics varies from 25 to 76 then what is the range over which the marks in IQ test can vary?
  - (a) 1–7
  - (b) 3–9

- (c) 4–11
  - (d) None of these.
7. Which of the following is not a possible theory score when the grade is either C, D, E, F or G?
- (a) 72
  - (b) 64
  - (c) 34
  - (d) 56
8. What is the percentage increase in marks in viva if theory marks has increased from 19 to 63?
- (a) 400
  - (b) 333.33
  - (c) 500
  - (d) None of these.

**Directions for questions 9 to 12:** In the ICC Champions Trophy, held across 4 continents, every team played 1 match on each of the four continents viz: Australia, Asia, Europe and Africa. All matches held in Asia were held in India, for Europe were held in England, for Africa were held in South Africa. In the Australian continent, of course, the matches were all held in Australia. At the end of the fiercely fought tournament, the best batsman was decided on the basis of runs scored by him in the four countries—Australia, India, England and South Africa. The weightage for the runs in each of the countries was 20%, 20%, 40% and 20% respectively.

Note: Runs in England were weighted higher since that particular year, the conditions in England were particularly humid and the ball swung a lot. The following are the runs scored and the ranks of the top 10 batsmen of the tournament (based on their weighted total scores). Some information is missing in the table.

It is known that no batsman scored more than 190 in any innings during the tournament. If two or more batsmen scored the same total runs, they are awarded the same place in the rankings.

| Player's name | Australia | England | India | South-Africa | Weighted<br>Total score | Rank |
|---------------|-----------|---------|-------|--------------|-------------------------|------|
| Sachin        | 130       | 130     | 150   |              | 144                     | 3    |
| Younis        | 140       | 130     |       | 120          | 124                     | 7    |
| Adam          | 120       | 120     | 160   | 170          | 138                     | 5    |
| Saurav        | 90        |         | 150   | 180          |                         | 1    |
| Lance         | 110       | 150     | 110   | 120          | 128                     | 6    |
| Srikant       | 140       | 130     | 160   | 190          | 150                     | 2    |
| Neel          | 100       | 90      | 110   |              |                         | 8    |
| Hamish        | 150       | 100     |       | 170          |                         | 4    |
| Rahul         | 90        | 80      | 120   | 120          | 102                     | 9    |
| Damian        | 80        | 90      | 90    |              |                         | 10   |

9. The minimum possible number of batsmen who scored more than Hamish in India is?
10. If Neel scored ‘k’ runs in South Africa, then how many different values are possible for k?
11. How many players definitely scored more than Damian in South Africa?
12. Find the maximum possible total weighted score of Saurav.

**Directions for questions 13 to 16:** 64 teams participated in the FIFA world cup 2050. There were a total of six rounds in the tournament – I, II, III, IV, semifinals, final. Each round was knock out in nature, which means that the winner advanced to the next round and the loser got eliminated from the tournament. The draw of the matches in the tournament were as follows:

1st round: 1<sup>st</sup> match was played between the 1<sup>st</sup> ranked team and the 64<sup>th</sup> ranked team. 2<sup>nd</sup> match was played between the 2<sup>nd</sup> highest team and 63<sup>rd</sup> number team and so on. The 32<sup>nd</sup> match of the first round was the match between the 32<sup>nd</sup> ranked team and the 33<sup>rd</sup> ranked team.

2<sup>nd</sup> round: The 1<sup>st</sup> match was played between the winner of the 1<sup>st</sup> match of the 1<sup>st</sup> round and the winner of the 32<sup>nd</sup> match of the first round, the second match of the 2<sup>nd</sup> round was played between the winner of the 2<sup>nd</sup> match and the winner of the 31<sup>st</sup> match of the first round team and so on.

A similar pattern was followed for the matches of the next rounds as well.

If a lower ranking team beat a higher ranking team in any match of any round then it was called an ‘upset’. In the tournament the 1<sup>st</sup> ranked team was considered to be the highest ranked team and so on.

13. If the rank 1 team was the winner of the tournament then, which among the following could be the team it beat in the final of the tournament?
  - (a) 22
  - (b) 56
  - (c) 4
  - (d) 13
14. If rank 23 team won the tournament then the minimum possible number of the upsets created by the 23<sup>rd</sup> ranked team would be?
15. If each team of the tournament caused or faced at least one upset, then the highest ranked team, which could have won the tournament, was?
16. If there were only four upsets in the tournament and no team faced or caused more than three upsets, then find the lowest ranked team who could have won the tournament.
  - (a) 16
  - (b) 32
  - (c) 64
  - (d) 33

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## ANSWER KEY

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### **Mock Test Paper 1**

1. (d)
2. (d)
3. (b)
4. (d)
5. (d)
6. (b)
7. (d)
8. (a)
9. 239
10. 34
11. 324
12. 61
13. (d)
14. (a)
15. 26000
16. 34000
17. (d)

### **Mock Test Paper 2**

1. (b)
2. (a)
3. (c)
4. (d)
5. (b)
6. (b)
7. (c)
8. (a)
9. (d)

10. 108
11. 3
12. 27
13. 1
14. (a)
15. (d)
16. 580

### **Mock Test Paper 3**

1. (d)
2. (c)
3. (c)
4. (a)
5. (c)
6. (b)
7. (d)
8. (c)
9. (b)
10. (a)
11. (c)
12. (d)
13. 1
14. (b)
15. 5
16. (a)

### **Mock Test Paper 4**

1. (c)
2. (d)
3. (a)
4. (c)
5. (a)
6. (a)

- 7. (b)
- 8. (c)
- 9. (d)
- 10. (c)
- 11. (a)
- 12. (a)
- 13. (d)
- 14. 3
- 15. 5
- 16. 7

## **Mock Test Paper 5**

- 1. (a)
- 2. (d)
- 3. (b)
- 4. (c)
- 5. (c)
- 6. (a)
- 7. (c)
- 8. (b)
- 9. (c)
- 10. (a)
- 11. (c)
- 12. 1
- 13. (d)
- 14. (b)
- 15. 56
- 16. (c)
- 17. 2nd Rank

## **Mock Test Paper 6**

- 1. (c)
- 2. (d)

- 3. (d)
- 4. (b)
- 5. (d)
- 6. (c)
- 7. (a)
- 8. (d)
- 9. (d)
- 10. (a)
- 11. (c)
- 12. (d)
- 13. (b)
- 14. (a)
- 15. (d)
- 16. (a)
- 17. (a)

## **Mock Test Paper 7**

- 1. (c)
- 2. (b)
- 3. (d)
- 4. (d)
- 5. (d)
- 6. (c)
- 7. (b)
- 8. (d)
- 9. (d)
- 10. (a)
- 11. (b)
- 12. (a)
- 13. 11252
- 14. (a)
- 15. (b)
- 16. (c)

## **Mock Test Paper 8**

1. (c)
2. (d)
3. (b)
4. (a)
5. (d)
6. (b)
7. (d)
8. (b)
9. (d)
10. (c)
11. (d)
12. (a)
13. 16 matches
14. 4 points
15. 8 points
16. 10 points

## **Mock Test Paper 9**

1. (c)
2. (c)
3. (d)
4. (d)
5. (d)
6. (c)
7. (d)
8. (c)
9. (b)
10. (b)
11. (c)
12. (d)
13. (c)

- 14. (b)
- 15. (c)
- 16. (a)
- 17. (d)

## **Mock Test Paper 10**

- 1. (c)
- 2. (d)
- 3. (d)
- 4. (b)
- 5. (b)
- 6. (b)
- 7. (c)
- 8. (d)
- 9. (e)
- 10. (d)
- 11. (a)
- 12. (c)
- 13. (d)
- 14. (a)
- 15. (d)
- 16. (c)
- 17. (a)
- 18. (d)

## **Mock Test Paper 11**

- 1. (a)
- 2. (a)
- 3. (c)
- 4. (b)
- 5. (a)
- 6. (b)
- 7. (d)

- 8. (c)
- 9. (c)
- 10. (d)
- 11. (d)
- 12. (d)
- 13. (c)
- 14. (b)
- 15. (d)
- 16. (d)

### **Mock Test Paper 12**

- 1. (c)
- 2. (c)
- 3. (b)
- 4. (d)
- 5. (d)
- 6. (a)
- 7. (d)
- 8. (a)
- 9. (c)
- 10. (b)
- 11. (b)
- 12. (c)
- 13. (b)
- 14. (a)
- 15. (d)
- 16. (d)

### **Mock Test Paper 13**

- 1. (d)
- 2. (a)
- 3. (d)
- 4. (d)

- 5. (d)
- 6. (a)
- 7. (d)
- 8. (c)
- 9. (c)
- 10. (d)
- 11. (d)
- 12. (c)
- 13. (a)
- 14. (d)
- 15. (c)
- 16. (d)

### **Mock Test Paper 14**

- 1. (c)
- 2. (b)
- 3. (a)
- 4. (e)
- 5. (c)
- 6. (d)
- 7. (b)
- 8. (e)
- 9. (a)
- 10. (b)
- 11. (a)
- 12. (b)
- 13. (d)
- 14. (d)
- 15. (c)
- 16. (d)

### **Mock Test Paper 15**

- 1. (b)

- 2. (b)
- 3. (c)
- 4. (d)
- 5. (b)
- 6. (c)
- 7. (c)
- 8. (d)
- 9. (c)
- 10. (e)
- 11. (a)
- 12. (d)
- 13. (b)
- 14. (a)
- 15. (a)
- 16. (c)

## **Mock Test Paper 16**

- 1. (c)
- 2. (d)
- 3. (c)
- 4. (a)
- 5. (a)
- 6. (c)
- 7. (d)
- 8. (a)
- 9. (d)
- 10. (d)
- 11. (a)
- 12. (d)
- 13. (c)
- 14. (b)
- 15. (d)
- 16. (a)

## **Mock Test Paper 17**

1. (d)
2. (b)
3. (d)
4. (a)
5. (a)
6. (d)
7. (c)
8. (c)
9. (b)
10. (b)
11. (d)
12. (b)
13. (d)
14. (c)
15. (c)
16. (b)

## **Mock Test Paper 18**

1. (b)
2. (d)
3. (b)
4. (d)
5. (c)
6. (b)
7. (d)
8. (b)
9. (c)
10. (a)
11. (d)
12. (d)
13. (a)

- 14. (b)
- 15. (c)
- 16. (c)

## **Mock Test Paper 19**

- 1. (a)
- 2. (b)
- 3. (c)
- 4. (c)
- 5. (a)
- 6. (b)
- 7. (b)
- 8. (b)
- 9. (d)
- 10. (d)
- 11. (c)
- 12. (d)
- 13. (a)
- 14. (b)
- 15. (d)
- 16. (d)

## **Mock Test Paper 20**

- 1. (b)
- 2. (c)
- 3. (a)
- 4. (b)
- 5. (b)
- 6. (c)
- 7. (d)
- 8. (d)
- 9. (e)
- 10. (a)

11. (a)
12. (e)
13. (d)
14. (a)
15. (a)
16. (d)

## **Mock Test Paper 21**

1. (b)
2. (c)
3. (a)
4. (b)
5. (b)
6. (a)
7. (b)
8. (a)
9. (a)
10. (b)
11. (c)
12. (a)
13. (a)
14. (a)
15. (c)

## **Mock Test Paper 22**

1. (d)
2. (c)
3. (e)
4. (b)
5. (d)
6. (d)
7. (a)
8. (e)

- 9. (c)
- 10. (b)
- 11. (a)
- 12. (c)
- 13. (a)

### **Mock Test Paper 23**

- 1. (a)
- 2. (c)
- 3. (d)
- 4. (d)
- 5. (a)
- 6. (c)
- 7. (a)
- 8. (c)
- 9. (a)
- 10. (a)
- 11. (e)
- 12. (e)
- 13. (a)
- 14. (e)
- 15. (e)
- 16. (a)

### **Mock Test Paper 24**

- 1. (d)
- 2. (c)
- 3. (e)
- 4. (b)
- 5. (c)
- 6. (d)
- 7. (c)
- 8. (b)

9. (c)
10. (a)
11. (c)
12. (b)
13. (b)
14. (c)
15. (b)
16. (a)

## **Mock Test Paper 25**

1. (a)
2. (e)
3. (b)
4. (a)
5. (c)
6. (b)
7. (c)
8. (d)
9. (d)
10. (c)
11. (b)
12. (b)
13. (b)
14. (c)
15. (a)
16. (b)
17. (b)

## **Mock Test Paper 26**

1. (b)
2. 250
3. 90
4. (a)

5. 4.25
6. 5
7. 2
8. 5
9. (a)
10. (c)
11. (a)
12. 17
13. 3
14. 38
15. 18
16. 36

## **Mock Test Paper 27**

1. 0.4
2. 4
3. 5 kgs
4. 5
5. 4 passengers
6. 2
7. 35
8. 19.46%
9. 144
10. 12
11. 312
12. 3

## **Mock Test Paper 28**

1. 570
2. 2.5%
3. 50
4. (a)
5. (d)

- 6. 2
- 7. (d)
- 8. (b)
- 9. (a)
- 10. 25
- 11. 22
- 12. 42
- 13. 36
- 14. 3
- 15. 3
- 16. (b)

## **Mock Test Paper 29**

- 1. 50
- 2. (b)
- 3. 9
- 4. 80
- 5. 5
- 6. (b)
- 7. (b)
- 8. (a)
- 9. 480
- 10. (d)
- 11. (b)
- 12. 200
- 13. 200
- 14. 200
- 15. 800
- 16. 400

## **Mock Test Paper 30**

- 1. (a)
- 2. (a)

3. (b)

4. 2

5. 90

6. (b)

7. (a)

8. (c)

9. 0

10. 70

11. 5

12. 160

13. (a)

14. 0

15. 33

16. (a)

# SOLUTIONS

## Mock Test Paper 1

1. The table gives data about the Average weight per marble for each of the boxes. However, the individual weights of marbles of any box is not given, therefore you cannot calculate AWPM hence ESI of the mixture.

**Answer is (d)**

2. AWPM and corresponding ESI when B2 is mixed with B1, B3, B4 and B5:

$$\text{B2 and B1: } \frac{16*180 + 48*90}{(16+48)} = \frac{7200}{64} = 112.5, \text{ so ESI} = 7.5$$

$$\text{B2 and B3: } \frac{48*90 + 32*140}{48+32} = \frac{8800}{80} = 110, \text{ so ESI} = 7.5$$

$$\text{B2 and B4: } \frac{48*90 + 64*130}{48+64} = \frac{12640}{112} = 112.85, \text{ so ESI} = 7.5$$

$$\text{B2 and B5: } \frac{48*90 + 40*170}{48+40} = \frac{11120}{84} = 132.38, \text{ so ESI} = 8$$

**Answer is option (d)**

3. ASPPM for:

$$\text{B1, B2 and B3} = 12.17$$

$$\text{B2, B3 and B4} = 14.44$$

$$\text{B3, B4 and B5} = 16.06$$

$$\text{B1, B4 ad B5} = 17.27$$

Only one of the 4 mixtures has ASPPM between 13 and 15, and its ESI would be easily 7.5 as its AWPM would be much more than 100.

**Answer is option (b)**

4. ASPPM for:

$$\text{B1, B4 ad B5} = 17.27$$

$$\text{B2, B3 and B4} = 14.44$$

$$\text{B3, B4 and B5} = 16.06$$

All give ASPPM between 12 and 18 but none can have ESI as perfect 10 as none of the mixtures mentioned can have AWPM >170

### **Answer is option (d)**

5. Let's solve the table first from all the data we have from the question.  
Fee paid to celebrities is 25% of the total budget of any campaign, thus we get the following:

According to the question-

1. Digital India:

Fee to be paid to celebrities for Digital India = 25% of 176 = 44 Lakhs INR

Fee already paid to celebrities = 26 Lakhs INR

Fee remaining to pay = 18 Lakhs INR

From table, only Moni or Kajal + Amir, if added as star campaigners can make a total of 18 Lakhs INR. All other celebrities are not considered.

2. Give It Up India:

Fee to be paid to celebrities for Give It Up India = 25% of 144 = 36 Lakhs INR

Fee already paid to celebrities = 26 Lakhs INR

Fee remaining to pay = 10 Lakhs INR

From the table, only Ashika when appointed can make up for this amount

3. Startup India:

Fee to be paid to celebrities for Startup India = 25% of 192 = 48 Lakhs INR

Fee already paid to celebrities = 24 Lakhs INR

Fee remaining to pay = 24 Lakhs INR

From table, only when Anshika and Hansika are appointed, can make up for this sum

4. Swachh Bharat Abhiyaan:

Fee to be paid to celebrities for Swachh Bharat Abhiyaan = 25% of 288 = 72 Lakhs INR

Fee already paid to celebrities = 24 Lakhs INR

Fee remaining to pay = 48 Lakhs INR

From table, only when Mohli and Imran and Moni/Kajal are appointed, can make up for this sum.

We get the following table:

| <i>Fee charged per campaign (in INR)</i>           | <i>Digital India</i> | <i>Give It Up India</i> | <i>Startup India</i> | <i>Swachh Bharat Abhiyaan</i> |
|--|----------------------|-------------------------|----------------------|-------------------------------|
| <i>Total budget for the campaign (in Lakh INR)</i> | 176                  | 144                     | 192                  | 288                           |
| <i>Star campaigner</i>                             |                      |                         |                      |                               |
| <i>Mohli</i>                                       | 20                   | No                      | Yes                  | No                            |
| <i>Imran</i>                                       | 16                   | Yes                     | No                   | No                            |
| <i>Sairukh</i>                                     | 10                   | Yes                     | No                   | No                            |
| <i>Moni</i>  | 12                   | *                       | No                   | Yes                           |
| <i>Kajal</i>                                       | 12                   | *                       | No                   | Yes                           |
| <i>Anshika</i>                                     | 10                   | No                      | Yes                  | Yes                           |
| <i>Hansika</i>                                     | 14                   | No                      | No                   | Yes                           |
| <i>Amir</i>  | 6                    | Yes                     | Yes                  | No                            |

Clearly, Kajal could have worked in Digital India or Swachh Bharat Abhiyaan. Hence we cannot determine the answer.

**Answer is option (d)**

- From the table above, Anshika has not worked with Sairukh in any of the given campaigns.

**Answer is option (b)**

- Mohli has worked in Give it Up India and Swachh Bharat Abhiyaan, total budget of which amounts to:

$$144 + 288 = 432 \text{ Lakhs INR}$$

Moni and Kajal have worked together only in Startup India with budget = 192 Lakhs INR

$$\text{Difference} = 432 - 192 = 240$$

**Answer is option (d)**

- We know that every celebrity works in exactly 2 of the 4 campaigns. Therefore, amount these celebrities charge =  $2 * (20 + 16 + 10 + 12 + 12 + 10 + 14 + 6) = 2 * (100) = 200 \text{ Lakhs INR}$

According to question, PM Narendra Modi announced 20% more to be added to it from National treasure

$$= 120\% \text{ of } 200 \text{ Lakhs INR}$$

$$= 240 \text{ Lakhs INR}$$

Amount spent on banners ads = 23% of 240 Lakhs INR

= 55.2 Lakhs INR

**Answer is option (a)**

9. If there were a total of 900 permanent employees in 1995, it means that there were 900 employees above 25 years of age. Since there are a total of  $315 + 346 = 661$  people above 40, we can conclude that there would be exactly 239 people above 25 in the 20 to 40 age group. This means that  $329 - 239 = 90$  people would be below 25 in that age group. The condition for the maximum number of people in the 40 to 45 category in 2000 would be fulfilled if all these 239 people were aged between 35 to 40 in 1995 and they would have moved to 40 to 45 in 2000. Hence, the required answer is 239.
10. If we look closely at the table, it is evident that any increase in the  $\geq 60$  age group would occur only because of people shifting from the 40 to 60 age group to the 60+ age group. Also, an increase in the 40 to 60 age group would occur, only because of people shifting from the 20 to 40 age group to the 40 to 60 age group. From 1995 to 2000, there must have been a shift of at least 14 from 20-40 to 40-60. In 2005 this value is 0. In 2010 there must have been a shift of at least 20 and in 2015 this number would be 0. Thus, the minimum shift required is  $20+14=34$ .
11. There are 329 employees in the age group 20 to 40 in 1995. All these people would go into the age group 40 to 60 in 2015. So, we would expect these 329 employees to be in the 40 to 60 age group in 2015. However, we see that there are only 326 employees in this age group in 2015. If we consider that there are no new employees recruited in this age group during this time period we will get that the minimum number of people leaving the job that must have occurred must have been 3. Likewise, from the 346 people who were in the 40 to 60 age group in 1995, and the 315 people who were in the 60+ age group in 1995, only 340 people are working in the 60+ age group in 2015. Again if we consider no recruitments between 1995 to 2015 in the 60+ age group, we can see that a minimum of  $346+315 - 340 = 321$  must have left the job. Hence, the minimum number of people who must have left the job between 1995 to 2015 must have been  $3 + 321 = 324$ .
12. The minimum number of recruitments would be given by 2 (in 20-40 in 2005) + 48 (in 20-40 in 2010) + 5 (in 20-40 in 2015) + 6 (in 60+ in

2015) = 61.

### 13–17.

For 1<sup>st</sup> 4000 units::

$$\text{Average salary per unit: For 1000 units} = \frac{400000}{1000} = \text{Rs. } 400$$

$$\text{For 2000 units: } \frac{400000 + \frac{100000}{3}}{2000} = \frac{1300000}{6000} = \text{Rs. } 216.67$$

$$\text{For 3000 units: } \frac{400000 + \frac{200000}{3}}{3000} = \frac{1400000}{9000} = \text{Rs. } 155.55$$

$$\text{For 4000 units} = \frac{400000 + 100000}{4} = \text{Rs. } 125$$

When number of units sold by the employee is greater than 4000 and less than or equals to 7000:

Average salary per unit:

$$\text{For 5000 units} = \frac{500000 + 100000 + \frac{500000}{3}}{5000} = \frac{2300000}{15000} = \text{Rs. } 153.33$$

$$\text{For 6000 units} = \frac{500000 + 100000 + 2 \times \frac{500000}{3}}{6000} = \frac{2800000}{18000} = \text{Rs. } 155.55$$

$$\text{For 7000 units} = \frac{500000 + 600000}{7000} = \frac{1100000}{7000} = \text{Rs. } 157.14$$

When number of units sold by the employee is greater than 7000 and less than or equals to 12000:

Average salary per unit:

$$\text{For 8000 units} = \frac{600000 + 600000 + \frac{400000}{5}}{8000} = \frac{6400000}{40000} = \text{Rs. 160}$$

$$\text{For 9000 units} = \frac{600000 + 600000 + 5 \times \frac{400000}{5}}{12000} = \frac{1500000}{12000} = \text{Rs. 133.33}$$

$$\text{For 10000 units} = \frac{600000 + 600000 + 3 \times \frac{400000}{5}}{10000} = \frac{7200000}{50000} = \text{Rs. 144}$$

$$\text{For 11000 units} = \frac{600000 + 600000 + 4 \times \frac{400000}{5}}{11000} = \frac{7600000}{55000} = \text{Rs. 138.18}$$

$$\text{For 12000 units} = \frac{600000 + 600000 + 5 \times \frac{400000}{5}}{12000} = \frac{1500000}{12000} = \text{Rs. 133.33}$$

13. Average salary per unit will be maximum when the employee sells exactly 1000 units. Option (d).
14. (a)
15. The lowest cost of transportation occurs when the grains are transported along the cheapest routes available, which are shown below:

Piku- D:  $20 \times 50 = 1000$

Ramu- D:  $20 \times 50 = 1000$

Qadir- B:  $60 \times 150 = 9000$

Tinku- A:  $20 \times 100 = 2000$

Sonu- A:  $60 \times 150 = 9000$

Tinku- C:  $20 \times 200 = 4000$

Total =  $1000 + 1000 + 9000 + 2000 + 9000 + 4000 = 26000$  INR

16. The minimum cost of transport when Qadir cannot supply grains to B and D would be:

Qadir- C:  $20 \times 300 = 6000$

Qadir- A:  $40 \times 250 = 10,000$

Ramu- D:  $20 \times 50 = 1000$

Piku- D:  $20 \times 50 = 1000$

Sonu-B:  $60 \times 200 = 12,000$

Tinku- A:  $40 \times 100 = 4000$

Total =  $6000 + 10,000 + 1000 + 1000 + 12000 + 4000 = 34000$  INR

17. Transportation cost when Piku supplies 20 tons grain to A:  $200 \times 20 =$   
INR 4000

When Piku supplies 20 tons to B =  $20 \times 150 =$  INR 3000

When Qadir supplies 20 tons to A =  $250 \times 20 =$  INR 5000

When Tinku supplies 20 tons to D =  $100 \times 20 =$  INR 2000

Hence, option (d) is correct.

## Mock Test Paper 2

1. Sneakers purchased in the year 2011 = 100

Sneakers disposed off in the year 2013 = 30% of 100 = 30

Sneakers purchased in the year 2013 =  $50 + 30 = 80$

**Answer is option (b)**

2. Sneakers bought in 2011 = 100, thus sneakers disposed off in 2013 =  
30% of 100 = 30

Sneakers bought in 2012 = 0, thus sneakers disposed off in 2014 = 0

Sneakers bought in 2013 =  $50+30 = 80$ , thus sneakers disposed off in  
2015 = 30% of 80 = 24

Therefore total sneakers disposed off till 2015 =  $30 + 0 + 24 = 54$

**Answer is option (a)**

3. In the question it is given that 20 Boots were disposed off in 2011, so  
new boots bought were =  $50 + 20 = 70$  (new boots were bought in  
2011.)

Now 2 years later, in 2013, 30% of 70 boots bought in 2011 will be  
disposed off

= 21 boots are disposed off in 2013

**Answer is option (c)**

4. This will depend on the number of boots bought in 2010 which would  
also include the boots bought in 2008 and disposed off in 2010,  
however no such information is given about the year 2008, hence we  
cannot determine the answer.

**Answer is option (d)**

5. In the question it is given that 20 Boots were disposed off in 2011, so  
new boots bought were =  $50 + 20 = 70$  new boots were bought in  
2011.

Now from the graph, Boots bought in 2013 =  $0 + 30\%$  of boots bought in 2011 =  $0 + 21 = 21$  boots were bought in 2013

**Answer is option (b)**

6. Let's try to decode the information given first.

In additional information it is given that at least one student from each course does not buy the set of books, the percentage of students who bought the set of books can never be 100

Taking cases- For MBBS course-

If percentage of students in MBBS buying the set of books is less than or equal to 60:

Then the total number of students in MBBS will have to be equal to or more than 1620. This is not possible because then the number of students from remaining 3 courses will be less than or equal to  $(2700 - 1620) = 1080$ , but from [Table- 2](#), it is clear that it is not possible because then the number of students buying the sets of books would be more than actual number of students available.

If percentage of students in MBBS buying the set of books is either 70 or 80%:

Then the total number of students in MBBS course is not an integral multiple of 10.

If percentage of students in MBBS buying the set of books is equal to 90%:

Then the total number of students in MBBs course = 1080 students

Similarly, for B.Tech course-

Percentage of students in B.Tech buying the set of books cannot be less than or equal to 60, it cannot be 70 either because then the value will not be integral, thus it is = 80

Similarly, for BA course-

Percentage of students in BA buying the set of books can be 60 or 70, but we note that if it is 60%, then percentage of students in B.Com buying the set of books would be 90%, but according to the question no two percentage values can be same.

Thus, percentage of students in BA buying set of books is = 70

Similarly, for B.com course-

Percentage of students in B.Com buying the set of books is = 60  
 Percentage and total number of students in other courses can be found out as :

|        | <i>Total number of students</i> | <i>Percentage of students buying set of books</i> | <i>Number of students buying set of books</i> |
|--------|---------------------------------|---|---|
| MBBS   | 1080                            | 90%   | 972   |
| B.Tech | 810                             | 80%   | 648   |
| BA     | 540                             | 70%   | 378   |
| B.Com  | 270                             | 60%   | 162   |

Therefore,  $p + q = n + s = o + r = m + t = 90$

$$p + r = n + t = o + s = 80$$

$$q + r = p + s = 70$$

$$q + s = 60$$

Solving these equations, we get:

$$m = 80, q = 40, n = 70, r = 30, o = 60, s = 20, p = 50, t = 10$$

Now, Indian Politics books are purchased by only students of course- MBBS, B.Tech and BA =

From Table, the total number of Indian Politics books bought are=

$$= 90\% \text{ of MBBS} + 80\% \text{ of B.Tech} + 70\% \text{ of BA}$$

$$= 972 + 648 + 378 = 1998 \text{ books}$$

**Answer is option (b)**

7. From table above, there are 540 students in BA course

**Answer is option (c)**

8. From the table above,  $m = 80, q = 40, n = 70, r = 30, o = 60, s = 20, p = 50, t = 10$

Thus,  $m = E1$  is the most bought book.

**Answer is option (a)**

9. From the table above,  $m = 80, q = 40, n = 70, r = 30, o = 60, s = 20, p = 50, t = 10$ . These are the percentage values.

Total number of students who buy E1 =  $m + o + p + q$

$$= 80\% \text{ of } 1080 + 60\% \text{ of } 810 + 50\% \text{ of } 540 + 40\% \text{ of } 270$$

$$= 1728$$

Likewise, we find total number of students who buy P1 =  $o + n + q$

$$= 60\% \text{ of } 1080 + 70\% \text{ of } 810 + 40\% \text{ of } 540$$

$$= 1431$$

Therefore, the required difference =  $1728 - 1431 = 297$

**Answer is option (d)**

### 10–13.

If we look carefully at the second table then we find that C has got his chocolates only in 4 and 6 chocolate packs. Also, the number of chocolates in 4 chocolate packs is twice the number of chocolates that he has in 6 chocolate packs. This gives us the following possibilities of number of chocolates that C has:

|               | Number of chocolates C has in 6 chocolate packs | Number of chocolates C has in 4 chocolate packs | Total number of chocolates C has |
|---------------|---|---|----------------------------------|
| Possibility 1 | 6   | 12  | 18                               |
| Possibility 2 | 12  | 24  | 36                               |
| Possibility 3 | 18  | 36  | 54                               |

However, since we see from the first table that C has a total of 10% of the total number of chocolates. Hence, if we give him 54 chocolates, the total number of chocolates that Charlie must have distributed on that day would have been 540, which is above the limit given in the question. Hence, only possibilities 1 and 2 need to be considered here. If we consider possibility 1, we can see that the total number of chocolates is 180. In such a case, the number of chocolates given to E,F,G,H,I and J would be 18 too and they would get 6 chocolates each in 6 and 4 chocolate packs. But the number of chocolates someone gets in 4 chocolate packs cannot be 6 (as it has to be a multiple of 4). Hence, Possibility 1 does not exist.

Considering possibility 2, we get the following scenario:

Solution Table

|        | Total number of chocolates | Number of chocolates in 4 chocolate packs | Number of chocolates in 6 chocolate packs |
|--------|----------------------------|---|---|
| A      | 90                         | 12  | 36  |
| B      | 108                        | 24  | 12  |
| C      | 36                         | 24  | 12  |
| D      | 90                         | 36  | 18  |
| E to J | 36                         | 12  | 12  |
|        | 360                        | 108                                       | 90  |

The answers can be inferred from the solution table:

10. 108

11.  $18/6 = 3$
12. Total number of 4 chocolate sets =  $108/4 = 27$
13. Others (6 people from E-J) have total 36 chocolates. Since, it is given that apart from A and D, no two children had the same number of chocolates, we can only have 1 child as having 0 chocolates.  
Therefore the maximum number of players who do not have any chocolate = 1
14. The Production profit varies linearly with the total units sold. Therefore, when the total units sold increases by three times the production profit also increases by three times. Distribution profit decreases with the total units sold so when the total units sold increases by three times the distribution profit reduces. Therefore the situation given in the question cannot be fulfilled by any real value of 'n'. Option (a) is correct.
15. Production profit increases with number of units sold and distribution profit decreases with number of units sold. It can be seen from the graph that the rate of decrease of distribution profit is greater than the rate of increase of production profit to the left of the intersection point. After the intersection point, the rate of decrease of distribution profit becomes slower than the rate of increase of the production profit. Hence, after the intersection point, the total profit would go up. Therefore, from the graph it is clear that total profit will be minimum at the intersection point (Production profit and distribution profit). Therefore the minimum possible total profit =  $15 + 15 = 30$  lakh rupees. Option (d) is the correct answer.
16. Required value of total units sold = 580 units

### **Mock Test Paper 3**

1. Since only the percentage break up is given, number of mobile phones sold cannot be determined.

**Answer is option (d)**

2. 20% of Kokia = 20% of Grade A

Hence, mobile phones sold by Kokia = Mobile phones sold of Grade A

**Answer is option (c)**

3. We can compare the percentage breakup of Kokia with different grades.

Grade A++:

$$1\% \text{ of total sales of Kokia (K)} = 22\% \text{ of total sales of A++}$$

$$K = 22 * A++$$

$$A++ = K/22$$

Grade A+:

$$2\% \text{ of } K = 21\% \text{ of A+}$$

$$A+ = (2/21)K$$

Grade A:

$$20\% \text{ of } K = 20\% \text{ of A}$$

$$A = K$$

Grade B+:

$$1\% \text{ of } K = 25\% \text{ of B+}$$

$$B+ = (1/25)K$$

Grade B:

$$76\% \text{ of } K = 1\% \text{ of B}$$

$$B = 76K$$

Therefore, required ratio of A++ : A+ : A : B+ : B = 1/22 : 2/21 : 1 : 1/25 : 76

**Answer is option (c)**

4. Given that, 1% of Kokia Phones is of grade A++

$$1\% \text{ of } 55,000 = 550 \text{ Phones of Kokia are of Grade A++}$$

Now, Kokia A++ contribute 22% of the total A++ phones available in the market

$$22\% \text{ of total number of A++ phones} = 550$$

$$\text{Total number of A++ phones} = 2500 \text{ phones}$$

**Answer is option (a)**

5. From A-A-A, Bhavuk now wants to move to any combination amongst- A-A-B or A-A-C (Because question says he'd compromise on rating of only one teacher)

Bhavuk's total score when he is taught by A-A-A combination = 85% of 300 = 255 marks

Case 1- When the combination becomes A-A-B

His new total score now becomes 80% of 300 = 240 marks

Case 2- When the combination becomes A-A-C

His new total score becomes 75% of 300 = 225 marks

Clearly, the maximum change occurs when he switches to A-A-C ratings of teachers.

Change =  $255 - 225 = 30$  marks over 255 marks scored earlier

Percentage change =  $(30/255)*100 = 11.76$

**Answer is option (c)**

6. We are talking about combination B-B-B where Pulkit scores 75% of total marks = 75% of 300 = 225 marks

In order to get minimum possible in one of the 2 sections, we'll have to make marks in other 2 sections as maximum as possible.

Consider Pulkit scored perfect 100 in 2 sections. This would be the case where he'd score the least in the 3<sup>rd</sup> section. Thus  $(225 - 2*100) = 25$  marks

Thus, lowest possible score Pulkit can get in one of the 3 sections = 25 marks

**Answer is option (b)**

7. From the Bar chart:

A-A-A is manageable

A-A-B is manageable

A-A-C is manageable

B-B-B is manageable

C-B-B is Not manageable- because although the average score is 75%, Pulkit's percentage is 70%.

C-C-A is Not manageable- For the same reason as above

Other 2 are also Not manageable

Therefore, only 4 combinations are manageable

**Answer is option (d)**

8. Pulkit:  $(90+80+80+75+70+75+70+65)/8 = 75.625$

Bhavuk:  $(85+80+75+75+80+70+65+65)/8 = 74.375$

Thus, both are inherently smart

**Answer is option (c)**

9. Decrypting the information in the question, we get the following solution:

| Café #   | Area it belongs to      |
|----------|-------------------------|
| Café – 1 | Rohini/Ashok Vihar      |
| Café – 1 | Pitampura/Shalimar Bagh |
| Café – 1 | Ashok Vihar             |
| Café – 1 | Pitampura               |
| Café – 1 | Ashok Vihar/Rohini      |
| Café – 1 | Haiderpur               |
| Café – 1 | Shalimar Bagh/Pitampura |
| Café – 1 | Rohini                  |

From the table, Haiderpur has only Café- 6.

**Answer is option (b)**

10. From above table, Café 1 belongs to either Rohini or Ashok Vihar. Thus from the given options we get Rohini area as the answer

**Answer is option (a)**

11. From above table, it is clear that Café 2 can belong to either Pitampura or Shalimar Bagh

**Answer is option (c)**

12. From above table, it is clear that no area can have more than 2 cafes.

**Answer is option (d)**

13. Taufiq has a production share of 14% that means the total production of the companies owned by Taufiq is 140 tons, it is possible only when Taufiq owned C and E or I and J or J and B or H, therefore maximum number of companies owned by Taufiq is 2 while the minimum number of companies owned by Taufiq is 1. Therefore the required difference = 2 – 1 = 1.

14. If each person owned more than one company then Taufiq could not own company H, he could own J and I or J and B or C and E. In each of the cases, Parizad owned at most three companies. Option (b) is

correct.

15. Minimum number of companies owned by Sakib, Taufiq and Rahim were 2, 1, 2 respectively. Therefore after buying all the companies of Sakib and Taufiq, Rahim owned total  $2 + 1 + 2 = 5$  companies.
16. There are multiple possibilities to get the numbers for each of the five people. Hence, we cannot uniquely determine the companies for any of the five owners. Hence, the correct answer would be 0. Option (a) is correct.

## Mock Test Paper 4

1. Fuel consumption between D and K = Distance travelled/Fuel efficiency for this distance  
 $= 140/14 = 10\text{L}$   
Fuel consumption between D and M =  $420/21 = 20\text{L}$   
Fuel efficiency between K and M = (distance between K and M)/fuel consumed in this journey  
 $= (860 - 580)/(20 - 10)$   
 $= 280/10$   
 $= 28 \text{ Km/L}$

**Answer is option (c)**

2. We do not know the Fuel efficiency hence the fuel consumption from Debring to Leh, hence we cannot determine the fuel consumed from Delhi to Leh.

**Answer is option (d)**

3. At Kurukshetra, it is given that the bike can travel 560 Km more if at the efficiency of 14Km/L, thus bike must have 40L fuel in the tank left at Kurukshetra.

Also bike travelled 140Km from Delhi to Kurukshetra with efficiency of 14Km/L, thus it consumed  $140/14 = 10\text{L}$  fuel to reach Kurukshetra. Therefore Bike had  $40 + 10 = 50\text{L}$  fuel in it when it started its journey from Delhi.

**Answer is option (a)**

4. When Bhavuk reaches Kurukshetra, he analyzes that his fuel efficiency had been 14Km/L (since the last refill in Delhi) and he is

left with 40L in his tank, so he can cover a maximum of 560Km more with this current efficiency. But Leh is 860Km away, hence he realizes the need to refuel the tank, however all fuel stations are inactive due to bandh and hence he would not be able to refuel there.

When he reaches Mandi, he analyzes that his fuel efficiency had been 21Km/L when considered from Delhi (Fuel last filled at) to Mandi, hence he has consumed  $420/21 = 20$ L of fuel until now. He realizes that he is left with 30L of fuel and with current efficiency of 21Km/L he can actually reach Leh without hassle because he'd need just  $580/21 \approx 28$ L of fuel, so he leaves Mandi without refueling.

When he reaches Debring, he realizes his fuel efficiency had been 23Km/L when considered from Delhi (Fuel last filled at), he calculates that he has consumed  $880/23 \approx 38$ L of fuel so far and is left with 12L to travel to Leh. He then calculates that at this fuel efficiency he'd need  $120/23 \approx 5$ L more, hence he can easily reach Leh without refueling. So he leaves without refueling.

Therefore, Bhavuk did not need to refuel anywhere after Delhi. Yes, if station at Kurukshetra was open, he'd have get a refuel there, but in this question as it states, Kurukshetra was shut down due to bandh.

### **Therefore answer is option (c)**

- From the table, Range upto which the fuel could last was only 560Km from Kurukshetra, however Bhavuk had to travel 860Km further to Leh. Using data from previous question, yes Bhavuk would have definitely got a refuel done.

### **Answer is option (a)**

- $$2(P+Q+R+S) = (P+Q+R) + (Q+R+S) + (P+S) = 28000$$
$$(P+Q+R+S) = 14000$$

Thus,  $S = 4800$ , and  $P = 1800$

And  $Q-R = 1000$

Hence,  $Q = 4200$  and  $R = 3200$

|                      | Number of faculty members |             |       |
|----------------------|---------------------------|-------------|-------|
|                      | Non-experienced           | Experienced | Total |
| <i>Lime</i>          | 3200                      | 12800       | 16000 |
| <i>Mindworkzz</i>    | 4800                      | 7200        | 12000 |
| <i>Career Lander</i> | 4200                      | 9800        | 14000 |
| <i>ITS</i>           | 1800                      | 16200       | 18000 |

Therefore, number of Non-experienced faculty members in Lime institute = 3200

**Answer is (a)**

$$7. 16200 - 4800 = 11400$$

**Answer is option (b)**

$$8. 12000/12800 = 15/16$$

**Answer is option (c)**

$$9. 18000/3 = 6000 \text{ faculty members each joined each of the 3 institutes}$$

$$000*100/12000 = 50$$

**Answer is option (d)**

10. The given information can be tabulated as:

| DISH | Cardamom | Milk | Sugar | Gram flour | Saffron |
|------|----------|------|-------|------------|---------|
| A    | 10%      | 40%  | (a)%  | (40-a)%    | 10%     |
| B    | 25%      | 15%  | 50%   | 5%         | 5%      |
| C    | 15%      | (b)% | 20%   | (30-b)%    | 35%     |
| D    | 20%      | 25%  | 15%   | 30%        | 10%     |
| E    | 5%       | 50%  | 25%   | 5%         | 15%     |
| F    | 40%      | 10%  | 5%    | 30%        | 15%     |

In Gujarati Cocktail, percentage of:

$$\text{Milk} = (3b + 95)/6$$

$$\text{Sugar} = (2a + 110)/6$$

$$\text{Gram flour} = (175 - 2a - 3b)/6$$

$$\text{Now, } (3b + 95) = (2a + 110) = (175 - 2a - 3b)$$

$$a = 25/3 \text{ and } b = 95/9$$

Therefore, percentage of Gram flour in dish A =  $(40 - a) = (40 - 25/3) = 95/3$

**Answer is option (c)**

11. From above table, we see that there are 2 possible ways in which dish X can be prepared. These 2 ways are: Mixing (E and F) or mixing (B and C)

**Answer is option (a)**

12. Percentage of sugar in A, E and F is 25/3%, 25% and 5% respectively

Checking options:

$$(a) \text{Percentage of sugar in mixture} = \frac{\frac{1 \times 25}{3} + 2 \times 25 + 3 \times 5}{6} = \frac{110}{9}\% > 12\%$$

**Answer is option (a)**

13. Because the percentage of Saffron in dish B and dish Z is 5% and 8.25% respectively, to maximize the percentage of B in Z, we need to choose a dish in which Saffron is much more than 8.25% and better if it's the maximum amongst the given dishes, so we choose dish C

Let the percentage of dish B in dish Z be x

$$\text{Thus, } 5x + 35(1-x) = 8.25$$

$$x = 89.16$$

**Answer is option (d)**

14. To maximize the production of 2<sup>nd</sup> highest productive company of a district we need to minimize the production of rest of the companies whose production quantity is unknown.

For district A: If production of 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> lowest productive companies are 9, 10, 11 metric tons then production of 2<sup>nd</sup> highest productive company =  $100 - (30 + 8 + 9 + 10 + 11) = 32$  which is not possible because the production of highest productive company is 30 metric tons. Therefore, the production of the 2<sup>nd</sup> highest productive company is 29 metric tons. We can do similar calculations for rest of the districts and the resulting data is shown in the table given below.

| District | Production of 2 <sup>nd</sup> highest productive company (in metric tons) | Highest production (in metric tons) |
|----------|---|-------------------------------------|
| A        | $30 - 1 = 29$   | 30                                  |
| B        | 31  | 40                                  |
| C        | 23  | 24                                  |
| D        | 31  | 32                                  |
| E        | 27  | 34                                  |
| F        | 33  | 34                                  |
| G        | 29  | 30                                  |
| H        | 29  | 30                                  |
| I        | 32  | 45                                  |
| J        | 34  | 35                                  |
| K        | 34  | 40                                  |
| L        | 19  | 35                                  |

From the above table we can conclude that there can be only three

districts F, J, K for which there are at least two companies whose production is greater than 32 metric tons.

15. For district A maximum possible production of second highest productive company =  $30 - 1 = 29$

For district A minimum possible production of second least productive company =  $8 + 1 = 9$ .

For district B minimum possible production of second least productive company =  $14 + 1 = 15$

For district B maximum possible production of second highest productive company =  $100 - (14 + 15 + 40) = 31$ .

Similarly we can do the same calculation for other companies as well.

| District | Production of 2 <sup>nd</sup> highest productive company (in metric tons) | Production of 2 <sup>nd</sup> lowest productive company (in metric tons) | Ratio          |
|----------|---|--|----------------|
| A        | $30 - 1 = 29$   | $8 + 1 = 9$  | $29/9 = 3.22$  |
| B        | 31  | 15   | $31/15 = 2.07$ |
| C        | 23  | 7  | $23/7 = 3.29$  |
| D        | 31  | 21   | $31/21 = 1.4$  |
| E        | 27  | 13   | $27/13 = 2.1$  |
| F        | 33  | 21   | $33/21 = 1.6$  |
| G        | 29  | 9  | $29/9 = 3.2$   |
| H        | 29  | 21   | $29/21 = 1.4$  |
| I        | 32  | 12   | $32/12 = 2.7$  |
| J        | 34  | 10   | $34/10 = 3.4$  |
| K        | 34  | 6  | $34/6 = 5.8$   |
| L        | 19  | 11   | $19/11 = 1.77$ |

From the above table it is clear that the required ratio is greater than 3 for five companies. Hence, the correct answer is 5.

16. According to the table given in the question, the number of companies in a given district is either 4 or 5 or 6.

Case 1: When the number of companies in a given district is 4 then less than half i.e. 1 company must produce more than half of the total production i.e. 51 metric tons. No district fulfills this condition.

Case 2: When the number of companies in a given district is 5 then less than half i.e. 2 companies must produce more than half of the total production i.e. 51 metric tons. Districts E, G and J fulfill this condition.

Case 3: When the number of companies in a given district is 6 then

less than half i.e. 2 companies must produce more than half of the total production i.e. 51 metric tons. Districts A, C, K, L fulfill this condition. Hence the correct answer is  $3 + 4 = 7$ .

## Mock Test Paper 5

1. Let the Total cost be 100 units, then to gain 50% profit, revenue should be 150 units.

From Chart- 2, Revenue generated by delivery on Motorbike =  $(240/360) * 150 = 100$  units

From Chart- 3, Cost incurred by delivery on Motorbike =  $(240/360) * 100 = 66.67$  units

Profit earned by delivery on Motorbike =  $(100 - 66.67) = 33.33$  units

Profit percentage on deliveries done on Motorbike =  $33.33/66.67 = 50$

**Answer is option (a)**

2. Let the total cost be =  $360C$

Let the total revenue be =  $360R$

Then, Profit generated by:

$$\text{Motorbike} = 240R - 240C$$

$$\text{Bicycle} = 100R - 60C$$

$$\text{Auto Rickshaw} = 20R - 60C$$

As we can see that Profit is a function of R and C, which is not known in the question.

OR

To calculate the actual profit, we need to know the numbers and not just percentage contribution.

Therefore we cannot calculate this and need more information.

**Answer is option (d)**

3. Let the total number of deliveries be  $360N$  and total cost incurred be  $360C$  in 2015 by Grocers

So the cost per delivery for:

$$\text{Auto-Rickshaw} = 60C/110N = .545 * (C/N)$$

$$\text{Motorbike} = 240C/100N = 2.4 * (C/N)$$

$$\text{Bicycle} = 60C/150N = 0.4 * (C/N)$$

Here the ratio (C/N) remain constant throughout, thus the relative values for the cost per delivery can be worked out in terms of which one is costlier and which is cheaper. Bicycle offers least Cost per delivery for Grocers.

**Answer is (b)**

4. Total revenue generated would be =  $10*360/20 = 180$  INR

Total Cost incurred would be =  $20*360/60 = 120$  INR

Cost incurred by delivery on Bicycle =  $60*120/360 = 20$  INR

Revenue generated by delivery on bicycle =  $100*180/360 = 50$  INR

Required ratio =  $20/50 = 2/5$

**Answer is option (c)**

5. From the bar-chart, Delhiites is liked by all people surveyed

Bodyguard is liked by all but one person surveyed

Dil me is liked by all but 2 persons and so on

From the information given in question, below table can be deduced:

|                       | <i>Delhiites</i> | <i>Bodyguard</i> | <i>Dil me</i> | <i>Gatekeeper</i> | <i>Junoon</i> | <i>Gharwale</i> | <i>Salam Bombay</i> | <i>Dilwale</i> |
|-----------------------|------------------|------------------|---------------|-------------------|---------------|-----------------|---------------------|----------------|
| <i>Liked by</i>       | 10 people        | 9 people         | 8 people      | 6 people          | 4 people      | 3 people        | 2 people            | 1 person       |
| <i>Name of person</i> |                  |                  |               |                   |               |                 |                     |                |
| Bhavye 2              | Bhavye 1         | Bhavye 0         | X             | X                 | X             | X               | X                   | X              |
| Dimpy 5               | Dimpy 4          | Dimpy 3          | Dimpy 2       | Dimpy 1           | Dimpy 0       | X               | X                   | X              |
| Pulkit 4              | Pulkit 3         | Pulkit 2         | Pulkit 1      | Pulkit 0          | X             | X               | X                   | X              |
| Bijoy 3               | Bijoy 2          | Bijoy 1          | Bijoy 0       | X                 | X             | X               | X                   | X              |
| Charu 1               | Charu 0          | X                | X             | X                 | X             | X               | X                   | X              |
| Shanky 8              | Shanky 7         | Shanky 6         | Shanky 5      | Shanky 4          | Shanky 3      | Shanky 2        | Shanky 1            | Shanky 0       |
| Neha 6                | Neha 5           | Neha 4           | Neha 3        | Neha 2            | Neha 1        | Neha 0          | X                   | X              |
| Guddu 7               | Guddu 6          | Guddu 5          | Guddu 4       | Guddu 3           | Guddu 2       | Guddu 1         | Guddu 0             | X              |
| Sanju 4               | Sanju 3          | Sanju 2          | Sanju 1       | Sanju 0           | X             | X               | X                   | X              |
| Kanu 3                | Kanu 2           | Kanu 1           | Kanu 0        | X                 | X             | X               | X                   | X              |

**\*\* Note:** “Bhavye 1” means that Bhavye likes this movie (mentioned in that column) and is left with 1 more like from the total number of likes as given in the question. Likewise “Bhavye 0” means Bhavye likes this movie (mentioned in that column) and has no more likes left. According to this table, 8 people did not like the movie- Salam Bombay

**Answer is option (c)**

- From the table above, Dimpy does not like only 3 movies- Gharwale,  
 6. Salam Bombay and Dilwale

**Hence Answer is option (a)**

7. From the table above, Pulkit likes Bodyguard, Dil me, Gatekeeper, these movies are not liked Charu

**Answer is option (c)**

8. From the table above, Kanu dislikes movies- Gatekeeper, Junoon, Gharwale but Neha likes these movies.

**Answer is option (b)**

## 9–12.

With the help of [table- Y](#), we can make a new table- Z which gives us details of the number of exams in which each of these nine students obtained 100 to 199 marks, 200 to 299 marks, 300 or more marks:

**Table- Z will look as follows:** (Note: Since A scored 100+ 3 times, 200+ 2 times and 300+ 2 times, he must have scored between 100 to 199 1 time, 200 to 299 zero times and 300+ 2 times)

| Student / Marks | 100–199 | 200–299 | 300+ |
|-----------------|---------|---------|------|
| A               | 1       | 0       | 2    |
| B               | 0       | 1       | 1    |
| C               | 1       | 1       | 2    |
| D               | 0       | 1       | 0    |
| E               | 2       | 1       | 1    |
| F               | 0       | 2       | 0    |
| G               | 1       | 0       | 1    |
| H               | 2       | 0       | 1    |
| I               | 1       | 0       | 0    |

According to table-Z, E and H scored 100 to 199 marks in two subjects. Therefore they must be from USA and China in any order.

E obtained 200- 299 marks in one subject, but no students from China scored 200- 299 marks in any subject therefore E is from USA and H is from China.

If we now include this information, we can transform [table X](#) to a new **table-X1** (After removing students E and H) This country wise table would look as shown below:

| Country / Marks | 100 to 199 | 200 to 299 | 300+ |
|-----------------|------------|------------|------|
| UK              | 1          | 2          | 2    |
| USA             | 1          | 0          | 1    |
| INDIA           | 1          | 2          | 1    |
| CHINA           | 0          | 0          | 0    |
| FRANCE          | 1          | 1          | 2    |

From table X1 and table Z it is clear that only G can be from USA and no other student can be from USA.

F can be from UK and India. If F is from India then India needs 1 student who scored 100 to 199 marks in exactly one subject and 1 student who scored 300+ in exactly one subject. But from table Z it is clear that no other student can fulfill this condition, therefore F is not from India and he/she is from UK.

New **table-X2** (After removing students E, H, G and F):

| Country / Marks | 100 to 199 | 200 to 299 | 300+ |
|-----------------|------------|------------|------|
| UK              | 1          | 0          | 2    |
| USA             | 0          | 0          | 0    |
| INDIA           | 1          | 2          | 1    |
| CHINA           | 0          | 0          | 0    |
| FRANCE          | 1          | 1          | 2    |

From tables Z and X2 it is clear that A is from UK.

C obtained 300+ marks in two subjects therefore he must be from France.

New **table-X3** (After removing students E, H, G, F, A and C):

| Country / Marks | 100 to 199 | 200 to 299 | 300+ |
|-----------------|------------|------------|------|
| UK              | 0          | 0          | 0    |
| USA             | 0          | 0          | 0    |
| INDIA           | 1          | 2          | 1    |
| CHINA           | 0          | 0          | 0    |
| FRANCE          | 0          | 0          | 0    |

From table X3 it is clear that rest of the students (B, D, I) were from India.

| Country | Students |
|---------|----------|
| UK      | F, A     |
| USA     | E, G     |
| INDIA   | B, D, I  |
| CHINA   | H        |

- 
9. B. option (c) is correct.
  10. India. Option (a) is correct.
  11. E. option (c) is correct.
  12. 1

### 13–17.

In physics paper: Combined score of Pulkit and Rahim in Physics Paper =  $405 - (132 + 108 + 90) = 75$  and their individual marks cannot be more than 10% of 405 = 40.5. Therefore Pulkit's marks are in the range of 40.5 – 34.5 and Rahim's marks would be in the range of 34.5 – 40.5.

In Chemistry paper: Rahim and Tejas obtained 45 marks each, since there are a total of 90 marks to be distributed between them and nobody can get more than 45 marks.

In Biology: Pulkit's and Qasim's marks should be less than or equal to 10% of 360 = 36. But from the [table A](#), Shaan got 30 marks. Therefore Pulkit and Qasim both got less than 30 marks. They can obtain a maximum of 29 marks and a minimum of 19 marks.

In Math: Combined marks of Rahim and Tejas = 58.5

Maximum possible marks of Rahim and Tejas = 30 therefore they can obtain marks in 28.5 to 30 marks.

| Student | Physics     | Chemistry | Biology | Math      |
|---------|-------------|-----------|---------|-----------|
| Pulkit  | 40.5 – 34.5 | 150       | 19–29   | 79.5      |
| Qasim   | 132         | 97.5      | 29 – 19 | 78        |
| Rahim   | 34.5 – 40.5 | 45        | 165     | 28.5 – 30 |
| Shaan   | 108         | 112.5     | 30      | 84        |
| Tejas   | 90          | 45        | 117     | 30- 28.5  |

13. Maximum possible marks of Pulkit in Physics = 40.5. Option (d).
14. Maximum marks obtained by Rahim =  $40.5 + 45 + 165 + 30 = 280.5$   
Required percentage contribution =  $\frac{280.5}{1515} \times 100 = 18.51\%$ . Option (b) is correct
15. The absolute difference of marks obtained by Pulkit and Rahim will be minimum when Pulkit got minimum possible marks and Rahim got

maximum possible marks. Minimum possible marks obtained by Pulkit =  $34.5 + 150 + 19 + 79.5 = 283$

Maximum possible marks obtained by Rahim =  $40.5 + 45 + 165 + 30 = 280.5$

Absolute difference =  $283 - 280.5 = 2.5$

In this case (when Pulkit got minimum and Rahim got maximum marks):

Marks obtained by Qasim =  $132 + 97.5 + 29 + 78 = 336.5$

Marks obtained by Tejas =  $90 + 45 + 117 + 28.5 = 280.5$

Required difference =  $336.5 - 280.5 = 56$

16.

| <i>Students</i> | <i>Range of scores</i> |
|-----------------|------------------------|
| Pulkit          | 283–299                |
| Qasim           | 326.5–336.5            |
| Rahim           | 273–280.5              |
| Shaan           | 334.5                  |
| Tejas           | 280.5–282              |

From the above table we can conclude that Rahim got the last ( $5^{\text{th}}$  rank), Tejas got the  $4^{\text{th}}$  rank, Pulkit got the  $3^{\text{rd}}$  rank and ranks of Qasim and Shaan cannot be determined.

Pulkit got the  $3^{\text{rd}}$  rank. Option (c) is correct.

17. If total marks of Qasim is a prime integer then he must score 331 marks therefore he got  $2^{\text{nd}}$  rank.

## Mock Test Paper 6

1. If no student failed in MBA 5, then all 144 get promoted, which means that exactly 18 ( $162 - 144$ ) fail in their Internship. Hence, the pass percentage is 83.33%.
2. If 228 new students joined MBA 1 in 2223, then 192 students from MBA 1 would have failed in the year 2222. Consequently,  $360 - 192 = 168$  students passed MBA 1 in 2222. These 168 would be part of the 300 students of 2223 who were in MBA 2. Thus,  $300 - 168 = 132$  students would have failed MBA 2 in 2222. So 120 students passed MBA 2 in 2222 and 90 students failed MBA 3 in 2222. So, 126

students passed MBA 3 in 2222 and 54 students failed MBA 4 in 2223. So  $192 - 54 = 138$  students passed MBA 4 in 2222 and 30 students failed MBA 5 in 2222. So, 114 students passed MBA 5 in 2222 and 48 students failed MBA Internship Year in 2222. Hence, option (d) is correct.

3. If no student of MBA 5 failed in 2222, it means that all the 168 students of MBA 5 in 2223, must have come from students who were in MBA 4 in 2222. Thus, 24 students of MBA 4, failed in 2222. So, 156 students of MBA 3 passed in 2222 and 60 students of MBA 3 would have failed in 2222. Hence, option (d) is correct.
4. Total failures =  $192 + 132 + 90 + 54 + 30 + 48 = 546$

## 5–8.

First we fill the table with the changes in marbles after every round

|  | Arun     | Barun    | Charan   | Deep     | Ela      | Faiz     |
|--|----------|----------|----------|----------|----------|----------|
| Initial No. of Marbles                       | 160      | 130      | 150      | 180      | 150      | 200      |
| No. of Marbles at the end of 1 <sup>st</sup> | 140(-20) | 150(+20) | 180(+30) | 160(-20) | 170(+20) | 170(-30) |
| No. of Marbles at the end of 2 <sup>nd</sup> | 150(+10) | 140(-10) | 190(+10) | 190(+30) | 140(-30) | 160(-10) |
| No. of Marbles at the end of 3 <sup>rd</sup> | 170(+20) | 130(-10) | 170(-20) | 200(+10) | -        | 150(-10) |
| No. of Marbles at the end of 4 <sup>th</sup> | 180(+10) | 120(-10) | 180(+10) | 190(-10) | -        | 170(+20) |
| No. of Marbles at the end of 5 <sup>th</sup> |          |          |          |          |          |          |

We can see that during the first round there is an exchange between Charan and Faiz as they both have transacted (+30) and (-30) marbles respectively. Also, further analysis of the first round gives us that Arun and Deep both have a (-10) and Barun and Ela both have a (+10). We can thus deduce from this information that Arun must have dealt with either Barun or Ela and similarly Deep must have dealt with either Ela or Barun.

From the analysis of the second round, it is clear that Deep and Ela must have transacted with each other. Thus we can resolve our doubt about the first round where Deep cannot have transacted with Ela and must have dealt with Barun and at the same time Arun and Ela must have transacted with each other.

In this way we find all the co-relations.

After the 3<sup>rd</sup> round the No. of Marbles with Ela is missing. We see that Barun and Faiz each has given 10 marbles to two persons and the table is showing only Deep as the recipient of 10 marbles. So Ela must have also

received 10 marbles and must have has 150 marbles at the end of the third round.

In the 4<sup>th</sup> round Faiz has a (+20) and no one else is having a (- 20). It automatically means that Faiz has exchanged coins with Ela who must have had - 20 and hence ended with 130 coins at the end of 4<sup>th</sup> round.

Thus the table at the end of the fourth round would look like:

| Players | 1      | 2      | 3      | 4      | 5      |
|---------|--------|--------|--------|--------|--------|
| Arun    | Ela    | Faiz   | Charan | Barun  | Deep   |
| Barun   | Deep   | Charan | Ela    | Arun   | Faiz   |
| Charan  | Faiz   | Barun  | Arun   | Deep   | Ela    |
| Deep    | Barun  | Ela    | Faiz   | Charan | Arun   |
| Ela     | Arun   | Deep   | Barun  | Faiz   | Charan |
| Faiz    | Charan | Arun   | Deep   | Ela    | Barun  |

So the answers from the above information are as follows:

5. Exact exchanges can be found for all the 5 rounds. Hence the correct option is (d).
6. Faiz exchanges marbles with Barun. Hence the correct option is (c).
7. (a) Charan will get 65 marbles from Ela and have 245 marbles while Deep will get 90 marbles from Arun and have 280 marbles. Thus, the required difference would be 35.
8. Arun transacted with Charan. Hence the correct option is (d).

## 9–12.

Draw the following table for solving this question:

| Team (with number of unknown values) | Penalty points got by cyclists whose penalty points are exactly known | Minimum penalty points possible | Maximum penalty points possible | Position        |
|--------------------------------------|---|---------------------------------|---------------------------------|-----------------|
| National (1)                         | 155.82  | 195.97                          | 211.26                          |                 |
| Loreto (0)                           | 198.94  | 198.94                          | 198.94                          | 5 <sup>th</sup> |
| Colvin Taluqdar (2)                  | 91.85   | 172.15                          | 202.73                          |                 |
| St. Francis (1)                      | 141.48  | 181.63                          | 196.92                          |                 |
| St. Fideles (2)                      | 88.31   | 168.61                          | 199.19                          |                 |
| St. Anthony (1)                      | 141.23  | 181.38                          | 196.67                          |                 |

9. Since St. Fidelis is sixth, no individual cyclist of St Fideles could break the record as their penalty points have to be greater than 198.94 (Loreto). We need to similarly look for the other teams in the table.

*For National:* The total penalties for National (Maximum) can be 198.92 (as 198.94 is for Loreto and Colvin Taluqdars can have a

maximum of 198.93) but even if we consider the maximum penalties the penalties Cyclist III of National would still be only  $198.92 - 155.82 = 43.10$  which still is better than 43.16.

*For Loreto:* it is very clear that no cyclist of Loreto would have broken the record as all of them are above 43.16 penalty points.

*For Colvin Taluqdars:* Since the minimum penalties possible for the National team is  $(155.82 + 40.15) = 195.97$  penalty points and Colvin Taluqdars is 4<sup>th</sup> then they must have greater than 195.97 penalty points. Hence, no Cyclist of Colvin Taluqdars can break the record. (as the maximum possible value for an individual cyclist is 55.44)

*St. Francis ... St. Anthony:* 1 Cyclist each of St. Francis and St. Anthony may or may not break the record.

So at least, 1 Cyclist (National) and at most 3 Cyclists (National, St. Francis and St. Anthony) will break the individual record. Hence, both statements I and II are true. So, answer option is (d).

10. From the above table it is clear that only 2 teams can break the team record (St. Fideles and Colvin Taluqdars) of 178.21.

*Colvin Taluqdars:* For Colvin Taluqdars the penalty points got by both Cyclists (II ...III) should be less than  $178.21 - 91.85 = 86.36$  i.e., combined timing of II and III can be a maximum of 86.35 penalty points i.e. an average of 43.175. Hence, one among the two cyclists (II and III) of Colvin Taluqdars must break the individual record.

*For St. Fidelis:* The time taken by II ... III Cyclist of St. Fidlis should be less than  $178.21 - 88.31 = 89.90$  an average of 44.95. So, one of them may or may not break the individual record. Hence, option (a) is correct.

11. (c) In the given condition, the total penalty points of St Anthony's would be  $141.23 + 44.30 = 185.53$  penalty points.

Every team must have got more than 185.53 penalty points. In such a case, a maximum of 1 Cyclist each of Colvin Taluqdars. St. Fidelis and National could break the individual record.

12. (d) If Cyclist II of St. Francis got 43.16 penalty points, then St. Francis must have got  $141 + 48 + 43.1 = 184.64$  penalty points. As no other Cyclist can break the record, therefore minimum time taken by National will be  $155.82 + 43.20 = 199.02$ . Hence, it will always be in

the 6<sup>th</sup> place as Loreto is fifth with 198.94 penalty points.

Hence, National cannot be third as mentioned by the fourth option.

13. On 14<sup>th</sup> May:

$$1 \text{ dollar} = 66 \text{ INR} = 114 \text{ ¥}$$

$$\Rightarrow 1 \text{ INR} = 114/66 \text{ ¥}$$

$$\Rightarrow 4000 \text{ INR} = 4000 * 114/66 = 6909.0909 = 6910 \text{ (when rounded off)}$$

**Hence option (b) is correct.**

14. Let us convert the value of each currency Bhavuk possesses into equivalent dollar amount and see which currency he has in excess to buy the watch worth \$300. Conversion would be done as per the exchange rate on 15<sup>th</sup> May.

$$\$ \text{ against INR} = 19,500/66.5 = \$293 \rightarrow \text{Not sufficient}$$

$$\$ \text{ against £} = 1.45 * 200 = \$290 \rightarrow \text{Not sufficient}$$

$$\$ \text{ against ¥} = 34,250/112.5 = \$304 \text{ (approx.)} \rightarrow \text{Sufficient}$$

Therefore, Bhavuk can buy this watch by offering Yen to the shopkeeper.

**Hence option (a) is correct.**

15. We cannot determine equivalent dollars for Yen on 13<sup>th</sup> May as the line graph- Yen/Dollar does not have data of that ratio on 13<sup>th</sup> May.

**Hence option (d) is the correct answer.**

16. Devaluing the currency means weakening the currency value against other global currencies. Here it is given that Yen was devalued by 2.22% of its value on 15<sup>th</sup> May. It stood at 112.5 Yen/dollar. Devaluation was 2.22% that is 2.22% of 112.5 = 2.5 Yen/dollar. Now Yen would stand at  $112.5 + 2.5 = 115$  Yen/Dollar.

Therefore, you can buy  $56000/115 = \$487$  (approx) for ¥56000

**Hence option (a) is correct**

17. It is given that the base (INR against other currencies) didn't change much on 16<sup>th</sup> May, hence its value against dollar remained at 66.5 Rupee/Dollar on 16<sup>th</sup> May.

On 15<sup>th</sup> May:

$$1 \text{ dollar} = 66.5 \text{ INR} = 112.5 \text{ ¥}$$

⇒ 1 INR = 112.5/66.5

On 16<sup>th</sup> May:

1 dollar = 66.5 INR = 115 ¥

⇒ 1 INR = 115/66.5

We are sure that INR appreciated against Yen, by how much?

⇒ 2.5/66.5 over 112.5/66.5

⇒ 2.5/112.5 = 2.22% appreciated

**Hence option (a) is the answer**

## Mock Test Paper 7

1. (c)
2. (b)
3. (d)
4. (d)
5. (d)
6. (c) He should buy weights with values of 1, 3, 9, 27 and 81 grams. If he does so, he would be able to weigh any value from 1 to 121 grams.

**Note:** All values are in powers of 3)

7. (b) He should buy weights with values of 1, 2, 4, 8, 16, 32 and 64. If he does so, he would be able to weigh any value from 1 to 127 grams.

**Note:** All values are in powers of 2)

8. (d) The cost for the British jeweller is:  $10+10+10+20+30 = \$80$   
The cost for the American jeweller is:  $10+10+10+10+20+30 = \$90$ .  
Hence, the American borrows \$5 from the British.

## 9–12.

**CSK's results:**

CSK – DD 4 – 2 (Since there is only one 4 – 2 result)

CSK – MI 2 – 0 (Since there is only one 2 – 0 result)

Then, CSK's 3 – 1 result must have come against KEP.

Hence, CSK-KKR was a 1 – 1 draw.

**MI's results:**

0 – 2 to CSK, 1-3 to KKR, 1 – 1 KEP ... 1 – 0 DD

**KKR's results:**

CSK 1 – 1, MI 3 – 1, KEP 2 – 2 and DD 1 – 2

**KEP's results:**

CSK 1 – 3, MI 1 – 1, KKR 2 – 2 and DD 1 – 1

**And DD's results:**

CSK 2 – 4, MI 0 – 1, KKR 2 – 1 and KEP 1 – 1

Hence, the answers are:

9. (d) Kings Eleven Punjab
10. (a) Chennai Super Kings
11. (b) Mumbai Indians has a performance ratio of 3/6 which is lower than all others.
12. (a) KKR has 5 points from it's first leg of matches. If it wins it's first two matches in the second leg it would end up with 11 points and would reach the top of the table. Hence, 2 matches are required.
13. The sum of required number of votes will be minimum when the number of votes for top four candidates is as close as possible and the fifth candidate gets no vote (=0).

Now just for calculation purpose, let's assume that they all get equal votes i.e.  $= 45000/5 = 9000$  votes each.

Now as we concluded that the 5<sup>th</sup> one with minimum number of votes will get no vote i.e. = 0 votes, therefore this 9000 votes will be equally distributed amongst top 4 candidates.

$\Rightarrow 9000/4 = 2250$  added to each.

Top 4 now have  $= 9000 + 2250 = 11250$  votes each

But question says that no 2 candidates can have same number of votes, therefore separating them so that they remain as close as possible, we get:

1<sup>st</sup> candidate = 11252 votes

2<sup>nd</sup> candidate = 11251 votes

3<sup>rd</sup> candidate = 11249 votes

4<sup>th</sup> candidate = 11248 votes

And 5<sup>th</sup> candidate = 0 votes

Hence, the sum =  $11252 + 0 = 11252$  votes.

**Answer is 11252**

14. Sum will be maximum for the candidate who got maximum number of votes in Round 1 + not more than 50% votes in Round 2 (Because 1 more than 50% in Round 2 will make him the winner and this is not the case) + just one less than 50% votes in Round 3 (Because this candidate is not the winner and assuming that the winner got exactly 50% votes in Round 3)

This person is Jai and his total votes are in this case=:

$$5,000 + 10,000 + 9,999 = 24,999$$

**Answer is option (a) 24,999 votes**

15. If this candidate got the least number of votes amongst the candidates who moved to Round 2 then he should be number 5<sup>th</sup> from the top. This candidate is Chetan. His Round 1 score from the table given is = 4499 votes which is 5<sup>th</sup> highest.

Now Round 2 has 48,000 votes and Chetan qualifies Round 2, however he'd receive least number of votes amongst top 3 qualifiers, therefore bottom two should have received 0 and 1 votes (Both cannot be = 0 votes because in the question, condition is mentioned that all candidates received unique number of votes every time in each round) and Chetan should have received 2 votes in Round 2. This makes him stand 3<sup>rd</sup> and a qualifier of Round 2.

Now Round has 51,000 votes and if Chetan won the election he should have received the maximum number of votes amongst all candidates, however this score should be as low as possible to satisfy the requirement of the question. Therefore 3 candidates received following number of votes:

1<sup>st</sup> = 17,001 (Winner) This is also the least number of votes the winner has to receive in order to win this round

2<sup>nd</sup> = 17,000

3<sup>rd</sup> = 16,999

Now as we know Chetan moved on to become the winner, his total number of votes (from all 3 rounds put together) should be at least=  $4499 + 2 + 17,0001 = 21,502$  votes

**Answer is option (b) 21,502**

16. The total can be minimum for Chetan who qualified Round at 5<sup>th</sup> rank with 4499 votes and qualified Round 2 with 2 votes and reached Round 3. He did not win the election hence to make the sum minimum we can consider that he received 0 votes in Round 3

Therefore total number of votes received by Chetan =  $4499 + 2 + 0 = 4501$  votes

**Answer is option (c)**

## Mock Test Paper 8

1. (c) There is a total payment of  $1040 + 728 + 728 = 2496$  Thai Bahts to be made (832 Bahts per person) and out of this Raghav has paid  $4 \times 46 = 184$  bahts while Nehal has paid  $8 \times 46 + 54 = 422$  Bahts. Hence, there would be an additional payment of 410 Bahts or 10 dollars that Nehal owes Shaurya.
2. (d) There is a total payment of  $1040 + 728 + 728 = 2496$  Thai Bahts to be made (832 Bahts per person) and out of this Raghav has paid  $4 \times 46 = 184$  bahts. Hence, there would be an additional payment of 648 Bahts that Raghav owes Shaurya.
3. (b) There are  $3C_2 \times 3!$  possible combinations for Aishwarya, out of which only 6 give the minimum possible number of marbles i.e.30.  
(Note:DIVIDE BY 2 will have to be used for all three, if we have to maintain the constraint of their values being lower than 100)
4. The three of them start with 10,7 and 8 marbles respectively. The maximum condition in the second round would be  $10 \times 4 + 7 \times 2 + 8 \times 3 = 78$
5. (d) There are  $3C_2 \times 3!$  possible combinations for Aishwarya, out of which the maximum number of marbles at the end could only be 40 when a combination of DIVIDE BY 2, MULTIPLY BY 3 and MULTIPLY BY 4 are used:

Further, for Chiranjeevi the minimum number would be if we use a

combination of DIVIDEBY2, MULTIPLYBY2 ... MULTIPLYBY3-  
In such a case his value would end up at 24 (whichever way you look  
at it).

8, 16,8,24. Hence, the difference is 16.

6. Lowest total will occur if we use a combination of DIVIDEBY2, MULTIPLYBY2 ... MULTIPLYBY3 for each of the three. Hence, this total will be 75.
7. (d) Maximum possible with Chiranjeevi is got by using a combination of DIVIDEBY2, MULTIPLYBY3 ... MULTIPLYBY4.

This makes a starting value of 8 into 48.

Similarly for Bebo 7 would become 42

For Aishwarya, the minimum possible value is 30.

Thus the ratio is 90:30=3:1

## 8-12.

| <b><i>Size</i></b> | <b><i>Millimeters</i></b> |
|--------------------|---------------------------|
| 2A                 | 1189 × 1682               |
| A0                 | 841 × 1189                |
| A1                 | 594 × 841                 |
| A2                 | 420 × 594                 |
| A3                 | 297 × 420                 |
| A4                 | 210 × 297                 |
| A5                 | 148 × 210                 |
| A6                 | 105 × 148                 |
| A7                 | 74 × 105                  |
| A8                 | 52 × 74                   |
| A9                 | 37 × 52                   |
| A10                | 26 × 37                   |

'C' series is the series of envelopes or folders suitable for enclosing stationary in the A sizes.

| <b>Size</b> | <b>Millimeters</b> |
|-------------|--------------------|
| C3          | $324 \times 458$   |
| C4          | $229 \times 324$   |
| C5          | $162 \times 229$   |
| C6          | $114 \times 162$   |
| C7          | $81 \times 114$    |
| DL          | $110 \times 220$   |

Hence, the answers are:

8. (b)  $A8 = 52 \times 74$
9. (d) From 1 A1 paper, we can get  $16 \times 16 = 256$  A9 papers. Hence, from 8 sheets we can obtain 2048.
10. (c) We can insert paper sizes from A3 to A10 in a C3 envelope. Hence, 8 possible solutions.

11. (d) From the table above it is  $114 \times 162$

12. (a) We need the sum of the geometric series:

$37 \times 52 + 37 \times 52 \times 2 + 37 \times 52 \times 4$  upto 11 terms which is given by the sum of the geometric series:

$$a(r^n - 1)/(r - 1) = 37 \times 52 \times (2^{11} - 1)$$

13. Total number of matches played is  $= 5 + 4 + 3 + 2 + 1 = 15$  in Round 1 where each team played 5 matches against any other team.

And 1 match in the final round

$$= 15 + 1 = 16 \text{ matches are played}$$

**Answer is = 16 matches**

14. Total number of points available is  $= (15 \text{ matches} \times \text{maximum } 2 \text{ points per match}) = 30 \text{ points}$

Let's consider that the top team won all matches, thus this first team to reach finals would have scored  $= 5*2 = 10$  points

Now the second team could have scored as much as other teams left in the group, however it was selected based on its performance for final round.

Thus all other 5 teams scored  $= 4$  points each

Hence total points exhausted  $= 10 + 4*5 = 10 + 20 = 30$  points

Therefore minimum points scored by any team that reached finals = 4 points

**Answer is = 4 points**

15. Consider the following case:

|                   | Against Liverpool | Against ManU | Against Chelsea | Against Arsenal | Against ManCity | Against Real Madrid |
|-------------------|-------------------|--------------|-----------------|-----------------|-----------------|---------------------|
| Liverpool plays   | X                 | Won          | Lost            | Won             | Won             | Won                 |
| ManU plays        | Lost              | X            | Won             | Won             | Won             | Won                 |
| Chelsea plays     | Won               | Lost         | X               | Won             | Won             | Won                 |
| Arsenal plays     | Lost              | Lost         | Lost            | X               | Won             | Won                 |
| ManCity plays     | Lost              | Lost         | Lost            | Lost            | X               | Won                 |
| Real Madrid plays | Lost              | Lost         | Lost            | Lost            | Lost            | X                   |

**\*\* Liverpool plays against ManU → Won means that team Liverpool won the match it played against team ManU**

As we can see in the above case 3 teams- Liverpool, ManU and Chelsea scored 8 points each; Arsenal scored 4 points; ManCity scored 2 points and Real Madrid scored 0 points, thus total points exhausted = 30 points

Now out of top 3 only 2 teams will advance to finals and one will not, this one will be rejected on basis of worse performance than top 2.

Therefore, maximum points any team score yet not reach finals is = 8 points

**Answer is = 8 points**

16. Winner can win all matches in Round 1 and the final round

Thus maximum points are =  $5*2 = 10$  points.

**Note: Points are only awarded in the first stage.**

Hence, even when the team wins the final it would get only ten points at the maximum.

**Answer is = 10 points**

## Mock Test Paper 9

### 1–3.

The plates are numbered 1,2,3...·9

Therefore, the sum of numbers on all plates =  $9 * 10/2 = 45$

If sum of numbers of plates in the 1<sup>st</sup> casket = X, then

Sum of numbers of plates in the 2<sup>nd</sup> casket= X – 2

Then, sum numbers of plates in the 3<sup>rd</sup> casket = X – 4

$$X + X - 2 + X - 4 = 45 \text{ or } X = 17$$

Therefore, the three caskets would have plates totaling 17, 15, and 13 respectively. So, each casket should have one plate from each of the following three sets of plates.

1, 2, 3 4, 5, 6 7, 8, 9

*The following combinations are possible if one has to satisfy the requirements.*

**Casket 1 :**  $17 = 9 + 6 + 2$        $9 + 5 + 3$        $9 + 5 + 3$

**Casket 2 :**  $15 = 8 + 4 + 3$        $8 + 6 + 1$        $6 + 7 + 2$

**Casket 3 :**  $13 = 7 + 5 + 1$        $7 + 4 + 2$        $8 + 4 + 1$

Combination 1      Combination 2      Combination 3

But combinations 2 and 3 are not possible because the only way a person can pay ₹ 7 is if three plates are 4, 2, 1 = 7

But in combination 2 and 3, this is not possible. Therefore the only combination possible is 1. The lowest possible payment is  $3 + 2 + 1 = 6$ .

1. (c)
2. (c)

The maximum possible payment is  $9 + 8 + 7 = ₹ 24$ .

3. (d) A customer can not pay ₹ 23 as  $23 = 9 + 8 + 6$  as 9 and 6 are in the same casket. Option (2) is possible as all three plates mentioned are in different casket. A customer can pay ₹ 19 i.e  $19 = 9 + 3 + 7$ , as all three plates are in different caskets.

## 4-8.

The hit sequences are:

Rahul: 12 – 14 – 15 – 16 → Total points =  $12 + 14 + 15 + 16 = 72$

Akhil: 14 – 15 – 16 – 18 → Total points =  $14 + 15 + 16 + 18 = 63$

Tarun 13 – 15. Since Tarun has hit two balls and has G-potted both,

his points must be double of the ball numbers he has hit. Only  $13 - 15$  is a possible combination of 2 balls which give him  $28 + 13 + 15 = 56$  points.

Samar  $18 - 20 - 12 - 14 - 15 \rightarrow$  Total points =  $18 + 20 + 12 + 14 + 15 + 12 + ? = 106$ . Hence, his other G-Pocket ball must have been 15.

Ritesh  $11 - 15 - 16 - 17 - 18 - 19 - 20 - 12 - 13 - 14 \rightarrow$  155 points + bonus points on 1 ball. Since his total is 168 he must have G-Potted ball number 13.

Mahim:  $11 - 15 - 16 - 17 - 18 - 19 - 20 - 12 - 13 - 14 \rightarrow$  155 points +  $19 + ? = 188 \rightarrow$  The second ball G-potted by Mahim must be 14.

The completed table would look like:

| Player's Name | 1st ball hit | Number of G-Pots made | G-Pot Ball Number | Total balls hit | Total Points |
|---------------|--------------|-----------------------|-------------------|-----------------|--------------|
| Rahul         | 12           | 1                     | 15                | 4               | 72           |
| Tarun         | 13           | 2                     | 13,15             | 2               | 56           |
| Akhil         | 14           | 2                     | 16,18             | 5               | 97           |
| Samar         | 18           | 2                     | 12,15             | 5               | 106          |
| Ritesh        | 11           | 1                     | 13                | 10              | 168          |
| Mahim         | 11           | 2                     | 19,14             | 10              | 188          |

Hence, the answers would be:

4. (d) The pink ball is G-potted exactly twice
5. (d) All the players hit ball number 15 (green)
6. (c)  $72 + 56 + 97 + 106 + 168 = 499$
7. (d) His second potted ball is a yellow
8. (c)  $168 - 72 = 96$ .
9. Profit of Grocers Pvt. Ltd. from various divisions=

Services- Online =  $3 * 42 / 100 = 1.26$  crore INR

Services- On call =  $5 * 54 / 100 = 2.7$  crore INR

Inventory- Online =  $7 * 67 / 100 = 4.69$  crore INR

Inventory- On call =  $5 * 68 / 100 = 3.40$  crore INR

Therefore, total profit = 12.05 crore INR

Now, salary of Inventory- Online employees is increased by 50% that is by 1,50,000 INR each

Increase in total salary is =  $78 * 1,50,000 = 1,170,000 = 1.17$  crore INR

Thus, new net profit =  $12.05 - 1.17 = 10.88$  crore INR

Therefore, new margin percentage = New net Profit/Total Sales \* 100 =

$$\begin{aligned}
 &= 10.88/20 * 100 \\
 &= 54.40
 \end{aligned}$$

**Answer is option (b)**

10. Services- Online:-

When no change:

Margin = 42

Annual Sales = 3 crore INR

Net Profit =  $42*3/100 = 1.26$  crore INR

After change:

Increase in cost =  $(3,00,000 - 2,00,000)*25 = 25$  Lakhs INR

Earlier net profit = 1.26 crore

New net profit =  $(1.26 - .25) = 1.01$  crore INR

$$\text{\% decrease in Services- Online margin} = \frac{\frac{.25}{1.26}}{\frac{3}{1.26}} * 100 = 19.84 \approx 20\%$$

**Answer is option (b)**

- 11.

New profit in Services- Online = 42% of (115% of 3 crore) = 1.45 crore INR

New profit in Services- On call = 54% of (115% of 5 crore) = 3.11 crore INR

New profit in Inventory- Online = 67% of (115% of 7 crore) = 5.30 crore INR

New profit in Inventory- On call = 68% of (115% of 5 crore) = 3.91 crore INR

Hence, new total profit = 13.77  $\approx$  13.8 crore INR

**Answer is option (c)**

12. Salary of each employee cannot be deduced from the available information.

**Answer is option (d)**

13. Consider the below match fixtures in case of no upset in the tournament:

| Round- 1        |                 | Round- 2        |                 | Round- 3        |                 | Round- 4        |                 | Round- 5        |                 | Round- 6        |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Seed of Player1 | Seed of Player2 |
| 1               | 128             | 1               | 64              | 1               | 32              | 1               | 16              | 1               | 8               | 1               | 4               |
| 2               | 127             | 2               | 63              | 2               | 31              | 2               | 15              | 2               | 7               | 2               | 3               |
| -               | -               | -               | -               | -               | -               | -               | -               | 3               | 6               |                 |                 |
| -               | -               | -               | -               | -               | -               | -               | -               | 4               | .5              |                 |                 |
| -               | -               | -               | -               | -               | -               | -               | -               | -               | -               |                 |                 |
| 64              | 65              | 32              | 33              | 16              | 17              | 8               | 9               |                 |                 |                 |                 |

### Round- 7

| Seed of Player1 | Seed of Player2 |
|-----------------|-----------------|
| 1               | 2               |

Clearly from above information, we see that the player seeded 8 plays players seeded lower than him till Round- 4. In Round- 5 player seeded 8 has to play player seeded 1 who is higher seeded than him.

**Answer is option (c)**

14. In case of no upset, players seeded 17 to 32 won the 1<sup>st</sup> round and 2<sup>nd</sup> round that is till the time they played lower seeded players, and were defeated in 3<sup>rd</sup> round by higher seeded players. Hence 16 players (seeded 17 to 32) won exactly 2 matches.

**Answer is option (b)**

15. Out of 7 rounds, in the first 3 rounds, player seeded 16 would win all the 3 matches he plays, without any upset. Then in 4<sup>th</sup> round when seed 16 faces seed 1 and wins- 1<sup>st</sup> upset happens; then in 5<sup>th</sup> round seed 16 faces seed 8 and wins- 2<sup>nd</sup> upset happens; then in 6<sup>th</sup> round seed 16 faces seed 4 and wins- 3<sup>rd</sup> upset happens and finally in 7<sup>th</sup> round seed 16 faces seed 2 and wins- 4<sup>th</sup> upset happens. Therefore in total 4 upsets happen.

**Answer is (c)**

16. If no upset happens in previous rounds, then Seed 2 faces Seed 15, but here no information is given on how many upsets had happened earlier in the tournament. In this case consider all possible seeds that can replace Seed 2 in 4<sup>th</sup> round. Therefore in 2<sup>nd</sup> round, when Seed 31 faces Seed 34, let's assume that upset happens, so Seed 34 moves

ahead. Now in 3<sup>rd</sup> round, Seed 34 faces seed 2 and again upset happens, so Seed 34 moves ahead in tournament

Now in 4th round Seed 34 will have to face Seed 15.

None of the other players mentioned in the other options can face Seed 15 like this in 4<sup>th</sup> round.

**Answer is option (a)**

17. From table above, clearly Seed 8 beats Seed 25 in 3<sup>rd</sup> round.

**Answer is option (d)**

## Mock Test Paper 10

1–5.

Eahsan has got the maximum number of palaces and number of palaces with Arun is equal to sum of number of palaces with Barun and Charan. As there are 9 palaces, so possible solutions are when Eahsan, Arun, Barun, Charan, and Deep have 3, 2, 1, 1 and 2 or 4, 2, 1, 1 and 1 palaces respectively.

**Case I:** Barun and Deep have one palace and two palaces respectively.

Let the value of a palace be  $x$ . So amount of cash with Barun =  $x$ .

So total assets of Barun =  $2x$

Total assets of Deep =  $x/2 + 2x$ .

As Deep has got assets worth 2 crore more than that of Barun,

So  $\{x/2 + 2x\} - 2x = 2$  crore, or  $x = 4$  crore.

**Case II:** Barun and Deep have one palace each

Let value of a palace be  $x$ . So, amount of cash with Barun =  $x$ .

Total assets of Barun =  $2x$

→ Total assets of Deep =  $x/2 + x$

As Deep has got assets worth 2 crore more than Barun →  $\{x/2 + x\}$

$-2x = 2$  crore

Here the value of x is coming as negative.

So this case is not possible.

We can collate the final distribution of assets in the following table:

|        | <i>Number of Palaces</i> | <i>Cash (in ₹ crore)</i> | <i>Total assets (in ₹ crore)</i> |
|--------|--------------------------|--------------------------|----------------------------------|
| Arun   | 2                        | 1 or 2 or 3              | 9 or 10 or 11                    |
| Barun  | 1                        | 4                        | 8                                |
| Charan | 1                        | 1 or 2 or 3              | 5 or 6 or 7                      |
| Deep   | 2                        | 2                        | 10                               |
| Eahsan | 3                        | 1 or 2 or 3              | 13 or 14 or 15                   |

1. (c) Value of 9 palaces is 36 crore.
2. (d) Maximum possible assets of Arun is 11 crore.  
(2 palaces + 3 crore)
3. (d) Maximum possible assets of Eahsan = 15 crore  
Minimum possible assets of Charan = 5 crore  
Ratio = 3 : 1
4. Maximum possible value of assets of all the brothers taken together =  $11 + 8 + 7 + 10 + 15 = 51$  crore. Minimum possible value =  $9 + 8 + 5 + 10 + 13 = 45$ . Thus any value between 45 to 51 crore is possible. Hence (b).
5. Only for Barun and Deep, it is possible to find the exact value of their total assets. Hence (b).
6. For any number in the above table, there are two constraints as defined by statement 2 –With respect to the overall percentile being less than the individual sectional percentiles,

And statement 3... 4 with respect to the respective percentiles in English and Reasoning as defined for the four batches.

Based on the logic that the overall percentile is lower than the individual sectional percentiles, it can be seen that for Microsoft, 44 students are above 60+ in their overall percentiles, hence, at least that number have to be above 60+ in English for Microsoft. This leaves at most 36 students who can be in the 30+ to 60 bracket. Similarly, for GE, the constraint that works will be that Reasoning < English.

Also, for GE, the minimum number of students who are in the 60+ to 80 percentile in reasoning range would be  $(36 + 48 + 56) - (38 + 82) = 20$ . The required difference is 16.

7. Compaq has 52 students in the 0-30 percentile range in English. Hence, we will need to put a minimum of 52 students in the 0-30 percentile category overall. Thus, we can only put 50 students in the 30-60 category (since there are a total of 110 students and 6+2 students are in the 60-80 and 80-100 category. Hence, the required difference =  $52 - 50 = 2$ ).
8. For the Apple batch the minimum number of students who must be included in the 60+ to 80 percentile range would be 4 (Since there are 160 students who have scored less than 80 percentile in reasoning from this batch and  $160 - 60 - 96 = 4$ ).  
Besides, the number of students who scored 0 – 30 in the Compaq batch must be at least 52. Hence, the required sum =  $4 + 52 = 56$ .
9. The number of students of GE batch in the 0 – 60 bracket for reasoning is 120. Also, since there are 164 students in the less than 80 percentile bracket overall and there are 140 students in the less than 80 percentile bracket in English, hence, there must be a maximum of 44 ( $164 - 120$ ) students in 60+ to 80 in reasoning for the batch and there must be a minimum of 20 students ( $140 - 120$ ) in the same category. Hence, the required sum =  $44 + 20 = 64$ .
10. In 2002:

Market share of SBI in loan segment =  $92/385 * 100 = 23.89$

Market share of FBI in loan segment =  $78/385 * 100 = 20.26$

Difference in share =  $23.89 - 20.26 = 3.63$

Housing finance market in 2002 = 150 crore INR

$3.63\% \text{ of } 150 \text{ crore} = 5.45 \text{ crore INR}$

**Answer is option (d)**

11. Banks affected are:

Citibank = 3% of 80 crore = 2.4 crore INR

Bank A, B, D, E and F.

C had a market share of 30% of 30% of 80 crore INR  
 $= 7.2 \text{ crore INR}$ , hence it continued its operations.

Therefore, 6 banks had to halt their operations

**Answer is option (a)**

12. Loan disbursement in 2006 = 110% of 558 = 613.80 crore INR

Loan disbursement in 2007 = 110% of 613.80 = 675.18 crore INR

Loan recovered in 2008 = 30% of 675.18 = 202.55 crore INR

Bad loan or amount NOT recovered =  $675.18 - 202.55$  or 70% of 675.18

$$= 472.63$$

$\approx 473$  crore INR

**Answer is option (c)**

13. Taking data from previous question, loan disbursement in 2007 = 675 crore INR

Percentage share of "Others" =  $80/558 \times 100 = 14.34\%$  (Because percentage share is the same in consecutive years after 2005)

Now in 2008:

Amount NOT recovered = 14.34% of 675

$$= 96.80 \text{ crore INR}$$

Share of banks that survived recession = 578.2 crore INR

Amount recovered by these banks = 50% of their share

$$= 50\% \text{ of } 578.2 = 289.05$$

$\approx 289$  crore INR

Therefore only 289 crore INR was recovered in 2008.

**Answer is option (d)**

14.  $675 - 289 = 386$  crore INR

**Answer is option (a)**

15. To minimize the number of men participating, we should maximize the number of men who participate in more than 1 event.

Here the number of men who participate in various events are:

1. Gala-

120 Men (can participate in other events)

80 Women (out of which 40 participate only in this round)

2. Karaoke-

100 Men (can participate in other events)

60 Women (out of which 20 participate only in this round)

3. Orchestra-

80 Men (can participate in other events)

50 Women (out of which 30 participate only in this round)

4. Classical-

100 Men (can participate in other events)

40 Men (participate only in this event)

120 Women (All participate only in this event)

Therefore, out of 120 Men from Gala that can participate in other events- 100, 80 and 100 also participate in Karaoke, Orchestra and Classical respectively. We are left with 40 Men that participate only in Classical.

Therefore, in total we have  $120 + 40 = 160$  Men minimum.

**Answer is option (d)**

16. Using same logic as above:

1. Gala-

80 Women (can participate in other events)

120 Men (out of which 40 can participate only in this event)

2. Karaoke-

60 Women (can participate in other events)

100 Men (out of which 20 can participate only in this event)

3. Orchestra-

50 Women (can participate in other events)

80 Men (out of which 30 can participate only in this event)

4. Classical-

120 Women (out of which 20 participate only in this event)

Thus 100 can participate in other events

140 Men (all participate only in this event)

Therefore, there are total of  $100 + 20 = 120$  Women

**Answer is option (c)**

17. In this case, we maximize the number of men and women in single events:

1. Gala-

40 Men participate only in this event

80 Men can participate in other events

2. Karaoke-

20 Men participate only in this event  
80 Men can participate in other events

3. Orchestra-

30 Men participate only in this event  
50 Men can participate in other events

4. Classical-

140 Men participate only in this event

Therefore, in total 105 Men can participate in more than 1 events + 40 only in Gala + 20 only in Karaoke + 30 only in Orchestra + 140 only in Classical = 335 Men.

**Answer is (a)**

**Note:** The calculation of 105 comes from the fact that of the 80 men in Gala who can participate in other events, 25 participate in Orchestra too. Similarly, 25 participate in Orchestra + Karaoke, leaving 55 participating in Karaoke + Gala. This would give us a total of 105 men who participate in more than one event.

18. Using same logic as above,

1. Gala-

40 Women participate only in this event  
40 Women can participate in other events

2. Karaoke-

20 Women participate only in this event  
40 Women can participate in other events

3. Orchestra-

30 Women participate only in this event  
20 Women can participate in other events

4. Classical-

120 Women participate only in this event

Therefore, in total 50 Women participate in more than 1 events + 40 only in Gala + 20 only in Karaoke + 30 only in Orchestra + 120 only in Classical = 260 Women

**Answer is option (d)**

## Mock Test Paper 11

1. The percentage of industries in the Oil sector in the year 1998–99 was  $(100 - (35 + 10 + 30)) = 25\%$ . Similarly the percentage of Industries in Power sector in the year 2004–2005 was  $[100 - (15 + 25 + 32)] = 28\%$ . Hence the ratio is  $(25 \times 33600) / (28 \times 66800) = 75/167$ .  
Hence (a)
2. The total number of industries in 1997–1998 was 176800. Number of industries in the year 1998–1999 =  $176800 \times 1.15 = 203320$ . Hence the number of multinational companies in the year 1998–1999 was  $203320 - 33600 = 169720$ . Hence (a)
3. The percentage of industries in the Oil sector in the year 2003–2004 was  $[100 - (45 + 8 + 15)] = 32\%$ . Hence the number of industries in the Oil business =  $32 \times 54600/100 = 17472$ . Hence (c) is the correct option
4. The number of medium scale companies would be 4% of 79600 = 3184. Hence, option (b) is correct.
5. The price per unit of Brand A:  $(0.25 \times 2250 \times 10^7) / (0.16 \times 13500 \times 10^6) = 562.5 / 216 = 2.6$   
Price per unit of brand B =  $(0.13 \times 2250) / (0.14 \times 1350) = 1.55$   
Similarly price per units of Brand C, D, E and F are 1.23, 2.22, 2.5 and 0.83 respectively. Hence brand A is the costliest which is 2.6 per bottle.  
Hence (a).
6. The cheapest brand cost 0.83 and the costliest brand's price is 2.6. Hence the required price ratio is 4:13. Hence (b)
7. The profit for one bottle of brand C is  $1.23 - 0.93 = 0.3$   
Hence the total profit of brand C =  $0.3 \times 0.27 \times 13500 \times 10^6 = 109.35$  crore. Hence (d)
8. Percentage share of brand A in value sales =  $25 + (2 / 5 \times 12) = 30$   
Hence (c).
9. The cumulative table can be broken into it's components as follows:

| Score | Physics                          |                    | Chemistry                        |                    | Mathematics                      |                    |
|-------|----------------------------------|--------------------|----------------------------------|--------------------|----------------------------------|--------------------|
|       | Cumulative Number<br>of students | Number of students | Cumulative Number<br>of students | Number of students | Cumulative Number<br>of students | Number of students |
| 0     | 100                              | 18                 | 100                              | 25                 | 100                              | 31                 |
| 10    | 82                               | 14                 | 75                               | 15                 | 69                               | 19                 |
| 20    | 68                               | 16                 | 60                               | 10                 | 50                               | 10                 |
| 30    | 52                               | 2                  | 50                               | 15                 | 40                               | 10                 |
| 40    | 50                               | 20                 | 35                               | 10                 | 30                               | 10                 |
| 50    | 30                               | 18                 | 25                               | 13                 | 20                               | 12                 |
| 60    | 12                               | 7                  | 12                               | 5                  | 8                                | 4                  |
| 70    | 5                                | 2                  | 7                                | 4                  | 4                                | 3                  |
| 80    | 3                                | 1                  | 3                                | 2                  | 1                                | 1                  |
| 90    | 2                                | 1                  | 1                                | 1                  | 0                                | 0                  |
| 100   | 1                                | 1                  | 0                                | 0                  | 0                                | 0                  |

Consider the marks in mathematics. 99 students get less than 100 marks, i.e. exactly one student gets 100. Similarly by calculating the above table can be derived.

50% of the total students imply 50 students. Now, from the table we can see that the first 50 students scored at least 20, 30 and 40 marks in mathematics, chemistry and physics respectively. Hence their overall score is 90 or more. Since the 51<sup>st</sup> student secured  $10+20+30 = 60$  marks as an overall score. Hence the cutoff is 70. Hence (c) is the correct option

10. The number of students who secured more than 60 marks, i.e. a minimum of 70 marks is 5, 7 and 4 in each of the three subject's physics, chemistry and mathematics respectively. Since 4 minimum students definitely secured more than 60 marks, hence 4 is the answer. Hence (d) is the correct option
11. Now the student who stood first must have got the highest score in all the three subjects as given in the question that when arranged in ascending / descending order of their scores, it's the same for all the three subjects.

Hence overall score =  $100 + 90 + 80 = 270$ . Hence (d) is the correct option

12. Upon considering the statements ...
  - (i) 68 students scored at least 20 marks in the Physics paper and 69 students secured 10 marks in the Mathematics paper. Hence exactly one student scored 10 marks in each of the three exams. Hence (i) is incorrect
  - (ii) The maximum number of students who scored 60 marks in any

paper is 7. Hence (ii) is true

- (iii) The number of students who secured more than 70 marks in each of the three sections is 3, 3 and 1 respectively. Hence only 1 student secured more than 70 marks in each of the three exams. Hence (iii) is false
- (iv) The number of students who secured zero in each of the three exams is 18, 25 and 31 respectively. Since 18 is the minimum, 18 students definitely secured a zero. Hence (iv) is false

Hence (i), (iii) and (iv) are false. Hence (d) is the correct option.

13. The number of T1 in SS1 is 50. A combination of 50 T1 can be formed by using the following combination of S's:-  
b. S1, S2 and S4  
c. S1 is used twice

The number of T2 in SS1 is 45. A combination of 45 T2 can be formed by using the following combinations of S:-

- (a) S1, S2 and S4
- (b) S1, S3 and S5

Combination (a) is common for both number of T1 and T2. Hence S1, S2 and S4 are used in SS1

Similarly, in SS2 we have the following combination: S2 once and S4 twice.

Hence types of S used are 3. Hence (c).

14. Number of T3 and T4 in SS3 is known. Calculating on similar lines as explained in the last question, we have the following combination of S's: S3 and S4. Hence (b)
15. We know the number of T1 and T5 used in SS4. Again calculating along similar lines, we get that SS4 has the following combination of S's: S1, S3, S4 and S5. Hence number of T2 on SS4 is  $= 20 + 8 + 15 + 17 = 60$   
From the previous results, T2 on SS3 = 23. Hence 83. Hence option (d)
16. As the number of T4's is 63 and the number of T5's is less than 80, the following combinations can be used:  
(a) SS1 and SS3

(b) SS3 and SS4

(c) SS3 twice and SS2

For combination (a) we have the following combinations of S's: S1, S2 and S5

For combination (b) we have the following combinations of S's: S1, S3, S4, and S5

For combination (c) and (d) we have the following combinations of S's: S2, S3, and S4. Hence option (d) is correct.

## Mock Test Paper 12

- Since P, S and T took leave on Friday; each one of them must have started manufacturing a new unit or product on Saturday. Thus each must have manufactured 2 units on Saturday and thus a total of 6 units of product A. The table given below illustrates this:-

|   | Sun | Mon | Tue | Wed | Thurs | Fri | Sat         |
|---|-----|-----|-----|-----|-------|-----|-------------|
| P |     |     | X   |     |       | X   | A(4) + A(4) |
| Q | X   |     |     |     | X     |     |             |
| R |     | X   |     |     | X     |     |             |
| S | X   |     |     | X   |       | X   | A(4) + A(4) |
| T |     |     | X   |     |       | X   | A(4) + A(4) |
| U |     |     |     | X   |       |     | X           |

On Saturday, 5, 3, and 8 hours were spent on B, C, and D respectively to produce 1, 1 and 2 units of each of the products were completed on Saturday. Thus Q and R must have used their working hours on Friday and Saturday as follows:-

|   | Thurs | Fri                   | Sat                   |
|---|-------|-----------------------|-----------------------|
| B | X     | B (5 hrs) + C (3 hrs) | B (5 hrs) + C (3 hrs) |
| C |       | D (2 hrs) + D (6 hrs) | B (1 hrs) + C (7 hrs) |

When the same rationalisation is applied over every product, workers and the number of hours and units produced on any given day while keeping in mind the days of rest of the workers, the following table is obtained (Deduction of the same left to students)

|   | Sun         | Mon         | Tue         | Wed         | Thurs       | Fri         | Sat         |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| P | A(4) + D(4) | B(5) + D(3) | X           | B(5) + C(3) | B(5) + C(3) | X           | A(4) + A(4) |
| Q | X           | C(6) + D(2) | A(3) + D(5) | A(1) + D(7) | X           | B(5) + C(3) |             |
| R | A(4) + A(4) | X           | A(4) + A(4) | X           | A(2) + C(6) | A(2) + D(6) |             |
| S | X           | C(1) + D(7) | C(5) + D(3) | B(4) + D(4) | B(1) + D(7) | X           | A(4) + A(4) |
| T | B(5) + C(3) | B(5) + C(3) | X           | C(2) + C(6) | A(4) + C(4) | X           | A(4) + A(4) |
| U | A(1) + C(6) | A(3) + D(5) | C(6) + D(2) | X           | A(4) + D(4) | B(5) + D(3) | X           |

It is clear from the above table that the correct answer is A and C. Hence (c)

2. It can be inferred from the above table that C is the correct option. Hence (c)
3. As seen from the table, C and D are the products. Hence (b)
4. It can be counted from the table above that the number of units produced is 8. Hence (d)
5. Maximum loss incurred is due to product G. Hence minimum units of product G should be sold. Hence checking option (c) and (d) shall give the answer. Hence for option (d)  $=> 6 + 1 - 9 - 1 = -3$  = maximum loss. Hence (d)
6. From the line graph we can see the profit (+) and loss (-) yielded by each of the products, i.e. +3, -1, -5 and 0. Hence to earn profit, maximum units of E and minimum units of G should be sold. Hence profit for each option can be calculated as following (option [a] taken as an example)

$$E = 40, F = 10 \text{ and } G = 20$$

$$\text{Profit} = (3 \times 40) - 30 - (5 \times 10) = ₹ 40$$

Similarly after calculation of other options, we find that [a] is the correct option.

7. For profit: Preparation cost < Tuition cost. It can be seen from the graph that 2 is the correct answer. Hence (d)
8. We can calculate the profit (+) / loss (-) of each of the four products to be -1, +2, +2 and 0 (no profit, no loss). If the number of units sold be e, f, g and h for the respective products. Since company Y suffered a loss of 20 hence we can say that  $2f + 2g - e = -20$ . Hence  $e = 2(f + g) + 20$ . We know that  $e + f + g + h = 100$  is given. From these equations we may conclude that  $3(f + g) + h = 80$ . Considering the options, only (a) is correct.
9. From the options the one that satisfies the given conditions is:  
Kazakhstan (-19)  $=>$  India (+14) and Japan (+5)  
Finland (-25)  $=>$  Denmark (+16) and Egypt (+9)  
Bangladesh (-30)  $=>$  Argentina (+19) and Holland (+11)  
Clearly option (c) is correct

10. From the options the one that satisfies the given conditions is:
- Japan (-23) => Holland (+23)
- Egypt (-45) => Finland (+33) and Kazakhstan (+12)
- India (-35) => Bangladesh (+11), Denmark (+8) and Germany (+16)
- Clearly option (b) is the correct answer
11. As we can see from the given data Bangladesh has the highest Doctors deficit. Upon looking further, the following combinations arise in which the deficit of countries Bangladesh, Finland and Kazakhstan can be fulfilled by the surplus of Argentina, Denmark, Egypt, Holland, India, and Japan
- Combination (1):
- Bangladesh (-30) => Argentina (+19) and Holland (+11)
- Finland (-25) => Denmark (+16) and Egypt (+9)
- Kazakhstan (-19) => India (+14) and Japan (+5)
- Combination (2):
- Bangladesh (-30) => India (+14), Japan (+5) and Holland (+11)
- Finland (-25) => Denmark (+16) and Egypt (+9)
- Kazakhstan (-19) => Argentina (+19)
- Combination (3):
- Bangladesh (-30) => Denmark (+16) and India (+14)
- Finland (-25) => Egypt (+9), Holland (+11) and Japan (+5)
- Kazakhstan (-19) => Argentina (+19)
- Thus Bangladesh can requisition Doctors from Argentina, Denmark, Holland, India and Japan. Hence (b)
12. As explained in the last question, there are three possible unique combinations in which countries Bangladesh, Finland and Kazakhstan can requisition Engineers. We have already seen that Bangladesh can requisition doctors from 5 different countries. If you look at the previous solution, you can see that Finland can source from 4 different countries (Denmark, Egypt, Holland and Japan. Hence, option (c) is correct.
13. The total number of votes in round 1 is 164 as the country of Dimpay is also allowed to vote. Audi gets 60 votes and Dimpay gets 24 votes. Hence total votes obtained by Boxer and Coffee is  $164 - (60 + 24) =$

80 votes

Since in round 3, the total number of votes is 147. Hence the 15 countries that are ineligible to vote+, voted for candidate Dimplly in round 1, for Coffee in round 2 and were ineligible to vote in round 3

The remaining  $24 - 15 - 1 = 8$  countries who voted for Dimplly in round 1, voted for Boxer in round 2. Since 15 countries who voted for Dimplly in round 1, voted for Coffee in round 2 and the number of members who voted for coffee in both the rounds 1 and 2 should be 24 ( $24 + 15 = 39$ ). As 25% of those who voted for Coffee in round 1 voted for Boxer in round 2,  $24 = 75\%$  of those who voted for Coffee in round 1 which is 32.

Obviously, number of voted for Boxer in round 1 would be  $80 - 32 = 48$ . In the third round, half of those who voted for Coffee in round 1 voted for Dimplly in round 2. Hence total votes for Boxer =  $48 + 16 + 8 = 72$ . Hence total votes in round 3 are 147. So votes for Audi in round 3 = 75

Hence only statement (ii) is true. Hence (b)

14. From the above discussion it is clear that the answer is 8. Hence (a)
15. From the above discussion it is clear that the answer is 32. Hence (d)
16. Members who voted for Coffee in round 2 = 39 out of which members eligible to vote in round 3 were  $39 - 15 - 1 = 23$ . Also those who voted for candidate Audi = 15. Hence required percentage =  $15 / 23 \times 100 = 65.2\%$ . Hence (d).

## Mock Test Paper 13

1. It will be useful to make the following table which depicts spare time on each machine after meeting the commitments to each of the two companies

|                      | Machine 1                                 | Machine 2  | Machine 3                                       | Machine 4                               |
|----------------------|---|--|---|---|
| Process: Substrating | 30 minutes (15 units for Electronica Ltd) | 30 minutes (10 units for Electrica Ltd)  | ---   | ---                                     |
| Process: Masking     | 30 minutes (6 units for Electronica Ltd.) | 30 minutes (6 units for Electrica Ltd)   | 4 hours 15 minutes (3 unit for Electronica Ltd) | 30 minutes (10 units for Electrica Ltd) |
| Process: Etching     | 30 minutes (10 units for Electronica Ltd) | 2 hours 15 minutes (5 units for Electronica Ltd and 2 units for Electrica Ltd) | No spare time (8 units for Electrica Ltd)       | ---                                     |

Using the above given table, option (a) and (b) are obviously ruled out. Option (c) is not possible as 1 unit for Electrica Ltd. needs 45 minutes for process Substrating and both the machines have an idle time of only 30 minutes each. Hence the correct option is (d)

2. The bottle neck for Electronica Ltd is obviously process masking as can be observed from the table. The maximum number of units each process masking machine can make is 6. Hence the maximum possible number units of Electronica Ltd. are 24; the other two processes not being any constraint. Hence (a)
3. Profit made by manufacturing only for Electronica Ltd. =  $24 \times 75 = 1800$   
Profit made by manufacturing only for Electrica Ltd =  $20 \times 100 = 2000$   
Hence (d)
4. From the given options, the most profitable one is (d) as it generates 1000 in profits. Hence (d) is the correct option.
5. As no class 11<sup>th</sup> student fails, hence all the 56 students of class 11<sup>th</sup> of 2008 are from class 10<sup>th</sup> of the year 2007. In class 10<sup>th</sup> the number of students failed in class 10<sup>th</sup> of 2007 =  $64 - 56 = 8$ . Hence in class 9<sup>th</sup> the number of students who failed =  $72 - 60 + 8 = 20$ . Hence (d).
6. 14 students of class 10<sup>th</sup> failed. Hence number of students of class 9<sup>th</sup> who failed in the year 2007 is  $72 - 60 + 14 = 26$ . Hence number of students from class 8<sup>th</sup> who failed =  $84 - 70 + 26 = 40$ . Hence number of failed students of class 7<sup>th</sup> =  $120 - 100 + 140 = 60$ . Hence out of 140 students studying in class 7<sup>th</sup> in 2008, 60 are those who failed in the year 2007. Hence number of students newly joined =  $140 - 60 = 80$ . Hence percentage decrease from 2007 to 2008 is  $(120 - 80) / 120 * 100 = 33.33\% = 100/3\%$ . Hence (a).
7. As no student failed in class 11<sup>th</sup> in the year 2007, there must be 48 students in class 12<sup>th</sup> in the year 2008. Since there were 54 students, hence  $54 - 48 = 6$  students failed in class 12<sup>th</sup> in 2007. Hence the pass percentage =  $30 / 36 * 100 = 83 (1/3) \%$ . Hence (d) is the correct option.
8. Number of students who failed in class 8<sup>th</sup> = 34. Hence number of

students who failed in class 7<sup>th</sup> = 120 – 100 + 34 = 54. Hence the total number of failed students (as derived from the other questions as well) = 6 + 8 + 20 + 24 + 54 = 122. Hence [c] is the correct option.

9. Drawing the following table shall prove useful:-

| Students | 2 <sup>nd</sup> year | 3 <sup>rd</sup> year | 4 <sup>th</sup> year | Total score        |
|----------|----------------------|----------------------|----------------------|--------------------|
| A        | 100                  | c                    | e                    | 190 + c or 189 + c |
| B        | 98                   | 96                   | 93                   | 287                |
| C        | 88                   | 99                   | 94                   | 281                |
| D        | 92                   | d                    | 97                   | 189 + d            |
| E        | a                    | 87                   | f                    | 176 + a or 177 + a |
| F        | b                    | 91                   | 95                   | 186+b              |
| Total    | $91 \times 6 = 546$  | $90 \times 6 = 540$  | $93 \times 6 = 558$  |                    |

The missing scores, wherever they were in the question have been replaced with a, b, c, d, e and f and the values of these unknowns has to be found. Clearly  $e + 93 + 94 + 97 + f + 95 = 558 \Rightarrow e + f = 179$ . Hence the only possible values of e and f are 89 and 90 in that particular order as per the conditions of the question.

Similarly,  $100 + 98 + 88 + 92 + a + b = 546 \Rightarrow a + b = 168$ . a and b can be any of the combinations (82, 86), (83, 85), (85, 83), (86, 82)

Similarly for c and d the values can be any of (81, 86), (82, 85), (83, 84), (84, 83), (85, 82), (86, 81)

Now if A and D are ranked the same then  $100 + c + e = 189 + d \Rightarrow c + e = d + 89$ . But e is either 89 or 90 and hence  $c = d$  or  $c + 1 = d$ .  $c = d$  is not possible hence  $c = 83$  and  $d = 84$ . If  $e = 90$  and  $f = 89$  and hence  $(a, b) = (82, 86)$  or  $(86, 82)$ . Hence (c) is the correct option

10. From the table above we can see that the maximum possible score of E is  $177 + 86 = 263$  which is less than the minimum possible score of any of the other five students. Hence E is ranked the lowest. Hence (d)
11. As per the given conditions, the score of E and F must be (82, 86) or (86, 82) respectively. (c, d) is thus (83, 84) or (84, 83). Hence the following possibilities arise:-

$e = 89$  and  $f = 90$ ,  $A = 272$  or  $273$ ,  $B = 287$ ,  $C = 281$ ,  $D = 273$  or  $272$ ,  $E = 259$  or  $263$  and  $F = 272$  or  $268$ . Hence two possibilities are there  $\rightarrow A = F = 272$  and  $D = F = 272$ .

Similarly for  $e = 90$  and  $f = 89$  we have two more set of possibilities (Left for the students to derive)

Hence there are four possibilities. Hence (d)

12. If no students are ranked the same then from the previous questions, we can get the following possibilities as the score of students

| Possibility | A   | B   | C   | D   | E   | F   |
|-------------|-----|-----|-----|-----|-----|-----|
| I           | 272 | 287 | 281 | 273 | 263 | 268 |
| II          | 273 | 287 | 281 | 272 | 263 | 268 |
| III         | 274 | 287 | 281 | 272 | 262 | 268 |

Clearly (c) is the correct option

13. It shall be beneficial for the student to draw a diagram illustrating the map of the given condition, i.e. the various cities that connect each other and the traversal time in between each of them. It is left for the student to do this activity.

From the map which the student must have drawn the following table can be inferred. The table given below gives the possible routes the five aircrafts could traverse along with the time taken to traverse the path to start from North Pole (NP) reach the destination of South Pole (SP). Stop over time at each stop over city has obviously not been included.

| Route number | Route             | Time in hours      |
|--------------|-------------------|--------------------|
| 1            | NP-E-H-A-SP       | $6+3+4+10=23$      |
| 2            | NP-E-H-D-G-C-SP   | $6+3+4+3+2+8=26$   |
| 3            | NP-E-H-B-D-G-C-SP | $6+3+3+1+3+2+8=26$ |
| 4            | NP-E-H-B-G-C-SP   | $8+6+2+8=24$       |
| 5            | NP-F-G-C-SP       | $8+6+2+8=24$       |

After adding the stop over times in each of the stop over cities, we find that the total time (including stop over time) along the five paths is 29, 36, 38, 36 and 30 hours. Clearly, the required answer is  $38 - 29 = 9$  hours. Hence (a)

14. Reducing the time along the cities B-G reduces the flying time in route 4 to 25 hours. Upon adding the stop over times, we get a total traversal time for the five routes 1 to 5 as 32, 30, 32, 30 and 30 respectively. It can be clearly seen that none of the options are correct. Hence (d).
15. From the given conditions it may be inferred that the stop over time at cities B and D should be 0 each. Similarly to make the traveling time

equal, the stop over time at cities A and F should be 7 and 6 hours respectively. Clearly 34 is the correct answer. Hence (c).

16. As shown in the above solutions, when we add the stop over time to each of the given cities, we find that none of the options (a) (b) and (c) satisfy the given conditions. Hence (d).

## Mock Test Paper 14

- We know that the difference in cities in between A and B is 8. Hence if A has  $x$  cities, B has  $x + 8$  or  $x - 8$  cities. Also since  $A - C = 13$  and  $B - C = 5$ . Thus B is the arithmetic mean of A and C. Hence number of cities C will be having is  $x + 13$  or  $x - 13$  corresponding to  $x + 8$  or  $x - 8$  respectively. On similar lines the following two cases may be there:-

| States | Cities Case 1 | Cities Case 2 |
|--------|---------------|---------------|
| A      | X             | X             |
| B      | $X + 8$       | $X - 8$       |
| C      | $X + 13$      | $X - 13$      |
| D      | $X + 6$       | $X - 6$       |
| E      | $X + 7$       | $X - 7$       |
| F      | $X + 21$      | $X - 21$      |
| G      | $X - 1$       | $X + 1$       |
| H      | $X - 7$       | $X + 7$       |
| I      | $X + 9$       | $X - 9$       |
| J      | $X + 12$      | $X - 12$      |
| K      | $X + 5$       | $X - 5$       |
| L      | $X - 2$       | $X + 2$       |
| M      | $X + 11$      | $X - 11$      |
| N      | $X + 19$      | $X - 19$      |
| O      | $X + 20$      | $X - 20$      |
| P      | $X + 17$      | $X - 17$      |
| Q      | $X + 27$      | $X - 27$      |
| R      | $X + 25$      | $X - 25$      |
| S      | $X + 23$      | $X - 23$      |
| T      | $X + 22$      | $X - 22$      |

In case 1, the number of cities in state H is  $x - 7$  which must be a

natural number. Hence the least possible value of  $x$  is 8. Similarly in case 2, state q has  $x - 27$  cities and in this case the least possible value of  $x$  is 28.

Now states C, J and P are the only states with number of cities in between M and N. Hence number of states that have more or less cities than M and N is  $20 - (C, J, P, M, N) = 20 - 5 = 15$ . Hence (c)

2. As per case 1:  $J + K + L + M + N = 5x + 45$  where  $x \geq 8$   
 As per case 2:  $J + K + L + M + N = 5x - 45$  where  $x \geq 28$   
 Clearly in either case  $x \neq 80$ . Hence (b)
3. Since  $P \neq (x + 17)$ , Hence  $P = (x - 17)$ . Hence  $x - 17 = 15 \Rightarrow x = 32$   
 Since  $A + C = 2x - 13 \Rightarrow [(2 * 32) - 13] = 51$ . Hence (a)
4. (i):  $A + B + C = 3x + 21$  or  $3x - 21$ . Since  $x$  is a natural number, hence  $3x + 21 \neq 80$  and  $3x - 21 \neq 80$ . Similarly checking other statements, we find that only option (iii) and (iv) can have 80 cities in total. Hence (e).
5. From the given conditions, Team F's total points must be less than Team E. Since Team E has got 2 points, it had 2 draws and 3 losses and no wins. Team F cannot have any win since it can have a maximum of 1 point, the match in between E and F must have been a draw. Hence Team F got 1 point.

Team D could have scored anywhere in between 3 to 7 points. D definitely won against F and had a draw/win against team E.

As can be noticed, total goals for = total goals against. Hence goals for team C are  $45 - 43 = 2$ . Since the number of draws must be an even number, hence the only possibility is that Team D has 4, 2 or 0 draws. Hence also total number of matches won = total number of matches lost. Hence team D should have lost 1 game more than it won. Hence team d definitely lost to team A and C. Hence D cannot have 4 draws.

If we consider that D has 2 draws, i.e. with Team B and E, there is an inconsistency as team C has had 2 draws but as per our hypothesis, there are no countries left to draw against it. Hence the only possibility is that Team D has had 0 draws which automatically means that D beat Team E and F and got 6 points.

The following table gives the details of our analysis thus far:

| Position | Country | Won | Draw | Loss | Goals For | Goals Against | Total Points |
|----------|---------|-----|------|------|-----------|---------------|--------------|
| 1        | A       | 5   | 0    | 0    | 17        | 5             | 15           |
| 2        | B       | 3   | 1    | 1    | 9         | 6             | 10           |
| 3        | C       | 2   | 2    | 1    |           | 2             | 8            |
| 4        | D       |     |      |      |           | 2             | 5            |
| 5        | E       | 0   | 2    | 3    | 7         | 11            | 2            |
| 6        | F       | 0   | 1    | 4    | 8         | 16            | 1            |

Since the total points of Team D cannot be determined, hence statements (ii) and (iii) cannot be determined. Hence option (c) is correct.

6. As is clear from the table, all the given statements are false. Hence (d) is correct
7. As is clear from the table, only (ii) is true. Hence (b) is correct
8. Statement (i): The number of wins of team D is not known hence this statement cannot be determined Statement (ii): It can be inferred from the above table that this statement is true  
Statement (iii): It can be inferred from the above table that this statement is false  
Statement (iv): The number of goals for of team C cannot be determined  
Statement (v): It can be inferred from the above table that this statement is true  
Hence (e) is the correct option
9. There are two pairs that satisfy a strike rate of 125: ST vs IB and RS vs PC. Hence, option (a) is correct.
10. It would be in the best interests of the students to make a table corresponding to the number of balls faced and runs scored by each batsman Vs each bowler to save time in this questions (Activity left for students to complete)  
It is clear from the given table that AC scored a maximum of 61 runs. Hence (b)
11. x can be calculated for each of the bowlers. As an example, for SG,  $x = \frac{3}{14} \times 100 = 21.42\%$  (highest) and for ST,  $x = 1/15 \times 100 = 6.66\%$  (lowest). The difference in between the two is  $21.42 - 6.66 = 14.76\%$ . Hence (a)
12. ZK gave away a maximum of 49 runs to all the batsman put together.

Hence (b)

13. Since the total of R7 and R8 is 17 and no two rats secured the same points, hence R7 and R8 must have secured 9 and 8 points (in any order) while R3 and R4 must have secured 10 and 6 points (again in any order). Similarly the ranks and points for others may be derived as seen in the following table (the points and positions of rats may be in any order)

| Province | Rats    | Race 1 |          | Race 2 |          | Race 3 |          |
|----------|---------|--------|----------|--------|----------|--------|----------|
|          |         | Points | Position | Points | Position | Points | Position |
| 1        | R1, R2  | 5, 2   | 6, 9     | 9, 6   | 2, 5     | 4, 1   | 7, 10    |
| 2        | R3, R4  | 10, 6  | 1, 5     | 5, 3   | 6, 8     | 10, 8  | 1, 3     |
| 3        | R5, R6  | 3, 1   | 8, 10    | 2, 1   | 9, 10    | 7, 3   | 4, 8     |
| 4        | R7, R8  | 9, 8   | 2, 3     | 7, 4   | 4, 7     | 5, 2   | 6, 9     |
| 5        | R9, R10 | 7, 4   | 4, 7     | 10, 8  | 1, 3     | 9, 6   | 2, 5     |

The rats that came third in race 1 could be either of R7 and R8. Hence (d) is the correct option.

14. To satisfy the given conditions, R1 must have secured 2 points while R5 and R6 must have got 1 and 3 points respectively. Similarly, the positions for others may be deduced as given in the following table:-

|    | Rat | Points | Position |
|----|-----|--------|----------|
| P1 | R1  | 2      | 9        |
| P1 | R2  | 5      | 6        |
| P2 | R3  | 6      | 5        |
| P2 | R4  | 10     | 1        |
| P3 | R5  | 1      | 10       |
| P3 | R6  | 3      | 8        |
| P4 | R7  | 8 or 9 | 3 or 2   |
| P4 | R8  | 9 or 8 | 2 or 3   |
| P5 | R9  | 4      | 7        |
| P5 | R10 | 7      | 4        |

We can see from the above table that only (iii) is true. Hence option (d) is correct

15. As can be seen from the table above, neither the position, nor the points of R7 and R8 can be determined. Hence both the statements (i) and (ii) are true. Hence (c) is the correct option.
16. From the table above, we can see that there are two possible values for each finish position for each rat.

Hence, we cannot make any of conclusions in the first three options. Hence, option (d) is correct.

## Mock Test Paper 15

1. From the data the following can be inferred (working out of the inference left for the students)
  - (i) D's total points should be greater than 19 (21 or 23) and hence its satisfactory ratings are either 5 or 6
  - (ii) C's total points are greater than 19 (21 or 23) satisfactory ratings are either 2 or 3
  - (iii) B's total points are greater than or equal to 21 (21 or 24) Good ratings are either 3 or 4
  - (iv) From the above B's total points are 24 and the number of Good ratings won by B and F are 4 and 1 respectively Clearly (b) is the correct answer
2. If D got 6 satisfactory ratings, C would have to score a minimum of 23 points in order to be ranked 4th. For this C would have to get 3 satisfactory ratings. Option (b) is correct.
3. There are 4 possibilities for A to get to his score of 24 points, B's points get exactly fixed, hence for B there is only one possibility. For C and D there are two possibilities each, while for E there are 6 possible scenarios. Thus, the total number of possible ways in which we can create the table for the first five positions would be got by multiplying these numbers - viz: 4, 2, 2 and 6 = 96 ways. Hence, option (c) is correct.
4. It can be clearly seen that both the options (a) and (c) are true. Hence (d)
5. As train number AMS008 reaches Lucknow after train number AMS006 and before train number AMS011 as given in the information, the time slot available for the train is at 0915 hrs as landing/arriving slot at 0930 hrs, 0945 hrs and 1000 hrs is already occupied and hence cannot be taken.

Time to traverse from Kanpur to Lucknow via Jaipur is 3 hrs 45 mins as given. As the time taken on a return trip is same, therefore train from Lucknow to Kanpur via Jaipur reaches Lucknow 3 hrs 45 mins after its departure from Kanpur (0800 hrs) and reaches at 1145 hrs. Hence option (b) is the correct alternative

6. As no train arrives/departs, to/from Lucknow at 0845 hrs other than train number AMS005 and train number AMS002 reaches Agra at 1000 hrs, it means it has left before 1000 hrs. The only slot available for departure from Lucknow before 1000 hrs is at 0815 hrs. So time taken for the journey from Lucknow to Agra is 1 hr 45 mins after its departure from Lucknow at 1100 hrs, i.e. 1245 hrs. Hence (c)
7. As the train between Lucknow and Kanpur takes less than two hours to reach its destination train number AMS023 should reach Lucknow on or before 1300 hrs. All time slots before 1300 hrs are occupied and the slot at 1300 hrs is empty. The train number AMS023 reaches Lucknow at 1300 hrs. Time taken for direct journey in between Lucknow and Kanpur is 1 hr 55 mins. So train number AMS012 leaves Lucknow 1 hr 55 mins before 1125 hrs, i.e. at 0930 hrs. Hence (c)
8. You can observe that trains AMS014 and AMS016 are parallel trains between the same cities. Hence, their time taken would be equal. Now, since train AMS014 reaches Pune at 13:35 hours, it must have left Lucknow before 13:35. Likewise, train AMS016 should reach Lucknow after 8:10 AM. In order to achieve both these outcomes, with the free slots at the Lucknow station between 8:10 and 13:35, we can see that only for a journey timing of 2 hours 35 minutes, do we get a possible solution, where the train AMS016 reaches Lucknow at 10:45 and the train AMS014 leaves Lucknow at 11:00. Hence, option (d) is correct.
9. The computers manufactured from the month of Jan and Mar, all computers are sold out before Sept. Computers manufactured in the month of Feb, sold in the year July =  $1077 - (23 + 26 + 45 + 9 + 973) = 1$ .

On a similar basis, computers manufactured in July are sold in the next month = 146 and the computers manufactured in June are sold in Sept = 51.

The student is expected to calculate for the other months as well

The unsold computers in Feb are sold at the end of Sept =  $1478 - (\text{Summation of the number of computers sold up to Sept}) = 0$ . On the basis of the above information the following table may be drawn:-

| <i>Month</i> | <i>Unsold Computers</i> |
|--------------|-------------------------|
| April        | 1                       |
| May          | 6                       |
| June         | 54                      |
| July         | 72                      |
| Aug          | 139                     |
| Sept         | 510                     |

Hence total computers = 782. Hence (c)

10. From the table, the number of computers sold in Mar =  $1421 - 373 = 1098$

Total computers sold in April =  $1496 + 373 - 459 = 1410$ . Computers manufactured in the month Mar and sold in Apr =  $1410 - 1236 - 41 - 19 = 114$

Hence the revenue generated can be calculated to be 718149.5. Hence (e)

11. Computers manufactured in Jan which were sold in Jan itself =  $1563 - 1231 = 332$

and those sold in Feb =  $332 - (1542 - 1389) = 179$ . Similarly calculating for May, we get 23 as an answer. Hence (a)

12. Computers manufactured in Feb which were not sold in Feb =  $1478 - 1389 = 89$ . Similarly computers manufactured in Feb and sold in Mar =  $1421 - 373 - 875 - 136 = 37$ . Computers manufactured in Feb that are not sold in Mar =  $89 - 37 = 52$ . Hence (d).

13. From the given data about the four matches, B and C have each lost one match and B and D have each won one match. This implies that D won against B and C lost to B. A drew both the matches against C and D. This implies that the remaining two matches in the first round are D against C and A against B. Hence (b) is the correct option

14. From the given statement (5) in the problem statement and the given information A has 7 points in second round

This implies that they have won two matches and drew one match

From statement (4) A drew a match against D and won against B and C

This implies that from statement (1) D lost to C and B

Hence C won only one match in the second round as they had drawn

against B. Hence (a) is the correct option.

15. C has goal comparison as 0-1(GF-GA) in the two matches of round one and 1-1 (GF-GA) in the second round. Therefore their goal comparisons for all matches are 1-2 (GF-GA) which is same as the final goal comparison. This implies that they have not scored any goal in the match which they drew against team D  
Therefore the score of the match is 0-0. Hence (a).
16. In the first round, C has drew two matches and lost one and in the second round they have won one match, drew one match and lost one match making a total point tally of 6. Team D has won one match in the first round and drew two, in the second round they drew one match but lost two taking their team score to 6. On the other hand, B has 8 points with two wins and two draws but C has less GA as compared to D. Hence C is ranked 3<sup>rd</sup>. Hence (c).

## Mock Test Paper 16

For the period of 2003–2004 quantity of wheat (in million kg) which

1. was not exported was  $645 - 215 = 430$  million kg

$$\text{Hence total population} = 430 / 0.544 = 790 \text{ million}$$

Hence (c)

2. Say the area under the productivity in the year 2003-2004 be ‘z’ hectare

$$\text{Productivity in 2003–2004} = 645/z$$

$$\text{Productivity in 2004-2005} = 660/0.9z = 733/z \text{ (approx)}$$

Hence rate of increase in productivity in 2004–2005

$$= [(733 / z) - (645 / z)] / (645 / z) \times 100 = 88 / 645 * 100 = 13.6$$

Hence (d)

3. The average wheat exported is  $(207 + 189 + 209 + 215 + 220) / 5 = 208$  million kg

$$\text{The average wheat production is } (421 + 561 + 581 + 645 + 660) / 5 = 574.8 \text{ million kg}$$

$$\text{Hence the required ratio is } 220 / 574.8 = 0.36$$

Hence (c)

4. Average of per capita availability =  $(487 + 464 + 510 + 544 + 566) / 5$

$$= 514.2 \text{ g}$$

Hence (a)

5. It can be calculated that there are five slots of 12 seconds each in a minute. In each slot the first second is used by the link to check for the host's job, in the second second the pending job is checked and 10 seconds are taken to complete the job.

### For Job 1:

| For 1 <sup>st</sup> minute |                        |                        |                         |                   |
|----------------------------|------------------------|------------------------|-------------------------|-------------------|
|                            | 1 <sup>st</sup> second | 2 <sup>nd</sup> second | 10 <sup>th</sup> second | Status            |
| Slot 1                     | Host                   | No                     | User 1                  | Completed         |
| Slot 2                     | Host                   | No                     | User 2                  | 3 second pending  |
| Slot 3                     | Host                   | No                     | User 3                  | 22 second pending |
| Slot 4                     | Host                   | No                     | User 4                  | 8 second pending  |
| Slot 5                     | Host                   | No                     | User 5                  | 1 second pending  |

| For 2 <sup>nd</sup> minute |                        |                        |                         |                   |
|----------------------------|------------------------|------------------------|-------------------------|-------------------|
|                            | 1 <sup>st</sup> second | 2 <sup>nd</sup> second | 10 <sup>th</sup> second | Status            |
| Slot 1                     | No Host job            | User 2                 | User 2                  | Completed         |
| Slot 2                     | No Host job            | User 3                 | User 3                  | 12 second pending |
| Slot 3                     | Host                   | No                     | User 3                  | 2 second pending  |
| Slot 4                     | Host                   | No                     | User 4                  | Completed         |
| Slot 5                     | Host                   | No                     | User 5                  | Completed         |

Students are required to make the table for the 3<sup>rd</sup> minute of job 1 by themselves to understand the question better.

### For job 2:

| For 1 <sup>st</sup> minute |        |                        |                        |                         |                   |
|----------------------------|--------|------------------------|------------------------|-------------------------|-------------------|
| Host                       | Slot   | 1 <sup>st</sup> second | 2 <sup>nd</sup> second | 10 <sup>th</sup> second | Status            |
| User 1                     | Slot 1 | Host                   | No                     | User 1                  |                   |
|                            |        | 9:02:10                | 9:02:11                | 9:02:21                 | 10 second pending |
| User 2                     | Slot 2 | No host job            | User 1                 | User 1                  |                   |
|                            |        | 9:02:22                | 9:02:23                | 9:02:33                 | Completed         |
| Host                       | Slot   | 1 <sup>st</sup> second | 2 <sup>nd</sup> second | 10 <sup>th</sup> second | Status            |
| User 3                     | Slot 3 | Host                   | No                     | User 3                  |                   |
|                            |        | 9:02:34                | 9:02:35                | 9:02:45                 | 21 second pending |
| User 4                     | Slot 4 | No host job            | User 2                 | User 2                  |                   |
|                            |        | 9:02:46                | 9:02:47                | 9:02:57                 | 3 second pending  |
| User 5                     | Slot 5 | Host                   | No                     | User 5                  |                   |
|                            |        | 9:02:58                | 9:02:59                | 9:03:09                 | 5 second pending  |

| For 2 <sup>nd</sup> minute |        |                        |                        |                         |                   |
|----------------------------|--------|------------------------|------------------------|-------------------------|-------------------|
| Host                       | Slot   | 1 <sup>st</sup> second | 2 <sup>nd</sup> second | 10 <sup>th</sup> second | Status            |
| User 1                     | Slot 1 | No host job            | User 2                 | User 2                  |                   |
|                            |        | 9:03:10                | 9:03:11                | 9:03:21                 | Completed         |
| User 2                     | Slot 2 | No host job            | User 3                 | User 3                  |                   |
|                            |        | 9:03:22                | 9:02:23                | 9:03:33                 | 11 second pending |
| User 3                     | Slot 3 | Host                   | No                     | User 3                  |                   |
|                            |        | 9:03:34                | 9:03:35                | 9:03:45                 | 1 second pending  |
| User 4                     | Slot 4 | Host                   | No                     | User 4                  |                   |
|                            |        | 9:03:46                | 9:03:47                | 9:03:57                 | 1 second pending  |
| User 5                     | Slot 5 | Host                   | No                     | User 5                  |                   |
|                            |        | 9:03:58                | 9:02:59                | 9:04:09                 | Completed         |

It is left for the students to make the table for the 3<sup>rd</sup> minute of job 2 by themselves to understand the question better.

From the table, user 3's job gets completed in slot 1 in 3<sup>rd</sup> minute. Hence (a).

From the table, only user 4 did not get access to the link in the first

6. minute of job 2. Hence (c).

7. As seen from the table, no user completes his job in its own slot.  
Hence (d).

8. Total slots used = 12

Total time for completion of job 2 =  $12 \times 12 = 144$  seconds

Actual link - use time =  $20+13+32+11+15 = 91$  seconds

Time for which the link is idle is therefore =  $144-91 = 53$  seconds

Hence (a).

9. Dogs named 1 through 16 are seated in a row. Dog 1 is seated 6 places to the right of the dog with the tag 1 and is seated 13 places to the left of the dog wearing the tag 3. Hence the dog wearing the tag 1 and 3 are seated on either of the extreme ends of the row. If the positions of the dogs be 1 through 20 (not to confused with their name or tag number) then the following table is obtained:-

| <i>Name of Dog</i> | <i>Position</i> |
|--------------------|-----------------|
| 1                  | $1 + 6 = 7$     |
| 13                 | $1 + 2 = 3$     |
| 19                 | $1 + 16 = 17$   |
| 16                 | $20 + 0 = 20$   |

Since the positions of the above four dogs is calculated, the positions of the other dogs can also be arrived at. (This activity is left for the students to complete)

The final list is as follows:-

| <i>Name of dog</i> | <i>Tag number</i> | <i>Seating position</i> |
|--------------------|-------------------|-------------------------|
| 1                  | 6                 | 7                       |
| 2                  | 12                | 6                       |
| 3                  | 5                 | 10                      |
| 4                  | 16                | 12                      |
| 5                  | 10                | 5                       |

|    |    |    |
|----|----|----|
| 6  | 14 | 8  |
| 7  | 20 | 14 |
| 8  | 7  | 13 |
| 9  | 19 | 11 |
| 10 | 13 | 9  |
| 11 | 15 | 2  |
| 12 | 1  | 1  |
| 13 | 11 | 3  |
| 14 | 2  | 4  |
| 15 | 4  | 15 |
| 16 | 3  | 20 |
| 17 | 18 | 16 |
| 18 | 9  | 19 |
| 19 | 8  | 17 |
| 20 | 17 | 18 |

Clearly from the above table, 19 dogs are seated to the left of dog 16 as it is on position 20. Hence (d)

10. As can be seen from the above table, only statements (iv) and (v). Hence [d] is the correct option.
11. The dog with tag 4 is in position 15. Hence the dog to his right is position 16, name 17 and tag 18. Hence (a) is correct.
12. It can be seen and compared from the table above that none of the statements are true. Hence (d)
13. From the given conditions, the following table may be derived regarding the industries and the companies associated with it (Deduction of the same left for students).

| Name of Industry | Possible Companies |
|------------------|--------------------|
| Agriculture      | 7, 10              |
| Machinery        | 1, 11              |
| Communication    | 4, 8, 9            |
| Polyester        | 2, 6, 12           |

Also, 3 is either machinery or Polyester based while 5 is either machinery or Agriculture based as derived (left for students)

As it can be seen, only Machinery or Polyester industry could have

four companies. Hence (c)

14. As can be seen from the above table, only (iii) and (v) are true and the rest are false. Hence (b) is the correct option.
15. The companies and the industries are:-

| <i>Name of Industry</i> | <i>Possible Companies</i> |
|-------------------------|---------------------------|
| Agriculture             | 5, 7, 10                  |
| Machinery               | 1, 3, 11                  |
| Communication           | 4, 8, 9                   |
| Polyester               | 2, 6, 12                  |

Hence none of the statements mentioned is true. Hence (d)

16. As seen from the above table, option (a) is correct

## Mock Test Paper 17

1. Statements (iii), (iv) and (v) are conditional statements, some or all of which have been violated in the table given. We need to find the entries in each row that pertain to the specific violations that have to be first identified and then considered for correctness or incorrectness as the case might be

Let the violations of statement (iii) be marked as @, that of statement (iv) be marked as # and of statement (v) be marked as \$ in the corresponding table. Then the final tabulated table shall be:-

| <i>Name of students</i> | <i>Grade in GD/PI</i> | <i>Marks obtained in</i> |              |           |                  |
|-------------------------|-----------------------|--------------------------|--------------|-----------|------------------|
|                         |                       | <i>English</i>           | <i>Quant</i> | <i>DI</i> | <i>Reasoning</i> |
| A                       | @C                    | @10                      | 40           | @20       | 30               |
| B                       | B                     | @40                      | 50           | @30       | 70               |
| C                       | #\$A                  | 60                       | 40           | #88       | \$50             |
| D                       | B                     | 70                       | 50           | 60        | 60               |
| E                       | \$A                   | 50                       | \$80         | 70        | \$40             |
| F                       | B                     | 80                       | 30           | 90        | 40               |
| G                       | B                     | 40                       | 50           | 80        | 70               |
| H                       | @C                    | @40                      | 60           | @50       | 80               |
| I                       | \$A                   | @40                      | 30           | @60       | \$50             |
| J                       | @C                    | 90                       | 85           | @40       | 90               |

To reduce the number of mistakes, for B there is definitely 1 mistake in his marks of English and DI. Similarly for E, we can either change his grade in his GD/PI or his marks in Quant or reasoning. For minimum changes, we should change his grade. Similarly the other changes should be:-

A: Marks in DI (1 change)

C: Grade in GD/PI (from A to B) (1 change)

H: Marks in DI (1 change)

I: Marks in Reasoning and English or Grades in GD/PI and DI (2 changes)

J: Marks in DI (1 change)

Hence a total of 8 changes is required. Hence (d)

2. Now the score of C after correction is Quant = 40, Reasoning = 100 (changed from 50), English = 60 and DI = 80 (changed from 88). Hence his total = 280.
3. A scored the least marks (The inspection has to show we arrived at this is left for the students). A scored 40 in Quant, 30 in Reasoning, 10 in English and 61 in DI. Hence his least possible total is 141. Hence (d)
4. J scored more than 320 marks as his grand total. Hence (a).
5. Based upon the information given the following table may be drawn which gives us the various possibilities

| Possibility | More than expected |          | Less than expected |          |
|-------------|--------------------|----------|--------------------|----------|
|             | 10% more           | 20% more | 10% less           | 20% less |
| 1           | Atron              | Ctron    | Btron              | Dtron    |
| 2           | Atron              | Ctron    | Dtron              | Btron    |
| 3           | Atron              | Dtron    | Btron              | Ctron    |
| 4           | Atron              | Dtron    | Ctron              | Btron    |
| 5           | Btron              | Ctron    | Atron              | Dtron    |
| 6           | Btron              | Ctron    | Dtron              | Atron    |
| 7           | Btron              | Dtron    | Atron              | Ctron    |
| 8           | Btron              | Dtron    | Ctron              | Atron    |

On similar lines, the corresponding marks for each of the above given possibilities is calculated as given below in the table:

| Possibility | Atron<br>Expected mean<br>life = 60 ns | Btron<br>Expected mean<br>life = 90 ns | Ctron<br>Expected mean<br>life = 80 ns | Dtron<br>Expected mean<br>life = 75 ns | Sum of mean life<br>Expected mean<br>life = 305 ns |
|-------------|--|--|--|--|--|
| 1           | 66                                     | 81                                     | 96                                     | 60.0                                   | 303.0  |
| 2           | 66                                     | 72                                     | 96                                     | 67.5                                   | 301.5  |
| 3           | 66                                     | 81                                     | 64                                     | 90.0                                   | 301.0  |
| 4           | 66                                     | 72                                     | 72                                     | 90.0                                   | 300.0  |
| 5           | 54                                     | 99                                     | 96                                     | 60.0                                   | 309.0  |
| 6           | 48                                     | 99                                     | 96                                     | 67.5                                   | 310.5  |
| 7           | 54                                     | 99                                     | 64                                     | 90.0                                   | 307.0  |
| 8           | 48                                     | 99                                     | 72                                     | 90.0                                   | 309.0  |

Clearly a total mean life of 195 ns corresponds of Btron and Ctron corresponds to possibility 5 and 6. Hence (a) is the correct option.

6. Clearly, a sum of mean life of 309 corresponds to possibility 5 and 8 in

the table above. As can be seen from the table, none of the given statements hold true. Hence (d) is the correct option.

7. The new mean life of Btron cannot be more than 20% of the old expected life because that violates the rule that the maximum mean life of any sub atomic particle is 100 ns. Hence for maximum difference, the new mean life of every sub atomic particle must be 20% less than that of the old expected mean life. Hence maximum difference = Old expected mean life – New expected mean life =  $310.5 - (0.8 \times 305) = 66.5$ . Hence (c).
8. As seen from the table, only possibility 4 satisfies the given condition. Hence statements i, ii and iv are correct. Hence (c) is correct.
9. Total number of products sold in 2006-2007 =  $60000 / 0.75 = 80000$   
Total number of products sold in 2007-2008 =  $1.5625 \times 80000 = 125000$   
Products sold in the category of Miran in the year 2007–2008 =  $125000 \times 0.168 = 21000$ . Hence sales of products in the category of Miran in 2006-2007 =  $21000 / 5 = 4200$   
Hence sales of products in the category of Cok in 2006-2007 =  $0.85 \times 80000 - 60000 - 4200 = 3800$ . Similarly sales of products in the miscellaneous category =  $12000 / 12 = 1000$ . Thus sales of products in the category of Cok ranks 7<sup>th</sup>. Hence (b).
10. From the given data, we have the total sales of the following category in two years.

$$\text{Pep} \Rightarrow 18000 + 17500 = 35500$$

$$\text{Dewy} \Rightarrow 7500 + 5000 = 12500$$

$$\text{Slic} \Rightarrow 13000 + 13500 = 26500$$

Now we know the ranks of the top five sales volume of the range in the respective year, we can find the range of sales of the remaining category. Since the sales of Miran in 2007-2008 is 21000 and as sales of category which ranked 5<sup>th</sup> (Fant) i.e. 5500, we have sales of Miran ranging from  $21000 < \text{Miran} \leq 26500$ .

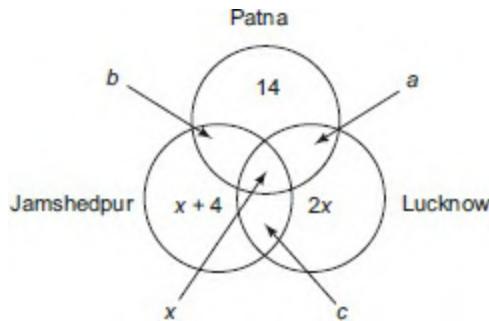
Similarly we have  $18000 \leq \text{Cok} \leq 23500$

$16000 \leq \text{Sprit} \leq 21000$

$5500 \leq \text{Fant} \leq 10500$

The drinks in the category of Miran, Cok and Sprit could have either of 3<sup>rd</sup>, 4<sup>th</sup> or 5<sup>th</sup> rank. Now as Dewy's sales are greater, Fant ranked 6<sup>th</sup>. Hence (b).

11. From the above discussion it can be concluded that the correct option is (d).
12. The total number of drinks in category Miran and Cok are 8000. As Miran ranks 6<sup>th</sup>, Cok has to be 7<sup>th</sup>. Thus the Miran has more units than 4000 and the Cok category less than 4000. Hence (b).
13. The question is understood best if done by Venn diagrams. As per the given conditions the following Venn diagram may be drawn:-



Let the number of teachers teaching in all the three cities be  $x$  and the number of teachers teaching in exactly two cities be  $a$ ,  $b$  and  $c$  respectively as shown in the above Venn diagram.

As per the given condition  $a + x + b = 10$  and  $a + b = 4$ . Since  $a$ ,  $b$  and  $c$  are in the ratio of 1:2:3 and  $a + b = 4$  then obviously  $a = 1$  and  $b = 3$  or  $a = 3$  and  $b = 1$ . For either case,  $c = 2$ . Based on this, we can deduce that  $x = 6$ ,  $2x = 12$  and  $x + 4 = 10$ .

Thus total faculty members =  $14 + 12 + 10 + 6 + 2 + (a + b) = 44 + 4 = 48$ .

Hence (d)

14. Statement (i) was inferred by us in the last question. Hence it need not be checked. As per the question, we need to find the exact values of  $a$  and  $b$ . From statement (ii)  $12 + 6 + 2 + a = 21$ . Hence  $a = 1$  and  $b = 3$ . Hence statement (ii) can be used.

Similarly from statement (iii), we have  $10 + 6 + 2 + b = 21$  and hence  $b = 3$  and  $a = 1$ . Hence statement (iii) can also be used.

Hence (c) is the correct option

15. All the 6 faculty members teaching at all the three centers have to be withdrawn into two projects. As per the given conditions, if number of teachers withdrawn from Patna is  $x$  then those withdrawn from Lucknow and Jamshedpur are  $x - 2$  and  $x - 4$  respectively. Thus  $x + (x - 2) + (x - 4) = 6 \Rightarrow x = 4$

Hence number of teachers working at:

Patna:  $24 - 4 = 20$

Lucknow:  $21 - (4 - 2) = 19$

Jamshedpur:  $21 - (4 - 4) = 21$

Clearly both (a) and (b) are incorrect. Hence (c)

16. From the above question, number of faculty members involved in each of the three centers after withdrawal is known. Hence if 3 new faculty members are inducted, the numbers shall become equal. Hence (b).

## Mock Test Paper 18

1. The only way to score ...

17 token points is: 3 UHL tokens + 1 MHL token

12 token points is: 2 UHL tokens + 1 MHL token + 1 LHL token

11 token points is: 1 UHL tokens + 3 MHL token

7 token points is: 1 UHL tokens + 2 LHL token

0 token points is: 4 LHL token

So on and so forth

Hence fitting the above values in the given table we get:-

| City    | Number of UHL tokens | Number of MHL tokens | Number of LHL tokens | Token points |
|---------|----------------------|----------------------|----------------------|--------------|
| Stage 1 |                      |                      |                      |              |
| A       | 1                    | 1                    | 2                    | 7            |
| B       | 2                    | 1                    | 1                    | 12           |
| C       | 3                    | 1                    | 0                    | 17           |
| D       | n                    | n                    | 4                    | n            |
| E       | 1                    | 3                    | 0                    | 11           |
| F       | 0                    | 3                    | 1                    | 6            |
| G       | 4                    | 0                    | 0                    | 20           |
| H       | 1                    | 1                    | 2                    | 7            |
| I       | 0                    | 2                    | 2                    | 4            |
| J       | 1                    | 2                    | 1                    | 9            |

From condition (iii) we know that city J had 9 token points in first stage and is the city with the second highest pollution level with 7 points in the second stage. Hence (b) is the correct answer:

2. Clearly from the above table, the city that ranked 9<sup>th</sup> in terms of pollution level, i.e. the city with the second highest token points at the end of the first stage is city I. Hence (d).
3. As mentioned in condition (iii) the city with 20 token points in stage 1 had the highest token points in stage 2 as well, i.e. 12. Clearly city G is the answer. Hence (b)
4. (i) Clearly incorrect as can be verified from the above table  
 (ii) Total UHL tokens = 13, hence total UHL token points =  $13 \times 5 = 65$ . Hence correct.  
 (iii) MHL tokens = 14 and UHL tokens = 13. Hence incorrect.  
 (iv) City D had 0 token points in stage 1. Hence it is obviously the least polluted.  
 (v) MHL tokens (first 5 cities) = 6 and LHL tokens (last five cities) = 6. Hence they are equal and hence the statement is incorrect  
 Hence (i), (iii) and (v) are incorrect. Hence (d).
5. *Diamond*:  $15550 / 14900 = 1.04$   
*Ruby*:  $67200 / 68100 = 0.98$   
*Pearl*:  $298 / 450 = 0.66$   
*Emerald*:  $8090 / 8200 = 0.98$   
 Clearly, Pearl has the minimum ratio. Hence (c).
6. It is best to draw a table which shows the ratio of the total sales to production for all the quarters

|         | Ratio of total sales to production |                         |                         |                         |
|---------|------------------------------------|-------------------------|-------------------------|-------------------------|
|         | 1 <sup>st</sup> Quarter            | 2 <sup>nd</sup> Quarter | 3 <sup>rd</sup> Quarter | 4 <sup>th</sup> Quarter |
| Diamond | 1                                  | 0.91                    | 1.04                    | 1.19                    |
| Ruby    | 0.94                               | 0.97                    | 0.9                     | 1.1                     |
| Pearl   | 0.46                               | 2.25                    | 1.18                    | 0.3                     |
| Emerald | 0.94                               | 0.94                    | 1                       | 1.04                    |

- Clearly, the maximum change in ratio can be observed for Pearl from 1<sup>st</sup> quarter to 2<sup>nd</sup> quarter. The % increase =  $(2.25 - 0.46)/0.46 \times 100 = 3891.3\%$ . Hence [b]
7. All the three statements can be verified from the table of the ratio of the Total sales to production. Statement (i) and (iii) are true while statement (ii) is false. Hence (d)
  8. The revenue from domestic sales =  $2 \times$  revenue from exports as given.

Let the per unit price for domestic sales and exports for Diamonds be  $a$  and  $b$  respectively.

Then,  $4000a = 2 \times 2000b \Rightarrow a/b = 2$

Similarly the ratio for the others comes out to be 14.5, 4 and 6.6 respectively. Hence (b) is the correct answer.

9. The company's combined turnover =  $120 + 126 + 139 + 151 + 163 = 699$ . D's share =  $0.26 \times 120 + 0.34 \times 126 + 0.30 \times 139 + 0.26 \times 151 + 0.24 \times 163 = 194.12$ .

Hence required %age =  $194.12/699 \times 100 = 27.8\%$ . Hence (c)

10. Highest growth rate is in between 2004-2005 and it is  $(139 - 126) / 126 \times 100 = 10.31$

Compounded average annual growth rate =  $[(163 - 120 / 120)^{1/4} - 1] \times 100 = 7.96$

The difference is 2.35%. Hence (a)

11. In 2006, (A+ C)'s turnover =  $(26 + 22) \% \text{ of } 151 = 72.48 \text{ cr}$ . In 2007, (B + D)'s turnover =  $(18 + 24) \% \text{ of } 163 = 68.46 \text{ cr}$ . Hence approx difference is  $4 \text{ cr}$ . Hence (d)

12. (a) is true as the average turnover is  $699/5 = 139.8 \text{ crore}$   
 (b) is true because B's turnover has continuously increased and decreased  
 (c) is true as E has recorded the highest jump in between 2006-2007.  
 Hence (d)

13. In the worst case, all the five students will take maximum time to complete their respective questions, i.e. Adam does question 4, Barbie does question 3 and so on and so forth. Hence time taken =  $57 + 53 + 53 + 49 + 38 = 250 \text{ minutes} = 4 \text{ hrs } 10 \text{ min}$ . Hence (a) is the correct option

14. The best case has to be taken here, i.e. everybody does his question fastest as compared to somebody else doing the same question. Hence  $25 + 39 + 29 + 24 + 36 = 153 \text{ minutes} = 2 \text{ hr } 33 \text{ min}$ . Hence (b)

| Question | 1     | 2       | 3    | 4      | 5        |
|----------|-------|---------|------|--------|----------|
| Student  | Dopey | Estella | Adam | Barbie | Chandler |
| Time     | 25    | 39      | 29   | 24     | 36       |

15. The most efficient way to assign the questions is: After 24 minutes, Barbie can assist Chandler with question 5 and Dopey joins them after

25 minutes and they will finish the question in approx. 5 min, i.e. 29 min from the start. After 29 min, everybody can work on question 2 which can be completed in under a minute. Hence (c)

16. Under given conditions, the most efficient three students are Adam, Barbie, and Dopey. Upon inspection we find that if we assign them questions 3, 4 and 1 respectively then the time shall come out to be the minimum. Once done with question 3, 4 and 1 they could work on question 2 which would be completed in approx. the 39<sup>th</sup> minute and then question 5 could be completed in by the 51<sup>st</sup> minute. Hence (c).

## Mock Test Paper 19

- The maximum someone can collect would occur if you give three people the minimum number of stamps.  
Thus,  $20 + 22 + 24 + 134 = 200$ . Hence, the maximum coins possible for one friend is 134. Option (a) is correct.
- If one friend collected 116, the other three have to collect 84, with the given condition. It can only be done if, Manish has 20 stamps, Karan has 42 stamps and Shyam has 22 stamps. Option (b) is correct.

### 3-7.

The following deductions can be made:

A1- played the final as it played 12 matches in all  
(Number of matches = total/average).

| Teams             | A1    | A2              | A3              | A4              | A5              | A6              | B1              | B2    | B3              | B4              | B5              | B6    |
|-------------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|-----------------|-----------------|-----------------|-------|
| Total             | 28    | 0               | 10              | 0               | 16              | 6               | -6              | 26    | 6               | 12              | 4               | 14    |
| Average           | 2.33  | 0               | 1               | 0               | 1.6             | 1.2             | -1.2            | 2.16  | 1.2             | 1.2             | 0.8             | 1.16  |
| Number of matches | 12    | 5               | 10              | 5               | 10              | 5               | 5               | 12    | 5               | 10              | 5               | 12    |
| Played            | Final | 1 <sup>st</sup> | 2 <sup>nd</sup> | 1 <sup>st</sup> | 2 <sup>nd</sup> | 1 <sup>st</sup> | 1 <sup>st</sup> | final | 1 <sup>st</sup> | 2 <sup>nd</sup> | 1 <sup>st</sup> | Final |

Hence, the answers are:

- A5 and B2 do not play each other in the finals. Option (c) is correct.
- The only way to score 0 points after 5 matches is:  $4 + 2 - 2 - 2 - 2 \rightarrow$  i.e. 1 win and 3 losses and 1 tie. Hence, together A2 and A4 won 2 matches. Option (c) is correct.
- Since, after the second round a total of 110 points have been scored,

and the entire table has a total score of 116, each of the three final matches must have had a win-loss result as together there are 6 points scored in the finals. Hence, the second runner up must have lost both its matches in the final and scored – 4 points.

6. Since, the winner won both its matches in the final, A1 must have had 20 points after the second round. B1 must have had 24 and B6 must have had 18. Hence, the answer is 2.4. option (b)
7. B2. Hence, option (b)

## 8–12.

The races were between:

Race 1: A,B,C,D,E

Race 2: B,C,D,E,F

Race 3: C,D,E,F,G

Race 4: D,E,F,G,H

Race 5: E,F,G,H,I

The following deductions can be drawn:

- A: must have stood first in the first race since A has scored a total of 5 points and this is the only race he has participated in.
- B: B must have stood outside the first three in the first race and first in the second race (this is the only way he could have scored 5 points in 2 races given the point scheme)
- C: Since C has scored 8 points overall, he must have got 5+3 points. Further since we know that H is the only horse which has scored points in consecutive races, it is clear that C must have scored 3 points in the first race (2<sup>nd</sup> position) and 5 points in the third race (first position)
- D: 2 points without scoring in consecutive races (which is exclusive for H) means that D must have stood third in two races and must have been outside the top three in the remaining 2 races he participates in,
  - I: Outside the top three in the last race (only race he participates in)
- H: 10 points in 2 races, means that H must have won both races 4 and 5. At this point of our analysis we know the winner of each race.
  - Race 1: A, Race 2: B, Race 3: C, Race 4: H and Race 5: H

As far as the second position is concerned, we are just aware of the first race (C stood second)

- G: 4 points in 3 races, means outside the top three in the fourth race and third once and second once in races 3 and 5 (but not respectively – rather in random order)
- F: 6 points can only happen with two 3's and two 0's. Means second position in any two non consecutive races (i.e. Either 2<sup>nd</sup> and 4<sup>th</sup> or 2<sup>nd</sup> and 5<sup>th</sup> or 3<sup>rd</sup> and 5<sup>th</sup>). And two races outside the top three (i.e. Either 3<sup>rd</sup> and 5<sup>th</sup> or 3<sup>rd</sup> and 4<sup>th</sup> or 2<sup>nd</sup> and 4<sup>th</sup> races).
- E: 5 points in 5 races, 3 points once and 1 point twice (i.e. one second position and two third positions) Also, these scores must have occurred in the 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> races. (again because of no consecutive scores for anybody except H).  
Also, since the second position in the first race goes to C, E must have got the third position in that race.

This gives us the following table:

| RACE # | First | Second | Third | Outside the top three |
|--------|-------|--------|-------|-----------------------|
| 1      | A     | C      | E     | B,D                   |
| 2      | B     |        |       | E                     |
| 3      | C     |        |       |                       |
| 4      | H     |        |       | G,E                   |
| 5      | H     |        |       |                       |

Looking at Race 4, D must have scored in it and hence must have got the third position, thus must be out of the top three in Race 3. Also, his other 1 point must have come in Race 2.

| RACE # | First | Second | Third | Outside the top three |
|--------|-------|--------|-------|-----------------------|
| 1      | A     | C      | E     | B,D                   |
| 2      | B     |        | D     | E                     |
| 3      | C     |        |       |                       |
| 4      | H     |        | D     | G,E                   |
| 5      | H     |        |       |                       |

At this stage we also know that G has one third and one second rank in Races 3 and 5 in some random order, and also E has a third and a second position in the same races in random fashion. This means that the blanks for the third and fifth races would be completely filled by two possibilities as below. We would also then know that F would have finished 2<sup>nd</sup> in races 2 and 4. Putting these informations in the table, the final table would emerge as follows:

| RACE #  | First | Second | Third | Outside the top three |
|---------|-------|--------|-------|-----------------------|
| 1-ABCDE | A     | C      | E     | B,D                   |
| 2-BCDEF | B     | F      | D     | E,D                   |
| 3-CDEFG | C     | G/E    | E/G   | D,F                   |
| 4-DEFGH | H     | I/F    | D     | G,E                   |
| 5-EFGHI | H     | F/C    | G/E   | I,F                   |

The answers to the questions can be derived from this table:

8. 2<sup>nd</sup>
9. Could be either 3:1 or 1:3 we do not know which. Hence, option (d) is correct
10. Option (d) is correct.
11. Race 4. Hence option (c)
12. If this case occurs, there would be a reduction of 2 points for C and an increase of 2 points for E. The correct answer is option (d)
13. From the tables A, G, H and K are the four games of the HI-HI Tournaments. The points awarded to the player are same as that for table 2. Similarly D and J are HA-HA and B, C, I, L and M are HE-HE and E and F are HO-HO. Since the prize money is distributed equally, for each of the semifinalists and each of the first finalists, the total prize money is distributed in  $20 + 14 + 9 + 9 + 5 + 5 + 5 + 5 = 72$  parts  
Therefore the winner gets  $20/72$  parts of the money, the runner up gets  $14/72$  parts of the money, each of the semifinalists get  $9/72$  parts of the money and the quarter finalists get  $5/72$  parts of the prize money offered.

The runner up will therefore get  $14 / 72 \times [(72000 \times 4) + (36000 \times 5) + (21600 \times 2) + (17700 \times 2)] = 106283$

Hence (a).

14. In the K game, Scrooge and DD have scored 50 points each and thus they have lost their respective quarter finals. Dexter, Dupey and Scooby have reached to semifinals and finals.

Therefore the possible quarterfinal match must be played in between one of Dexter, Dupey and Scooby against one of Scrooge and DD. Since option (b) satisfies the given conditions.

15. Donald has reached beyond quarter finals in only two games, L and M where he is runner up and both are the HE-HE tournaments. Hence Prize money =  $14 / 72 \times 36000 \times 2 = 14000$ . Hence (d)

16. Its best to go through the options to solve the given problem  
 Scrooge and Jetson lose in R16 round. Hence (a) is incorrect  
 Shaggy loses in quarter final so option (b) is incorrect  
 Scrooge and Jetson also loose out before Semifinal, hence (c) is incorrect.  
 Hence (d) is the correct answer (and can be verified).

## Mock Test Paper 20

**1–4.**

Result of all the matches played in the Honda World Cup Tennis Cup (In the year 2090)

| Vs   | Fed | Nad | Sam | Mc  | Ldl | Aga | Lee | Rod | Beck | ED  | Con | Sti |
|------|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|
| Nad  | 5-0 |     |     |     |     |     |     |     |      |     |     |     |
| Sam  | 5-0 | 4-1 |     |     |     |     |     |     |      |     |     |     |
| Mc   | 4-1 | 0-5 | 5-0 | Mc  |     |     |     |     |      |     |     |     |
| Ldl  | 0-5 | 5-0 | 4-1 | 1-4 | Ldl |     |     |     |      |     |     |     |
| Aga  | 4-1 | 0-5 | 5-0 | 4-1 | 1-4 | Aga |     |     |      |     |     |     |
| Lee  | 5-0 | 5-0 | 1-4 | 5-0 | 1-4 | 5-0 | Lee |     |      |     |     |     |
| Rod  | 0-5 | 1-4 | 4-1 | 5-0 | 1-4 | 5-0 | 4-1 | Rod |      |     |     |     |
| Beck | 1-4 | 5-0 | 0-5 | 1-4 | 5-0 | 1-4 | 4-1 | 0-5 | Beck |     |     |     |
| ED   | 0-5 | 5-0 | 1-4 | 5-0 | 5-0 | 5-0 | 1-4 | 4-1 | 0-5  | ED  |     |     |
| Con  | 0-5 | 5-0 | 1-4 | 4-1 | 5-0 | 5-0 | 4-1 | 1-4 | 1-4  | 4-1 | Con |     |
| Sti  | 5-0 | 4-1 | 5-0 | 4-1 | 4-1 | 4-1 | 5-0 | 4-1 | 0-5  | 1-4 | 5-0 |     |

The above table gives the points for each match (The first match shows Nadal vs. Federer where Nadal gets 5 points ... Federer gets 0 points.

The points would be

| Player        | Seeding  |
|---------------|----------|
| Federer (Fed) | 26       |
| Nadal(Nad)    | 5+16=21  |
| Sampras (Sam) | 9+19=28  |
| McEnroe (Mc)  | 9+11=20  |
| Lendl(Ldl)    | 10+13=23 |
| Agassi(Aga)   | 14+18=32 |
| Leander(Lee)  | 22+7=29  |
| Roddick (Rod) | 20+11=31 |
| Becker (Beck) | 17+14=31 |
| Edberg (Ed)   | 21+5=26  |

|               |         |
|---------------|---------|
| Connors (Con) | 25+5=30 |
| Stich (Sti)   | 33      |

Hence, the answers are:

1. Nadal has only 4 wins in the tournament. Hence, option (b) is correct.
2. Agassi scores 32 points.
3. Stich has the highest points while Agassi has the second highest points. Hence, Agassi-Stich. Option (a) is correct.
4. McEnroe scored only 20 points. Hence, option (b) is correct.
5. Since matches lost at home = total matches played – total matches won at home

Hence the following table may be drawn:-

| Team | Number of wins at home | Number of losses at home |
|------|------------------------|--------------------------|
| Aus  | 58                     | 27                       |
| Ind  | 69                     | 21                       |
| NZ   | 60                     | 10                       |
| SA   | 75                     | 5                        |
| Pak  | 70                     | 15                       |
| SL   | 69                     | 20                       |

Out of the 80 matches at SA, SA won 75 matches and hence lost 5 matches. NZ defeated SA 11 times while being away from home. Hence at best, NZ won against SA at SA is 5 times. Hence NZ won 6 matches on neutral grounds against SA. Hence (b)

6. As can be seen from the table above, only statements i and iv stand true. Hence (c)
7. We need to know the maximum number of matches played in between NZ and Pak in either NZ or Pak. NZ won 60 matches at home and lost 10 matches at home against Pak. Hence Pak won  $21 - 10 = 11$  matches on neutral grounds. Pak had won 70 matches at home which means that Pak lost 15 matches to NZ at home.

Similarly NZ won 23 matches against Pak while playing away and hence the number of matches it won on neutral grounds is  $23 - 15 = 8$ . Hence NZ and Pak played at least  $11 + 8 = 19$  matches on neutral grounds. Hence (e)

8. Total matches played in Aus = 85. Matches won by Aus = 58. Hence

Aus lost 27 matches at Aus. SA or Pak with at the most one of Ind, NZ or SL have won all their matches against Aus. Hence at the most 3 teams have won against Aus in Aus. Hence (d).

9. As each team has won/lost different number of matches, the number of matches could be 0, 1, 2, 3, or 4. Also the sum of the number of matches won and lost by any team has to be equal to 4. Also, as the GAIN or LOSS for any team is maximum 40 and the sum of LOSSES and GAINS for A, D and E is more than 40, hence one out of B and C is the team that has either won or lost all the four bets.

Since C has lost more matches than what D has, it implies that C has lost to all the four teams and won none. Hence the LOSS of team C is 40. Automatically, B has won against four teams and lost none of the matches and hence its GAIN is 37.

Again since the GAIN of A is equal to the LOSS of D, hence 1 and 3 teams for each of them. E has won and lost against two teams each (The loss being against A and C). As A lost to B and E, it must have lost 3 matches and won 1, i.e. A lost to D as well. The values of the same are just opposite for D. Also, C had lost to D.

Also total amount of transactions =  $55 + 37 + 40 + 55 + 53 = 240$ . Hence total gains / losses =  $240 / 2 = 120$ . Since LOSS of D is same as the GAIN of A, hence the sum of money gain/lost by A+D = 55.

The total amount won by A + B + C + D + E =  $55 + 37 + 0 + \text{gain of E}$ . Hence gain of E = 28. Therefore A + C gave 28 to E. Hence A lost 17 to E and C lost 11 to E. Hence the GAIN of C is at least 20 and the amount lost by C to A is at most 21. All this data can be tabulated as given as follows.

|      | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> | <i>LOSS</i> |
|------|----------|----------|----------|----------|----------|-------------|
| A    |          | a        | 0        | b        | 17       | 35          |
| B    | 0        |          | 0        | 0        | 0        | 0           |
| C    | c        | d        |          | 4        | 11       | 40          |
| D    | 0        | f        | 0        |          | 0        | 20          |
| E    | 0        | g        | 0        | h        |          | 25          |
| GAIN | 20       | 37       | 0        | 35       | 28       | 120         |

From the above,  $c = 20$  or  $21$ . But  $c = 21$  is not valid because then we know that from the equation  $c + d + 4 + 11 = 40 \Rightarrow d = 4$  which is a contradiction as the stakes of no two matches can be the same. Thus  $c = 20$  and  $d = 5$

As the total loss of D is equal to the gain of A hence  $f = 20$

Clearly the money involved in the match between B and C is 5. Hence (e).

10. As is clear from the discussion, B won the maximum number of matches. Hence (a).
11. As is clear from the discussion, the total loss of A is 35. Hence (a).
12. As is clear from the discussion, team E lost to two teams and won against two teams. Hence (e) is the correct option.
13. A student can take a maximum of two lab courses since the slots are clashing, i.e., CS002 and SI007. Students have to select five courses with minimum possible credits. All the credits for the classroom courses are either 6 or 8. Thus a student can take any five courses out of 1z, 2z, 3z, 4z, 5z, or 6z but all the courses of 2z and 5z have credit 8. Also, z is any of the three days. Thus, minimum possible credits are  $3 + 5 + 6 + 6 + 8 = 40$ . Hence (d)
14. The student has already taken courses with the time slot 1z, 4z, and 6z. Also, as it can be seen from the previous answer, he has taken lab courses with time slot (7a, 8a, 9a). Hence he can take any two out of 2z, 3z, and 5z courses. From the given options (d) does not satisfy the given conditions. Hence (a)
15. As it can be seen from the given data that all the courses with time slots 2z has contact hours of 4 hrs, one out of the three lab courses has a 3 hr contact period. Hence minimum hours that a student should attend is  $3 + 4 + (3 \times 5) = 22$  hrs. Hence (a)
16. From the given courses we can calculate the contact hours and credits. A student has to attend 15 hrs of lecture, 6 hrs of tutorials in the semester. Hence all the given statements are true. Hence (e)

## Mock Test Paper 21

### 1–4.

5 people out of six, there are 6 ways.

The six groups of 5 students each that can be formed

ABCDE > ABCDF > ABCEF > ABDEF > ACDEF > BCDEF

$$5A + 5B + 5C + 5D + 5E + 5F = 5(A + B + C + D + E + F)$$

Sum of all 6 correct statements made by the teachers about scores of 5 students must be a multiple of 5.

Total of the numbers given by the 7 teachers

$$232 + 238 + 244 + 245 + 250 + 256 + 235 = 1700$$

232, 238, 244 ... 256 are correct values.

One amongst 235, 245, 250 are incorrect.

**Case (i):** If 250 is incorrect

Total of all six correct statements  $1700 - 250 = 1450$

$$A + B + C + D + E + F = 1450/5 = 290$$

$$F = 290 - 256 = 34$$

$$E = 290 - 245 = 45$$

$$D = 290 - 244 = 46$$

$$C = 290 - 238 = 52$$

$$B = 290 - 235 = 55$$

$$A = 290 - 232 = 58$$

**Case (ii):** If 245 is incorrect

Total of all six correct statements  $= 1700 - 245 = 1455$

$$A + B + C + D + E + F = 1455/5 = 291$$

$$F = 291 - 256 = 35$$

$$E = 291 - 250 = 41$$

$$D = 291 - 244 = 47$$

$$C = 291 - 238 = 53$$

$$B = 291 - 235 = 56$$

$$A = 291 - 232 = 59$$

**Case (iii):** If 235 is incorrect

Total of all 6 correct statements  $= 1700 - 235 = 1465$

$$A + B + C + D + E + F = 1465/5 = 293$$

$$F = 37$$

$$E = 43$$

$$D = 48$$

$$C = 49$$

$$B = 55$$

$$A = 61$$

1. A-F = 24
2. 55 or 56
3. 34
4. We are talking about case (iii) here. Sum of  $49 + 55 = 104$  is a possible value in such a case.
5. Aristotle, being the first to deduce after being told Bach's currency, he must be having Indian currency. Since, Einstein also speaks up at this point, he would also be having Indian currency. Hence, option (b) is correct.
6. Coutin and Dell
7. Aristotle did not know about Bach's Currency. Only Einstein's currency was known to him
8. Aristotle

### 9–13.

From the given clues, the following table can be deduced:

|        | 1      | 2       | 3       | 4       |
|--------|--------|---------|---------|---------|
| A      | Biren  | Chandan | Biren   | Biren   |
| B      | Amar   | Deepak  | Deepak  | Chandan |
| C      | Deepak | Amar    | Amar    | Biren   |
| D      | Amar   | Chandan | Chandan | Deepak  |
| <hr/>  |        |         |         |         |
| TOTALS | AMAR   | BIREN   | CHANDAN | DEEPAK  |
|        | 10     | 30      | 4       | 32      |
|        | 18     | 22      | 12      | 24      |
|        | 2      | 6       | 26      | 8       |
|        | 28     | 14      | 20      | 16      |
| Total  | 58     | 72      | 62      | 80      |

9. Amar
10. Biren
11.  $80 - 62 = 18$

12. 58  
 13. Amar  
 14. Monday stock =  $128 + 50 = 178 \rightarrow$  Cost of keeping stock =  $178 \times 5 = 890$ .  
 Tuesday stock =  $178 + 156 = 334 \rightarrow$  Cost of keeping stock =  $334 \times 5 = 1670$ . It's better to hire the truck on Tuesday. In the same manner we can see that the truck should be hired on Thursday and Saturday too.  
 15.  $890 + 1000 + 320 + 1000 + 360 + 1000 + 600 = 5170$

## Mock Test Paper 22

### 1–4.

The following table would represent the set of possibilities that exist:

|        | (1)   | (2)  | (3)  | (4)  | (5)   | Median Index | Differential Index |
|--------|-------|------|------|------|-------|--------------|--------------------|
| Sachin | 194   | 60   | 0-73 | 124  | 120   | 120          | 134                |
| Viru   | 126   | 0-59 | 250  | 0-66 | 144   | 126          | 191-250            |
| Rahul  | 112   | 0-59 | 0-73 | 0-66 | 160   | 0-73         | 101-160            |
| Laxman | 0-108 | 170  | 74   | 154  | 0-106 | 74-108       | 96-170             |
| Jaffer | 0-108 | 130  | 124  | 96   | 0-106 | 96-108       | 34-130             |

The answers can be read off for the various questions from the above table.

In the 1<sup>st</sup> match:

Sachin + Viru + Rahul = 432. Total score is 540. Hence, remaining runs = 108.

In the 2<sup>nd</sup> match, Laxman+ Jaffer + Sachin = 360. Total score is 480. Hence, remaining runs = 120.

In the 3<sup>rd</sup> match: Viru + Jaffer + Laxman = 448. Total score is 640. Hence, remaining runs = 192.

In the 4<sup>th</sup> match: Laxman + Sachin + Jaffer = 374. Total score is 440. Hence, remaining runs = 66.

In the 5<sup>th</sup> match: Rahul + VIru + Sachin = 424. Total score is 530. Hence, remaining runs = 106.

1. Rahul
2. Total 2630. Total of Sachin + Rahul = 1040  $\rightarrow$  40% approximately.
3. 2
4. Only Jaffer, Rahul or Laxman

## Mock Test Paper 23

5. The win on the second throw would happen under the following cases:  
4 ... 4 or 5 ... 5 or 6...6 or 8...8 or 9...9 or 10 ... 10. The required probability will be  $(3/36 \times 3/36) + (4/36 \times 4/36) + (5/36 \times 5/36) + (6/36 \times 6/36) + (7/36 \times 7/36) = 100/1296$
6. The loss on the second throw would happen under the following cases:  
4 ... 7 or 5 ... 7 or 6...7 or 8...7 or 9...7 or 10 ... 7  
The required probability will be  $(3/36 \times 6/36) + (4/36 \times 6/36) + (5/36 \times 6/36) + (6/36 \times 6/36) + (7/36 \times 6/36) = 144/1296$   
The series of wins/losses can be summarised in the table below:

| Player ↓ |  |         |                       |               |
|----------|--|---------|-----------------------|---------------|
| A        | 6,4,10,9,8,6 (win)   | 7 win   | 12 loss               | 9,2 no result |
| B        | 8,5,7 loss   | 12 loss | 6,3,2,9,8,3 no result |               |
| C        | 2 Loss, 7 Win, 3 Loss, 12 Loss, 7 Win, 6,3,4,6 Win, 3 Loss |         |                       |               |

Only statement (iii) is correct.

7. Statements (i) and (iii) are correct. Hence, option (a) is correct.
8. Option (c) is correct.
9. A has lost only once. Hence, option (a)
10. Option (a)  $4 \text{ losses} - 3 \text{ wins} = 1$
11.  $4 + 3 + 7 = 14$  games. Hence option (e).

## Mock Test Paper 24

### 5–8.

There are a total of  ${}^6C_2 = 15$  matches played.

Maximum points for all teams together = 45; Minimum points for all teams together = 30.

**Deduction 1:** We also know that Spain beat England. Since, Spain got a total of 8 points, it could have scored 5 more points in the remaining 4 matches only if it won one game and drew two.

**Deduction 2:** Also, Brazil's 10 points can only happen if it won 3 matches, drew 1 and lost 1.

**Deduction 3:** Spain won against England and lost to Argentina. It must have drawn against Brazil and France, while France versus Cameroon must also have been a draw. Also, both of Spain's draws must have been 0-0.

The following would be the final table:

| Position  | Won | Draw | Loss | Goals For | Goals Against | Total |
|-----------|-----|------|------|-----------|---------------|-------|
| Argentina | 5   | 0    | 0    | 17        | 5             | 15    |
| Brazil    | 3   | 1    | 1    | 9         | 6             | 10    |
| Spain     | 2   | 2    | 1    | 2         | 2             | 8     |
| England   | 2   | 0    | 3    | 2         | 5             | 6     |
| France    | 0   | 2    | 3    | 7         | 11            | 2     |
| Cameroon  | 0   | 1    | 4    | 8         | 16            | 1     |

The answers are quite clear through these deduction and the table:

5. Cameroon vs France
6. England 6 points
7. Brazil vs Spain match is a draw with 0 goals
8. At most 3 goals, since England has two more losses to concede with only 5 goals conceded.

## 9–12.

|                  | Rathore | Russell | Bindra |
|------------------|---------|---------|--------|
| Primary points   | 23      | 21      | 15     |
| Secondary points | 21      | 22      | 23     |
| Points Scored    | 81      | 85      | 83     |
| Total            | 125     | 125     | 121    |

9.  $128 - 121 = 7$  points
10.  $21 + 22 = 43$
11.  $10 + 10 = 20$  Bindra
12. Russell

## 13–16.

| Name    | No. of cups | No. of sugar cubes | Milk consume |
|---------|-------------|--------------------|--------------|
| Amit    | 6           | 6                  | Yes          |
| Vandana | 5           | 1                  | Yes          |
| Ritesh  | 4           | 2                  | No           |
| Bharat  | 1           | 0                  | No           |
| Ben     | 8           | 4                  | No           |

13. 4  
 14. Ben(8)  
 15. (b)  
 16. Amit

## Mock Test Paper 25

**1–2.**

| Team         | W  | L  | T  |
|--------------|----|----|----|
| India        | 26 | 30 | 04 |
| Pakistan     | 14 | 36 | 10 |
| Sri Lanka    | 24 | 30 | 06 |
| South Africa | P  | Q  | R  |
| Bangladesh   | 20 | 32 | 08 |
| Canada       | 18 | 30 | 12 |

1. From the table it is clear that, the total number of wins = the total number of losses =  $102 + P = 158 + Q$

$$\text{The total number of matches played} = {}^6C_2 \times 12 = 180$$

$$\text{Total matches draw} = (40 + R)/2$$

Hence at least 20 matches were tied.

Thus we know that in at least 178 matches of the 180 matches, there were 158 wins/losses and 20 ties in the tournament

The other 2 matches can have three results:

- (a) No match tied, will mean that  $R = 0$ ;
- (b) 1 match tied means  $R = 2$ ;
- (c) 2 matches tied means  $R = 4$ .

In case,  $R = 0$ , it means that 20 matches were tied and 159 matches

had results. This would mean  $102 + P = 158 + Q = 160 \rightarrow$  we will get  $P = 58$  and  $Q = 2$  (so that both the W and L columns are equal).

In case,  $R = 2$ , it means that 21 matches were tied and 159 matches had results. This would mean  $102 + P = 158 + Q = 159 \rightarrow P = 57$  and  $Q = 1$  and  $R = 2$ . Likewise, when  $R = 4$ ,  $P = 56$  and  $Q = 0$ . Thus, there are three possibilities for W, L and T combinations for South Africa. Option (a) is correct.

2.

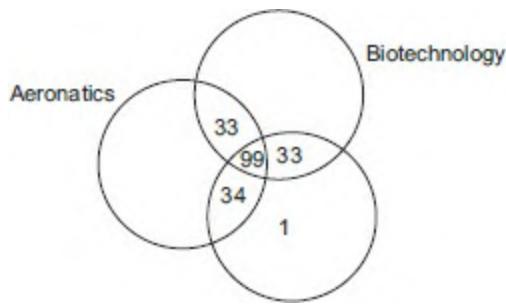
|              | <i>Win</i> | <i>Loss</i> | <i>Tie</i> |
|--------------|------------|-------------|------------|
| South Africa | 56-57-58   | 0-1-2       | 4-2-0      |
| India        | 26         | 30          | 4          |
| Sri Lanka    | 24         | 30          | 6          |
| Bangladesh   | 20         | 32          | 8          |
| Canada       | 18         | 30          | 12         |
| Pakistan     | 14         | 36          | 10         |

The third ranked team is Sri Lanka with a total of  $24 \times 5 - 30 \times 3 + 6 \times 2 = 42$  points

The second last ranked team is Bangladesh with a total of  $20 \times 5 - 32 \times 3 + 8 \times 2 = 20$  points

Thus, the difference between their points is 22 points. Hence, option (e) is correct.

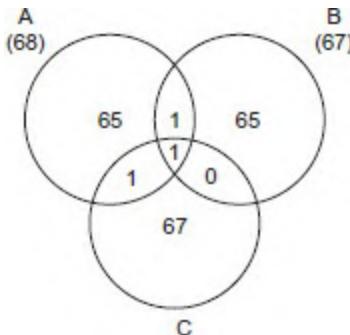
3. The following condition would maximise Biotechnology while obeying all the constraints of the problem. In such a case, we can see that Bio Technology can be maximised at  $99+33+33=165$



**Figure 1**

4. For minimising Cryogenics, we need to reduce the number in the

middle (i.e for all three) to the minimum possible value. This can be done by taking all three as 1 (as we have been given this constraint), only 2 as 2 (as it has to be greater than all three), and the remaining 197 can be distributed as shown in the [Figure 2](#).

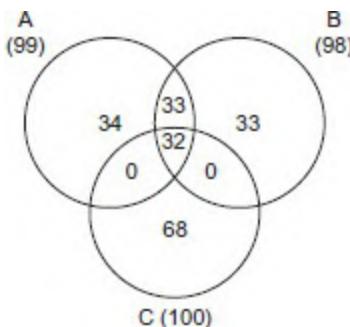


**Figure 2**

This gives us a minimum value of 69 for Cryogenics, while Aeronautics becomes 68 and Biotechnology is 67.

- The given conditions are satisfied by the following

[Figure 3:](#)



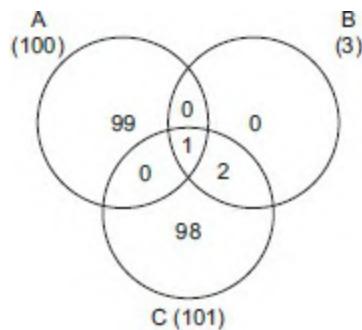
**Figure 3**

**Note:** If we try to put a value of 33 or more in the central area of the Venn diagram (i.e. for all three), the equilibrium gets disturbed. Hence, the correct answer is 32.

- In order to maximise only Aeronautics we need to use the following

[Figure 4.](#)

Hence, Only Aeronautics can be maximised at 99.



**Figure 4**

7. Aroon must have scored at least two 8 pointers (1<sup>st</sup> ranks) in the first 10 tests. This can be deduced by thinking about his scoring 60 points in the first ten tests to maintain an average of 6 points per test. Since, we have a constraint that a particular score is not repeated for three consecutive times we can try to use the maximum number of sixes first-

6,6,\_,6,6,\_,6,6,\_,\_. In the above sequence, the blanks have to be filled in such a way that an average of 6 points is maintained throughout without using any more sixes. This can only be done by using 2 8s and 2 4s. Thus, he must have got the first rank at least twice in the first 10 tests.

Follow a similar analysis pattern for the remaining tests and you will realise that:

**In tests 11–20**, he needs no 1<sup>st</sup> ranks to get 40 points as there are many combinations without using an 8, that can give 40 points in ten tests. (note; we have to find the minimum number of first ranks and for this we need to use 8's only when and if required!!)

Similarly, for tests 21–30 → No 1<sup>st</sup> ranks required

For tests 31–40 → No first ranks required,

For tests 41–50 → No first ranks required,

For tests 51–60 → 2 first ranks are necessary.

Hence, the answer is option c (minimum 4 first ranks for Aroon)

8. If we try using twelve 4s (from the options) and three 6s we will get a total of 66 points after 15 tests. In the remaining 5 tests we require a total of 34 points which can be achieved by using four 8's and one 2.

**Note:** In case you try to use thirteen 4s and three 6s, then we would need a total of 40 points in 4 tests by using only 8, 2 and 0s. This is not possible to achieve. Hence, 12 is the maximum possible answer.

9. Use an analysis similar to the first question of the set above. This would give you  $7 + 7 + 6 + 7 + 2 + 5$  (in the respective groups of tests 1-10, 11-20 and so on till 51-60) = 34 instances of last rank for Daroon maximum.
10. Twice each in each set of ten tests in the first forty sets. Hence, 8
11. In the first set of ten tests he requires 20 points overall. Since he uses exactly 2 twos, he must score 16 from the remaining 8 tests. This can be achieved without using a 6 pointer. Hence, he need not have stood second in the first ten tests. Similarly, he need not have stood second in the next ten tests either as the same conditions apply. In the next ten tests he scores 50 points out of which he scores 4 points through two two pointers. This means that he needs to score 46 in the remaining 8 tests by using 0, 4, 6 and 8 only. Since 46 is not a multiple of 4 or 8 we need to use at least one 6. Hence, the required answer is 1. (Option (b))

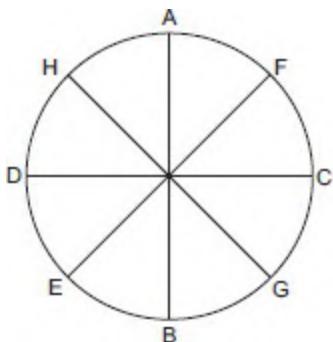
## 12–14.

The only way to handle this question is through the options. We can see that Vikas's age now should be more than 8. Hence, This gives us 15 as the only viable answer and we start with Vikas = 15.

From the first clue, we get: there was a time when Vikas was 9 times as old as Amit. This means, their age combinations could be 1, 9; 2, 18 etc. But since Vikas is only 15 years old, he cannot have been 9 times Amit in the past. Thus, Amit was 1 when Vikas was 9. Thus, Amit's current age =  $15 - 8 = 7$ . Also, we can work out that at the time Amit and Vikas were 1 and 9 respectively, Vishal was 8 years old. Hence, the answers are:

12. Amit = 7
13. Vishal = 14
14. Vikas = 15

## 15–17.



First from A, send 2 planes along with the main plane. The journey consists of 8 parts A-F-C-G-B-E-D-H-A.

Let one part of the journey require 1 unit of fuel. Then 3 planes leave A with 4 units of fuel each and reach F with 3 units of fuel left each. One plane gives 1 unit of fuel to the main plane and the other plane and returns back to A. So, at F, the main plane and its' supporting plane both have 4 units of fuel each. Let both planes reach C with 3 units of fuel each. The supporting plane gives 1 unit of fuel to the main plane and returns back. The main plane now has 4 units of fuel and can reach D. At D it would run out of fuel and hence needs refuelling at D. In order to get refueled at D, the main plane needs a support plane from A. But the support plane also needs to go back. So two planes should fly from A anti-clockwise, when the main plane has reached B. One of these two support planes refuels the other at H, and the refueled plane reaches D with 3 units of fuel left. It refuels the main plane with 1 unit of fuel. So at D, there are two planes - the main plane with 1 unit of fuel and the support plane with 2 units of fuel. The support plane can reach A on its' own, but the main pane would need another refuel of 1 unit at H. So, another support plane would need to reach H from A, when the main plane reaches H. The answers can then be read off from this story:

15. Only 2 planes are required to support the main plane in it's journey - since there are only 2 support planes in the air at any point of time. Hence, the correct answer is option (a).
16. Number of flights required is:  $2 + 2 + 1 = 5$ . Option (b) is correct.
17. 2 refuelling planes with one plane flying twice. So a total of 2 planes.

## **Mock Test Paper 26**

1. To minimize the number of EC students we need to minimize the

number of EC students who participated in exactly one event or we need to maximize the number of EC students who participated in more than one event.

In Dancing – all the 90 EC students can participate in other events as well as the 30 students who are only in Dancing can all come from CS. The same logic can be applied to Robotics as well as to Singing and hence there could be 75 EC students from Robotics and 60 students of EC in Singing who can participate in other events as well.

In Bike Riding however, we will need to put a minimum of 30 EC students who would be participating only in Bike riding and 75 EC students who are participating in Bike riding can participate in other events as well.

Now the 90 students who participated in Dancing, can participate in Robotics, Singing as well as Bike riding (and covers up the numbers required in each of those sports who are involved in more than one sport). Also, since 30 EC students did not participate in any other event except bike riding, therefore the minimum number of EC students who participated in Encore =  $90 + 30 = 120$ . Option (b) is correct

2. To maximize the number of EC students we need to maximize the number of students who participated in exactly one event or we need to minimize the number of students who participated in more than one event.

30 EC students participated only in dancing ... 60 students participated in dancing and other events as well.

15 EC students participated only in robotics and 60 students participated in robotics and other events as well.

20 EC students participated only in Singing and 40 students participated in singing and other events as well.

105 students participated only in Bike riding.

Total EC students participated only in one event =  $30 + 15 + 20 + 105 = 170$ .

60 students participated in dancing and other events as well, if we consider 40 out of these 60 students participated in Robotics as well and rest 20 participated in Singing. Similarly 20 students who

participated in singing also participated in Robotics as well.

Hence the required number of students =  $170 + 20 + 40 + 20 = 250$ .

3. To minimize the number of CS students we need to minimize the number of students who participated in exactly one event or we need to maximize the number of students who participated in more than one event.

60 students (Dancing): can participate in other events as well.

45 students (Robotics): can participate in other events as well.

40 students (Singing): can participate in other events as well.

15 students (Bike riding): cannot participate in other events.

75 students (Bike riding): can participate in other events as well.

Now the 75 students who participated in bike riding and other events can participate in other events as well – so that would take care of the students from CS in dancing, robotics and singing. Also 15 students of CS who did not participate in any other event except bike riding would need to be added to this.

Therefore the minimum number of CS students participated in Encore =  $75 + 15 = 90$ .

#### 4-8.

Company F has total 7 competitors therefore each of the other company is the competitor of F. Company C has only one competitor therefore it has no competitor other than F. Company D and Company G have six competitors each therefore each of them is a competitor of every other company except C. B and H have three competitors each therefore each of them is a competitor of F, D and G.

E has four competitors. D, G, F are competitors of E and B, C, H cannot be the competitors of E, therefore A must be a competitor of E.

From the above discussion we can conclude that A has four competitors- D, E, F, G.

4. Only option (c) is correct.
5. Required average =  $(4 + 3 + 1 + 6 + 4 + 7 + 6 + 3)/8 = 34/8 = 4.25$
6. The number of competitors of B and H is 3 and 3 respectively. Therefore the number of competitors who sell mobile in the country in

which either of B and H sell mobiles can be at most 4.

Now suppose there is a country in which five companies sell their phones. In such a country five companies A, D, E, F and G can sell their mobile phones.

If there is a country where six companies sell their mobile phones then each of the company must have at least five competitors but we have only three such companies (D, F, G). Therefore we cannot have six or more companies selling their phones in a single region.

Hence the required answer is 5.

7. According to the analysis we have done above B, E and H are competitors of companies D, F and G.

But no two among B, E and H are competitors of each other. If we allot maximum number of companies to C then final distribution will look like this:

Country 1: B, D, F, G

Country 2: E, D, F, G, A

Country 3: H, D, F, G

Country 4: C, F

Country 5: C

Therefore maximum number of countries in which company C sells its mobile phones is 2.

8. From the previous solution it is clear that if P has maximum number of mobile companies then P should have five companies. Hence the required answer is 5.

## 9–12.

[Table B](#) states that the first wicket falls at score 35. As Sachin himself scored 40, as  $40 > 35$ , we can conclude that Sehwag was the first to get out. At that time Sachin must have scored  $35 - 29 = 6$  runs. From doing the similar analysis for other batsmen we can get the following result:

| <i>Fall of wickets</i> | <i>Total score</i> | <i>Runs scored by the batsmen to get out</i>      | <i>Runs scored by the batsman who is not out/batting.</i> | <i>Partnership</i> |
|------------------------|--------------------|---|---|--------------------|
| 1                      | 35                 | Sehwag (29)                                       | Sachin (6)  | 35                 |
| 2                      | 54                 | Gautam (11)                                       | Sachin (8)  | 19                 |
| 3                      | 62                 | Yuvraj (0)  | Sachin (8)  | 8                  |
| 4                      | 87                 | Sachin (18)                                       | Kohli (7)   | 25                 |
| 5                      | 97                 | Dhoni (6)   | Kohli (4)   | 10                 |
| 6                      | 122                | Kohli (14)  | Raina (11)  | 25                 |
| 7                      | 128                | Harbhajan (5)                                     | Raina (1)   | 6                  |
| 8                      | 133                | Ashwin (1)  | Raina (4)   | 5                  |
| 9                      | 144                | Bhuvi (9)/ Raina (2)                              | Raina (1) / Bhuvi (10)                                    | 11                 |
| 10                     | 150                | Raina (1)/ Zaheer (5) or<br>Bhuvi (1)/ Zaheer (5) | Zaheer (5)/ Raina (1) or<br>Zaheer (5)/ Bhuvi (1)         | 6                  |

9. (a) 0

10. (c) 5

11. (a) Total runs scored by all the batsmen of India is equal to the total score of the team, so there is no extra runs in the Indian team's score.

12. For the first wicket: Sehwag can hit maximum four sixes and Sachin can hit maximum one six. Similarly for the 2<sup>nd</sup> wicket Gautam can hit maximum one six and Sachin can hit maximum one six.

| <i>Fall of wickets</i> | <i>Maximum possible 6's</i> |
|------------------------|-----------------------------|
| 1                      | 5                           |
| 2                      | 2                           |
| 3                      | 1                           |
| 4                      | 4                           |
| 5                      | 1                           |
| 6                      | 3                           |
| 7                      | 0                           |
| 8                      | 0                           |
| 9                      | 1                           |
| 10                     | 0                           |

Maximum possible number of sixes = 17 sixes.

13. Here we need to find the minimum possible number of farms, so first consider the farm with range of production less than 20 tons. From village A, at least one farm (of area 900 square feet) must be counted.

Now analyze the second range which is between 20 tons and 28 tons. Again we have at least 1 farm from village A and 1 farm from village B.

The next range cannot be analyzed as we cannot be sure about the farms in the 28 tons to 36 tons category, whether the farms did have production less than 30 tons and also had an area less than 1000 square feet. So the required answer is 3.

14. Let's analyze each production range one by one.

| <i>Range of production</i> | <i>0.04 times of the farm area for village A</i> | <i>0.04 times of the farm area for village B</i> | <i>Maximum possible number of required farmers</i> |
|----------------------------|--|--|--|
| $p < 20$                   | 5 (36–60)  | 4 (44–60)  | $0 + 0 = 0$  |
| $20 \leq p < 28$           | 8 (28–44)  | 7 (30–56)  | $0 + 0 = 0$  |
| $28 \leq p < 36$           | 10 (24–36)                                       | 11 (28–44)                                       | $9 + 10 = 19$                                      |
| $36 \leq p < 44$           | 6 (18–30)  | 6 (24–40)  | $6 + 6 = 12$                                       |
| $44 \leq p < 60$           | 3 (16–24)  | 4 (20–32)  | $3 + 4 = 7$  |

$$\text{Total number of farmers} = 0 + 0 + 19 + 12 + 7 = 38.$$

15. Here we need to find the number of farmers whose farms produce more than 34 tons. So we need to concentrate only on the last three rows of the given table (only for Village B, as stated in the problem). For the range,  $28 \leq p \leq 36$ .

For this range, there are at most 10 farms with an area more than 750 square feet and production more than 34 tons.

Similarly for range,  $36 \leq p \leq 44$  there are a maximum of  $6 - 1 = 5$  farms and for  $44 \leq p \leq 60$  range, there are maximum  $4 - 1 = 3$  farms with an area greater than 750 square feet.

Hence, the required answer =  $10 + 5 + 3 = 18$

16. To maximize the average production, we need to maximize the production of farms that falls under a production range. In the  $< 20$  production range, the maximum production can be  $19.9999999 \approx 20$ . Hence, we would take the limiting value as 20 for the purpose of the calculations.

$$\text{Required average} = \frac{9 \times 20 + 15 \times 28 + 21 \times 36 + 12 \times 44 + 7 \times 60}{64} = 36.$$

## Mock Test Paper 27

1–5.

According to the questions condition of Aman, Binay, Charu, Dinesh, Ervin and Fahim's weight carried at the Mumbai airport, being more than or equal to their weights carried at the Delhi airport we get the following relationships that a and b should obey:

$$10a \geq 20b, 20a \geq 10b, 25a \geq 15b, 10a \geq 18b, 20a \geq 32b, 30a \geq 12b$$

$$\text{Or } a \geq 2b, a \geq 0.5b, a \geq 0.6b, a \geq 1.8b, a \geq 1.6b, a \geq 0.4b$$

$$a \geq 2b$$

Similarly we can conclude:  $a \geq 2.5c$  and  $0.5d \geq a$

1. According to the question  $20b = 8c$  or  $b = 0.4c$

$$\text{Required ratio} = 20b/20c = b/c = 0.4$$

2. Aman is a light weight passenger in Mumbai and Chennai airports. Binay is a light weight passenger at the Delhi, Chennai, Bangalore airports. Charu is a light weight passenger at the Delhi and Bangalore airports. Dinesh is a light weight passenger at the Mumbai airport. Ervin is a light weight passenger at the Chennai and Bangalore airports. Fahim is a light weight passenger at the Delhi airport. Hence the required number of passengers who are light weight in at least 2 airports is 4.

3.  $30d = 30\text{kg} \rightarrow d = 1\text{kg}$ .

$$\text{Since, } 0.5d \geq a \text{ or } a \leq 0.5$$

Maximum possible weight carried by Aman at the Mumbai airport =  $10 \times 0.5 = 5\text{kg}$

4.  $D = 20a - 10b$

$$a \geq 2b$$

$$\text{Minimum value of } D = 40b - 10b = 30b$$

Except Ervin rest of the passengers are definitely carrying lesser weight than D at the Delhi airport. Hence the correct answer is 5.

5.  $30b = 120$  or  $b = 4$

| Passenger name | Maximum possible weight (in kg) |
|----------------|---------------------------------|
| Aman           | 80                              |

|        |     |
|--------|-----|
| Binay  | 40  |
| Charu  | 60  |
| Dinesh | 72  |
| Ervin  | 128 |
| Fahim  | 48  |

Therefore four passengers definitely carried weight less than 75 kg.

## 6–8.

Let us analyse the scores in QA first:

Marks scored by Qasim, Sameer and Taskin =  $98 + 72 + 70 = 240$

Hence, marks obtained by Pulkit and Rohan =  $280 - 240 = 40$

Pulkit and Rohan can score maximum 28 marks in the subject (10% of 280).

Hence, marks range for Pulkit in QA = 12–28, and subsequently marks range for Rohan in QA = 28–12.

By doing the similar analysis for rest of the three sections, we can get the following data:

**In LR section:** Marks obtained by Rohan = 32–48

Marks obtained by Taskin = 48–32

**In DI section:** Marks obtained by Pulkit = 27–23

Marks obtained by Qasim = 23–27

**In VA section:** Marks obtained by Rohan = 25–35

Marks obtained by Taskin = 35–25

| Name of students | QA    | LR    | DI    | VA    |
|------------------|-------|-------|-------|-------|
| Pulkit           | 12–28 | 100   | 23–27 | 63    |
| Qasim            | 98    | 55    | 27–23 | 62    |
| Rohan            | 28–12 | 32–48 | 110   | 25–35 |
| Sameer           | 72    | 85    | 30    | 65    |
| Taskin           | 70    | 48–32 | 80    | 35–25 |
| Total            | 280   | 320   | 270   | 250   |

6.

| Student's name | Marks range |
|----------------|-------------|
| Pulkit         | 198–218     |
| Qasim          | 238–242     |

|        |         |
|--------|---------|
| Rohan  | 179–221 |
| Sameer | 252     |
| Taskin | 207–233 |

Rank A must be of Sameer. Rank B must be of Qasim. We cannot determine the ranks of Pulkit, Rohan and Taskin.

7. Minimum possible difference between the two would be if we allocate 28 to Pulkit in QA and 23 in DI. His total would then be:  $100 + 63 + 28 + 23 = 214$ . In such a case, Rohan can reach a total of  $48 + 110 + 12 + 35 = 205$ . The gap between them comes out to be 9. This gap can be reduced to the minimum by reducing Pulkit's score in QA by 4 marks and increasing Rohan's score by 4 marks. Thus, in the even that we use:  $100 + 63 + 24 + 23 = 210$  for Pulkit and  $48 + 110 + 16 + 35 = 209$  for Rohan, the difference between Pulkit and Rohan's total scores are reduced to 1. In such a case, the value of Qasim =  $98 + 55 + 27 + 62 = 242$  and for Taskin it would equal  $70 + 32 + 80 + 25 = 207$ . Required difference =  $242 - 207 = 35$ .
8. Maximum possible marks scored by Pulkit in QA =  $28 + 100 + 27 + 63 = 218$

$$\begin{aligned}\text{Required percentage} &= \frac{218}{280 + 320 + 270 + 250} \times 100 \\ &= \frac{218}{1120} \times 100 = 19.46\%\end{aligned}$$

## 9–12.

According to the statement 4, Sudhir attempted 250 questions and scored 402 marks. He did not attempt 120 questions, because of these 120 questions he lost total  $120 \times 1 = 120$  marks.

If we assume that there are total x incorrect attempts.

$$\begin{aligned}(250 - x)6 - 2x - 120 &= 804 \\ 1500 - 6x - 2x - 120 &= 804 \\ 8x &= 1500 - 120 - 804 = 576 \\ x &= 72\end{aligned}$$

Correct attempts =  $250 - 72 = 178$ .

Total marks obtained in mock test-3 =  $(34 - 12)6 - 12 \times 2 - 36 = 72$

From statement-1, total score in mock test-1 =  $72 \times 2 = 144$ .

From statement-3, incorrect attempts in test-4 =  $72/6 = 12$

Because of these 12 incorrect attempts Sudhir lost 24 marks and if the number of correct attempts = c, then according to the question:

$$6c - 24 - (68 - c)1 = 132$$

$$7c - 92 = 132$$

$$c = \frac{92 + 132}{7} = \frac{224}{7} = 32$$

From statement-3: Incorrect attempts in test-1 = 6.

By applying the approach of the previous step we can get: Total attempts in test-1 = 36, Correct attempts in test-1 = 30.

Total problems attempted by Sudhir in Mock test-5 =  $250 - (36 + 58 + 34 + 44) = 78$ .

Incorrect attempts in Mock test-5 =  $78 - 60 = 18$ .

Total marks in test-5 =  $60 \times 6 - 18 \times 2 - 12 = 312$

Correct attempts in Mock test-2 =  $178 - (30 + 22 + 32 + 60) = 34$ .

Incorrect attempts in Mock test-2 =  $58 - 34 = 24$

Total score in test-2 = 144

From the above analysis we can get the following table:

| Mock Tests | Total number of problems | Attempted problems | Correct attempts | Incorrect attempts | Total score |
|------------|--------------------------|--------------------|------------------|--------------------|-------------|
| 1          | 60                       | 36                 | 30               | 6                  | 144         |
| 2          | 70                       | 58                 | 34               | 24                 | 144         |
| 3          | 70                       | 34                 | 22               | 12                 | 72          |
| 4          | 80                       | 44                 | 32               | 12                 | 132         |
| 5          | 90                       | 78                 | 60               | 18                 | 312         |

9. 144

10. 12

11. 312

12. 3

## Mock Test Paper 28

### 1–4.

Let the total number of 2 marks question be ‘a’ and the total number of 4 marks questions be ‘b’.

$$a + b = 1000 \dots \dots (1)$$

$$0.15a + 0.20b = 160 \dots \dots (2)$$

By solving equation 1 and equation 2 we get:  $a = 800$ ,  $b = 200$ . This will give us the following table:

| Section      | 2 marks questions | 4 marks questions |
|--------------|-------------------|-------------------|
| Math I       | 160               | 30                |
| Math II      | 160               | 60                |
| Chemistry I  | 120               | 40                |
| Chemistry II | 80                | 10                |
| Physics I    | 160               | 20                |
| Physics II   | 120               | 40                |

- From the above discussion we can form the following table for the maximum number of 2 marks questions possible for Piyush:

| Subject      | Maximum possible 2 marks questions |
|--------------|------------------------------------|
| Math I       | 30                                 |
| Math II      | 90                                 |
| Chemistry I  | 120                                |
| Chemistry II | 60                                 |
| Physics I    | 150                                |
| Physics II   | 120                                |

$$\text{Hence the required answer} = 30 + 90 + 120 + 60 + 150 + 120 = 570$$

- Maximum possible marks in the exam  $= 800 \times 2 + 200 \times 4 = 2400$   
From the solution of the previous question minimum possible 4 marks question attempted by Piyush = 15

$$\text{Therefore the required percentage} = \frac{60}{2400} \times 100 = 2.5\%$$

- To minimize the number of attempts in Chemistry II exam he had to attempt maximum number of 4 marks questions. Therefore he should have attempted all the ten four marks questions and in this case he attempted total  $10 + 80/2 = 10 + 40 = 50$  questions.
- Option (a).

Total score of the class in the five tests are 290, 240, 220, 240 and 260 respectively. This means that the remaining score of the respective tests that students outside the top 3 have scored would be: 87, 84, 66, 84 and 78 respectively.

Also, the scores of the remaining two students (amongst the top 5) would be:

|               | <i>Abhay</i> | <i>Balwinder</i> | <i>Chetan</i> | <i>David</i> | <i>Faraz</i> |
|---------------|--------------|------------------|---------------|--------------|--------------|
| <b>Test 1</b> | 90           | 55               | 58            | 0–54         | 0–54         |
| <b>Test 2</b> | 40           | 0–39             | 0–39          | 60           | 56           |
| <b>Test 3</b> | 0–26         | 75               | 0–26          | 27           | 52           |
| <b>Test 4</b> | 54           | 0–35             | 0–35          | 66           | 36           |
| <b>Test 5</b> | 50           | 62               | 70            | 0–49         | 0–49         |

| <i>Student</i> | <i>Value of C.V.</i> |
|----------------|----------------------|
| Abhay          | 50                   |
| Balwinder      | 55                   |
| Chetan         | 0–39                 |
| David          | 27–54                |
| Faraz          | 36–52                |

5. Balwinder had the highest value of C.V.
6. The exact value of C.V. can be calculated only for two students—Abhay and Balwinder.

7.

| <i>Student</i> | <i>Value of I.V.</i> |
|----------------|----------------------|
| Abhay          | 90–116               |
| Balwinder      | 75–110               |
| Chetan         | 70–96                |
| David          | 66–93                |
| Faraz          | 56–92                |

It is clear from the table that anyone of the five students can have the lowest value of I.V. Hence, the correct answer to this question would be option (d).

8.

| <i>Test No.</i> | <i>Maximum scores of Chetan and Balwinder together</i> |
|-----------------|--|
| 1               | 113  |
| 2               | 77   |
| 3               | 101  |

|              |            |
|--------------|------------|
| 4            | 69         |
| 5            | 132        |
| <b>Total</b> | <b>420</b> |

$$\begin{aligned}\text{Required percentage} &= \frac{492}{290 + 240 + 220 + 240 + 260} \times 100 \\ &= \frac{492}{1250} \times 100 = 39.36\%\end{aligned}$$

## 9–11.

| <i>Stages</i> | <i>Earlier stage</i> | <i>Time required to complete the stage from beginning (in months)</i> |
|---------------|----------------------|---|
| O             | None                 | 4   |
| P             | O                    | 15 + 4 = 19   |
| Q             | O                    | 12 + 4 = 16   |
| R             | Q                    | 9 + 16 = 25   |
| S             | P, R                 | 2 + 25 = 27   |
| T             | P                    | 3 + 19 = 22   |
| U             | T                    | 5 + 22 = 27   |
| V             | S                    | 7 + 27 = 34   |
| W             | R                    | 9 + 25 = 34   |
| X             | U, V                 | 17 + 34 = 51  |
| Y             | V, W                 | 11 + 34 = 45  |
| Z             | Y                    | 7 + 45 = 52   |

9. Stage X depends upon U and V. Stage U takes 27 months and stage V takes 34 months.  
 $\therefore$  X can start in the 35<sup>th</sup> month. So, X can start in November, 2024.
10. After stage S, number of months required to complete the training = 52 – 27 = 25 months.
11. The least possible number of months taken by the training is 52 months. Hence, stage T should have been completed by at most 27 + 3 = 30 months. Therefore the required answer = 52 – 30 = 22 months.
12. O → P → T → U

| <i>Stages</i> | <i>Session M</i> | <i>Session N</i> |
|---------------|------------------|------------------|
|---------------|------------------|------------------|

|   |       |       |
|---|-------|-------|
| O | 1–4   | 5–8   |
| P | 5–19  | 20–34 |
| T | 20–22 | 35–37 |
| U | 23–27 | 38–42 |

The least required time is 42 months.

13. O → Q → R

|   |       |       |
|---|-------|-------|
| O | 1–4   | 5–8   |
| Q | 5–16  | 17–28 |
| R | 17–25 | 29–36 |

The least required time is 36 months.

## 14–16.

**Deduction 1:** The number of horror movies watched in INOX is 7. Therefore, B and C must have watched horror movies in INOX (as they cannot be fit into any other movie category for INOX). From amongst, A,D,E and F we need to find one more person who would have watched a horror movie in INOX.

**Deduction 2:** From [Table-A](#) and [Table-B](#), A watched comedy movies in PVR and Big cinemas.

**Deduction 3:** D watched a romantic movie in PVR, since there is only one ‘1’ in PVR in both the tables.

**Deduction 4:** From the given clues, we know that there is one person who has watched horror movies in all the cinemas. From deduction 2 and deduction 3, we conclude that A and D could not have been the ones to have watched horror movies in all the cinemas. Also, F could not have watched a horror movie in all the three cinemas as only one horror movie was watched in Big Cinemas (while F has watched 2 movies in Big Cinemas). Therefore, only E is left for watching one horror movie in INOX. He must also have watched horror movies in PVR and Big Cinemas.

At this point the table starts to look as follows:

| Name | PVR       | BIG CINEMAS | INOX     |
|------|-----------|-------------|----------|
| A    | 4-Comedy  | 4-Comedy    | 1        |
| B    | 2         | 1           | 2-Horror |
| C    | 2         | 1           | 4-Horror |
| D    | 1-Romance | 1           | 1        |
| E    | 2-Horror  | 1-Horror    | 1-Horror |
| F    | 2         | 2           | 1        |

**Deduction 5:** Exactly two people out of A, D and F watched the same type of movies in all the three multiplexes; the possible person-movie combinations in such a case could be: A-Comedy, D-Romance, F-Dance-based. Exactly 2 out of the given 3 combinations are true. In INOX, they definitely watched these types only, as otherwise the given condition could not be true. So A is definitely one of the persons who watched the same type of movie in all the three multiplexes (as A would then have watched comedy in all three theaters). In Big Cinemas, D did not watch Action, Sci-Fi, comedy or horror movie. D could not have watched a Dance movie in BIG cinemas as in that case even F would not be able to watch dance-based movies in all the three cinemas. Therefore D must have watched one romantic movie in BIG cinemas. Therefore, D is the other person to have watched the same type of movie in all the three multiplexes. The table becomes:

| Name | PVR       | BIG CINEMAS | INOX      |
|------|-----------|-------------|-----------|
| A    | 4-Comedy  | 4-Comedy    | 1-Comedy  |
| B    | 2         | 1           | 2-Horror  |
| C    | 2         | 1           | 4-Horror  |
| D    | 1-Romance | 1-Romance   | 1-Romance |
| E    | 2-Horror  | 1-Horror    | 1-Horror  |
| F    | 2         | 2           | 1-Dance   |

14. 3.
15. F watched one dance-based movie in INOX. He cannot watch dance-based movie in all the three multiplexes as then there will be three students who watched the same type of movie in all the three multiplexes. Hence the required answer for the maximum number of dance-based movies watched by F would be:  $1 + 2 = 3$ .
16. E

## Mock Test Paper 29

- Let B scored 'x' marks in Biology.

According to the question:

$$70 \times \frac{20}{100} + 65 \times \frac{40}{100} + x \times \frac{20}{100} + 60 \times \frac{20}{100} = 62$$

By solving the above equation we get:  $x = 50$ .

Note: The solution can be thought off much faster as follows:

$$\begin{aligned} 20\% \text{ of } 70 + 40\% \text{ of } 65 + 20\% \text{ of } x + 20\% \text{ of } 60 &= 62 \rightarrow 14 + 26 + 12 \\ + 20\% \text{ of } x &= 62 \rightarrow 20\% \text{ of } x = 10, \text{ hence } x = 50. \end{aligned}$$

- G's rank is 8, hence he should have scored more than 51 marks and less than 62 marks in Maths.

$$\therefore 51 < 0.2p + 10 + 18 + 11 < 62$$

$$\rightarrow 51 < 0.2p + 39 < 62$$

$\Rightarrow 12 < 0.2p < 23$  or  $60 < p < 115$ . However, the question has mentioned that the value of p cannot be greater than 95. Hence,  $60 < p \leq 95$ . Hence only option (b) is correct.

- H got the 4<sup>th</sup> rank. His total marks must be more than 69 (Marks scored by C who got 5<sup>th</sup> rank in the exam). If he scored x marks in Biology then according to the question:

$$75 \times \frac{20}{100} + 50 \times \frac{40}{100} + x \times \frac{20}{100} + 85 \times \frac{20}{100} > 69$$

$$15 + 20 + 0.2x + 17 > 69$$

$$x > 85$$

Hence, H scored more than everybody else in biology. Hence, the required answer must be 9.

- D is the topper of the exam hence he must have scored more than 75. To maximize his total score his marks in chemistry should be the highest possible.

If he scored 95 marks in chemistry, then his total score =  $45 \times 0.2 + 95 \times 0.4 + 75 \times 0.2 + 90 \times 0.2 = 80$ .

- Let A scored 'x' marks in Maths.

$$\therefore 40 \times 0.2 + 45 \times 0.4 + 45 \times 0.2 + x \times 0.2 < 51$$

By solving we get:  $x < 80$ .

Hence, at least 5 students (C, D, H, F, J) scored more marks than A in Maths. (Note: Working out for J, we see that he should have scored 90

marks in Maths).

## 6–8.

**Deduction 1:** Since Faraz has scored the highest marks in Gate 2013, hence Faraz cannot be R or S. Hence, Faraz is either P or Q. Similarly Ajay is either Q or P (since he scored the lowest marks in Gate-2012). Therefore, Mohanish and Peter are R ... S in any order.

**Deduction 2:** Total marks obtained by R =  $102 + 118 + 56 = 276$ .

Maximum possible marks obtained by S =  $106 + 20 + 150 = 276$ . Thus, marks of R  $\geq$  Marks of S.

Also, we know from clue 5 that Peter > Mohanish. Therefore, Peter is R and Mohanish is S. The table becomes:

|             | P = Ajay/Faraz | Q = Faraz/Ajay | Peter | Mohanish |
|-------------|----------------|----------------|-------|----------|
| Gate-2012   | 94             |                | 102   | 106      |
| Gate-2013   |                | 124            | 118   | 20       |
| Gate-2014   | 144            | 50             | 56    |          |
| Total marks | w              | x              | 276   | z        |

Now let's assume Ajay is disguised as Q and his marks in Gate 2012 exam was 'n' then according to statement 2,  $50 + n + 124 > 276$

$n > 102$ , which is not possible because this violates the third statement, that Ajay scored the lowest marks in Gate 2012. Therefore, our assumption is incorrect and Ajay must be P. The final table would be:

|             | Ajay          | Faraz | Peter | Mohanish |
|-------------|---------------|-------|-------|----------|
| Gate-2012   | 94            | >94   | 102   | 106      |
| Gate-2013   | >38, but <124 | 124   | 118   | 20       |
| Gate-2014   | 144           | 50    | 56    | <150     |
| Total marks | w             | x     | 276   | z        |

6. If Mohanish scored 'k' marks in the Gate-2014 exam then according to the question:

$$106 + 20 + k < 276. \text{ Hence, } k < 150.$$

All the even scores from -50 to +148 are possible in any of the tests, except 140, 146 and 148.

Therefore, different scores possible for Mohanish =  $100 - 3 = 97$ .

7. Faraz

8. Ajay is disguised as P. Let's assume that Ajay scores q marks in Gate 2013. As Faraz scored the highest in Gate 2013,  $q < 124$  and  $94 + 144 + q > 102 + 118 + 56$ .

$$\therefore 38 < q < 124$$

Ajay's total score is a multiple of 12.

$$\therefore 238 + q \text{ needs to be a multiple of 12.}$$

$$\therefore q = 12 K + 2, \text{ where } K \text{ is a whole number.}$$

$$38 < 12 K + 2 < 124$$

$$\therefore 4 \leq K \leq 10$$

Therefore, 7 different values are possible for w.

## 9–11.

The logic of this question, is to be based on the fact that the total budget for scientists in each project is  $1/8^{\text{th}}$  of the total budget of the project.

**Deduction 1:** In Project A, the total budget of the project is 352 crores. the total payments to the scientists as their fees would be  $1/8^{\text{th}}$  of 352 = 44 crores. Since, we already know that q and R are working on Project A, it means that the balance budget for scientists' payments in budget A is 18 crores. This can only be fulfilled by using the combinations of S and W or T and W. Using similar logic for what is possible for projects B, C and D, we can come up with the following table. We also realise that: If S works on project A then T must have worked in D and vice versa.

|                                    | <i>Fee per project<br/>(in Crore Rs.)</i> | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
|------------------------------------|---|----------|----------|----------|----------|
| <i>Total Budget (in Crore Rs.)</i> |   | 352      | 288      | 384      | 576      |
| P                                  | 20  | N        | Y        | N        | Y        |
| Q                                  | 16  | Y        | N        | N        | Y        |
| R                                  | 10  | Y        | N        | N        | Y        |
| S                                  | 12  |          | N        | Y        |          |
| T                                  | 12  |          | N        | Y        |          |
| U                                  | 10  | N        | Y        | Y        | N        |
| V                                  | 14  | N        | N        | Y        | Y        |
| W                                  | 6   | Y        | Y        | N        | N        |

$$9. \text{ Required difference} = (288 + 576) - (384) = 480$$

10. (d)

11. (b)

## 12–16.

**Deduction 1:** From statements 2, 3, and 4 either G-H or H-I must carry 600 amperes. If G-H carries 600 amperes then H-I must carry 400 amperes, which is not possible because it violates the statement 2.

Hence, H-I must carry 600 amperes and G-H must carry 800 amperes.

**Deduction 2:** D-G should carry 800 amperes more than the requirement of G. G's requirement is equal to the requirement of G-H.

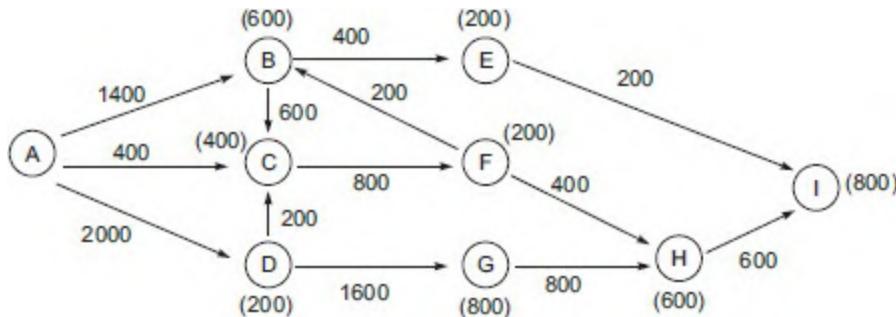
Hence, requirement of G = 800 amperes and connector D-G carries the  $800 + 800 = 1600$  amperes of current.

**Deduction 3:** The current in the connector E-I and requirement of E both are same and equals to 200 amperes. Therefore the requirement of town I =  $200 + 600 = 800$  amperes.

**Deduction 4:** The current transfer in the node F-B and requirement of F both are same and equals to 200 amperes.

**Deduction 5:** Current in the connector C-F =  $200 + 200 + 400 = 800$  amperes.

Similar analysis for the other towns would lead us to the following diagram:



12. 200 amperes.
13. 200 amperes.
14. 200 amperes.
15. 800 amperes.
16. 400 amperes.

## Mock Test Paper 30

1–5.

If a student named four of the scientists correctly then definitely he named the fifth scientist correctly. It is given that the five contestants got different marks hence these five students named 5, 3, 2, 1, 0 scientists correctly in any order.

Now let's assume Pulkit named all of them correct. Then Qasim, Rahim, Sahir, Taufiq named 1, 3, 0, 2 of them correctly. This means that this is a possibility for the 5 winners – since we have got all the number of correct answers corresponding to different numbers of students. Similarly, if we check for Qasim getting all 5 answers correct, we would see that Pulkit, Rahim, Sahir and Taufiq get 1,2,0 and 3 answers correct respectively – thus satisfying the condition. However, if we check the table for Rahim getting all answers correct, we see that there is no one with 0 answers correct (as we get Qasim and Taufiq both getting 1 answer correct). Hence, Rahim getting all answers correct is not a possibility. Similar thinking would give us that, Sahir and Taufiq as all answers correct would also not be possible.

Thus, based on the answers of Pulkit and Qasim we get the following two possibilities:

| Year | Possibility-1<br>Pulkit all correct<br>Scientist name | Possibility-2<br>Qasim all correct<br>Scientist name |
|------|---|--|
| 2010 | Chris   | Bob  |
| 2011 | Denial  | Chris  |
| 2012 | Alex  | Alex   |
| 2013 | Elina   | Denial   |
| 2014 | Bob   | Elina  |

1. Bob could be a winner of 2010 physics Nobel prize. Option (a).
2. Pulkit and Qasim can get 100 marks in the quiz. From the given options only option (a) is correct.
3. Alex. Option (b).
4. In both the possible cases, two students predicted the winner correctly.
5. Maximum possible marks scored by Pulkit = 100 (Possibility-1)

In either of the possible arrangements, Sahir got none of the scientists in the correct order.

Hence, marks scored by Sahir =  $10 \times 0 + 10 = 10$ .

Required difference =  $100 - 10 = 90$ .

## 6–8.

| <i>Theory marks in exam of thermal physics</i> | <i>Practical marks in thermodynamics</i> |
|--|--|
| 1–10   | 12                                       |
| 11–20  | 15                                       |
| 21–30  | 17                                       |
| 31–40  | 21                                       |
| 41–50  | 22                                       |
| 51–60  | 25                                       |
| 61–70  | 27                                       |
| 71–80  | 31                                       |
| 81–90  | 33                                       |
| 91–100   | 34                                       |

6. If theory marks varies from 25 to 76 then practical marks varies from 17 to 31. From [table B](#) we can see that for a 17 to 31 marks variation in practical marks in thermodynamics corresponding change in the marks in IQ test is 3 to 9.
7. For grades C to G the practical marks is from 17 to 27. From practical marks from 17 to 27 corresponding theory marks will be from 21–70. Hence, 72 is not a possible score.

8.

Theory marks increases → 19 to 63

Practical marks increases → 15 to 27

Viva marks increases → 1 to 6

$$\text{Percentage increase in viva marks} = \frac{6-1}{1} \times 100 = 500\%$$

9. According to the table Hamish's rank is 4<sup>th</sup> so his weighted total score must have been more than that of the 5<sup>th</sup> ranked batsman i.e. > 138. Let the runs scored by Hamish in India be 'x' runs, then:

$$150 \times 0.2 + 100 \times 0.4 + x \times 0.2 + 170 \times 0.2 > 138$$

$$30 + 40 + 0.2x + 34 > 138$$

Hence,  $x > 170$

Younis's score in India

$$\begin{aligned} &(124 - (140 \times 0.2 + 130 \times 0.4 + 120 \times 0.2)) + \\ &0.2 = (124 - 28 - 52 - 24) + 0.2 = 100. \end{aligned}$$

Therefore, Hamish must have scored more than anyone else in India. So the required answer is 0.

10. Neel's rank is 8, so his total score should be between 102 and 124.

$$102 < 100 \times 0.2 + 90 \times 0.4 + 110 \times 0.2 + k \times 0.2 < 124$$

$$102 < 78 + k \times 0.2 < 124$$

$$24 < 0.2k < 46$$

$$120 < k < 230$$

But according to the question no player scored more than 190 runs in any country, so the required answer is  $190 - 120 = 70$ .

11. The maximum runs Damian would have scored in South Africa are just less than 160. So at least 5 batsmen—Sachin, Adam, Saurav, Srikant and Hamish scored more than Damian in South Africa.
12. Saurav was in 1<sup>st</sup> position in the ranking so his total score must be at least 152. If he scored 190 runs in England (maximum possible runs) then his total score would be 160. So the required answer is 160.

## 13–16.

We can make the following structure for a tournament with no upsets to analyse the tournament flow:

|          | <i>Round 1<br/>(32 matches)</i> | <i>Round 2<br/>(16 matches)</i> | <i>Round 3<br/>(8 matches)</i> | <i>Round 4<br/>(4 matches)</i> | <i>Round 5<br/>(2 matches)</i> | <i>Round 6<br/>(1 match)</i> |
|----------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|------------------------------|
| Match 1  | 1–64                            | 1–32                            | 1–16                           | 1–8                            | 1–4                            | 1–2                          |
| Match 2  | 2–63                            | 2–31                            | 2–15                           | 2–7                            | 2–3                            |                              |
| Match 3  | 3–62                            | 3–30                            | 3–14                           | 3–6                            |                                |                              |
| Match 4  | 4–61                            | 4–29                            | 4–13                           | 4–5                            |                                |                              |
| Match 5  | 5–60                            | 5–28                            | 5–12                           |                                |                                |                              |
| Match 6  | 6–59                            | 6–27                            | 6–11                           |                                |                                |                              |
| Match 7  | 7–58                            | 7–26                            | 7–10                           |                                |                                |                              |
| Match 8  | 8–57                            | 8–25                            | 8–9                            |                                |                                |                              |
| Match 9  | 9–56                            | 9–24                            |                                |                                |                                |                              |
| Match 10 | 10–55                           | 10–23                           |                                |                                |                                |                              |
| Match 11 | 11–54                           | 11–22                           |                                |                                |                                |                              |
| Match 12 | 12–53                           | 12–21                           |                                |                                |                                |                              |
| -----    |                                 |                                 |                                |                                |                                |                              |
| -----    |                                 | 16–17                           |                                |                                |                                |                              |
| Match 31 | 31–34                           |                                 |                                |                                |                                |                              |
| Match 32 | 32–33                           |                                 |                                |                                |                                |                              |

13. From the given information we can deduce that the 1<sup>st</sup> round had 32 matches, 2<sup>nd</sup> round had 16 matches, 3<sup>rd</sup> round had 8 matches, 4<sup>th</sup> round had 4 matches and so on.

If rank-1 team won the tournament then it must have beaten the 64<sup>th</sup> rank team in the 1<sup>st</sup> round, the 32<sup>nd</sup> or 33<sup>rd</sup> rank team in the second round, the 16<sup>th</sup> or 17<sup>th</sup> or 48<sup>th</sup> and 49<sup>th</sup> ranked team in the 3<sup>rd</sup> round. In round 4 it must have beaten one of the following ranked teams: 8, 9, 24, 25, 40, 41, 56 or 57. In round 5 it must have beaten exactly one of the following ranked teams: 4, 5, 28, 29, 12, 13, 20, 21, 44, 45, 36, 37, 60, 61.

Except the above-mentioned teams each team can reach in the final. Hence, option (a) is correct.

Alternately, checking the team rankings from the options we can see that A would have played 4 or 13 only in the round 5 and it would have played team 56 only in round 4. Hence, it is only team 22 from the given options that the rank 1 team could have played in the final.

14. Let each match of the round 1 be an upset except the match played by the 23<sup>rd</sup> rank team. Then in the second round the 23<sup>rd</sup> rank team would meet the 55<sup>th</sup> ranked team. If except this match, each match of the 2<sup>nd</sup> round was an upset then in the 3<sup>rd</sup> round and the next rounds it would

meet against a lower ranked team. So, it is possible that there would be 0 upsets created by the team ranked 23, and it could still win the tournament.

15. To maximize the rank of the winner all the upsets must happen in the 1<sup>st</sup> round. This would make sure that every team has either caused or faced an upset. If every match of the 1<sup>st</sup> round was an upset, then the 33<sup>rd</sup> to the 64<sup>th</sup> ranked team were left in the second round. The highest ranked team that could win the tournament is the 33<sup>rd</sup> ranked team.
16. If we analyze carefully then we can see that the 16<sup>th</sup> ranked is the highest ranked team who can win the tournament with four upsets, three caused by it. The 16<sup>th</sup> ranked team could advance to the 3<sup>rd</sup> round without any upset. In the 3<sup>rd</sup> round suppose it played against the 32<sup>nd</sup> rank team, who beat the 1<sup>st</sup> rank team in the 2<sup>nd</sup> round. So the 16<sup>th</sup> ranked team reaches the 4<sup>th</sup> round without any upset. From there it could win the tournament by causing three upsets in the 4<sup>th</sup> round, the semifinal and in the final. You can check that teams below 16, like the 17<sup>th</sup> ranked team onwards could not win the tournament with only 4 upsets in the tournament.

**SECTION - III**

**DATA INTERPRETATION**

**FROM THE ARCHIVES**

## PART 1

# XAT Exam Paper

XAT Papers 2019 to  
2008

### In This Part You will Learn:

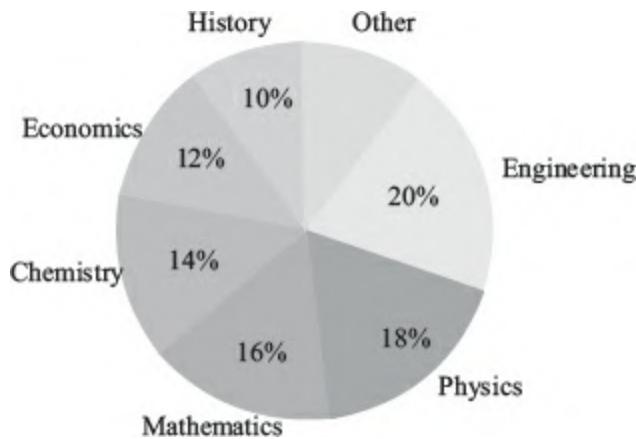
- **The Data Interpretation Questions in XAT** are a mix of traditional and Logical DI – and also come with a huge variance in their difficulty levels. One thing to note is that there is no separate section for DI in XAT – as all the data interpretation questions are a part of the Quantitative Aptitude and Data Interpretation Section. Of late – during the last 5-7 years, typically you would see that the XAT would test you with

**anywhere between 6-9 questions out of the 24-27 questions in the QA & DI section of the test. In the earlier XAT papers (before 2010) you would see between 10-15 questions in the exam.**

- In this part, we have included the DI from the XAT papers from 2008 to 2019. Please go through each of the papers carefully, with a time limit of 8 minutes per set first, before you go on to solve the question set in unlimited time.**

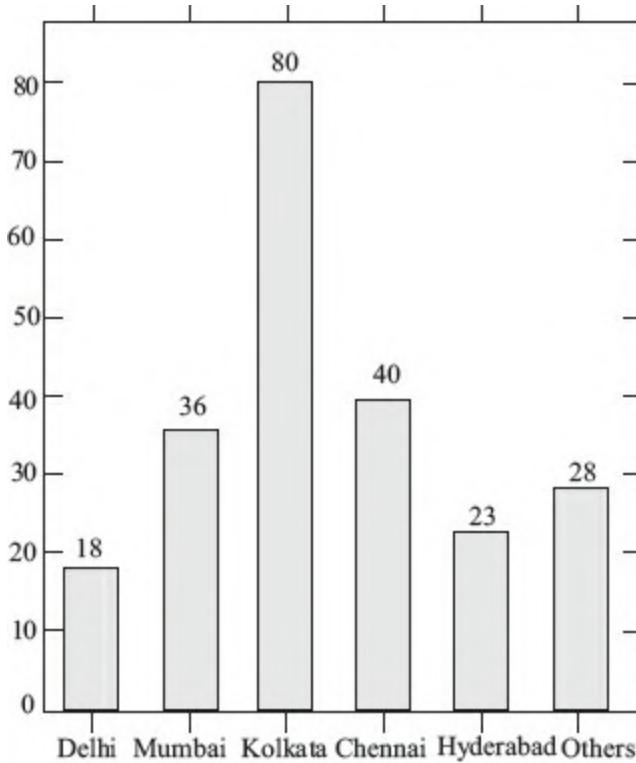
**Directions for Questions 1 to 3:****Comprehension:**

The break-up of the students in a university by subject major is given in the polar pie-chart. The bar chart shows the number of students who major in physics by geographic location.

**Percentage of students, by major**

1. How many students major in chemistry?
  - (a) 200
  - (b) 170
  - (c) 190
  - (d) 180
  - (e) 175

**Location of Physics majors**



2. If the proportion of physics majors who are from Delhi is the same as the proportion of engineering majors who are Delhi, how many engineering majors are from Delhi?
- 24
  - 22
  - 26
  - 20
  - 18
3. 12% of all students are from Chennai. What is the largest possible percentage of economics students that can be from Chennai, rounded off to the nearest integer?
- 71%
  - 77%
  - 75%
  - 73%
  - 69%

**Direction for Question 4 to 6:**

## **Comprehension:**

Given below is the time table for a trans-continental train that cuts across several time zones. All timings are in local time in the respective cities. The average speed of the train between any two cities is the same in both directions.

| <i>Local time</i> | <i>Local time</i> |   |      |   | <i>Local time</i> | <i>Local time</i> |
|-------------------|-------------------|---|------|---|-------------------|-------------------|
| Arrival           | Departure         |   | City |   | Arrival           | Departure         |
| -                 | 06:00 AM          | ↓ | Zut  |   | 12:40 PM          | -                 |
| 07:45 AM          | 07:50 AM          | ↓ | Yag  | ↑ | 10:50 AM          | 10:55 AM          |
| 02:45 PM          | 02:50 PM          | ↓ | Vaq  | ↑ | 11:50 PM          | 11:55 PM          |
| 07:40 PM          | 07:45 PM          | ↓ | Sab  | ↑ | 12:55 PM          | 01:00 PM          |
| 10:40 PM          | -                 | ↓ | Raz  | ↑ | -                 | 08:00 AM          |

4. Which of the following pairs of cities are in the same time zone?
  - (a) Yag and Vaq
  - (b) Vaq and Sab
  - (c) No pair of cities are in the same time zone
  - (d) Zut and Yag
  - (e) Sab and Raz
5. What is the total time taken in minutes by the train to go from Zut to Raz?
  - (a) 28 hours, 40 minutes
  - (b) 22 hours, 40 minutes
  - (c) 16 hours, 40 minutes
  - (d) 24 hours, 40 minutes
  - (e) 20 hours, 40 minutes
6. What time is it at Yag when it is 12:00 noon at Sab?
  - (a) 7:00 am
  - (b) 12:00 noon
  - (c) 9:30 am
  - (d) 2:30 pm
  - (e) 5:00 pm

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**ANSWER KEY**

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1. (e)
  2. (d)
  3. (d)
  4. (d)
  5. (b)
  6. (e)
- 

## SOLUTIONS

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### Questions 1 to 3:

1. The total number of Physics Majors can be seen from the bar chart – and is equal to:  $18 + 36 + 80 + 40 + 23 + 28 = 225$ . This number is equal to 18% of the total. Chemistry is equal to 14% of the total and hence is equal to  $14/18 \times 225 = 1175$ . Option (e) is correct.
2. It can be seen that Engineering corresponds to 20% of the total pie chart. Since, the Physics majors correspond to 18% & of these, 18 are from Delhi, hence, for Engineering's value of 20%, 20 would be from Delhi. Option (d) is correct.
3. Since, 18% of the total (for Physics) has a total value of 225, there are a total of 1250 students majoring in one of the subjects. 12% students of all students from Chennai, means that there are a total of 150 students from Chennai. Out of these 150, 40 students are majoring in Physics. This leaves us with a total of  $150 - 40 = 110$  more students from Chennai who need to be allocated to the various majors. We will get the condition for the maximum possible percentage of economics students being from Chennai, if we allocate all these remaining 110 Chennai students to Economics as a major. Also, the total number of Economics majors are  $12\% \text{ of } 1250 = 150$ . The required percentage value is given by, the percentage value of the fraction:  $110/150 \approx 73\%$ . Option (d) is correct.

### Questions 4 to 6:

Assuming no time zone gaps, we can see that the timings for each journey seem to be:

|                              | <i>Journey from Zut to Raz</i> | <i>Journey from Raz to Zut</i> |                     | <i>Time difference</i>      |
|------------------------------|--------------------------------|--------------------------------|---------------------|-----------------------------|
| Time required for Zut – Yag  | 1 hour 45 minutes              | Time required for Yag to Zut   | 1 hour 45 minutes   | Yag and Zut = 0             |
| Time required for Yag – Vaq  | 6 hours 55 minutes             | Time required for Vaq to Yag   | 10 hours 55 minutes | Yag is 2 hours ahead of Vaq |
| Time required for Vaq to Sab | 4 hours 50 minutes             | Time required for Sab to Vaq   | 10 hours 50 minutes | Vaq is 3 hours ahead of Sab |
| Time required for Sab to Raz | 2 hours 55 minutes             | Time required for Raz – Sab    | 4 hours 55 minutes  | Sab is 1 hour ahead of Raz  |

Interpretation of the table: For Sab to Raz, the going time is seen as 2 hours 55 minutes, while the return time is seen as 4 hours 55 minutes. This is not possible since the time for going and the time for returning should be the same. The only possible explanation is that Sab is 1 hour ahead of Vaq in timing. So, when the train leave Sab for Raz at 7:45 PM, it is actually 6:45 PM at Raz. In such a case, the train would take 3 hours 55 minutes to reach Raz. The return journey also makes sense the same way → When it is 8 AM at Raz, it is actually 9 AM at Sab (Since the time at Sab is 1 hour ahead of the time at Raz). So, when the train reaches Sab at 12:55, it has traveled for 3 hours 55 minutes exactly. The other time differences are marked in the table based on the same logic.

4. It can be inferred from the table that there is no time difference between Zut and Yag and hence they are in the same time zone. Option (d) is correct.
5. The total journey starts at 6 AM at Zut and ends at 10:40 PM at Raz. Since, Zut is 6 hours ahead of Raz, when it is 10:40 PM at Raz, it must be 4:40 AM at Zut. Thus, in terms of Zut time, the journey starts at 6 AM and gets completed the next day at 4:40 AM. The total time taken is 22 hours 40 minutes. Option (b) is correct.
6. Yag is 5 hours ahead of Sab. Hence, the time at Yag would be 5 PM. Option (e) is correct.

## 2 XAT 2018

**Directions for Questions 1 to 3:** Answer question 1-3 on the basis of information given in the following situation.

A courier service has offices at three locations: Jamshedpur, Kharagpur and Howrah. Its employees travel by trains from one location to another for pick-up and delivery. It takes 40 minutes for an employee to travel from any railway station to the nearest office (and another 40 minutes for coming back); the paperwork to deliver the parcel at the respective office takes an additional 10 minutes. Assume employees do not waste any time.

Employees have the option to choose from any of the trains, whose timetable is given in the table below. Assume all trains travel on time and there is no time gap between arrival and departure of a train. Further, assume that the employee boards the train as soon as it arrives at the station.

| Train Numbers →    | T101  | T102  | T103  | T104  | T105  |
|--------------------|-------|-------|-------|-------|-------|
| Jamshedpur Station | 06:00 | 07:30 | 10:15 | 15:00 | 17:00 |
| Kharagpur Station  | 07:30 | 09:05 | 12:05 | 16:50 | 18:25 |
| Howrah Station     | 09:05 | 11:10 | 14:30 | 19:30 | 20:30 |
| Train Numbers →    | T201  | T202  | T203  | T204  | T205  |
| Howrah Station     | 06:30 | 08:30 | 10:30 | 14:30 | 16:00 |
| Kharagpur Station  | 08:15 | 10:40 | 12:15 | 16:15 | 17:55 |
| Jamshedpur Station | 10:20 | 12:35 | 14:00 | 17:45 | 20:00 |

- What will be the minimum time required to deliver a parcel at Kharagpur office from Jamshedpur station and come back to Jamshedpur station?

- (a) 4 hours 25 minutes
  - (b) 5 hours 5 minutes
  - (c) 6 hours 35 minutes
  - (d) 7 hours 30 minutes
  - (e) None of the above
2. An employee, starting from Howrah station, has to deliver one parcel at Kharagpur office and another parcel at Jamshedpur office. His task starts the moment he boards the train at Howrah station, and gets completed immediately after delivering the second parcel.  
Which of the following trains should he board at Howrah station to **minimize** the time required to complete his task?
- (a) T201
  - (b) T202
  - (c) T204
  - (d) Both Option (a) and Option (b)
  - (e) Both Option (b) and Option (c)
3. An employee, starting from Kharagpur station, has to deliver one parcel at Howrah office and another parcel at Jamshedpur office. His task starts the moment he boards the train at Kharagpur station, and gets completed immediately after delivering the second parcel.  
Which of the following trains should be board at Kharagpur station to **minimize** the time required to complete his task?
- (a) T102
  - (b) T103
  - (c) T202
  - (d) T203
  - (e) Both Option b and Option d

**Directions for Questions 4 to 6:** Six teams are playing in a hockey tournament where each team is playing against every other team **exactly once**. At an intermediate stage, the status is as follows:

| <b>Teams</b> | <b>No. of Matches Played</b> | <b>No. of Matches won</b> | <b>No. of Matches Lost</b> | <b>No. of Matches Drawn</b> | <b>Goals scored by the team</b> | <b>Goals conceded by the team</b> |
|--------------|------------------------------|---------------------------|----------------------------|-----------------------------|---------------------------------|-----------------------------------|
| Team A       | 2                            | 2                         | 0                          | 0                           | 5                               | 1                                 |
| Team B       | 2                            | 1                         | 0                          | 1                           | 5                               | 1                                 |
| Team C       | 2                            | 1                         | 0                          | 1                           | 2                               | 0                                 |
| Team D       | 2                            | 0                         | 0                          | 2                           | 1                               | 1                                 |
| Team E       | 2                            | 0                         | 2                          | 0                           | 1                               | 4                                 |
| Team F       | 2                            | 0                         | 2                          | 0                           | 0                               | 7                                 |

**Notes:** The team that scores more goals than it concedes wins the match, while if both the teams score the same no. of goals, the match is declared drawn.

In a match played between Team X and Team Y, if team X scores 1 and concedes none, then the score line would read: Team X – Team Y (1–0).

4. Which of the following matches are yet to be played?
  - (a) Team A – Team B and Team C – Team D
  - (b) Team C – Team D and Team E – Team F
  - (c) Team E – Team F and Team B – Team D
  - (d) Team C – Team D and Team A – Team E
  - (e) Team A – Team B and Team E – Team F
5. Which of the following score line is a possible outcome in the tournament?
  - (a) Team A – Team D (1–0)
  - (b) Team A – Team E (2–1)
  - (c) Team B – Team D (1–0)
  - (d) Team C – Team F (2–0)
  - (e) None of the above
6. Which of the following score line is **not** a possible outcome in the tournament?
  - (a) Team A – Team F (4–0)
  - (b) Team B – Team F (4–0)
  - (c) Team C – Team D (0–0)
  - (d) Team C – Team E (2–0)
  - (e) All of the above options are possible

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## ANSWER KEY

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1. (b)
  2. (e)
  3. (b)
  4. (e)
  5. (b)
  6. (a)
- 

## SOLUTIONS

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### Questions 1 to 3:

1. The least time would be required if a person takes the train at 7:30 and reaches Kharagpur station at 9:05, then goes to the Kharagpur office (+40 minutes), finishes his paperwork in 10 minutes and comes back to the Kharagpur station (+40) minutes. From 9:05, these three would take a total of 90 minutes so that he reaches the Kharagpur station back by 10:35, then catches the 10:40 train and reaches Jamshedpur station by 12:35. The total time required in this case would be 5 hours 5 minutes (from 7:30 to 12:35). Hence, option (b) is correct.
2. It can be seen that if he takes T201, he would start from Howrah at 6:30, reach Kharagpur at 8:15, get back to the Kharagpur station in 90 minutes by 9:45 and then take the T202 train to Jamshedpur to reach Jamshedpur station at 12:35. He would take 40 minutes from the station to reach the office – but we can ignore that time while calculating the fastest way to deliver the two parcels, since the time from the Jamshedpur station to the office and further would be constant under all scenarios. So, we can see that if he boards T201, he would reach the Jamshedpur station at 12:35, 6 hours 5 minutes after boarding at Howrah.

Checking up what happens if we start with T202, we get that if he starts at 8:30, he reaches Kharagpur at 10:40, comes back to the Kharagpur station at 12:10 (after delivering the package to the office in  $40 + 10 + 40 = 90$  minutes) and takes the 12:15 train to reach Jamshedpur at 14:00 hours. The total time taken from 8:30 to 14:00 is 5 hours 30 minutes.

Checking for T204, we can see again that he would take a total time of 5 hours 30 minutes again (14:30 to 20:00). Hence, both Options (b) and (c) give us the same minimum time. Hence, option (e) is correct.

3. We can work out the time frames required in each case as follows:

T102 at Kharagpur: Starts at 9:05, reaches Howrah at 11:10, comes back to the Howrah station at 12:40, takes T204 at 14:30 and reaches Jamshedpur station at 17:45 – total time elapsed in reaching the Jamshedpur station is 8 hours 40 minutes.

T103 at Kharagpur: Starts at 12:05, reaches Howrah at 14:30, comes back to the Howrah station at 16:00, takes T205 at 16:00 and reaches Jamshedpur station at 20:00 – total time elapsed in reaching the Jamshedpur station is 7 hours 55 minutes.

T202 at Kharagpur: Starts at 10:40, reaches Jamshedpur at 12:35, comes back to the Jamshedpur station at 14:05, takes T104 at 15:00 and reaches Howrah station at 19:00 – total time elapsed in reaching the Howrah station is 8 hours 20 minutes.

T203 at Kharagpur: Starts at 12:15, reaches Jamshedpur at 14:00, comes back to the Jamshedpur station at 15:30, takes T105 at 17:00 and reaches Howrah station at 20:30 – total time elapsed in reaching the Howrah station is 8 hours 15 minutes.

Please note that we have not considered the extra 40 minutes from the final station to the office in that city, since that time would be the same for all options – and would have no bearing in finding the minimum time.

The minimum time can be seen to be if he takes T103 at Kharagpur. Hence, option (b) is correct.

#### **Questions 4 to 6:**

From the numbers in the table the following set of deductions can be made:

**Deduction string 1:** Team A won matches against Teams E and F, since E and F are the only teams who have lost matches. Further, Team A must have won its match against Team E by 2-1 or 3-1, since it is clear from the goals conceded column, that Team A conceded 1 goal in its two matches, while at the same time, Team F has not scored a goal. Thus, Team A has two possibilities for its two matches against E and F: Possibility 1: Won 2-1 against E, Won 3-0 against F; Possibility 2: Won 3-1 against E and won 2-0

against F.

**Deduction string 2:** Based on these possibilities if we look at Team B's results, we realize that possibility 2 is not possible, since if Team A won 2-0 against F, and since F has conceded 7 goals and scored none, Team B should have won 5-0 against F. But if Team B wins 5-0, then it would have to lose its second match 0-1 to match the numbers in its goals scored and goals conceded columns. This is not possible. Hence, we come up with the following conclusions:

**Deduction string 3:** Team A wins 2-1 against E, wins 3-0 against F, while Team B wins 4-0 against F and draws 1-1 against D.

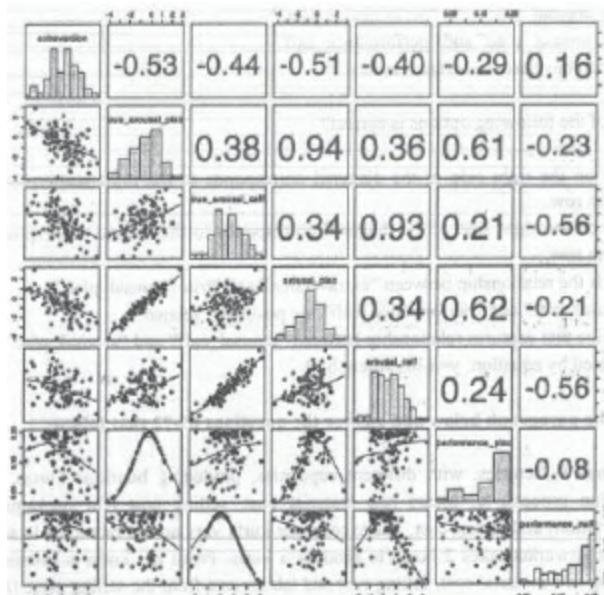
**Deduction string 4:** Team C must win its game 2-0 against E and draw 0-0 against Team D. At this point we realize that we know the results of all the six matches played.

The Answer can be read off from the information derived through the three deductions above:

4. Only option (e) is correct, since the matches between C and D & B and D have been played and each of the first 4 options contains one of these matches as a not played yet match. For option (e) we can see that A-B and E-F, both these matches haven't happened. Hence, option (e) is correct.
5. We can see from the results that we have derived, that option (b) is the correct Answer.
6. Team A cannot beat Team F by 4-0. Hence, option (a) is the correct Answer.

**Analyse the Graph below and Answer the Questions 1 to 4 that follow:**

The grid below captures relationships among seven personality dimensions: “extraversion”, “true\_arousal\_plac”, “true\_arousal\_caff”, “arousal\_plac”, “arousal\_caff”, “performance\_plac”, and “performance\_caff”. The diagonal represents histograms of the seven dimensions. Left of the diagonal represents scatterplots between the dimensions while the right of the diagonal represents quantitative relationships between the dimensions. The lines in the scatterplots are closest approximation of the points. The value of the relationship to the right of the diagonal can vary from -1 to +1, with -1 being the extreme linear negative relation and +1 extreme linear positive relation. (Axes of the graph are conventionally drawn).



1. Which of the following is true?
  - (a) “Extraversion” has two modes.

- (b) Median for “arousal\_plac” is definitely the same as its average.
  - (c) Median for “arousal\_caff” is definitely higher than its average.
  - (d) Median for “performance\_plac” is definitely lower than its average.
  - (e) Median for “performance\_caff” is definitely lower than its average.
2. Which of the scatterplots shows the weakest relationship?
- (a) Between “extraversion” and “performance\_caff”.
  - (b) Between “true\_arousal\_plac” and “arousal\_plac”.
  - (c) Between “true\_arousal\_plac” and “performance\_plac”.
  - (d) Between “true\_arousal\_caff” and “performance\_caff”.
  - (e) Between “arousal\_caff” and “performance\_caff”.
3. In which of the following scatterplots, the value of one dimension can be used to predict the value of another, as accurately as possible?
- (a) “extraversion” and “true\_arousal\_caff”.
  - (b) “true\_arousal\_plac” and “arousal\_plac”.
  - (c) “true\_arousal\_plac” and “performance\_plac”.
  - (d) “true\_arousal\_plac” and “performance\_caff”
  - (e) All the above are irrelevant relations.
4. Which of the following options is correct?
- (a) 0.93 on the right side of the diagonal corresponds to the third scatterplot in the fourth row.
  - (b) 0.94 on the right side of the diagonal corresponds to the second scatterplot in the fourth row.
  - (c) 0.38 is the relationship between “extraversion” and “true\_arousal\_plac”.
  - (d) “arousal\_caff” and “performance\_caff” are positively related.
  - (e) The line that captures relationship between “arousal\_caff” and “arousal\_plac” can be denoted by equations:  $y = a - bx$ , where  $b > 0$ .

**Study the Paragraph below and Answer the Questions 5 to 8 that follow:**

Abdul has 8 factories, with different capacities, producing boutique kurtas. In the production process, he incurs raw material cost, selling cost (for packaging and transportation) and labour cost. These costs per kurta vary across factories. In all these factories, a worker takes 2 hours to produce a

kurta. Profit per kurta is calculated by deducting raw material cost, selling cost and labour cost from the selling price ( $\text{Profit} = \text{selling price} - \text{raw materials cost} - \text{selling cost} - \text{labour cost}$ ). Any other cost can be ignored.

### **Exhibit : Business Details of Abdul's 8 Factories**

|           | <i>Production Capacity</i> | <i>Selling Price/ Kurta</i> | <i>Profit/ Kurta</i> | <i>Selling Cost/ Kurta</i> | <i>Labour Cost/ Hour</i> |
|-----------|----------------------------|-----------------------------|----------------------|----------------------------|--------------------------|
| #         | (No. of kurtas)            | ₹                           | ₹                    | ₹                          | ₹                        |
| Factory 1 | 2500                       | 4800                        | 775                  | 60                         | 450                      |
| Factory 2 | 1500                       | 5300                        | 800                  | 45                         | 400                      |
| Factory 3 | 800                        | 5800                        | 900                  | 60                         | 550                      |
| Factory 4 | 1000                       | 5500                        | 800                  | 68                         | 450                      |
| Factory 5 | 1500                       | 5400                        | 600                  | 75                         | 600                      |
| Factory 6 | 1100                       | 6000                        | 875                  | 65                         | 400                      |
| Factory 7 | 2500                       | 4900                        | 500                  | 85                         | 350                      |
| Factory 8 | 2000                       | 5300                        | 600                  | 70                         | 420                      |

5. Which of the following options is in decreasing order of raw materials cost?
  - (a) Factory 3, Factory 4, Factory 7, Factory 5
  - (b) Factory 4, Factory 3, Factory 2, Factory 5
  - (c) Factory 6, Factory 3, Factory 5, Factory 7
  - (d) Factory 6, Factory 8, Factory 7, Factory 2
  - (e) Factory 8, Factory 3, Factory 2, Factory 4
6. Which of the factories listed in the options below has the **lowest** sales margin (Sales margin = profit per kurta divided by selling price per kurta)?
  - (a) Factory 2
  - (b) Factory 4
  - (c) Factory 5
  - (d) Factory 6
  - (e) Factory 7
7. Abdul has received an order for 2,000 kurtas from a big retail chain. They will collect the finished pre-packaged kurtas directly from the factories, saving him the selling cost. To deliver this order, he can use

multiple factories for production. Which of the following options will ensure maximum profit from this order?

- (a) Factory 1
  - (b) Factories 2 and 3
  - (c) Factories 4 and 6
  - (d) Factories 3, 6 and 4
  - (e) Factory 1 or Factory 7 or Factory 8
8. Abdul has introduced a new technology in all his factories. As a result, a worker needs just 1.5 hour to produce a kurta. If raw materials cost and selling cost remain the same, which of the factories listed in the options below will yield the highest profit per kurta?
- (a) Factory 2
  - (b) Factory 3
  - (c) Factory 4
  - (d) Factory 5
  - (e) Factory 6

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## ANSWER KEY

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- 1. (a)
- 2. (a)
- 3. (c)
- 4. (b)
- 5. (a)
- 6. (e)
- 7. (b)
- 8. (b)

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## SOLUTIONS

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### Questions 1 to 4:

1. It is clear from the histogram that there are two maximum bars in the

histogram for extraversion. Hence, extraversion has 2 modes is the correct answer. Option (a) is correct.

2. The question clearly asks us to look at the scatterplots to look for the relationship. Amongst the given options, the scatter plot between extraversion and Performance-caff is the most scattered – thus showing the weakest relationship amongst the two dimensions. Hence, option (a) is correct.
3. Among ‘true arousal plac’ and ‘performance plac’ the scatterplot exhibits almost a one-to-one relationship – with almost no deviations between the points of the two dimensions. Clearly, then you can use the value of true arousal plac to predict the value of performance plac the most accurately. Hence, option (c) is correct.
4. 0.94 corresponds to the quantitative relationship between true arousal plac and arousal plac. This is represented by the scatterplot in the second column of the fourth row. Hence, option (b) is correct. The other options can be understood to be incorrect.

#### Questions 5 to 8:

5. Looking at the options, we can see that we would need to find the raw material costs for each of the factories except factory 1, in order to answer this question.

$$\text{Raw material cost for Factory 2} = 5300 - 800 - 45 - 2 \times 400 = 3665$$

$$\text{Raw material cost for Factory 3} = 5800 - 900 - 60 - 2 \times 550 = 3740$$

$$\text{Raw material cost for Factory 4} = 5500 - 800 - 68 - 2 \times 450 = 3732$$

$$\text{Raw material cost for Factory 5} = 5400 - 600 - 75 - 2 \times 600 = 3525$$

$$\text{Raw material cost for Factory 6} = 6000 - 875 - 65 - 2 \times 400 = 4260$$

$$\text{Raw material cost for Factory 7} = 4900 - 500 - 85 - 2 \times 350 = 3615$$

$$\text{Raw material cost for Factory 8} = 5300 - 600 - 70 - 2 \times 420 = 3790$$

Only option (a) gives us the correct decreasing order of raw material cost.

6. Sales margin for Factory 2 =  $800/5300 = 8/53$

$$\text{Sales margin for Factory 4} = 800/5500 = 8/55$$

$$\text{Sales margin for Factory 5} = 600/5400 = 6/54$$

$$\text{Sales margin for Factory 6} = 875/6000$$

$$\text{Sales margin for Factory 7} = 500/4900 = 5/49$$

Sales margin is lowest for Factory 7. Option (e) is correct.

7. The problem states that Abdul would be saving the selling cost in this case. Hence, the effective profit per kurta would be the profit per kurta + the selling cost per kurta.

Profit when we use Factory 1 for production =  $775 + 60 = 835$

Similarly we can calculate the profit for other factories as well.

Factory 2 = 845

Factory 3 =  $900 + 60 = 960$

Factory 4 = 868

Factory 6 = 940

Factory 7 = 585

Factory 8 =  $600 + 70 = 670$

Since the profit margins are the highest in Factories 3 and 6, these factories should be used for maximum production. However, we cannot completely produce 2000 units in Factories 3 and 6 together. Hence, we should also use Factory 4 for the remaining 100 units (as Factory 4 has the third highest profit margin). Hence, we select (d).

8. With the new technology the total labour cost will be decreased by 25%. So, the net profit will get increased by a value equal to half an hour's labour cost in the factory.

New profit for Factory 2 =  $800 + 400/2 = 1000$

New profit for Factory 3 =  $900 + 550/2 = 1175$

New profit for Factory 4 =  $800 + 450/2 = 1025$

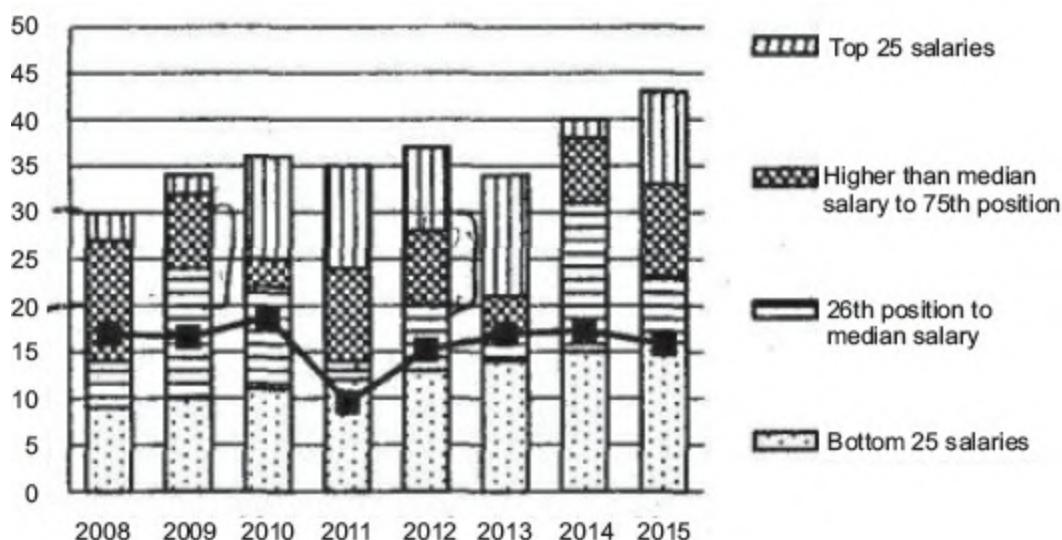
New profit for Factory 5 =  $600 + 600/2 = 900$

New profit for Factory 6 =  $875 + 400/2 = 1075$

Highest profit is for Factory 3. Hence, option (b) is correct.

**Study the Graph below and Answer the Questions 1 to 4 that follow:** This graph depicts the last eight years' annual salaries (in ₹lacs.) offered to students during campus placement. Every year 100 students go through placement process. However, at least one of them fails to get placed. The salaries of all unplaced students are marked zero and represented in the graph.

**Salaries at various years**



*The bold line in the graph presents Mean salaries at various years.*

1. In which year were a maximum number of students offered salaries between ₹20 and ₹30 lacs (both inclusive)?
  - (a) 2008
  - (b) 2009

- (c) 2010  
 (d) 2012  
 (e) Cannot be determined
2. Identify the years in which the annual median salary is higher by at least 60% than the average salary of the preceding year?
- (a) 2009, 2010  
 (b) 2012, 2014  
 (c) 2009, 2010, 2012  
 (d) 2009, 2012, 2014  
 (e) 2009, 2010, 2012, 2014
3. Identify the number of years in which the difference between the average salaries of the top 25% and the bottom 25% is more than ₹20 lacs:
- (a) 0  
 (b) 1  
 (c) 2  
 (d) 3  
 (e) 4
4. If the average salary is computed excluding students with no offers, in how many years will the new average salary be greater than the existing median salary? Refer the table below for number of students without offers.

| Year                      | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|------|------|------|------|------|------|------|------|
| Number without job offers | 9    | 5    | 20   | 2    | 2    | 4    | 15   | 2    |

- (a) 3  
 (b) 4  
 (c) 5  
 (d) 6  
 (e) Cannot be solved without additional information.

**Study the data given in the table below and answer the questions 5 to 7 that follow:**

| <i>Shop Type \ Region</i> | <i>North</i> | <i>East</i> | <i>West</i> | <i>South</i> | <i>All India</i> |
|---------------------------|--------------|-------------|-------------|--------------|------------------|
| Grocers                   | 34.7         | 32          | 32.2        | 30.2         | 32.4             |
| Pan Bidi                  | 7.1          | 21.2        | 13.1        | 19.1         | 14.6             |
| Food Shops                | 11.8         | 7.9         | 14.8        | 12           | 11.6             |
| General Stores            | 12.4         | 9.1         | 12          | 6.6          | 10.1             |
| Electrical Hardware       | 8.3          | 5.6         | 7.7         | 5.7          | 6.7              |
| Chemists                  | 6            | 5.8         | 5           | 5.7          | 5.7              |
| Cosmetic Stores           | 3.8          | 3.6         | 3.3         | 3.9          | 3.7              |
| Others                    | 15.8         | 14.8        | 12          | 16.8         | 15.2             |
| Total                     | 100          | 100         | 100         | 100          | 100              |

*All figures are in percentage*

Based on a survey of ‘shop types’ Kamath categorized Indian states into four geographical regions as shown in the table above. His boss felt that the categorization was inadequate since important labels were missing. Kamath argued that no further labels are required to interpret the data.

5. A consultant observing the data made the following two inferences:

**Inference I:** The number of Grocers per-thousand-population is the highest in North India.

**Inference II:** The number of Cosmetic per-thousand-population is the highest in South India.

Which of following options is DEFINITELY correct?

- (a) Inference I alone is correct.
  - (b) Inference II alone is correct.
  - (c) Either of the inferences is correct.
  - (d) Neither of the inferences is correct.
  - (e) Inference I will be correct only if Inference II is correct.
6. The average size of Food Shops in East India was twice that of Food Shops in West India. Which of the following CANNOT be inferred from the above data?
- (a) As far as ‘Food Shops’ are concerned, customers in East India prefer spatial surroundings compared to customers in West India.
  - (b) As far as ‘Food Shops’ are concerned, Rentals are very high in West India compared to East India.
  - (c) The ratio of customers buying from ‘Food Shops’ in East India to customers buying from ‘Food Shops’ in West India is 15.8 : 11.8.

- (d) There are 740 ‘Food Shops’ in West India.  
 (e) There are 240 ‘Food Shops’ in South India.
7. Bala collected the same data five years after Kamath, using the same categorisation. His data is presented below:

|                     | <i>North</i> | <i>East</i> | <i>West</i> | <i>South</i> | <i>All India</i> |
|---------------------|--------------|-------------|-------------|--------------|------------------|
| Grocers             | 30           | 32          | 32.2        | 40           | 32.4             |
| <i>Pan Bidi</i>     | 7.1          | 25          | 13.1        | 19.1         | 14.6             |
| Food Shops          | 4            | 7.9         | 14.9        | 12           | 11.6             |
| General Stores      | 12.4         | 9.1         | 12          | 7            | 10.1             |
| Electrical Hardware | 15           | 5.8         | 7.6         | 5.7          | 6.7              |
| Chemists            | 7            | 5.8         | 5           | 5.7          | 5.7              |
| Cosmetic Stores     | 3.9          | 3.6         | 3.2         | 3.9          | 3.7              |
| Others              | 20.6         | 10.8        | 12          | 6.6          | 15.2             |
| Total               | 100          | 100         | 100         | 100          | 100              |

Which of the following statements can DEFINITELY be concluded?

- (a) In the last four years the number of Electrical Hardware shop types has increased in North India.
- (b) In the last four years the number of Grocers shop types has increased in South India.
- (c) For the last four years in All India the number of Chemists shop types has remained constant.
- (d) In the four years in East India the number of ‘others’ shop type has decreased.
- (e) As per the new survey conducted *Pan Bidi* shops in East India are next only to Grocers.

## ANSWER KEY

1. (e)
2. (b)
3. (–)
4. (a)
5. (d)
6. (c)

7. (e)

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## SOLUTIONS

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### Questions 1 to 4:

1. As we don't have information about the actual salaries so we cannot predict the number of students in the salary range of 20–30 lacs. Hence option (e) is correct.
2. It can be seen that the median salary ( $50^{\text{th}}$  from bottom) is over 60% higher than the average salary for the previous year in the years 2012 and 2014. Hence, option (b) is correct.
3. This question was incorrect in the XAT and was not considered for evaluation.
4. New Average Salary =  $(\text{Old Average Salary}) \times 100 / (\text{100-students without jobs})$

The new average would be higher than the graph average of all years. For 2008 and 2013 the old average was already higher than the median salary.

In 2010, the new average salary would jump to 23.4, which is higher than the median salary for that year. If you check the other years, you see that the new average would not go above the median salary for that year.

Hence for 3 years (2008, 2010, 2013) the new average salary would be higher than the median salary. Hence, option (a) is correct.

### Questions 5 to 7:

5. As we don't have any information about the population of these four zones. So we cannot determine both the inferences. Hence, option (d) is correct.
6. We cannot infer any of the last 3 options here. Option (c) cannot be inferred because, we do not have any information about the number of 'customers buying' from the food shops. Options (d) and (e) cannot be inferred since we do not have any information about the number of any type of shop for the entire table. The official answer key, though marked option (c) as correct, though (d) and (e) should also be correct

- since the number of food shops cannot be inferred about from the given information.
7. Options (a), (b), (c) and d cannot be determined because there is no mention of gross numbers of shops for any of the four zones in either table. From the table it is clear that in East India, the number of *Pan Bidi* shops, are next only to Grocers. Hence, option (e) is correct.

**Directions for Questions 1 to 4:** Answer the questions on the basis of information given below.

Twitter allows its users to post/share and read short messages known as tweets. Tweets can be of three types—Positive Tweets (in support), Negative Tweets (against) and Neutral Tweets. The following table presents the *Number of Votes* and *Tweets* received by certain political parties.

| Parties        | Number of Votes |           |           | Tweets (Year 2010)  |                     |                     |
|----------------|-----------------|-----------|-----------|---------------------|---------------------|---------------------|
|                | Year 2000       | Year 2005 | Year 2010 | Total No. of tweets | Positive Tweets (%) | Negative Tweets (%) |
| A              | 329,700         | 343,200   | 364,450   | 131,021             | 33.3%               | 35.4%               |
| B              | 133,450         | 154,000   | 241,325   | 108,128             | 30.4%               | 29.7%               |
| C              | 196,250         | 123,200   | 162,525   | 96,620              | 32.5%               | 26.6%               |
| D              | 27,475          | 48,400    | 54,175    | 41,524              | 30.6%               | 36.1%               |
| E              | —               | 30,800    | 49,250    | 32,724              | 21.6%               | 41.0%               |
| Other Parties* | 98,125          | 180,400   | 113,275   | 15,000              |                     |                     |

\*Any party which has secured less than 2% of the total votes falls under ‘Other Parties’ category. For example, Party E secured less than 2% of total votes, in the year 2000.

**Note:** If the vote share (%age of total votes) of a party changes from 15% to 40%, gain in vote share would be 25%(= 40%, -15%).

- Which of the following options correctly arranges the political parties in descending order of gain in vote share from the year 2005 to the year 2010?

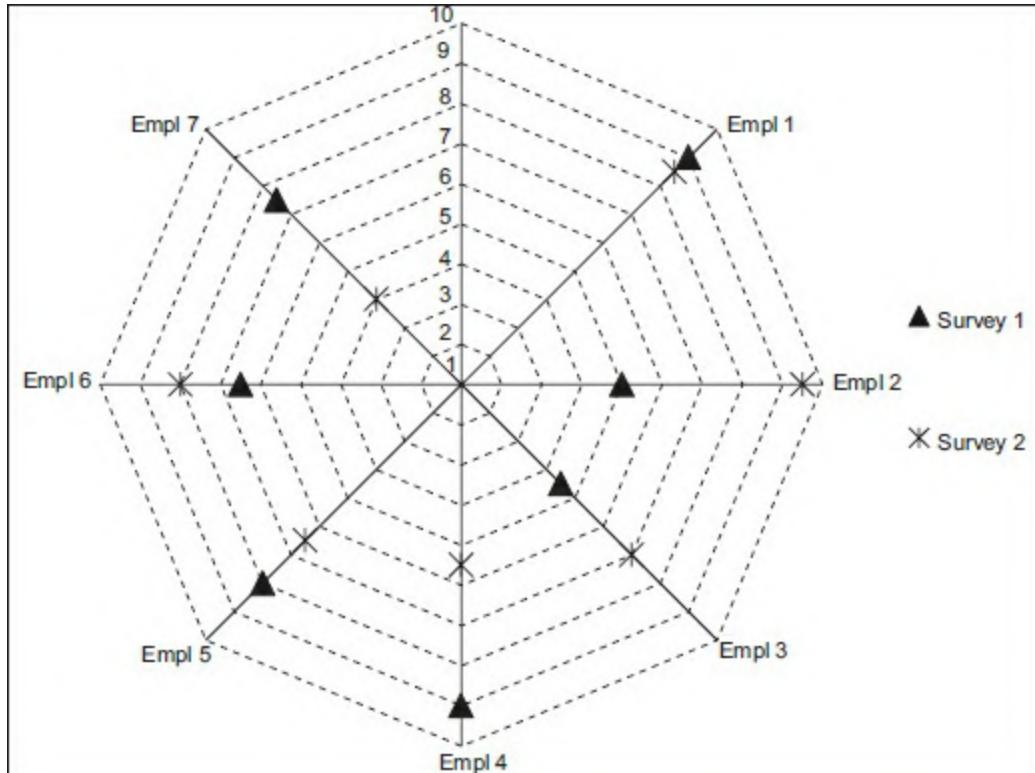
- (a) EBDCA
  - (b) EBCDA
  - (c) EBCAD
  - (d) BCEDA
  - (e) BCEAD
2. Which of the following parties received maximum number of “neutral tweets” in the year 2010?
- (a) Party B
  - (b) Party C
  - (c) Party D
  - (d) Party E
  - (e) One of the parties categorised under ‘Other Parties’
3. Between 2000 and 2010, in terms of gain in vote share which of the following *cannot* be a possible value (approximated to one decimal place) for any party?
- (a) 2.0%
  - (b) 2.5%
  - (c) 3.5%
  - (d) 4.5%
  - (e) 7.5%
4. In 2010, which of the following options has maximum difference between the vote share and tweet share?
- (a) Party B
  - (b) Party C
  - (c) Party D
  - (d) Party E
  - (e) Other Parties

**Directions for Questions 5 to 8:** Answer the questions on the basis of information given below.

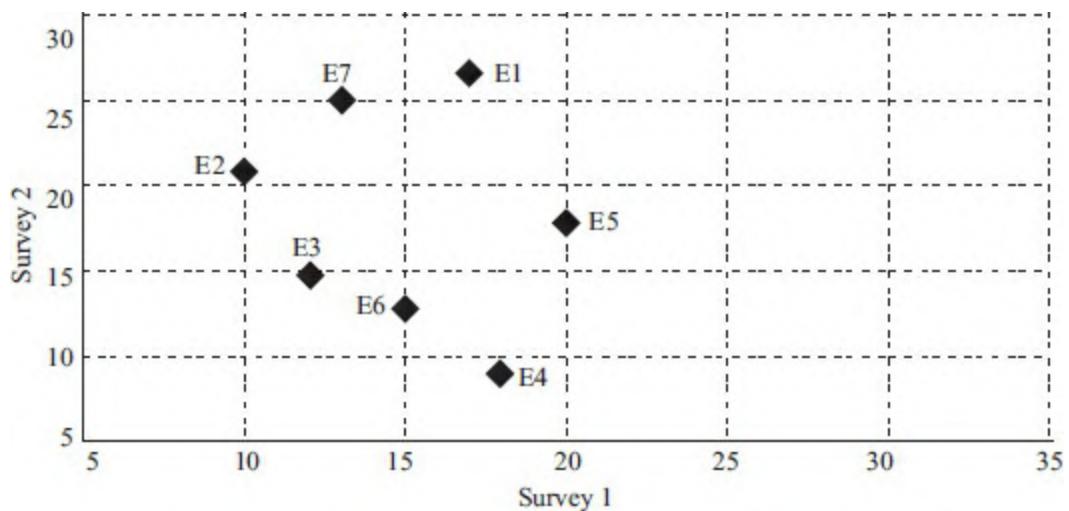
As a part of employee improvement programs, every year an organization conducts a survey on three factors: 1. Number of days (in integers) of training undergone, 2. Amount of bonus (in lacs) received by an employee and 3.

Employee effectiveness score (on the scale of 1 to 10). Survey results for last two years are given below for the same seven employees.

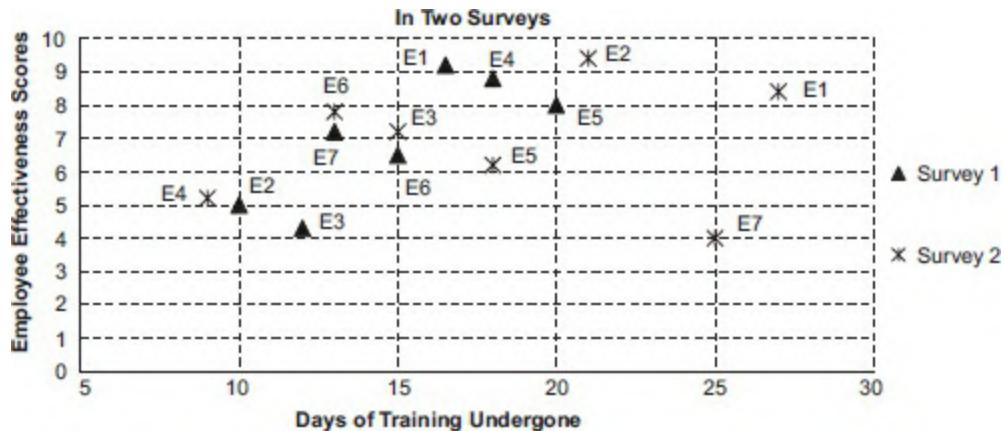
### 1. Employee Effectiveness Scores in Two Surveys



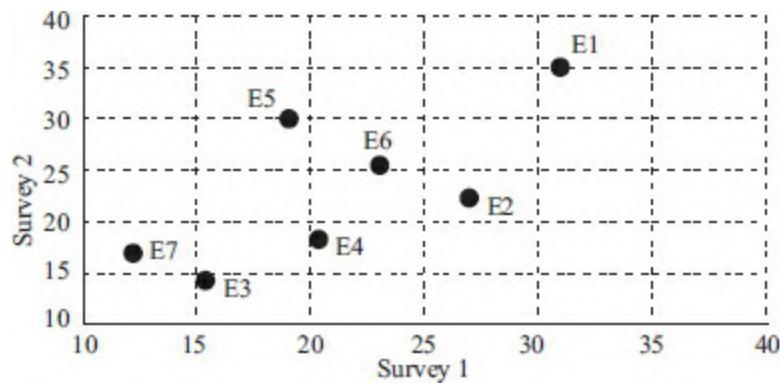
### 2A. Days of Training Undergone in Two Surveys



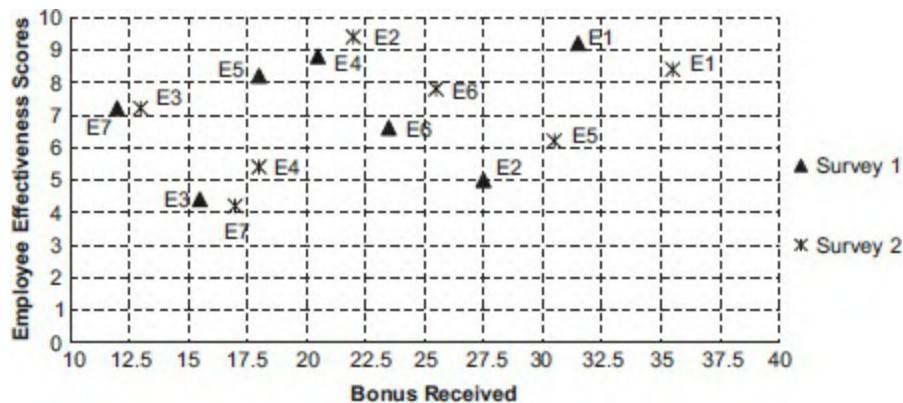
### 2B. Days of Training Undergone vs. Employee Effectiveness Scores



### 3A. Bonus Received In Two Surveys



### 3B. Bonus Received vs. Employee Effectiveness Scores In Two Surveys



5. In Survey 1, what was the average bonus earned by employees who underwent training for more than 17 days?
  - Between 16 and 17 lacs
  - Between 17 and 18 lacs
  - Between 18 and 19 lacs

- (d) Between 19 and 20 lacs  
(e) None of the above
6. Identify the number of employees whose employee effectiveness score was higher than 7 in Survey 1, but whose bonus was lower than 20 lacs in Survey 2.
- (a) 2  
(b) 3  
(c) 4  
(d) 5  
(e) None of the above
7. From Survey 1 to Survey 2, how many employees underwent more days of training but their annual bonus decreased?
- (a) 1  
(b) 2  
(c) 3  
(d) 4  
(e) None of the above
8. From Survey 1 to Survey 2: for how many employees training days increased along with an increase of employee effective score by at least 1.0 rating?
- (a) 2  
(b) 3  
(c) 4  
(d) 7  
(e) None of the above

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## ANSWER KEY

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1. (d)
2. (a)
3. (b)
4. (e)
5. (d)

6. (a)
  7. (b)
  8. (a)
- 

## SOLUTIONS

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1. By observing the options E or B can have the highest gain in vote share.

The gain in vote shares of E is to 49250 out of 985000 from 30800 out of 880000. This is a 1.5% gain in the vote share

Similarly the gain in the vote share of B is to 241325 out of 985000 (24.5%) from 154000 out of 880000 (17.5%)— a gain of 7%. Thus, B's vote share gain is larger than the vote share gain of E. Note: These calculations can be done approximately.

So options 1, 2, 3 are eliminated. Between options (4) and (5) the difference is between whether A has a larger vote share gain or D.

A's vote share can be seen to have diminished 364450 out of 985000 from 343200 from 880000, while the vote share of D is seen to be constant: 48400 out of 880000 becomes 54175 out of 985000.

Hence, option 5 is eliminated. Hence, option (d) is the correct answer.

2. Number of “neutral tweets” for B, C, D and E are:

Number of “neutral tweets” for party B: 39.9% of 108128; for Party C = 40.9% of 96620; Party D = 33.3% of 41524; Party E = 37.4% of 32724. A rough calculation would show that the value for B (which is just below 40%) would work out to around to 43000 would be higher than the corresponding values for parties C, D and E.

Hence, options (b), (c) and (d) are eliminated.

Parties classified under ‘Other Parties’ have a total of 15000 tweets. Thus, ‘Other Parties’ cannot have the maximum number of neutral tweets even if all 15000 tweets are neutral. Hence, option (e) is eliminated.

Hence, option (a) is correct.

3. In order to solve this question, you would need to look for the gain in

vote shares for each of the parties:

The respective values of these gains are: A = -5%, B = 7.5%; C = -8.5%; D = 2%. Thus, options (a) and (e) can be rejected as values that cannot occur. The growth in vote share for Party E would be between 3 to 5%. This is because, the party has a 5% vote share in 2010, while it has a maximum of 2% vote share in 2000. Thus, vote share gains of 3.5% and 4.5% are also possible. Only the second option remains – since 2.5% vote share gain is not possible for any party. Hence, option (b) is correct.

4. The difference between vote shares and tweet shares in 2010 for B =  $25.4 - 24.5 = 0.9$ ; For C =  $22.7 - 16.5 = 6.2$ ; For D =  $9.8 - 5.5 = 4.3$ ; For E =  $7.7 - 5 = 2.7$ ; For Others =  $11.5 - 3.5 = 8$ .

Hence, option (e) is correct.

5. From the second figure (days of training undergone in two surveys), it is clear that In survey 1 there are only 2 employees who underwent training for more than 17 days. These are employees E4 and E5.

Average bonus of E4 and E5 in survey 1 would be somewhere between 19 and 20. Approximately =  $\frac{21+18}{2} = 19.5$  (Note: These values can be read off the 4<sup>th</sup> or the 5<sup>th</sup> figures.

6. For solving this question, you need to look at the last figure. The employees who have an Employee effectiveness score of over 7 in Survey 1 are E1, E4, E5 and E7. Out of these employees, E4 and E7 earn less than 20 lacs in survey 2.

Hence, option (a) is correct.

7. It can be seen from the third figure, that the number of days of training increased for four employees between Survey 1 to Survey 2. These are E1, E2, E3 and E7. Out of these, the bonuses of E2 and E3 decreased from Survey 1 to Survey 2.

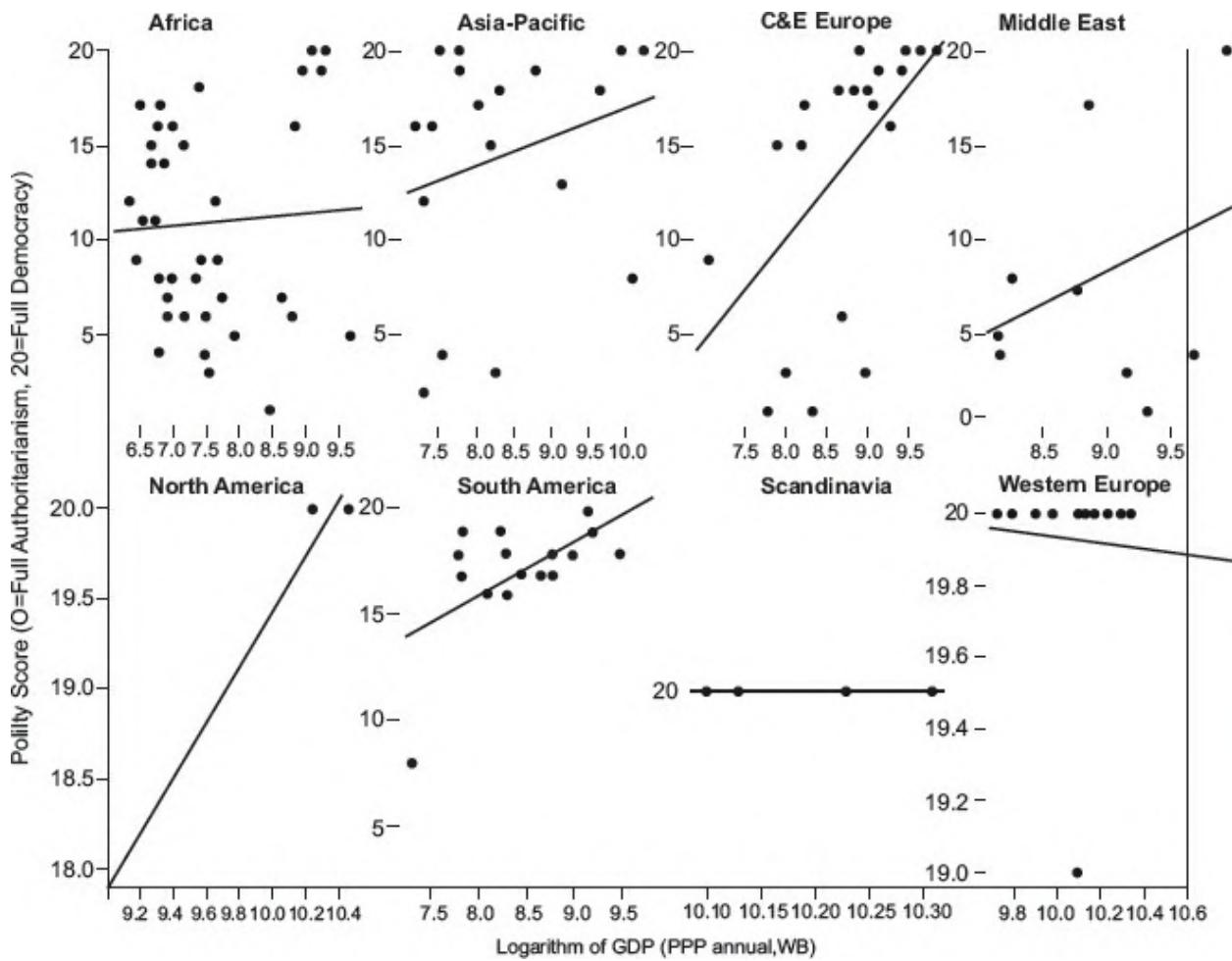
Hence, option (b) is correct.

8. Again has to be seen from the third figure. The number of days of training of E1, E2, E3 and E7 increased from Survey 1 to Survey 2. Out of these four, the employee effectiveness scores of E2 and E3 increased by at least 1.0 rating point.

Hence, option (a) is correct.

**Directions for Questions 1 to 3:** Answer the questions based on the trends lines from the following graphs.

Note: Left side of X axis represents countries that are “poor” and right side of X axis represents countries that are “rich”, for each region. GDP is based on purchasing power parity (PPP). These are World Bank (WB) estimates.



1. Which of the following could be the correct ascending order of democratic regions for poor?

  - (a) North America, C and E Europe, South America, Middle East, Asia Pacific
  - (b) Scandinavia, Western Europe, Africa, Asia Pacific, Middle East
  - (c) Scandinavia, Western Europe, North America, C and E Europe, Middle East
  - (d) C and E Europe, Africa, South America, Western Europe, Scandinavia
  - (e) Africa, South America, Western Europe, North America, Scandinavia
2. Which region has the highest disparity of democratic participation, between rich and poor?

  - (a) North America
  - (b) C and E Europe
  - (c) Africa
  - (d) South America
  - (e) Western Europe
3. The maximum GDP of African region is higher than the maximum GDP of South American region by factor of:

  - (a) 10
  - (b) 100
  - (c) 2
  - (d) 4
  - (e) None of these

**Directions for Questions 4 to 6:** Answer the questions based on the given data on the tourism sector of India.

| Years | Foreign Tourist Arrivals in India (in million) | Foreign Exchange Earnings from Tourism in India (in US \$ million) | Foreign Exchange Earnings from Tourism in India (in ₹ Crore) | Number of Indian Nationals Departures from India (in million) | Number of Domestic Tourist Visits to all States UTs (in millions) |
|-------|--|--|--|---|---|
| 1997  | 2.37   | 2889   | 10511  | 3.73  | 159.88  |
| 1998  | 2.36   | 2948   | 12150  | 3.81  | 168.2   |
| 1999  | 2.48   | 3009   | 12951  | 4.11  | 190.67  |
| 2000  | 2.65   | 3460   | 15626  | 4.42  | 220.11  |
| 2001  | 2.54   | 3198   | 15083  | 4.56  | 236.47  |
| 2002  | 2.38   | 3103   | 15064  | 4.94  | 269.6   |
| 2003  | 2.73   | 4463   | 20729  | 5.35  | 309.04  |
| 2004  | 3.46   | 6170   | 27944  | 6.21  | 366.27  |
| 2005  | 3.92   | 7493   | 33123  | 7.18  | 392.01  |
| 2006  | 4.45   | 8634   | 39025  | 8.34  | 462.32  |
| 2007  | 5.08   | 10729  | 44360  | 9.78  | 526.56  |
| 2008  | 5.28   | 11832  | 51294  | 10.87   | 563.03  |
| 2009  | 5.17   | 11136  | 53700  | 11.07   | 668.8   |
| 2010  | 5.78   | 14193  | 64889  | 12.99   | 747.7   |
| 2011  | 6.29   | 16564  | 77591  | 14.21   | 850.86  |

4. In which of the following years was the percentage increase in the number of *Indians going abroad* greater than the percentage increase in the number of *domestic tourists*?
- 2004 and 2005
  - 2005 and 2006
  - 2005 and 2007
  - 2006 and 2008
  - 2004, 2005 and 2006
5. In which of the following years was the rupee cheapest with respect to the dollar?
- 2001
  - 2002
  - 2007
  - 2010
  - 2011
6. Let ‘R’ be the ratio of *Foreign Exchange Earnings from Tourism in India* (in US \$ million) to *Foreign Tourist Arrivals in India* (in million). Assume that R increases linearly over the years. If we draw a pie chart of R for all the years, the angle subtended by the biggest sector in the pie chart would be approximately:

- (a) 24 degrees
- (b) 30 degrees
- (c) 36 degrees
- (d) 42 degrees
- (e) 48 degrees

**Directions for Questions 7 to 9:** Answer the questions based on the following information given below.

The exhibit given below compares the countries (first column) on different economic indicators (first row), from 2000-2010. A bar represents data for one year and a missing bar indicates missing data. Within an indicator, all countries have same scale.



The table given below contains data of GDP in constant 2000 US Dollars (in billions)

| Country       | 2000  | 2001   | 2002   | 2003   | 2004   | 2005   | 2006   | 2007   | 2008   | 2009   | 2010   |
|---------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Brazil        | 645   | 653    | 671    | 678    | 717    | 740    | 769    | 816    | 858    | 855    | 919    |
| China         | 1,198 | 1,298  | 1,416  | 1,558  | 1,715  | 1,909  | 2,151  | 2,457  | 2,693  | 2,940  | 3,246  |
| India         | 475   | 498    | 518    | 559    | 603    | 659    | 720    | 790    | 821    | 888    | 973    |
| Malaysia      | 94    | 94     | 99     | 105    | 112    | 118    | 125    | 133    | 140    | 137    | 147    |
| Philippines   | 81    | 83     | 86     | 91     | 97     | 101    | 107    | 114    | 119    | 120    | 129    |
| Thailand      | 123   | 125    | 132    | 141    | 150    | 157    | 165    | 174    | 178    | 174    | 187    |
| United States | 9,899 | 10,007 | 10,190 | 10,450 | 10,814 | 11,146 | 11,443 | 11,661 | 11,619 | 11,209 | 11,548 |
| Vietnam       | 31    | 33     | 36     | 38     | 41     | 45     | 48     | 53     | 56     | 59     | 63     |

7. Which of the following countries, after United States, has the highest spending on military as percentage of GDP, in the period 2000–2010?

- (a) Vietnam
  - (b) China
  - (c) India
  - (d) Brazil
  - (e) Thailand
8. Which country (and which year) has witnessed maximum year-to-year decline in “industry as percentage of GDP”? Given that the maximum value of industry as percentage of GDP is 49.7% and the minimum value of industry as percentage of GDP is 20.02%, in the chart above.
- (a) United States in 2002–3
  - (b) Brazil in 2006–7
  - (c) India in 2009–10
  - (d) Malaysia in 2008–9
  - (e) China in 2008–9
9. Which of the following countries has shown maximum increase in the “services, value added as % of GDP” from year 2000 to year 2010?
- (a) Brazil
  - (b) India
  - (c) United States
  - (d) Philippines
  - (e) None of the above

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## ANSWER KEY

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- 1. (d)
- 2. (b)
- 3. (e)
- 4. (c)
- 5. (b)
- 6. (c)
- 7. (c)
- 8. (d)
- 9. (b)

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## SOLUTIONS

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### Questions 1 to 9:

1. We can reject Option (a) because, for C and E Europe the polity score for poor nations is clustered below a score of 15, while for North America, the only poor nation is at 18. Thus, the order North America – C and E Europe for ascending order of polity score for poor is incorrect. Options (b) and (c) can be rejected because Scandinavia has a polity score as 20 for all its countries and hence it cannot be at the start of any list with increasing order of polity scores. Option (e) is also rejected because it puts Western Europe (which has perfect democracy as all its countries are at 20) below North America. Only the order in Option (d) obeys ascending order for polity scores. Hence, Option (d) is the correct answer.
2. It can be visually observed to be for C & E Europe as the poor countries in this region are clustered below 10 while the rich countries are clustered around a polity score of 18 to 20.
3. Clearly, the value of the maximum GDP for both the given regions is around 9.5 and hence equal. Hence, Option (e) is the correct answer.
4. It can be seen for the years 2005 and 2007 that the growth of Indian tourists traveling abroad was greater than the growth of domestic Indian tourists. Hence, Option (c) is correct.
5. The ratios to be compared are: 15083/3198 (2001), 15064/3103 (2002), 44360/10729 (2007), 64889/14193 (2010) and 77591/16564 (2011). We are looking for the cheapest value of rupee with respect to dollar, which means that we are looking for the costliest dollar with respect to rupee. We thus need to find the highest of these 5 ratios.  
The following chain of thoughts would lead you to the answer in the most efficient way:  
Between 2001 and 2002, and the ratios 15083/3198 (for 2001), 15064/3103 (for 2002) we can identify that the 2002 value is higher (since from 15083 to 15064, there is a drop of approximately 0.1% while in the denominator the drop is from 3198 to 3103—

approximately 3%—it has an effect of making a ratio of 100/100 to a ratio of 99.9/97. The second ratio is obviously bigger).

The value of 2002 can be calculated approximately by calculating  $150/31 \approx 4.8+$ .

The ratio for 2007 is lower than this since  $443/107 \approx 4.1+$ .

The ratio for 2010 is again lower since  $648/141 \approx 4.5+$ .

Likewise, the ratio for is also lower than the ratio for 2002, since  $775/165 \approx 4.8-$ .

Thus, we conclude that Option (b) is correct.

6. You can make the following table for R's value across the years:

| Year  | Tourist Arrivals | Foreign Earnings | R        |
|-------|------------------|------------------|----------|
| 1997  | 2.37             | 2889             | 1218.99  |
| 1998  | 2.36             | 2948             | 1249.15  |
| 1999  | 2.48             | 3009             | 1213.31  |
| 2000  | 2.65             | 3460             | 1305.66  |
| 2001  | 2.54             | 3198             | 1259.06  |
| 2002  | 2.38             | 3103             | 1303.78  |
| 2003  | 2.73             | 4463             | 1634.80  |
| 2004  | 3.46             | 6170             | 1783.24  |
| 2005  | 3.92             | 7493             | 1911.48  |
| 2006  | 4.45             | 8634             | 1940.22  |
| 2007  | 5.08             | 10729            | 2112.01  |
| 2008  | 5.28             | 11832            | 2240.91  |
| 2009  | 5.17             | 11136            | 2153.97  |
| 2010  | 5.78             | 14193            | 2455.54  |
| 2011  | 6.29             | 16564            | 2633.39  |
| Total |                  |                  | 26415.49 |

The value of 2011 being the highest value of R, would naturally subtend the largest central angle in the pie chart. We can see that 2633 is approximately 10% of 26415 and hence the required angle is 10% of  $360 = 36^\circ$ .

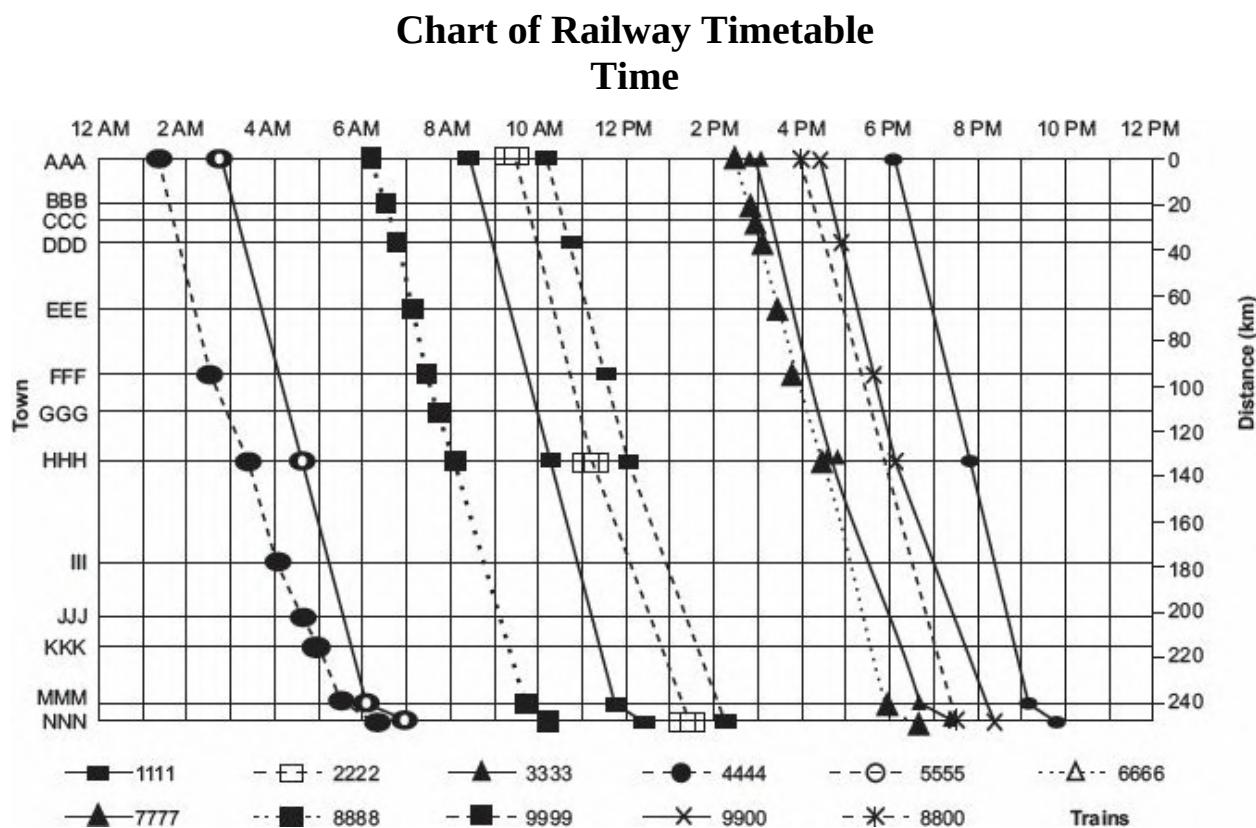
7. It can be visually seen that the military expenditure as a % of GDP is maximum in India (after the US), since the bars for India are the tallest and it is given clearly in the data that for any economic indicator, all the bars have the same scales. Hence, India has the second highest value for this particular economic indicator. Option (c) is correct.
8. A close visualisation shows, that Malaysia for 2008-09 shows the

maximum decline. Option (d) is correct.

9. The bar for services as a percentage of GDP has grown the maximum for India. Option (b) is correct.

**Directions for Questions 1 to 3:** Based on the following information:

Analyse the railway train chart below:



- Which is the fastest train between HHH and NNN?

- (a) 1111
  - (b) 2222
  - (c) 4444
  - (d) 7777
  - (e) 9999
2. Which is the fastest train between AAA and NNN?
- (a) 8800
  - (b) 8888
  - (c) 6666
  - (d) 4444
  - (e) 3333
3. If you have to travel from AAA and reach HHH at around 9:00 AM, and then further travel to NNN at around 6:00 PM, which is the best combination of trains for you?
- (a) 1111 and 8800
  - (b) 1111 and 9900
  - (c) 8888 and 7777
  - (d) 8888 and 8800
  - (e) 8888 and 9900

**Directions for Question 4 to 7:** Based on the following information:  
Data on an ongoing football league of a country is given here. 20 teams are playing in the league. The rules of the league are as follows:

1. Each team plays all the other teams twice, once in its home ground, and once in the opponent's home ground. These matches are known as the "Home" match and the "Away" match respectively.
2. A win results in 3 points, a draw in 1 point, and a loss in 0 point for team.
3. The number of goals a team scores is termed as "Goals For" and the number of goals it concedes is termed as "Goals Against". We get the "Goal Difference" by subtracting "Goals Against" from "Goals For".  
The ranking of the teams is decided on the total points. If two teams are tied on their total points, the team which has higher Goal

Difference gets the higher rank. If the tie cannot be resolved on Goal Difference, Goals For is checked followed by Goals Against. If the tie persists, the teams are ranked in the ascending order of their names.

[Table 1](#) provides data on the current top 13 teams based on the overall situation, i.e., by taking into account both home matches and away matches of each team.

[Table 2](#) provides data on the current top 13 teams based on home matches only.

Chart 1 provides a plot of the goal difference of each of the 13 teams based on the overall situation.

Table 1

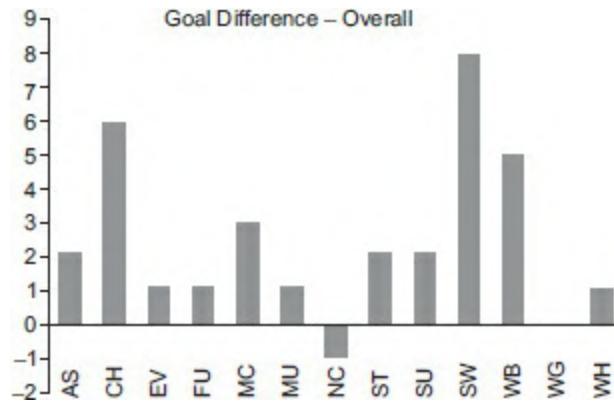
| Overall |   |   |   |    |
|---------|---|---|---|----|
| Team    | M | W | D | GF |
| CH      | 3 | 3 | 0 | 8  |
| SW      | 3 | 2 | 1 | 10 |
| WB      | 3 | 2 | 1 | 6  |
| MC      | 3 | 2 | 1 | 8  |
| MU      | 3 | 2 | 0 | 6  |
| WH      | 3 | 2 | 0 | 4  |
| EV      | 3 | 2 | 0 | 4  |
| AS      | 3 | 1 | 2 | 2  |
| WG      | 3 | 1 | 1 | 4  |
| NC      | 3 | 1 | 1 | 3  |
| FU      | 3 | 1 | 0 | 7  |
| ST      | 3 | 0 | 3 | 3  |
| SU      | 2 | 0 | 2 | 2  |

Table 2

| Home |   |   |   |    |    |
|------|---|---|---|----|----|
| Team | M | W | D | GF | GA |
| WB   | W | 2 | 0 | 5  | 0  |
| WH   | 2 | 2 | 0 | 4  | 0  |
| CH   | 2 | 2 | 0 | 6  | 2  |
| MC   | 2 | 2 | 0 | 6  | 3  |
| SW   | 2 | 1 | 1 | 5  | 2  |
| NC   | 2 | 1 | 1 | 3  | 2  |
| FU   | 1 | 1 | 0 | 5  | 0  |
| EV   | 1 | 1 | 0 | 1  | 0  |
| MU   | 1 | 1 | 0 | 3  | 2  |
| TOT  | 2 | 0 | 2 | 2  | 2  |
| NW   | 1 | 0 | 1 | 1  | 1  |
| AS   | 1 | 0 | 1 | 0  | 0  |
| ST   | 1 | 0 | 1 | 0  | 0  |

4. Considering away matches only, which of the following teams is the second ranking team?
  - (a) AS
  - (b) CH
  - (c) WG
  - (d) SW
  - (e) WB
5. Considering away matches only, the least number of teams with either 0 or 1 point is:
  - (a) 2
  - (b) 3

- (c) 4
  - (d) 5
  - (e) 6
6. Let us define a term *pos* as the difference between “home rank” and “away rank”. Which of the following has the maximum value of *pos*?



- (a) AS
  - (b) WB
  - (c) WH
  - (d) MC
  - (e) SW
7. How many unique values of goal difference are there for away matches?
- (a) 5
  - (b) 6
  - (c)  $\geq 6$
  - (d)  $\geq 6$  and  $\leq 13$
  - (e)  $\geq 6$  and  $\leq 14$

**Directions for Question 8 to 10:** Based on the following information:

Given below are a few data points on the Indian economy from the year 2005 to 2010:

| Indicator                                | Unit       | 2005    | 2006     | 2007     | 2008     | 2009     | 2010     |
|--|------------|---------|----------|----------|----------|----------|----------|
| GDP, current prices                      | ₹ Billions | 35662.2 | 41159.73 | 47675.86 | 54470.27 | 60712.76 | 73555.34 |
| GDP per capita, current prices           | ₹          | 32128.1 | 36553.93 | 41747.69 | 47038.23 | 51714.45 | 61784    |
| Gross national savings percent of GDP    | %          | 32.88   | 34.28    | 36.65    | 32.17    | 35.08    | 32.14    |
| Inflation, average consumer prices index | Index      | 115.67  | 122.92   | 130.75   | 141.67   | 157.08   | 175.92   |
| Volume of imports of goods and services  | % change   | 17.99   | 9.438    | 16.3     | 10.84    | 8.321    | 16.49    |
| Volume of exports of goods and services  | % change   | 18.88   | 13.83    | 17.13    | 10.63    | 0.813    | 21.86    |
| Unemployment rate                        | %          | 9.2     | 8.9      | 7.8      | 7.2      | 6.8      | 7.32     |
| Current account balance percent of GDP   | %          | - 1.272 | - 1.024  | - 0.701  | - 2.475  | - 2.066  | - 3.268  |

\*Per capita GDP is arrived by dividing GDP by population.

8. What is the ratio of the current account balance in the year 2010 to the current account balance in 2005?
  - (a) 0.35
  - (b) 4.56
  - (c) 5.01
  - (d) 2.57
  - (e) 5.30
9. Read the statements given below:
  1. Exports were more than imports in 2006.
  2. Imports were more than exports in 2009.
  3. Exports increased at faster rate than imports during the period 2005 to 2010.

Which of the above statements is necessarily true?

  - (a) 1 and 2
  - (b) 1, 2 and 3
  - (c) Only 3
  - (d) Only 2
  - (e) Only 1
10. What was the approximate number of unemployed persons in 2006?
  - (a) 100 million
  - (b) 102 million
  - (c) 98 million
  - (d) 96 million

(e) 94 million

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## ANSWER KEY

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1. (d)
  2. (a)
  3. (e)
  4. (d)
  5. (d)
  6. (a)
  7. (e)
  8. (e)
  9. (c)
  10. (a)
- 

## SOLUTIONS

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1. If we check the movement of the five trains given in the options (between HHH and NNN), we see that the Train 1111 leaves HHH at 10:15 AM and reaches NNN at 12:30 PM, 2222 leaves at 11:15AM and reaches at 1:30 PM, Train 4444 leaves at 3:30 AM and reaches at 6:30 AM, while Train 7777 leaves at 8 PM and reaches at 10 PM. Train 9999 also takes 2 hours 15 minutes as it leaves at 12 PM and reaches at 2:15 PM.

Thus, Train 7777 is the fastest (as it takes only 2 hours).

Option (d) is correct.

2. In this question too, we need to check only the trains given in the options. Train 8800 leaves at 4 PM and reaches at 7:45 PM and takes only 3 hours 45 minutes for the journey. All other trains take at least 4 hours or more. Hence, Option (a) is correct.
3. The first objective can be met by traveling by the train 8888 (as that is the train that reaches HHH closest to 9 AM). Further, you have to leave HHH at around 6 PM. There are two trains from HHH at around

6 PM—8800 and 9900. Of these trains 8800 is at HHH at exactly 6 PM, but we cannot take it, as it does not have a stop at HHH. Thus, only Train 9900 is a feasible option to leave HHH at around 6 PM. Hence, Option (e) is the correct answer.

### Quations 4 to 7:

The first thing you should do (once you look through the Questions 4 & 5) is to make a table for the away matches based on the overall performance of each team and its home performance.

The following table gets formed:

| TEAM | M                  | W | D | GF | GA | GD | Points | Rank |
|------|--------------------|---|---|----|----|----|--------|------|
| CH   | 1                  | 1 | 0 | 2  | 0  | 2  | 3      | 3+   |
| SW   | 1                  | 1 | 0 | 5  | 0  | 5  | 3      | 2    |
| WB   | 1                  | 0 | 1 | 1  | 1  | 0  | 1      | 8+   |
| MC   | 1                  | 0 | 1 | 2  | 2  | 0  | 1      | 7+   |
| MU   | 2                  | 1 | 0 | 3  | 3  | 0  | 3      | 5+   |
| WH   | 1                  | 0 | 0 | 0  | 3  | -3 | 0      | 10+  |
| EV   | 2                  | 1 | 0 | 3  | 3  | 0  | 3      | 4+   |
| AS   | 2                  | 1 | 1 | 2  | 0  | 2  | 4      | 1    |
| WG   | DATA NOT AVAILABLE |   |   |    |    |    |        |      |
| NC   | 1                  | 0 | 0 | 0  | 2  | -2 | 0      | 9+   |
| FU   | 2                  | 0 | 0 | 2  | 6  | -4 | 0      | 11+  |
| ST   | 2                  | 0 | 2 | 3  | 3  | 0  | 2      | 6+   |
| SU   | DATA NOT AVAILABLE |   |   |    |    |    |        |      |

Looking at the information in both the tables, we can synthesise the above information for the away matches for some of the top teams. Of course, there would be other teams who could have more than 0 points in away matches – but most of these cannot have more than 2 points in away matches (except WG) because, there are only 12 teams in [Table 1](#) which have 3 or more points overall. (A team cannot have 3 points in away matches if it does not have 3 points overall in the tournament)

The case for WG is a little bit different. WG must have won its match in an away tie, because WG is not in the top 13 in home matches. Thus, for WG, of its three matches the win must have definitely occurred in an away match, the draw and loss could happen in either an away or a home tie. In case, WG has 1 win and 1 draw in away ties, it would have 4 points in its away matches. However, that would place it at a possible best position of 3<sup>rd</sup> in the table

above – since WG cannot be placed above SW since the maximum possible positive goal difference for SW would be 4. Thus, for the teams ranked 3<sup>rd</sup> onwards in the table above (team CH and all teams ranked below it), there might be a possibility of a shifting down of their ranks – which is why we have mentioned CH's rank in away matches as 3+ and not 3.

4. We can conclude that the team SW definitely ranks second. Option (d) is correct.
5. There are at least 5 teams that have scored 0 or 1 point (as can be seen from the above table). These are WB, MC, WH, NC and FU. There can, of course, be more than these 5, but these five are definite. Hence, Option (d) is correct.
6. Clearly, AS has the maximum value of 'pos' as its 'pos' value is  $12 - 1 = 11$ . Option (a) is correct.
7. There are six distinct values for the goal difference in away matches. This can be seen in the table above. These are 0, 2, 5, -2, -3 and -4. Also, these goal differences account for 11 of the 20 teams in the tournament. Of the remaining 9 teams, by default, any team can have any value for the goal difference and if all these teams have a different value for their goal difference, it pegs the maximum value as 15 different values for the goal difference.

However, if we take a closer look at SU, we see that SU has played 2 drawn matches. Its goal difference is 0 and it has scored 2 goals. Hence, it must have conceded two goals. This leads to two scenarios – Scenario 1: SU drew one match 2-2 and one match 0-0.

### **Scenario 2: SU drew both its matches 1-1.**

In both scenarios, SU cannot have played both its matches at home – since SU is not in the top 13 teams on a 'home' basis. Thus, it must have played at least one of its matches away and the result of this match would necessarily be a draw. Hence, SU's goal difference in away matches cannot be anything but 0. This means that the number of possible distinct values of goal difference that can be possible is at least 6 and at most 14. i.e.  $\geq 6$  and  $\leq 14$

### **Option (e) is the correct answer.**

8. The required ratio would be given by:

3.268% of 73555 to 1.272% of 35662. (Note: we have ignored the negative sign in the percentages since both the numerator and denominator have the same negative sign).

In order to simplify such calculations consider the following:

$(0.03268 \times 73555) \div (0.1272 \times 35662)$  can be rewritten as:

$$(3268 \times 73555) \div (1272 \times 35662) = (326 \times 735) \div (127 \times 356)$$

This leaves us with the work of calculating two ratios:

- (i)  $326 \div 127$ , which can be seen as approximately 2.6.
- (ii)  $735 \div 356$  which is close to 2.06.

Thus,  $2.6 \times 2.06 = 5.3$  approximately.

9. Even though we know that there is a current account deficit (as the current account balance is always negative throughout the given period)—this only suggests that the currency value of imports was more than the currency value of exports. However, we are not in a position to judge from the given information whether the volume of imports was also greater than the volume of exports since that would also depend on the value of the items imported and exported. Thus, it is quite possible that the volume of imports might be lower than the volume of exports even though the value of imports is higher than the value of exports for any particular year. Naturally, neither the first nor the second conclusion matches.

If we look at statement 3, we realise that it has to be correct since the growth of exports has mostly outstripped the growth of imports (in terms of % growth) in the period 2005–2010) – except for 1 year when import growth is much higher than export growth. Also, from the options, only Option (c) matches.

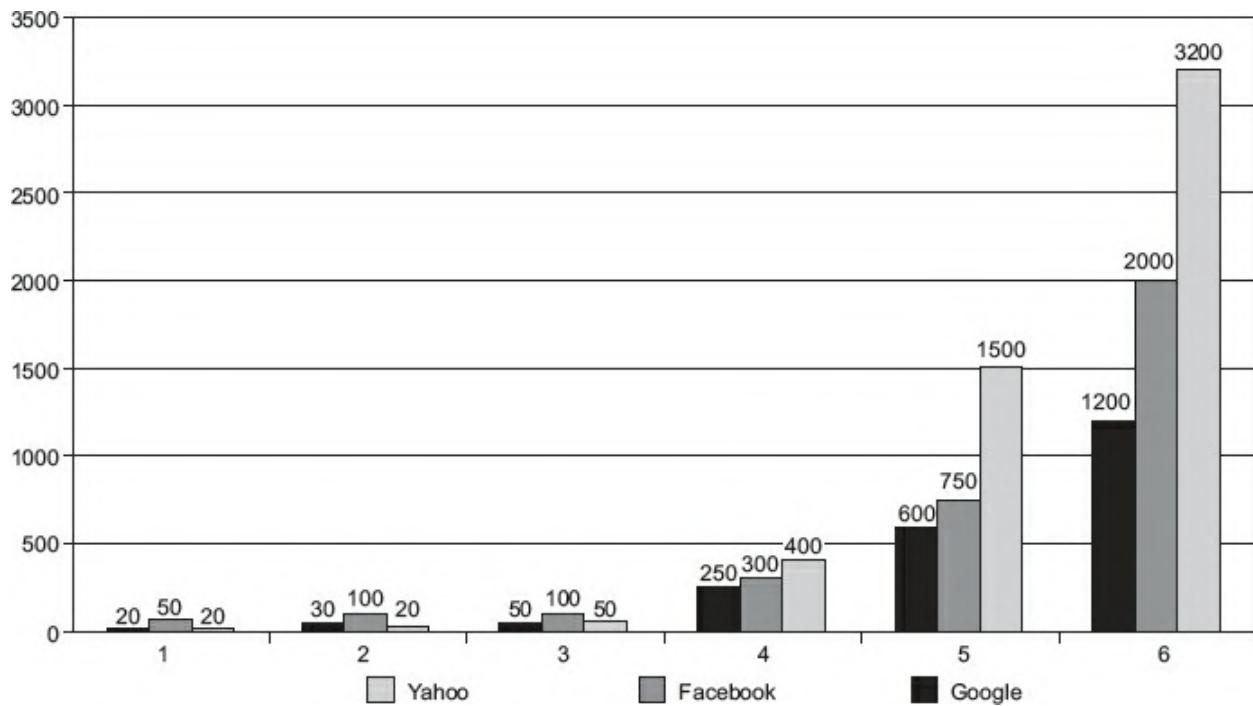
**Hence, Option (c) is correct.**

10. Number of unemployed persons in 2006 = Unemployment rate  $\times$  population = 8.9% of  $(41159 \div 36553)$  in billions = 8.9% of  $(411 \div 365)$  = 8.9% of 1.13 = 0.1 billion = 100 million. Option (a) is correct.

***Directions for Questions 1 to 3:*** Based on the following information.

The following graph shows the revenue (in \$ million) of three companies in their initial six years of operations, in an economy which is characterised by persistent inflation.

1. In 2010, which of the following could be a valid statement about the revenues (adjusted for inflation) of these three companies?
  - (a) Revenues of all the three companies were equal.
  - (b) Revenues of all the three companies could be equal.
  - (c) Revenue of Yahoo was definitely more than Facebook which was definitely more than Google.
  - (d) Total of Yahoo and Facebook was definitely more than that of Google.
  - (e) None of the above



2. The difference in the average percentage increase in revenues, from the fourth to the sixth year, of Yahoo and Facebook is:
- 35%
  - 40%
  - 45%
  - 50%
  - 55%
3. What would have been Facebook's revenue (in \$ million) in its sixth year of operation if the company had matched Google's percentage growth in revenues from the fifth to the sixth year?  
Choose the option that is nearest to the answer.
- 1600
  - 1700
  - 1800
  - 2100
  - None of the above

**Directions for Questions 4 to 5:** Based on the following information and table.

Ramya, based in Shanpur, took her car for a 400 km trip to Rampur. She maintained a log of the odometer readings and the amount of petrol she purchased at different petrol pumps at different prices (given below). Her car already had 10 litres of petrol at the start of the journey, and she first purchased petrol at the start of the journey, as given in the table below, and she had 5 litres remaining at the end of the journey.

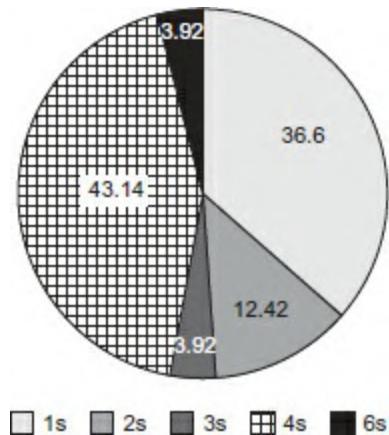
|                     | Odometer<br>Reading (km) | Petrol<br>purchased (litre) | Rate of<br>Petrol (₹7/litre) |
|---------------------|--------------------------|-----------------------------|------------------------------|
| Start of<br>journey | 400                      | 20                          | 30                           |
|                     | 600                      | 15                          | 35                           |
|                     | 650                      | 10                          | 40                           |
| End of<br>journey   | 800                      |                             |                              |

4. What has been the mileage (in kilometers per litre) of her car over the entire trip?
  - (a) 8.00
  - (b) 8.50
  - (c) 9.00
  - (d) 9.50
  - (e) 10.00
5. Her car's tank-capacity is 35 litres. Petrol costs ₹45/- litre in Rampur. What is the minimum amount of money she would need for purchasing petrol for the return trip from Rampur to Shanpur, using the same route? Assume that the mileage of the car remains unchanged throughout the route, and she did not use her car to travel around in Rampur.
  - (a) 1714
  - (b) 1724
  - (c) 1734
  - (d) 1744
  - (e) Data insufficient

**Directions for Questions 6 to 7:** Based on the following information.

The following pie chart shows the percentage distribution of the runs scored

by a batsman in a test innings.



6. If the batsman has scored a total of 306 runs, how many 4s and 6s did he hit?
  - (a) 31 and 4 respectively
  - (b) 32 and 2 respectively
  - (c) 32 and 3 respectively
  - (d) 33 and 1 respectively
  - (e) 33 and 2 respectively
7. If 5 of the dot balls had been hit for 4s, and if two of the shots for which the batsman scored 3 runs each had fetched him one run instead, what would have been the central angle of the sector corresponding to the percentage of runs scored in 4s?
  - (a) 160
  - (b) 163
  - (c) 165
  - (d) 167
  - (e) 170

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## ANSWER KEY

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1. (e)
2. (c)
3. (a)
4. (a)

5. (d)
  6. (e)
  7. (e)
- 

## SOLUTIONS

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### Questions 1 to 3:

1. Notice that in the graph, the years are not mentioned and hence we cannot determine anything with respect to the year 2010. Thus, the answer cannot be determined and we select None of the above as the correct answer. Hence, Option (e) is correct.
2. Yahoo has increased from 250 to 1200 over the two year period—which is an overall increase of  $(950/250) \times 100 = 380\%$ . This would represent an average percentage increase of  $380/2 = 190\%$ .  
For Facebook, the revenue has gone up from 350 to 2000 over 2 years which is an overall increase of  $(1650/350) \times 100 = 471\%$ . This would represent an average percentage increase of  $471/2 = 235.5\%$ .  
The difference in average percentage increase between the two is approximately 45%. Option (c) is correct.
3. Google has grown from 1500 to 3200 between the fifth and sixth year, which is approximately a percentage increase of 113%. Thus, Facebook's revenue if it had grown at the same pace would have been:  $750 \times 2.13$  which would approximately be 1600.Hence, Option (a) is correct.

### Questions 4 to 5:

4. Ramya has travelled 400 kms and the amount of petrol used by her is given by:  
Original quantity of petrol in her car + petrol filled during the journey – petrol left in the car at the end of the journey:

$$= 10 + 20 + 15 + 10 - 5 = 50 \text{ litres.}$$

Thus, the average she has got is:  $400/50 = 8$  km per litre.

Option (a) is correct.

5. Notice that the cost of petrol has always increased throughout her going out journey. Hence, on her way back her focus would be to keep filling the minimum amount of petrol at each petrol pump so that she is able to just reach back, while minimising the costs.

Since she is starting from Rampur and her car already has 5 litres of petrol, her first target is to reach the first petrol pump which is at a distance of 150 km from Rampur. For this she would need  $150/8 = 18.75$  litres of fuel which would mean an extra 13.75 litres of fuel to be filled from Rampur.

From this petrol pump to the next one— a distance of 50 kms she would need to fill  $50/8 = 6.25$  litres of petrol and at the last petrol pump she would need to fill  $200/8 = 25$  litres of petrol to reach Shanpur safely. Total cost would be:

$$13.75 \times 45 + 6.25 \times 40 + 25 \times 35 = 618.75 + 250 + 875 = 1743.75,$$

which is closest to 1744. Option (d) is correct.

### Questions 6 to 7:

6. The batsman would have scored 43.14% of his 306 runs in fours. This would be equal to 132 runs which would mean 33 fours.

Also, since 3.92% of his runs come in sixes; it means he must have scored 12 runs through sixes and hence he has hit 2 sixes.

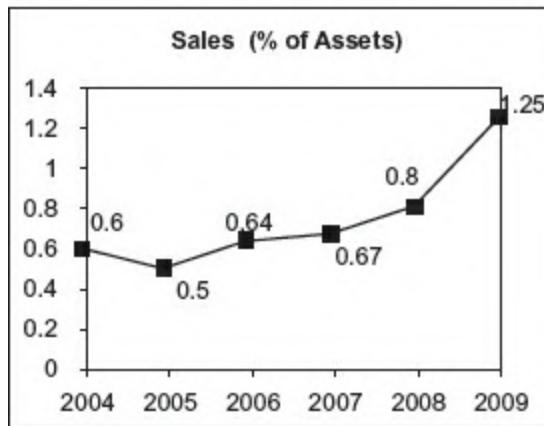
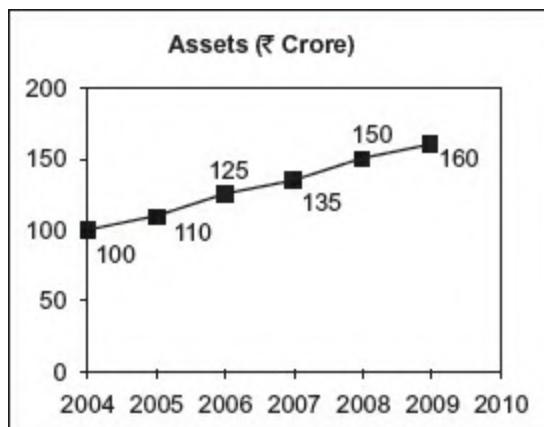
Option (e) is correct.

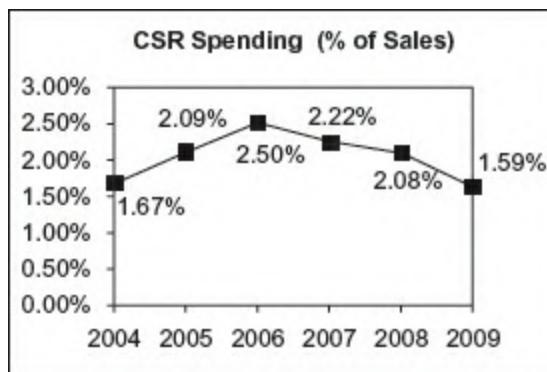
7. With the given changes; the batsman would have scored a total of  $306 + 5 \times 4 - 2 \times 2 = 322$  runs out of which 152 runs would have been in fours. The central angle for the number of fours would be:

$$(152 \times 360)/322 = 170\%. \text{ Option (e) is correct.}$$

**Directions for Questions 1 to 4:** Based on the following information.

The following graphs give the annual data of Assets, Sales (as percentage of Assets) and Spending on Corporate Social Responsibility (CSR) (as a percentage of sales), of a company for the period 2004–2009.



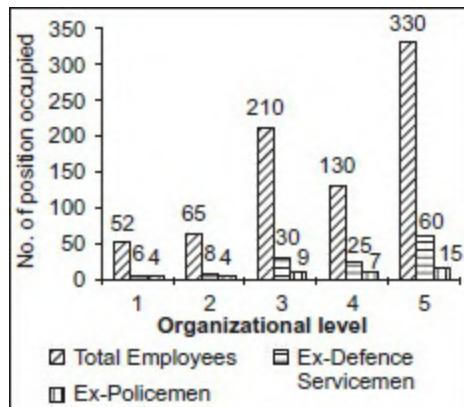


1. In which year was the increase in spending on CSR, vis-à-vis the previous year, the maximum? (1 marks)
  - (a) 2005
  - (b) 2006
  - (c) 2008
  - (d) 2007
  - (e) 2009
  
2. Of the years indicated below, in which year was the ratio of CSR/Assets the maximum? (1 marks)
  - (a) 2004
  - (b) 2006
  - (c) 2005
  - (d) 2007
  - (e) 2008
  
3. What was the maximum value of spending on CSR activities during the period 2004–2009? (2 marks)
  - (a) ₹0.5 Crore
  - (b) ₹1.0 Crore
  - (c) ₹2.0 Crore
  - (d) ₹3.0 Crore
  - (e) ₹4.0 Crore
  
4. In which year, did the spending on CSR (measured in ₹) decline as compared to the previous year? (2 marks)
  - (a) 2006
  - (b) 2007
  - (c) 2008

- (d) 2009
- (e) Never declined

**Directions for Questions 5 to 7:** Based on the following information.

Five years ago, *Maxam Glass Co.* had estimated its staff requirements in the five levels in their organisation as: Level-1: 55, Level-2: 65, Level-3: 225, Level-4: 255 and Level-5: 300. Over the years the company had recruited people based on ad-hoc requirements, in the process also selecting ex-defence service men and ex-policemen. The following graph shows actual staff strength at various levels as on date.



5. The level in which the Ex-Defence Servicemen are highest in percentage terms is: (1 mark)
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4
  - (e) 5
6. If the company decides to abolish all vacant posts at all the levels, which level would incur the highest reduction in percentage terms? (1 marks)
  - (a) 1
  - (b) 2
  - (c) 3
  - (d) 4

- (e) 5
7. Among all levels, which level has the lowest representation of Ex-policemen in percentage terms? (1 mark)
- (a) 1  
 (b) 2  
 (d) 3  
 (d) 4  
 (e) 5

**Directions for Questions 8 to 9:** Based on the following information.

| Income-Tax Rates for Financial year 2009—10 |                             |           |
|---|-----------------------------|-----------|
| Individual & HUF below age of 65 years      | Women below age of 65 years | Tax Rates |
| Income up to ₹1,60,000/-                    | Income up to ₹1,90,000/-    | Nil       |
| ₹1,60,001 to ₹3,00,000/-                    | ₹1,90,001 to ₹3,00,000/-    | 10%       |
| ₹3,00,001 to ₹5,00,000/-                    | ₹3,00,001 to ₹5,00,000      | 20%       |
| Above ₹5,00,001                             | Above ₹5,00,001             | 30%       |

Total income tax payable is obtained by adding two additional surcharges on calculated income tax.

- *Education Cess:* An additional surcharge called ‘Education Cess’ is levied at the rate of 2% on the amount of income tax.
  - *Secondary and Higher Education Cess:* An additional surcharge called ‘Secondary and Higher Education Cess’ is levied at the rate of 1% on the amount of income tax.
8. Sangeeta is a young working lady. Towards the end of the financial year 2009-10, she found her total annual income to be ₹3,37,425/-. What percentage of her income is payable as income tax? (1 mark)
- (a) 5.64  
 (b) 6.82  
 (c) 7.38  
 (d) 8.10  
 (e) None of the above

9. Mr. Madan observed his tax deduction at source, done by his employer, as ₹3,17,910/-. What was his total income (in ₹) if he neither has to pay any additional tax nor is eligible for any refund? (2 marks)
- (a) 13,48,835/-
  - (b) 14,45,522/-
  - (c) 14,47,169/-
  - (d) 15,70,718/-
  - (e) None of the above

**Directions for Question 10:** Based on the following information.

From a group of 545 contenders, a party has to select a leader. Even after holding a series of meetings, the politicians and the general body failed to reach a consensus. It was then proposed that all 545 contenders be given a number from 1 to 545. Then they will be asked to stand on a podium in a circular arrangement, and counting would start from the contender numbered as 1. Counting would be done in a clockwise fashion. The rule is that every alternate contender would be asked to step down as the counting continues, with the circle getting smaller and smaller, till only one person remains standing. Therefore the first person to be eliminated would be the contender numbered as 2.

10. Which position should a contender choose if he has to be the leader? (5 marks)
- (a) 3
  - (b) 67
  - (c) 195
  - (d) 323
  - (e) 451
11. There are 240 second year students in a B- School. The Finance course offers 3 electives in the second year. These are Financial Derivatives, Behavioural Finance, and Security Analysis. Four students have taken all the three electives, and 48 students have taken Financial Derivatives. There are twice as many students who study Financial Derivatives and Security Analysis but not Behavioural Finance, as

those who study both Financial Derivatives and Behavioural Finance but not Security Analysis, and 4 times as many who study all the three. 124 students study Security Analysis. There are 59 students who could not muster up the courage to take up any of these subjects. The group of students who study both Financial Derivatives and Security Analysis but not Behavioural Finance is exactly the same as the group made up of students who study both Behavioural Finance and Security Analysis. How many students study Behavioural Finance only? (2 marks)

- (a) 29
- (b) 30
- (c) 32
- (d) 35
- (e) None of the above

**Directions for Questions 12 to 14:** Based on the following information.

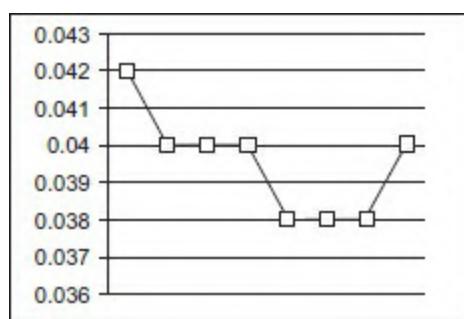
Mulchand Textiles produces a single product of only one quality—waterproof synthetic fabric. Mr. Sharma, the cost accountant of Mulchand Textiles, estimated the costs of Mulchand Textiles for different possible monthly output levels. However, before he could tabulate his estimates, his computer crashed and Mr. Sharma lost all the data. Fortunately he had some printouts of some incomplete tables, charts and diagrams. The table titled “Variable Cost Estimates of Mulchand Textiles” provided the estimates of labour and material costs.

| Variable Cost Estimates of Mulchand Textiles |                 |                   |
|--|-----------------|-------------------|
| Output (Square feet)                         | Labour cost (₹) | Material cost (₹) |
| 25000  | 21500           | 11050             |
| 50000  | 41500           | 22000             |
| 75000  | 60000           | 33000             |
| 100000                                       | 78000           | 44000             |
| 125000                                       | 95000           | 54750             |

|        |        |       |
|--------|--------|-------|
| 150000 | 111000 | 65700 |
| 175000 | 133000 | 76650 |
| 200000 | 160000 | 88000 |

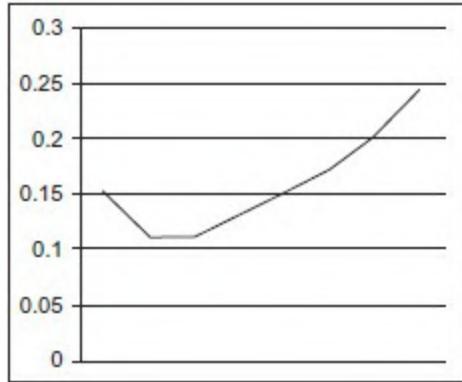
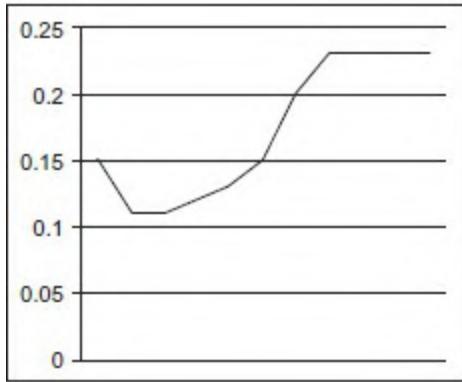
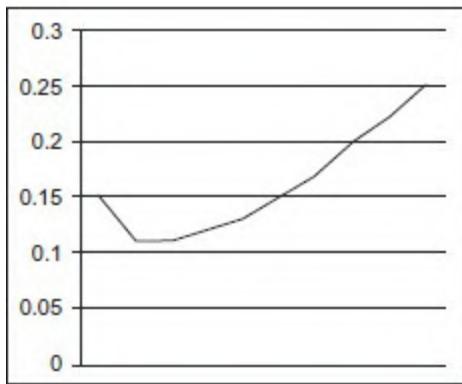
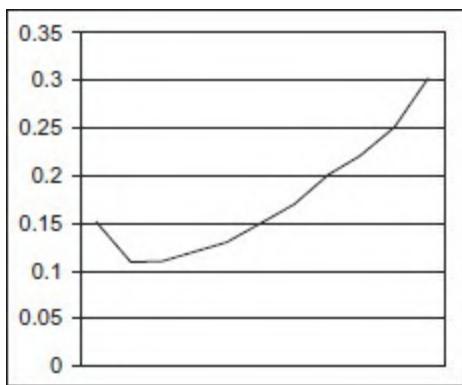
Apart from labour and material costs, Mulchand Textiles incurs administrative costs of ₹40,000 per month and electricity costs. Mr. Sharma recalled that estimate data of variable electricity cost had certain peculiar characteristics. Values at every 25000 sq ft of output increased in geometric progression till 150000 sq ft of output, after which values increased in arithmetic progression for every 25000 sq ft of output. Mr. Sharma also recalled that the electricity cost was estimated to be ₹3800 for 25000 Sq. ft. of output, ₹5700 for 50000 feet of output and ₹38856.50 for 175000 square feet of output.

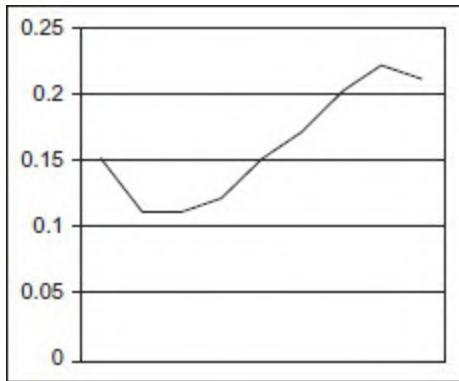
12. The estimated cost per square feet of output is least for: (3 marks)
- (a) 75000 square feet output
  - (b) 100000 square feet output
  - (c) 125000 square feet output
  - (d) 150000 square feet output
  - (e) 175000 square feet output
13. The estimated material cost given in the table titled “Variable Cost Estimates of Mulchand Textiles” included the cost of material that gets spoiled in the production process. Mr. Sharma decomposed the estimated material cost into material spoilage cost and material usage cost, but he lost the data when his computer crashed. When he saw the following line diagram, he recalled that he measured the estimate of material spoilage cost per square feet of output on the y- axis and monthly output on the x-axis.



Estimated material usage cost per square feet of output:

- (a) Decreases up to 125000 square feet of monthly output and then increases monotonically.
  - (b) Decreases up to 50000 square feet of monthly output, remains constant between 50000 and 100000, decreases between 100000 and 125000, remains constant between 125000 and 175000 and finally increases between 175000 and 200000 of monthly output.
  - (c) Remains constant for all levels of monthly output.
  - (d) Increases up to 50000 square feet of monthly output, remains constant between 50000 and 100000, increases between 100000 and 125000, remains constant between 125000 and 175000 and finally decreases between 175000 and 200000 of monthly output.
  - (e) Increases up to 100000 square feet of monthly output and then decreases monotonically.
14. Mr. Sharma found some printouts of line diagrams. The axes of the graphs were not marked, but Mr. Sharma remembered that he measured monthly output on the x-axis. Which of the following diagrams would represent the estimates of electricity cost per square feet of output versus monthly output? (3 marks)





**Directions for Questions 15 to 18** Based on the following information.

In the beginning of the year 2010, Mr. Sanyal had the option to invest ₹800000 in one or more of the following assets— gold, silver, US bonds, EU bonds, UK bonds and Japanese bonds. In order to invest in US bonds, one must first convert his investible fund into US Dollars at the ongoing exchange rate. Similarly, if one wants to invest in EU bonds or UK bonds or Japanese bonds, one must first convert his investible fund into Euro, British Pound and Japanese Yen respectively at the ongoing exchange rates. Transactions were allowed only in the beginning of every month. Bullion prices and exchange rates were fixed at the beginning of every month and remained unchanged throughout the month. Refer to the table titled “Bullion Prices and Exchange Rates in 2010” for the relevant data.

### Bullion Prices and Exchange Rates in 2010

| Date        | Gold<br>prices | Silver<br>prices | US\$        | €    | £    | ¥    |
|-------------|----------------|------------------|-------------|------|------|------|
|             | Rs/10<br>gram  | Rs/10<br>gram    | Rs/<br>US\$ | Rs/€ | Rs/£ | Rs/¥ |
| January 1   | 20000          | 300              | 40          | 60.0 | 70.0 | 0.50 |
| February 1  | 20100          | 302              | 41          | 61.5 | 71.0 | 0.51 |
| March 1     | 20250          | 307              | 41          | 62.0 | 71.0 | 0.52 |
| April 1     | 20330          | 310              | 42          | 62.0 | 71.0 | 0.52 |
| May 1       | 20400          | 312              | 42          | 62.5 | 72.0 | 0.53 |
| June 1      | 20500          | 318              | 42          | 62.5 | 72.0 | 0.54 |
| July 1      | 20650          | 330              | 44          | 63.0 | 73.0 | 0.55 |
| August 1    | 20720          | 335              | 45          | 63.0 | 73.0 | 0.55 |
| September 1 | 20850          | 340              | 47          | 64.0 | 74.0 | 0.57 |
| October 1   | 20920          | 342              | 49          | 65.0 | 74.0 | 0.58 |
| November 1  | 20950          | 345              | 50          | 65.0 | 74.5 | 0.59 |
| December 1  | 21000          | 350              | 50          | 65.0 | 75.0 | 0.60 |

Interest rates on US, EU, UK and Japanese bonds are 10%, 20%, 15% and 5% respectively.

15. Mr. Sanyal invested his entire fund in gold, US bonds and EU bonds in January 2010. He liquefied his assets on 31st August 2010 and gained 13% on his investments. If instead he had held his assets for an additional month he would have gained 16.25%, which of the following options is correct? (3 marks)
  - (a) Mr. Sanyal invested less than 40% in gold and more than 40% in EU bonds.
  - (b) Mr. Sanyal invested less than 40% in each of gold and US bonds.
  - (c) Mr. Sanyal invested less than 40% in gold, and less than 25% in US bonds.
  - (d) Mr. Sanyal invested more than 40% in gold, less than 25% in EU bonds.
  - (e) Mr. Sanyal invested more than 40% in each of US bonds and EU bonds.
16. At the beginning of every month, by sheer luck, Mr. Sanyal managed to correctly guess the asset that gave maximum return during that month and invested accordingly. If he liquefied his assets on 31st December 2010, how much was the percentage gain from his investments? (2 marks)
  - (a) 34.64%
  - (b) 46.71%
  - (c) 47.5%
  - (d) 49.15%
  - (e) 49.96%
17. Mr. Sanyal adopted the following investment strategy. On 1st January 2010 he invested half of his investible fund in gold and the other half in fixed deposit of an Indian bank that offered 25% interest per annum. At the beginning of every quarter he liquefied his assets to create his investible fund for that quarter. Every quarter he invested half of his fund in the bullion that gave maximum return in the previous quarter and the other half in the foreign bond that gave maximum return in the previous quarter. However, if in any quarter none of the foreign bonds

gave a better return than the fixed deposit of his Indian bank, he invested half of his investible fund in the fixed deposit for the next quarter. On 31st December 2010, Mr. Sanyal liquefied his assets and realised that all of the following options are true except, (2 marks)

- (a) By investing the entire amount in US bonds, he would have gained an additional ₹118395.
  - (b) By investing the entire amount in UK bonds, he would have gained an additional ₹65035.
  - (c) By investing the entire amount in EU bonds, he would have gained an additional ₹65035.
  - (d) By investing the entire amount in Japanese bonds, he would have gained an additional ₹38395.
  - (e) By investing the entire amount in fixed deposit of his Indian bank, he would have gained an additional ₹38395.
18. Advisors were asked to prepare an investment strategy that involved US Bonds, EU Bonds and Japanese Bonds keeping at least 20% of the initial fund in each of these assets for the entire year, and allowing exactly four additional transactions in the course of the year. On 2nd January 2011, while comparing five different recommendations that he had received from his financial advisors in the beginning of 2010, Mr. Sanyal referred to the table “Bullion Prices and Exchange Rates in 2010”. One transaction is defined as the buying or selling of an asset. Which of the recommendation out of the following was the best one? (3 marks)
- (a) Two additional transactions each during the month of June and November.
  - (b) Two additional transactions each during the month of June and October.
  - (c) Two additional transactions each during the month of May and June.
  - (d) Two additional transactions each during the month of March and November.
  - (e) Two additional transactions each during the month of March and October.
-

## ANSWER KEY

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1. (b)
  2. (e)
  3. (d)
  4. (e)
  5. (d)
  6. (d)
  7. (c)
  8. (a)
  9. (a)
  10. (b)
  11. (a)
  12. (d)
  13. (c)
  14. (d)
  15. (d)
  16. (b)
  17. (Incorrect question)
  18. (c)
- 

## SOLUTIONS

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### Questions 1 to 4:

The conventional way to solve this question would be to calculate all the values for each of the years.

The following numbers would emerge based on the relationships that Sales are defined as a percentage of assets while CSR spending is defined as a percentage of sales.

| Year | Assets | Sales (in lacs) | CSR Spending (in lacs) |
|------|--------|-----------------|------------------------|
| 2004 | 100    | 60              | 1                      |
| 2005 | 110    | 55              | 1.14                   |
| 2006 | 125    | 80              | 2                      |
| 2007 | 135    | 90.45           | 2                      |
| 2008 | 150    | 120             | 2.49                   |
| 2009 | 160    | 200             | 3.18                   |

From the table it is clear that the highest growth has happened in 2006 and hence option (b) is correct.

However, this process of solving is not feasible to be executed under exam conditions and pressure. Hence, we need to look at an alternative approach for doing the same. The expression for the value of the CSR spending is linearly connected to Assets  $\times$  Sales (as % of assets)  $\times$  CSR spending (as a % of sales) and hence it is a straight multiplicative relationship.

Consequently, in order to spot the probable years when the highest increase in CSR could feasibly occur we can see that the value of CSR in 2004 is ₹1 lac. After this we can see what percentage changes are occurring in each of the parts of the product in order to see how the product would behave from year to year.

In the first year there is a 10% growth in assets, 16.66% drop in sales as a percentage of assets and approx 26% increase in CSR spending as a percentage of sales. Using the Percentage Change Graphic (PCG) for calculating the overall percentage change, we can see that this would mean a 15% (approx) change in the CSR spending.

The second year (2006) obviously becomes the favourite for being the highest increase as it shows a 14% growth in assets, 28% growth in sales as a percentage of assets and approx 21% increase in CSR spending as a percentage of sales—overall a growth of around 75%.

On visual inspection, the only year which needs to be checked against this is 2009 which can be seen to be showing a lower growth than 2006.

**(Note:** while doing this you would need to be careful of making sure that 2006 is greater than 2009 in absolute growth and not just percentage growth—as the base value for 2009 is greater than the base value for 2006 and hence there might be a situation where although the percentage

increase in 2006 is higher than in 2009, in terms of absolute growth 2009 is still greater than 2006.)

Alternately, you can do the following proxy calculation to see which is the highest:

$100 \times 6 \times 1.67$  compared against  $110 \times 5 \times 2.09$  compared against  $125 \times 6.4 \times 2.5$  compared against  $135 \times 6.7 \times 2.22$  compared against  $150 \times 8 \times 2.08$  compared against  $160 \times 12.5 \times 1.59 \rightarrow 1000 \rightarrow 1100 \rightarrow 2000 \rightarrow 2000 \rightarrow 2500 \rightarrow 3180$  (approximate values)

2. The highest value as seen from the table above (for the years provided in the options) is for 2008 (2.49/150).
3. The options for this question were incorrect as they cannot be in lakhs. From the numbers in the charts it is clear that the sales turnover of the company barely reaches 2 crores in 2009 and is lower than that even earlier. On the other hand CSR spending is in the range of 1–3 lacs right through. Hence, the question can be seen as incorrect. Option (d) can be marked if we assume that the error is in terms of writing lacs as crores.
4. It is clear that the CSR spending has never declined during the entire period. Hence, option (e) is clearly the correct answer.

### **Questions 5 to 7:**

5. The highest percentage of ex-defence servicemen is for the ratio 25/130 which is for level 4. Option (d) is correct.
6. Level 4 would lose the maximum as it would incur a reduction of 125 out of the original estimation of 255 posts. No other level is close to this value in percentage terms. Option (d) is correct.
7. The closest comparisons are 9 out of 210 (level 3) and 15 out of 330 (level 5). 9 out of 210 is a lower percentage as compared to 15 out of 330. Option (c) is correct.

### **Questions 8 to 9:**

8. The tax Sangeeta would have to pay would be under the following structures:  
10% on income between 190001 to 300000  
And 20% on income from 300001 to 337425

Her income tax liability would be: 10% of 110000 + 20% of 37425 =  
11000 + 7485 = 18485

Her total tax liability would be calculated by adding 3% to her income tax as calculated above.

Thus, her total tax liability =  $1.03 \times 18485 = 19039$ .

This is 5.64% of her income.

Thus, Option (a) is correct.

9. Solve through options. For Option (a), total tax liability would be:

103% of [14000 + 40000 + 30% of 848835] = 317910.

Hence, Option (a) is correct.

### Question 10:

10. The successive groups that would be left would be as follows:

1, 3, 5, 7, 9,...545 (273 numbers available) → 3, 7, 11, 15, 19, 23, 27, 31, 35, 39, 43, 47, 51, 55, 59...543 (136 numbers available) → 3, 11, 19,...539 (68 numbers available)

→ 3, 19, 35, 51, 67, 83, 99, 115, 131, 147, 163, 179, 195, 211, 227, 243, 259, 275, 291, 307, 323, 339, 355, 371, 387, 403, 419, 435, 451, 467, 483, 499, 515, 531 (34 numbers available)

→ 3, 35, 67, 99, 131, 163, 195, 227, 259, 291, 323, 355, 387, 419, 451, 483, 515 (17 numbers available)

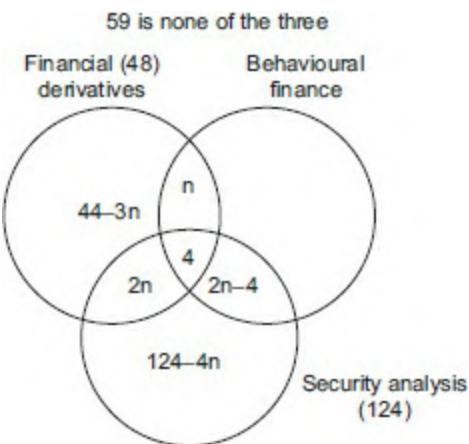
→ 3, 67, 131, 195, 259, 323, 387, 451, 515 (8 numbers available)

→ 67, 195, 323, 451 (4 numbers available) → 67, 323 (2 numbers available) → 67

Thus, the person on position 67 would be elected the leader. Option (b) is correct.

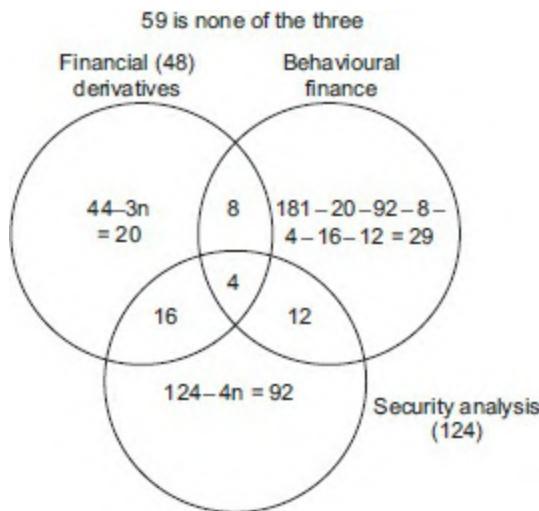
### Question 11:

The following Venn diagram portrays the information given in the question.



We also know that the number of people who study Financial Derivatives and Security Analysis but not Behavioural Finance is 4 times the number who study all the three. This means that  $2n = 16$  and hence,  $n = 8$ .

With this value of  $n$ , the numbers in the Venn diagram get simplified and look as follows:



### Questions 12 to 14:

12. The cost component for Mulchand Textiles consists of 4 costs—Labour, Material, Electricity (all variable) and Administrative cost (fixed).

The following table completes the values for all three variable costs:

| <i>Output</i> | <i>Labour cost</i> | <i>Material cost</i> | <i>Electricity costs (based on AP and GP as described in the question)</i> | <i>Administrative costs</i> |
|---------------|--------------------|----------------------|--|-----------------------------|
| 25000         | 21500              | 11050                | 3800.00  | 40000                       |
| 50000         | 41500              | 22000                | 5700.00  | 40000                       |
| 75000         | 60000              | 33000                | 8550.00  | 40000                       |
| 100000        | 78000              | 44000                | 12825.00   | 40000                       |
| 125000        | 95000              | 54750                | 19237.50   | 40000                       |
| 150000        | 111000             | 65700                | 28856.25   | 40000                       |
| 175000        | 133000             | 76650                | 38856.50   | 40000                       |
| 200000        | 160000             | 88000                | 48856.75   | 40000                       |

This is a highly calculation intensive question as the values of costs per unit are extremely close.

For 150000 units the cost per unit is 1.637 while for 175000 units the value is 1.648. The value of cost per unit for 75000,100000 and 125000 units are clearly above these values and hence can be rejected. Thus, Option (d) is correct i.e. for 150000 units the cost per unit is the least.

13. The material cost per unit = material spoilage cost per unit + material usage cost per unit.

For 25000 units we have:  $0.442 = 0.042 + \text{material usage cost per unit}$ .

Hence, material usage cost per unit = 0.4 for 25000 units.

For 50000 units we have:  $0.44 = 0.04 + \text{material usage cost per unit}$ .

Hence, material usage cost per unit = 0.4 for 50000 units.

For 75000 units we have:  $0.44 = 0.04 + \text{material usage cost per unit}$ .

Hence, material usage cost per unit = 0.4 for 75000 units.

For 100000 units we have:  $0.44 = 0.04 + \text{material usage cost per unit}$ .

Hence, material usage cost per unit = 0.4 for 100000 units.

For 125000 units we have:  $0.438 = 0.038 + \text{material usage cost per unit}$ .

Hence, material usage cost per unit = 0.4 for 125000 units.

By this stage we can clearly see that the material usage cost per unit is constant at 0.4 per unit at all values of production output. Hence, Option (c) is correct.

14. We have already worked out the following table for Question 12.

| <i>Output</i> | <i>Labour cost</i> | <i>Material cost</i> | <i>Electricity costs (based on AP and GP as described in the question)</i> | <i>Administrative costs</i> |
|---------------|--------------------|----------------------|--|-----------------------------|
| 25000         | 21500              | 11050                | 3800.00  | 40000                       |
| 50000         | 41500              | 22000                | 5700.00  | 40000                       |
| 75000         | 60000              | 33000                | 8550.00  | 40000                       |
| 100000        | 78000              | 44000                | 12825.00   | 40000                       |
| 125000        | 95000              | 54750                | 19237.50   | 40000                       |
| 150000        | 111000             | 65700                | 28856.25   | 40000                       |
| 175000        | 133000             | 76650                | 38856.50   | 40000                       |
| 200000        | 160000             | 88000                | 48856.75   | 40000                       |

From this table we just need to work out the electricity costs per unit output to see which of the given graphs is an accurate description of the electricity costs per unit.

The first value has to be  $3800/25000 = 0.152$  which is seen to be given in all the five options. Hence, it might be a wise idea to look at the last couple of values—since it is evident that most of the graphs in the 5 options are similar in nature and indeed in their values for the initial output levels. For 200000 units it is seen that the value should be around 0.24 which is given in the third and fourth options. The first, second and fifth options get removed at this point. To choose between the third and the fourth options we can see the value for 175000 units. The per unit electricity cost for that level is  $38856.50/175000 = 0.22$ . This value is in sync with the graph given in option (d) while option (c) can be rejected on the basis of this value. Hence, we choose option (d) as the correct answer.

### Questions 15 to 18:

Between January to August, for the 8 month period—the returns in gold are 3.6%. In US bonds it would be equivalent to 8 months interest plus the appreciation of the dollar vis-a-vis the rupee. In this case, the interest is 6.66% ( $2/3^{\text{rd}}$  of the year @ 10% per annum) and the dollar appreciation is from 40 to 45 which is an 12.5% growth. Since, it is a multiplicative relationship between the two, the actual growth would be: 100 would grow to

$$100 \times 1.125 \times 1.0666 = 20\%.$$

Similarly, the growth in EU bonds would be equivalent to 8 months interest plus the appreciation of the Euro vis-a-vis the rupee. In this case, the interest is 13.33% ( $2/3^{\text{rd}}$  of the year @ 20% per annum) and the Euro appreciation is from 60 to 63 which is a 5% growth. Since, it is a multiplicative relationship between the two, the actual growth would be: 100 would grow to  $100 \times 1.1333 \times 1.05 = 19\%$ .

You need to observe that the percentage returns on US bonds and EU bonds are almost the same and the weighted average of returns between these two instruments would lie somewhere in between 19 and 20%. Hence 13% is effectively the weighted average between 3.6% (return in gold) and 19.xx % (weighted average return in US and EU bonds). It can be seen that the investment in gold is close to 40% and is greater than 40% if we take the weighted average return for US and EU bonds closer to 20% (the extreme case is  $7/16.4 = 42.68\%$ ) while it goes lower than 40% if we take this weighted average closer to 19% (the extreme case being  $6/15.4 = 38.96\%$ )

If we assume equal investments in EU and US bonds, their weighted average return would be 19.5%. At 19.5% the investment in gold would be  $6.5/15.9 = 40.88\%$

We still have to use the other information in this case.

If sold in September we are given that the returns become 16.25%. If we take a look at the respective returns for January to September for the three instruments we get:

Gold = 4.25%

US Bonds = 100 grows to  $100 \times 1.075 \times 1.175$   
= 126.31 which means a 26.3% return

EU Bonds = 100 grows to  $100 \times 1.15 \times 1.0666$   
= 122.66 which means a 22.66% return

The weighted average for these three returns is 16.25%.

From this point we need to move to trial and error for finding the ratio of the investments between EU bonds and US bonds and consequently their weighted average.

Suppose we assume a 1:1 ratio of investment between these two, we get a weighted average return between EU and US bonds as 24.5% approx. At this

value, we also realize that the weighted average of all 3 being 16.25%, the relative investments between gold and the two bonds would be such that we get a weighted average between 4.25 and 24.5 as 16.25— which gives us approximately 40.7% investment in gold. Since there is a gap between 40.7% here and 40.88% got earlier assuming a 1:1 ratio of investment we need to close this gap. In order to do so we would need to increase the investment in US bonds slightly.

At this point we can conclude that the investment in gold is approximately 40.7 to 40.8 % of his initial investment while the remaining investment is shared equally between EU and US bonds and would be 29.6% each (approx.) with EU bonds at a lower value than 29.6. If we now look at the options, the fourth option is the only one which gives us an investment in gold of over 40% and hence is the correct answer.

Option (d) is correct.

On a serious note, how do the XAT question setters expect a student to do so much mental processing? Frankly it beats me— and this question set is definitely one to be left.

16. In order to decide which is the asset class which is giving the highest return in each month we need to first build the following table mainly comparing US, EU and UK bonds.

|  | <i>US bonds (monthly<br/>return 0.83%)</i> | <i>EU bonds (monthly<br/>return 1.66%)</i> | <i>UK bonds (monthly<br/>return 1.25%)</i> | <i>Japanese bonds (monthly<br/>return 0.4166%)</i> |
|--|--|--|--|--|
| February   | 2.5  | 2.5  | 1.42                                       | 2  |
| March  | 0  | 0.81                                       | 0  | 1.96   |
| April  | 2.44                                       | 0  | 0  | 0  |
| May  | 0  | 0.80                                       | 1.41                                       | 1.92   |
| % RETURNS DUE<br>TO CURRENCY<br>RATE FLUCTUATIONS<br>(approx values) | June                                       | 0  | 0  | 1.88   |
|  | July                                       | 4.76                                       | 0.8  | 1.85   |
|  | August                                     | 2.27                                       | 0  | 0  |
|  | September                                  | 4.44                                       | 1.58                                       | 3.63   |
|  | October                                    | 4.25                                       | 1.56                                       | 1.75   |
|  | November                                   | 2.04                                       | 0  | 1.72   |
|  | December                                   | 0  | 0.7  | 1.69   |

The asset class for investment would be:

| Month            | Best asset class | Value of an initial investment of ₹100 |
|------------------|------------------|--|
| Jan to Feb (Feb) | EU bonds         | 104.2                                  |
| March            | EU Bonds         | 106.8                                  |
| April            | US Bonds         | 110.31                                 |
| May              | UK bonds         | 113.27                                 |
| June             | Silver           | 115.44                                 |
| July             | US bonds         | 121.94                                 |
| August           | US bonds         | 125.75                                 |
| September        | US bonds         | 132.43                                 |
| October          | US bonds         | 139.21                                 |
| November         | US bonds         | 143.23                                 |
| December         | Japanese bonds   | 146.26%                                |

Thus, option (b) is the closest answer and hence is correct.

Again a question that you cannot feasibly do inside the examination as the minimum time required to solve this given the intricate calculations and the mind blowing length of the question is somewhere between 10-15 minutes for the aspirants who are fastest at calculations.

17. The question was incorrect in the XAT 2011 examination.

In this case, Mr. Sanyal's investment and return track would be something like what is given in the following table:

|   | <i>Bullion<br/>invested<br/>in</i> | <i>Amount</i> | <i>Bond/fixed<br/>deposit<br/>invested in</i> | <i>Amount</i> | <i>Total valua-<br/>tion</i> |
|---|------------------------------------|---------------|---|---------------|------------------------------|
| Initial investment in January   | Gold                               | 400000        | Indian FD                                     | 400000        | 800000                       |
| Valuation on 1 <sup>st</sup> April at the end of the first quarter    |                                    | 406600        |   | 425000        | 831600                       |
| Investment on 1 <sup>st</sup> April                                   | Silver                             | 415300        | EU Bonds                                      | 415300        |                              |
| Valuation on 1 <sup>st</sup> June at the end of the second quarter    |                                    | 442093        |   | 443098        | 885191                       |
| Investment on 1 <sup>st</sup> July                                    | Silver                             | 442595        | US Bonds                                      | 442595        |                              |
| Valuation on 1 <sup>st</sup> October at the end of the third quarter  |                                    | 458689        |   | 505212        | 963900                       |
| Investment on 1 <sup>st</sup> October                                 | Silver                             | 481950        | US Bonds                                      | 481950        |                              |
| Valuation on 31 <sup>st</sup> December at the end of the last quarter |                                    | 499475        |   | 504080        | 1003555                      |

From the options all the options are seen to be incorrect based on this value of what his initial investment of 800000 has become.

This can be further verified if we look at what each asset would have returned in terms of the valuation at the end of the year in case the entire amount was invested in that asset.

The valuation of ₹800000 invested for a year in US bonds would be 1100000

The valuation of ₹800000 invested for a year in EU bonds would be 1040000

The valuation of ₹800000 invested for a year in UK bonds would be 985714

The valuation of ₹800000 invested for a year in Japanese bonds would be 1008000

The valuation of ₹800000 invested for a year in FD would be 1000000. Even from these values and working backwards from the options we can see that all 5 options give us different values of his investment valuation at the end of the year.

Hence, this question can be concluded to be incorrect.

18. The best recommendation would be the ones which would give the maximum variance in the returns as against not transacting. In order to spot the best recommendation months we need to look at the months where converting an investment from one asset class to another would give us the maximum impact in terms of returns.

The months to be considered from the options are:

June, November, October, May and March.

Based on the following table we can see the respective returns for US, EU and Japanese bonds in these months:

|  |           | US<br>bonds<br>(monthly<br>return<br>0.83%) | EU<br>bonds<br>(monthly<br>return<br>1.66%) | Japan-<br>ese<br>bonds<br>(monthly<br>return<br>0.4166%) |
|--|-----------|---|---|--|
| % RETURNS<br>DUE TO<br>CURRENCY<br>RATE FLUC-<br>TUATIONS<br>(approx.<br>values) | February  | 2.5   | 2.5   | 2  |
|  | March     | 0   | 0.81  | 1.96   |
|  | April     | 2.44  | 0   | 0  |
|  | May       | 0   | 0.80  | 1.92   |
|  | June      | 0   | 0   | 1.88   |
|  | July      | 4.76  | 0.8   | 1.85   |
|  | August    | 2.27  | 0   | 0  |
|  | September | 4.44  | 1.58  | 3.63   |
|  | October   | 4.25  | 1.56  | 1.75   |
|  | November  | 2.04  | 0   | 1.72   |
|  | December  | 0   | 0   | 1.69   |

From the above table we can derive the following table for the return estimates comparisons for EU, US and Japanese bonds for all the months of 2010.

|           | <i>US bonds<br/>(monthly re-<br/>turn 0.83%)</i> | <i>EU bonds<br/>(monthly<br/>return 1.66%)</i> | <i>Japanese<br/>bonds<br/>(monthly return<br/>0.4166%)</i> |
|-----------|--|--|--|
| February  | 3.35%  | 4.2%   | 2.42%  |
| March     | 0.83%  | 2.49%  | 2.38%  |
| April     | 3.3%   | 1.66%  | 0.4166%  |
| May       | 0.83%  | 2.48%  | 2.34%  |
| June      | 0.83%  | 1.66%  | 2.30%  |
| July      | 5.63%  | 2.48%  | 2.27%  |
| August    | 3.12%  | 1.66%  | 0.4166%  |
| September | 5.31%  | 3.27%  | 4.06%  |
| October   | 5.11%  | 3.25%  | 2.17%  |
| November  | 2.89%  | 1.66%  | 2.14%  |
| December  | 0.83%  | 1.66%  | 2.11%  |

From this table it is clear that the more funds we park in US bonds from July to December the greater would be our return. Hence, the best recommendation of all must have recommended shifting all the excess money into US bonds before June. (By excess money we mean the money beyond the minimum of 20% of the initial funds which have to be kept compulsorily in each bond).

Thus, option (c) would be the best recommendation— 2 transactions each during May and June viz: convert EU bonds to US bonds in May end and convert Japanese bonds to US bonds in June end.

## 10 XAT 2010

**Directions for Questions 1 to 3:** Based on the following information.

An automobiles company's annual sales of its small cars depends on the state of the economy as well as on whether the company uses some high profile individual as its brand ambassador in the advertisements of its product. The state of the economy is "good", "okay", "bad" with probabilities 0.3, 0.4 and 0.3 respectively. The company may choose a high profile individual as its brand ambassador in TV ads or may go for TV ads without a high profile brand ambassador.

If the company fixes price at ₹3.5 lakh, the annual sales of its small cars for different states of the economy and for different kinds of TV ads are summarized in [table 1](#). The figures in the first row are annual sales of the small cars when the company uses a high profile individual as its brand ambassador in its TV ads and the ones in the second row are that when the company does not use any brand ambassador in its TV ads, for different states of the economy.

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**Table 1**

|                          | "Good" | "Okay" | "Bad" |
|--------------------------|--------|--------|-------|
| With brand ambassador    | 100000 | 80000  | 50000 |
| Without brand ambassador | 80000  | 50000  | 30000 |

Without knowing what exactly will be the state of the economy in the coming one year, the company will either have to sign a TV ad contract with some high profile individual, who will be the company's brand ambassador for its small car for the next one year, or go for a TV ad without featuring any high profile individual. It incurs a cost of ₹3.45 lakh (excluding the payment

to the brand ambassador) to put a car on the road.

When the company's profit is uncertain, the company makes decisions on the basis of its expected profit. If the company can earn a profit  $x_i$  with probability  $p_i$  (the probability depends on the state of economy), then the expected profit of the company is  $\sum_i x_i p_i$

1. The maximum that the company can afford to pay its brand ambassador is
  - (a) ₹10.0 crore
  - (b) ₹10.6 crore
  - (c) ₹10.8 crore
  - (d) ₹12.0 crore
  - (e) ₹16.4 crore
2. Mr. Khan a popular film actor, agrees to sign the contract to become the company's brand ambassador for ₹9 crore. As a result, the cost to the company of putting a car on the road also gets escalated. The maximum escalation in cost of putting a car on the road, for which the company can afford to sign the contract with Mr. Khan is
  - (a) ₹900
  - (b) ₹967
  - (c) ₹1250
  - (d) ₹1267
  - (e) ₹1300
3. Mr. Khan, a popular film actor, agrees to sign the contract to become the company's brand ambassador for ₹9 crore. The cost to the company of putting a car on the road also gets escalated by ₹1000. If the company signs the contract with Mr. Khan, its profit will
  - (a) increase by ₹40 lakh
  - (b) increase by ₹60 lakh
  - (c) decrease by ₹20 lakh
  - (d) decrease by ₹40 lakh
  - (e) decrease by ₹50 lakh

**Directions for Questions 4 to 6:** Based on the information given

below.

The cost and price data for Portland cement manufactured by Paharpur Cement and Bahsin Cement, for four consecutive quarters are given in [table 2](#):

**Table 2**

|               | Paharpur Cement              |               | Bahsin Cement                |               |
|---------------|------------------------------|---------------|------------------------------|---------------|
|               | Cost (as % of sales revenue) | Price (₹/bag) | Cost (as % of sales revenue) | Price (₹/bag) |
| Oct– Dec 2008 | 92.11                        | 352           | 94.21                        | 438           |
| Jan– Mar 2009 | 87.56                        | 304           | 91.34                        | 440           |
| Apr– Jun 2009 | 91.03                        | 340           | 89.96                        | 430           |
| Jul– Sep 2009 | 90.42                        | 322           | 90.38                        | 434           |

$$\text{Sales Revenue} = \text{Price} \times \text{Sales Quantity}$$

$$\text{Profit} = \text{Sales Revenue} - \text{Cost}$$

$$\text{Profit Rate} = \text{Profit}/\text{Sales Quantity}$$

4. Profit rate of Paharpur Cement is more than the profit rate of Bahsin Cement in:
  - (a) Oct – Dec 2008 and Jan – Mar 2009
  - (b) Jan – Mar 2009 and Apr – Jun 2009
  - (c) Oct – Dec 2008 only
  - (d) Jan – Mar 2009 only
  - (e) Apr – Jun 2009 only
5. If between Jan – Mar 2009 and Apr – Jun 2009 sales of Paharpur cement increased from 543278 to 698236 and that of Bahsin Cement decreased from 526532 to 499874, then which of the following is true?
  - (a) Between Jan – Mar 2009 and Apr – Jun 2009, profit and profit rate of Paharpur Cement increased, whereas profit and profit rate of Bahsin Cement decreased.
  - (b) Between Jan – Mar 2009 and Apr – Jun 2009, profit rate of Paharpur Cement increased but its profit decreased, whereas both profit and profit rate of Bahsin Cement increased.
  - (c) Between Jan – Mar 2009 and Apr – Jun 2009, both the profit and

- profit rate of Paharpur Cement decreased, whereas profit rate of Bahsin Cement decreased but its profit increased,
- (d) Between Jan – Mar 2009 and Apr – Jun 2009, profit of Paharpur Cement increased but its profit rate decreased, whereas profit rate of Bahsin Cement increased but its profit decreased.
  - (e) Between Jan – Mar 2009 and Apr – Jun 2009, profit rate of Paharpur Cement decreased but its profit increased, whereas both profit and profit rate of Bahsin Cement increased.
6. If between Apr – Jun 2009 and Jul – Sept 2009 sales of Paharpur Cement increased by 2.25%, its profit increased by
- (a) 2.08%
  - (b) 2.25%
  - (c) 2.96%
  - (d) 3.28%
  - (e) 3.42%

**Directions for Questions 7 to 9:** Answer the questions based on the following information.

Madhubala Devi, who works as a domestic help, received ₹2500 as Deepawali bonus from her employer. With that money she is contemplating purchase of one or more among 5 available government bonds – A, B, C, D, and E.

To purchase a bond, Madhubala Devi will have to pay the price of the bond. If she owns a bond she receives a stipulated amount of money every year (which is termed as the coupon payment) till the maturity of the bond. At the maturity of the bond she also receives the face value of the bond.

$$\text{Price of a bond is given by: } P = \left[ \sum_{t=1}^T -\frac{C}{(1+r)} \right] + \frac{F}{(1+r)^T},$$

where C is the coupon payment on the bond, which is the amount of money the holder of the bond receives annually; F is the face value of the bond, which is the amount of money the holder of the bond receives when the bond matures (over and above the coupon payment for the year of maturity); T is the number of years in which the bond matures;  $r = 0.25$ , which means the

market rate of interest is 25%.

Among the 5 bonds bond A and another two bonds mature in 2 years, one of the bonds matures in 3 years, and bond D matures in 5 years.

The coupon payments on bonds A, E, B, D and C are in arithmetic progression, such that the coupon payment on bond A is twice the common difference, and the coupon payment on bond B is half the price of bond A.

The face value of bond B is twice the face value of bond E, but the price of bond B is 75% more than the price of bond E. The price of bond C is more than ₦1800 and its face value is same as the price of bond A. The face value of bond A is ₦1000.

Bond D has the largest face value among the five bonds.

7. The face value of bond E must be

- (a) ₦1406.25
- (b) ₦1686.25
- (c) ₦2250.50
- (d) ₦2812.50
- (e) ₦3372.50

8. Madhubala Devi purchased one or more of the 5 available bonds from her bonus pay and spent the remainder. She made the purchase decision such that her return from the bonds is maximized. Her return from the bonds is

- (a) ₦3000.00
- (b) ₦3250.00
- (c) ₦3656.25
- (d) ₦3906.25
- (e) ₦4531.25

9. The price of bond C must be

- (a) ₦1825
- (b) ₦1874
- (c) ₦1925
- (d) ₦1976
- (e) ₦2342

**Directions for Questions 10 to 12:** Based on the information given below.

The retail prices of flowers, consumers expenditure on flowers and sales of flowers for the calendar year 2009, in Phoolgaon, a small town with a population of 70000, is summarized in [Table 3](#).

10. Compared to January, the total expenditure on carnations in March
  - (a) increased by 6.27%
  - (b) decreased by 6.64%
  - (c) increased by 6.69%
  - (d) decreased by 7.11%
  - (e) did not change
11. Compared to January, the sales of roses in July
  - (a) decreased by 39.15%
  - (b) decreased by 28.13%
  - (c) increased by 4.53%
  - (d) increased by 4.33%
  - (e) did not change
12. Compared to January, the price of carnations in December
  - (a) increased by 26.57%
  - (b) increased by 28.12%
  - (c) increased by 36.19%
  - (d) increased by 38.16%
  - (e) did not change

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**Table 3**

| Month | Price (retail) of roses<br>(₹/dozen) | Average consumer expenditure<br>on roses and carnations (₹) | Total consumer expenditure<br>on roses (₹) | Sales of carnations<br>(dozens) |
|-------|--------------------------------------|---|--|---------------------------------|
| Jan   | 99.0                                 | 47.4  | 1136916                                    | 13848                           |
| Feb   | 112.5                                | 51.9  | 1051650                                    | 20486                           |
| Mar   | 135.0                                | 49.5  | 1137915                                    | 12928                           |
| Apr   | 130.5                                | 51.6  | 1315310                                    | 14021                           |
| May   | 126.0                                | 59.4  | 1116612                                    | 18774                           |
| Jun   | 157.5                                | 55.8  | 979020                                     | 17579                           |
| Jul   | 144.0                                | 56.4  | 1188432                                    | 17521                           |
| Aug   | 117.0                                | 54.0  | 940446                                     | 20355                           |
| Sep   | 162.0                                | 55.5  | 1287900                                    | 16031                           |
| Oct   | 126.0                                | 55.2  | 772884                                     | 22897                           |
| Nov   | 189.0                                | 52.8  | 597240                                     | 19128                           |
| Dec   | 166.5                                | 56.4  | 977688                                     | 18859                           |

## ANSWER KEY

1. (d)
2. (c)
3. (b)
4. (c)
5. (e)
6. (e)
7. (a)
8. (c)
9. (d)
10. (c)
11. (b)
12. (e)

## SOLUTIONS

### Questions 1 to 3:

1. The maximum the company can afford to pay the brand ambassador is the expected increase in profits due to the use of the brand ambassador.

The expected increase in sales would be given by the summation of:

Extra sales for a particular state of the economy  $\times$  The probability of that state of the economy =  $20000 \times 0.3 + 30000 \times 0.4 + 20000 \times 0.3 = 24000$  units.

Since the profit per unit is ₹5000 (Sales price being 3.5 lacs and cost per unit being 3.45 lacs)

The additional profit the company makes due to the use of the brand ambassador is:

$$24000 \times 5000 = ₹12 \text{ crore.}$$

This is the amount the company can afford to pay to the brand ambassador.

2. The increase in cost that can be afforded should be such that the total extra profit should still be ₹9 crore. Since the expected extra sale is 24000 units, the profit per unit should be  $= 9 \text{ crore}/24000 = ₹3750$ . For a profit of ₹3750, the cost per unit can rise to a maximum of 346250, an increase of ₹1250. Option (c) is correct.
3. The extra profit with an escalation of cost of ₹1000 would be given by  $24000 \times 4000 = ₹9.6 \text{ crore}$ . Out of this since Mr.Khan has to be paid ₹9 crore, the profit will go up by ₹60 lacs. Option (b) is correct.

### Solutions to Questions 4 to 6

4. The information provided to us is about the cost as a percentage of sales revenue- which obviously means that we also know the profit as a percentage of sales revenue.

Profit as a percentage of sales revenue = Profit  $\times 100/\text{sales revenue} = (\text{profit} \times 100)/(\text{sales quantity} \times \text{price})$ .

But Profit/sales quantity is defined as profit rate. Thus,

Profit as a percentage of sales revenue = profit rate  $\times 100/\text{price}$

$\rightarrow$  Profit rate = profit as a percentage of sales revenue  $\times \text{price}/100$

Thus, for October-December 2008 Profit Rate for Paharpur Cement =  $7.89 \times 352/100 = 7.89 \times 3.52 = 27.77$

Doing the same calculations for both companies over each of the four quarters we get the following table:

|                         | <i>Profit rate of<br/>Paharpur Cement</i> | <i>Profit rate of<br/>Bahsin Cement</i> | <i>Greater one</i> |
|-------------------------|---|---|--------------------|
| October – December 2008 | $7.89 \times 3.52$                        | $5.79 \times 4.38$                      | Paharpur           |
| January – March 2009    | $12.44 \times 3.04$                       | $8.66 \times 4.4$                       | Bahsin             |
| April – June 2009       | $8.97 \times 3.4$                         | $10.04 \times 4.3$                      | Bahsin             |
| July – September 2009   | $9.58 \times 3.22$                        | $9.62 \times 4.34$                      | Bahsin             |

Thus, we can see that the profit rate of Paharpur is higher than Bahsin only for the quarter October to December 2008. Option (c) is correct.

5. In order to solve this question we need to find out the profit and profit rate for both Paharpur Cement and Bahsin Cement over the two periods.

Profit rate for Paharpur cement as can be seen from the calculation of the previous question (as seen in the table in the solution to the previous question) has decreased from  $12.44 \times 3.04$  to  $8.97 \times 3.4$ . At the same time profit rate of Bahsin Cement has gone up from  $8.66 \times 4.4$  to  $10.04 \times 4.3$ .

Since, the profit rate of Paharpur cement has decreased; we can eliminate options (a), (b) and (d) as they all refer to the profit rate of Paharpur cement increasing.

Also, option (c) can be eliminated because it says that the profit rate of Bahsin cement is decreasing whereas we know for a fact that the profit rate of Bahsin cement has actually increased.

This leaves us only with option (e) as a feasible answer and hence it should be selected as the correct answer.

6. In order to solve this, assume that the initial sale (for April to June 2009) is 1 unit @ ₦340 per unit. Total sales revenue is ₦340 and profit would be 8.97% of that, which would be approximately equal to 30.49. The sales units in the next quarter would be 1.0225 @ ₦322 the sales revenue would be approximately 329.2 and the profit would be 9.58% of that—which would be approximately 31.54.

The growth in profit is close to 3.42%.

Hence, Option (e) is correct.

### **Questions 7 to 9:**

There are three key variables in the question: Price of a bond, Coupon payment on a bond, Face value of a bond besides the number of years to maturity for a bond.

Next, since we know that the coupon payments on A, E, B, D and C are in Arithmetic Progression, we can assume the coupon payments as:

- Coupon Payment for A =  $a - 2d$ ,
- Coupon Payment for E =  $a - d$ ,
- Coupon Payment for B =  $a$ ,
- Coupon Payment for D =  $a + d$  and
- Coupon Payment for C =  $a + 2d$

We also know that the coupon payment on A is two times the common difference

**Thus,  $a - 2d = 2d \rightarrow a = 4d$  and hence the values of the coupon payments become:**

- Coupon Payment for A =  $2d$ ,
- Coupon Payment for E =  $3d$ ,
- Coupon Payment for B =  $4d$ ,
- Coupon Payment for D =  $5d$  and
- Coupon Payment for C =  $6d$

Also, since coupon payment for B = half the price of A  $\rightarrow$  Price of A =  $2 \times$  coupon payment for B =  $2 \times 4d = 8d$ .

Also, since A matures in 2 years and because it's face value is 1000 we have:

$$\text{Price of A} = 8d = (2d/1.25) + 2d/1.25^2 + 1000/1.25^2$$

$$8d = 4.5d/1.25^2 + 1000/1.25^2$$

$$12.5d - 4.5d = 1000 \rightarrow d = 125.$$

Thus, the price of bond A =  $8d = 1000$ .

If we now try to tabulate the information we get the following table:

| Bond | Coupon | Face Value | Price | Time period  |
|------|--------|------------|-------|--------------|
| A    | 250    | 1000       | 1000  | 2 years      |
| E    | 375    |            |       | 2 or 3 years |
| B    | 500    |            |       | 2 or 3 years |
| D    | 625    |            |       | 5 years      |
| C    | 750    |            |       | 2 or 3 years |

From this point we need to use the remaining information to solve question 91.

7. Since the face value of C is the same as price of A, and also using the remaining information we get:

| Bond | Coupon | Face Value         | Price     | Time period  |
|------|--------|--------------------|-----------|--------------|
| A    | 250    | 1000               | 1000      | 2 years      |
| E    | 375    | $F_E$              | $P_E$     | 2 or 3 years |
| B    | 500    | $2F_E$             | $1.75P_E$ | 2 or 3 years |
| D    | 625    | Highest face value |           | 5 years      |
| C    | 750    | 1000               | 1800+     | 2 or 3 years |

At this point we are in a position to try to calculate the price of C. If we try to calculate the price of C for 2 years maturity we see that the price of C is:

$$P_C = 750 [1/1.25 + 1/1.25^2] + 1000/1.25^2$$

$= 600 + 480 + 640 = 1720$  which is less than 1800. Hence, the maturity of C should be 3 years and the maturity of the other bonds B and E should be 2 years.

The face value of E would be:

$$P_E = 375 [1/1.25 + 1/1.25^2] + F_E/1.25^2$$

$$\text{Also, } P_B = 1.75P_E = P_C = 500 [1/1.25 + 1/1.25^2] + 2F_E/1.25^2$$

Using the above two equations together, we get:

$$1.75 \{375 [1/1.25 + 1/1.25^2] + F_E/1.25^2\} = 500 [1/1.25 + 1/1.25^2] + 2F_E/1.25^2$$

$$\rightarrow 1.75 \{540 + 0.64F_E\} = 400 + 320 + 1.28F_E$$

$$0.16 F_E = 225 \rightarrow F_E = 1406.25$$

Option (a) is correct.

8. In order to complete the table from this point we can complete the remaining calculations and get:

| Bond | Coupon | Face Value         | Price | Time period |
|------|--------|--------------------|-------|-------------|
| A    | 250    | 1000               | 1000  | 2 years     |
| E    | 375    | 1406.25            | 1440  | 2 years     |
| B    | 500    | 2812.5             | 2520  | 2 years     |
| D    | 625    | Highest face value |       | 5 years     |
| C    | 750    | 1000               | 1976  | 3 years     |

The highest return is given by E and after purchasing 1 unit of E, she can also purchase another unit of A. Thus, she would get back:  $1406.25 + 375 \times 2 + 1000 + 250 \times 2 = 3656.25$ . Option (c) is correct.

9. The price of bond C would be given by:

$$750 \times \{1/1.25 + 1/1.25^2 + 1/1.25^3\} + 1000/1.25^2 = 600 + 480 + 384 + 512 = 1976.$$

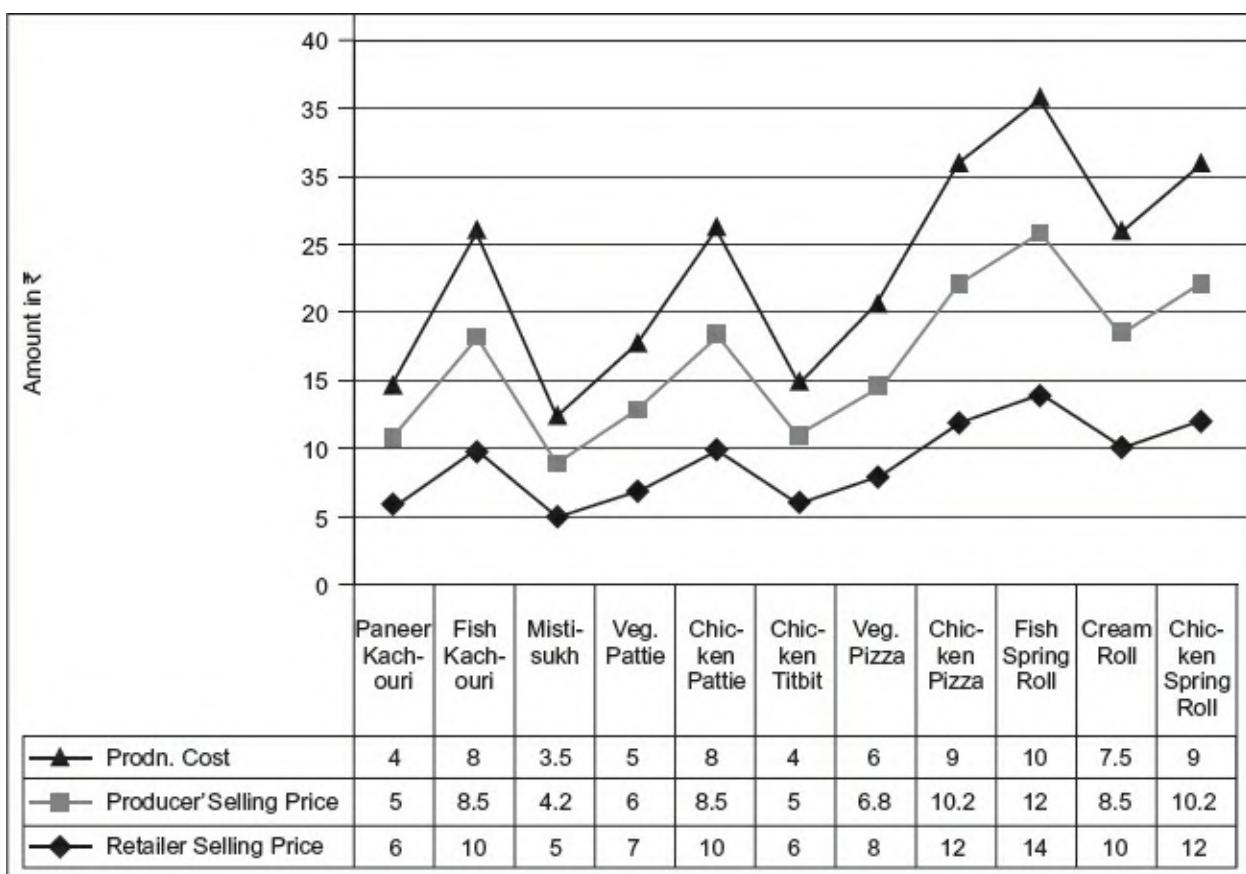
Option (d) is correct.

### Questions 10 to 12:

10. In January the total expenditure on roses and carnations was  $70000 \times 47.4 = 33.18$  lacs out of which the expense on Roses was 1136916. Thus, the expenditure on carnations was  $3318000 - 1136916 = 2181084$ . The same values for March were: total expenditure on roses and carnations =  $70000 \times 49.5 = 3465000$  while expenditure on roses only was 1137915. So expenditure on carnations in March =  $3465000 - 1137915 = 2327085$ . The percentage change from 2181084 to 2327085 is an increase of 6.69%. Thus, option (c) is correct.
11. The sales of roses in January =  $1136916/99 = 11484$ , Sales of roses in July =  $1188432/144 = 8253$ . The percentage drop from 11484 to 8253 is 28.13%.
12. January price of carnations = total revenue on carnations/sales of carnations =  $2181084/13848 = 157.5$   
 Also, total revenue on carnations in December =  $70000 \times 56.4 - 977688 = 3948000 - 977688 = 2970312$   
 December price of carnations = total revenue on carnations/sales of carnations =  $2970312/18859 = 157.5$ .  
 Thus, there is no change in the price of carnations in January when compared to the price in December.

# 11 XAT 2009

**Directions for Questions 1 to 2:** On the basis of the data given in the chart.



The above Chart gives per unit selling prices and costs in rupees of 11 items prepared by a sweet shop. Margins are calculated on percentage basis. Based on the data given, answer the questions that follow:

- Which of the following conclusions can be made?

- Producer's margin for paneer kachouri is less than retailer's margins.
- (a) Producer's margin for chicken pizza is more than retailer's margins.
- (b) Producer's margin for fish spring roll is more than retailer's margins.
- (c) Producers and retailer's margins are highest for paneer kachouri alone.
- (d) Retailer's made losses in a few products.
2. Which of the following conclusion can be drawn from the diagram?
- (a) Retailers' selling price for mistisukh was more than producer's selling price for chicken titbit.
- (b) Difference between retailer's selling price and producer's selling price for fish kachouri was more than that of cream roll.
- (c) There are three types of margins for all items.
- (d) Of all the margins, both for retailer and producer, producer's margin for chicken pizza was the maximum.
- (e) The three lines that connect different points, in the diagram above, are superfluous.

**Directions for Questions 3 to 5:** On the basis of the data given in [Table 1](#).

A cake chain manufactures two types of products—‘cakes/pastries/gâteaux’ and savouries. The chain was concerned about high wastage (in terms of leftover) and wanted to reduce it. [Table 1](#) provides information about sales, costs and wastage for both products.

3. Which of the following statement(s) is (are) right?
- (1) The worth of leftover for cakes/pastries/gâteaux increased from 1993 to 2004.
- (2) The worth of leftover for cakes/pastries/gâteaux kept on fluctuating, many a times, between 1993 and 2004.
- (3) The worth of leftover for savouries and cakes/pastries/gâteaux was highest in 2004.

- (4) The worth of leftover for savouries kept on fluctuating, many a times, between 1993 and 2004.

Choose the right combination from the following:

- (a) 1 and 4
  - (b) 3 and 4
  - (c) 1 and 2
  - (d) Only 3
  - (e) 2 and 3
4. Maximum decline in amount of leftover of cakes/pastries/gateaux occurred in the year:
- (a) From 1997 to 1998
  - (b) From 1996 to 1997
  - (c) From 1998 to 1999
  - (d) There was always an increase in worth of leftover.
  - (e) Cannot be calculated from the data.
5. If profit = sales – cost – leftover. In which year was the cakes chain was in losses?
- (1) 1993
  - (2) 1997
  - (3) 1998
  - (4) 2000
- Choose the right option:
- (a) 1, 2, 3, 4
  - (b) 3, 4
  - (c) 2,3
  - (d) 1, 2, 3
  - (e) It was always in profit.

**Directions for Questions 6 to 7:** On the basis of the following information:

In the diagram above, the seven letters correspond to seven unique digits chosen from 0 to 9. The relation among the digits is such that:

$$P.Q.R = X.Y.Z = Q.A.Y$$

|   |   |   |
|---|---|---|
| P |   | X |
| Q | A | Y |
| R |   | Z |

**Table 1** Revenue statement

| Year | Cakes/Pastries/Gateaux |                |                           | Savouries      |                |                           |
|------|------------------------|----------------|---------------------------|----------------|----------------|---------------------------|
|      | Sales in ₹ lac         | Costs in ₹ lac | Leftover as %age of sales | Sales in ₹ lac | Costs in ₹ lac | Leftover as %age of sales |
| 1993 | 81.47                  | 80.06          | 1.52                      | 41.79          | 41.07          | 9.38                      |
| 1994 | 171.42                 | 168.03         | 1.58                      | 80.69          | 79.09          | 10.61                     |
| 1995 | 326.95                 | 323.7          | 1.43                      | 146.88         | 145.42         | 10.08                     |
| 1996 | 591.77                 | 576.52         | 1.23                      | 220.96         | 215.26         | 10.45                     |
| 1997 | 667.1                  | 657.89         | 2.06                      | 516.23         | 509.10         | 8.43                      |
| 1998 | 936.52                 | 928.95         | 1.74                      | 468.39         | 464.60         | 11.04                     |
| 1999 | 978.69                 | 966.97         | 1.19                      | 528.31         | 521.98         | 6.98                      |
| 2000 | 752.09                 | 743.20         | 1.50                      | 637.63         | 630.09         | 5.61                      |
| 2001 | 713.46                 | 687.83         | 1.83                      | 694.42         | 669.47         | 5.96                      |
| 2002 | 885.29                 | 845.83         | 1.76                      | 869.15         | 830.40         | 5.66                      |
| 2003 | 1071.81                | 1014.87        | 1.81                      | 913.68         | 865.14         | 6.72                      |
| 2004 | 1225.00                | 1163.75        | 2.78                      | 1075.00        | 1021.25        | 6.14                      |

6. What is the value of A?
  - (a) 0
  - (b) 2
  - (c) 3
  - (d) 6
  - (e) None of the above
  
7. What is the sum of the digits which are not used?
  - (a) 8
  - (b) 10
  - (c) 14
  - (b) 15
  - (e) None of the above

**Directions for Questions 8 to 10:** On the basis of the following

*information.*

KK, an aspiring entrepreneur wanted to set up a pen drive manufacturing unit. Since technology was changing very fast, he wanted to carefully gauge the demand and the likely profits before investing. Market survey indicated that he would be able to sell 1 lac units before customers shifted to different gadgets. KK realized that he had to incur two kinds of costs – fixed costs (the costs which do not change, irrespective of numbers of numbers of units of pen drives produced) and variable costs (= variable cost per unit multiplied by number of units). KK expected fixed cost to be ₹40 lac and variable cost to be ₹100 per unit. He expected each pen drive to be sold at ₹200.

8. What would be the break-even point (defined as no profit, no loss situation) for KK's factory, in term of sales?
  - (a) ₹80 lac
  - (b) ₹100 lac
  - (c) ₹120 lac
  - (d) ₹140 lac
  - (e) Cannot be found with the given data.
9. KK was skeptical that per unit variable cost might increase by 10% though the demand might remain same. What will be the expected changes in profit in such a case?
  - (a) Profit would decrease by 10.33%
  - (b) Profit will increase will by 15.75%
  - (c) Profit would decrease by 15.75%
  - (d) Profit will decrease by 16.67%
  - (e) Profit will increase by 16.67%
10. He discussed his business with a chartered accountant. KK informed that he was contemplating a loan of 20 lac at simple interest of 10% per annum for starting the business. The chartered accountant informed him that in such a case KK has to pay interest, followed by 30% tax.

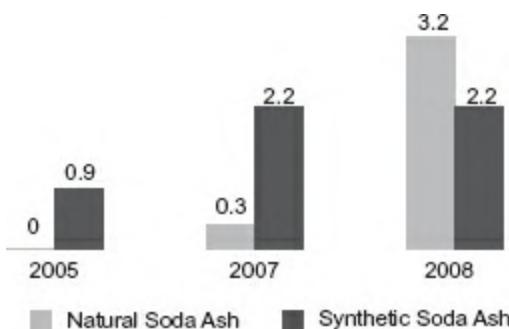
By how much does KK's earnings change with 20% growth in sales vis-à-vis the original sales volume, in both cases considering tax and interest on loan?

  - (a) 20%

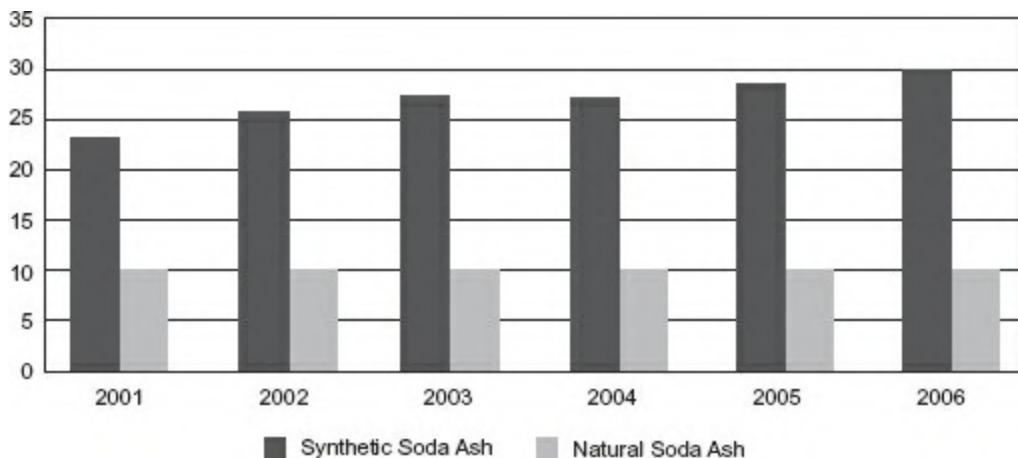
- (b) 16.7%
- (c) 25.6%
- (d) 33.3%
- (e) 34.5%

**Directions for Questions 11 to 15:** On the basis of the data given in the two charts.

Tata Chemicals Soda Ash Production (MT)



Global Soda Ash Production (MT)



Sodium carbonate, also called as soda ash is an important ingredient for glass, soaps and detergents, and many other products. There were two ways producing soda ash. The first is producing soda ash from *trona* obtained naturally. The second method was producing soda ash from common salt through Solvay process. Soda ash produced thus was called synthetic soda ash. Tata Chemicals was one of the largest producers of soda ash. The first chart shows production and the second chart shows the global soda ash

production of two varieties of soda ash in the world.

11. It was expected that global soda ash production would be same for 2006, 2007 and 2008 (only for this question). What could be a possible reason for different patterns of production in Tata Chemicals and the world?
  - (a) Tata Chemicals built new plants of 2.2 MT natural soda ash capacity in 2007.
  - (b) Tata Chemicals built 3.2 MT of natural soda ash capacity from 2005 to 2008.
  - (c) Tata Chemicals produced 2.7% of total soda ash in the world.
  - (d) Tata Chemicals might have acquired 0.3 MT of natural soda ash facility in 2007.
  - (e) None of above conclusion could possibly be drawn.
12. Suppose the total global production increased (year on year) from 2005 to 2008 by the amount Tata Chemicals' synthetic production (year on year) increased in the same period. By what percentage did the total global production increase from 2007 to 2008?
  - (a) Cannot be calculated at all from the given charts.
  - (b) Increased by 10.16%.
  - (c) Increased by 9.48%.
  - (d) Did not increase at all.
  - (e) Increased by 8.64%.
13. Which of the following statements are true?
  - (1) Proportion of natural soda ash to synthetic soda has decreased from 2001 to 2006 globally.
  - (2) Proportion of natural soda ash to synthetic soda ash has increased from 2001 to 2006 globally.
  - (3) Proportion of synthetic soda ash to total soda ash has decreased for Tata chemicals from 2005 to 2007.
  - (4) Proportion of synthetic soda ash to total soda ash has increased for Tata chemicals.
    - (a) 1 and 3
    - (b) 1 and 4
    - (c) 2 and 4

- (d) 2 and 3
  - (e) 1, 2 and 3 only
14. What is Tata Chemicals' share of global production in 2008?
- (a) 12.86%
  - (b) 17.42%
  - (c) 59.34%
  - (d) Incomplete data
  - (e) None of the above
15. Suppose total global production of soda ash in 2008 was 40 MT and Tata Chemicals was second highest producer of soda ash globally after another company called Solvay. FMC Wyoming was the third highest producer. Two Indian giants, Tata Chemicals and Nirma have a combined production capacity of 8.8 MT. Which of the following statements are right?
- (1) Solvay's market share was more than 20.66%
  - (2) Solvay's market share was more than 13.5%
  - (3) FMC's market share was less than 10.33%
  - (4) FMC's market share was less than 13.5%
  - (5) Nirma, which was sixth largest producer, had a share of less than 8.5%

Choose the right option.

- (a) 1 and 3
- (b) 1 and 5
- (c) 2 and 4
- (d) 1, 3 and 5
- (e) 2, 4 and 5

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## ANSWER KEY

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- 1. (c)
- 2. (e)
- 3. (d)
- 4. (c)

5. (a)
  6. (b)
  7. (e)
  8. (a)
  9. (d)
  10. (e)
  11. (d)
  12. (d)
  13. (a)
  14. (d)
  15. (c)
- 

## SOLUTIONS

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### Questions 1 and 2:

1. It can be clearly seen that the producer's margin for fish spring roll (20%) is more than the retailer's margin for the same. Hence, option (c) is correct.
2. Looking at each of the 5 options, we can see that the first option is rejected because the retailer's selling price of mistisukh was not more than producer's selling price for chicken titbit as for both of them the price was 5.

Option (b) is also rejected as we can see that the difference between the retailer's selling price and the producer's selling price was equal.

Option (c) gets rejected because there are only two types of margins and not three, i.e. retailer's margin and producer's margin

Option (d) also gets rejected because there are higher margins than the producer's margins for chicken pizza.

Hence, Option (e) has to be correct—and it indeed is because if we try to look at the line graphs in the chart, they have no correlation to the values in the table and hence we cannot make any sense from them. Thus, they can be described as superfluous.

### Questions 3 to 5:

3. In order to solve this question we need to take a look at the behaviour of the actual leftover values (as a % of sales) for both cakes/pastries as well as for savouries.

The following visual observations can be made about the leftover amount for cakes/pastries:

| Year | Sales of cakes/pastries/gateaux | Leftover as % of sales for cakes/pastries/gateaux | Hence, actual leftover amount for cakes/pastries/gateaux |
|------|---------------------------------|---|--|
| 1994 | Grows                           | Grows   | Grows  |
| 1995 | Grows close to 90%              | Reduces about 10%                                 | Grows  |
| 1996 | Grows 80-90%                    | Reduces 10-20%                                    | Grows  |
| 1997 | Grows                           | Grows   | Grows  |
| 1998 | Grows over 40%                  | Reduces 10-20%                                    | Grows  |
| 1999 | Grows about 5%                  | Reduces by over 30%                               | Reduces  |
| 2000 | Grows                           | Grows   | Grows  |
| 2001 | Reduces 5%                      | Grows over 20%                                    | Grows  |
| 2002 | Grows over 20%                  | Reduces around 5%                                 | Grows  |
| 2003 | Grows                           | Grows   | Grows  |
| 2004 | Grows                           | Grows   | Grows  |

From the table of conclusions about the direction that the leftover of cakes/pastries/gateaux is taking— we can see that both statements 1 and 2 are incorrect because we cannot say that the worth of leftover for cakes, etc. increased continuously from 1993 to 2004 and neither can we say that the worth of leftover kept fluctuating many a times.

We can definitely conclude that the worth of leftover for cakes/pastries/gateaux would have been highest in 2004. In order to test the remaining two statements we need to see the behaviour of leftovers for savouries:

| Year | Sales of savouries | Leftover as % of sales for savouries | Hence, actual left-over amount for savouries |
|------|--------------------|--------------------------------------|--|
| 1994 | Grows              | Grows                                | Grows  |
| 1995 | Grows 80%          | Reduces 5%                           | Grows  |
| 1996 | Grows              | Grows                                | Grows  |
| 1997 | Grows over 100%    | Reduces about 20%                    | Grows  |
| 1998 | Reduces about 10%  | Grows about 30%                      | Grows  |
| 1999 | Grows about 13%    | Reduces more than 30%                | Reduces                                      |
| 2000 | Grows about 20%    | Reduces about 20%                    | Very close call                              |
| 2001 | Grows              | Grows                                | Grows  |
| 2002 | Grows about 20-30% | Reduces about 5-10%                  | Grows  |
| 2003 | Grows              | Grows                                | Grows  |
| 2004 | Grows 17-18%       | Reduces about 10%                    | Grows  |

Looking at this table of values about leftovers for savouries we can conclude that the value for this would be highest in 2004. Thus, statement 3 is completely correct.

At the same time we can reject statement 4 too, as the worth of leftovers for savouries was not fluctuating all the time.

Thus, only statement 3 is correct and hence we choose option (d) as the correct answer.

4. From our table of conclusions about the leftovers for cakes/pastries/gateaux we can see that the only year when there is a decrease in it's value is from 1998 to 1999 and hence option (c) is the correct answer.
5. In order to solve this question we need to test the values of profit/loss for the cake chain in the years 1993, 1997, 1998 and 2000.

In 1993, the value of profit/loss would be given by:

$$\begin{aligned}
 & (81.47 + 41.79) - (80.06 + 41.07) - (1.52\% \text{ of } 81.47 + 9.38\% \text{ of } 41.79) \\
 & = 123.46 - 121.13 - (1.52\% \text{ of } 81.47 + 9.38\% \text{ of } 41.79) \\
 & = 2.33 - (1.52\% \text{ of } 81.47 + 9.38\% \text{ of } 41.79)
 \end{aligned}$$

This can clearly be seen to be a negative value and hence there is a loss in 1993.

Once we have this conclusion that the chain was in losses in 1993 we look at the options and see that there are only two feasible choices—Option (a) or Option (d) as Options (b), (c) and (e) are effectively telling us that the chain made profits in 1993 and hence can be rejected.

To choose between Options (a) and (d) we need to check for the year 2000.

In 2000, the value of profit/loss would be given by:

$$\begin{aligned} &= 1389.72 - 1373.29 - (1.5\% \text{ of } 752.09 + 5.61\% \text{ of } 637.63) \\ &= 16.43 - (1.5\% \text{ of } 752.09 + 5.61\% \text{ of } 637.63) \end{aligned}$$

This can clearly be seen to be a negative value and hence there is a loss in 2000.

### Questions 6 and 7:

The structure of the diagram is such that  $PQR = XYZ = QAY$

In other words, we need to find three ways of making the same product. Further a closer look gives us that two of these ways have to be made from unique digits while the third way has to be made using one new digit and one digit each from the first two ways of making the same product. Looking at the digits from 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 we can see that the first product from the higher side is  $9 \times 8 \times 1$  which can be also made using  $6 \times 4 \times 3$ . Also, 72 can also be achieved using  $9 \times 4 \times 2$  and hence we have the answers as follows:

6. The value of A is 2.
7. The unused digits are: 5 and 7 apart from 0. The sum of the unused digits is 12.

### Questions 8 and 10:

8. The break-even point would be got by finding the number of units at which there is no profit no loss.

It is given by  $(\text{Total fixed cost}/\text{margin per unit}) = 4000000/100 = 40000$  units. The sales revenue at which the break even occurs would be equal to  $40000 \times 200 = 80$  lacs.

9. The variable cost per unit would go up to 110 and hence the margin per unit would go down to ₹90.

Over 1 lac units the profit would be  $90 \times 1$  lacs – 40 lacs = 50 lacs

The original profit without the increase in variable cost would have been:

$$100 \times 1 \text{ lac} - 40 \text{ lacs} = 60 \text{ lacs.}$$

Thus, the reduction in profit is from 60 lacs to 50 lacs = 16.66% drop.

Option (d) is correct.

10. Under the circumstances his profit would get reduced by the value of the interest and his earnings would get estimated by further reducing by 30% the profit that we get after deduction of interest.

Scenario 1:

Sales of 1 lac units:

$$\text{Profit before interest deduction} = 1 \text{ lac} \times 100 - 40 \text{ lacs} = 60 \text{ lacs}$$

Interest = 2 lacs

$$\text{Profit after interest} = 60 - 2 = 58 \text{ lacs.}$$

$$\text{Tax} = 30\% \text{ of } 58 \text{ lacs} = 17.4 \text{ lacs.}$$

$$\text{Earnings} = 58 - 17.4 \text{ lacs} = 40.6 \text{ lacs.}$$

Scenario 2:

Sales of 1.2 lac units:

$$\text{Profit before interest deduction} = 1.2 \text{ lac} \times 100 - 40 \text{ lacs} = 80 \text{ lacs}$$

Interest = 2 lacs

$$\text{Profit after interest} = 80 - 2 = 78 \text{ lacs.}$$

$$\text{Tax} = 30\% \text{ of } 78 \text{ lacs} = 23.4 \text{ lacs.}$$

$$\text{Earnings} = 78 - 23.4 \text{ lacs} = 54.6 \text{ lacs.}$$

$$\% \text{ difference in profit between the two scenarios} = (54.6 - 40.6) \times 100 / 40.6 = 34.5\% \text{ approx.}$$

Option (e) is correct.

### Questions 11 to 15:

11. From the two graphs it is evident that the global soda ash production for natural soda ash has always been stagnant at 10 MT. At the same time it can be seen that Tata Chemicals has increased its natural soda ash production from 0 to 0.3 MT between 2005 and 2007—which obviously means that Tata Chemicals must have acquired 0.3 MT of soda ash production facility in 2007.

Thus, option (d) is a conclusion we can draw from the graphs by

looking at the patterns of production for Tata Chemicals and the world.

12. It can be seen that the increase in Tata Chemicals' Synthetic soda ash production between 2007 to 2008 was 0. Hence, there would be no increase in the global soda ash production also. Option (d) is correct.
13. The proportion of natural soda ash to synthetic soda ash was  $10/34$  in 2001 and it became  $10/40$  in 2006. Thus, it has decreased. Thus statement 1 is correct.

Statement 2 is the opposite of statement 1 and hence has to be false.

Statement 3 is also seen to be true as the proportion of synthetic soda ash for Tata Chemicals' was  $0.9/0.9$  in 2005 and it reduced to  $2.2/2.5$  in 2007.

Thus, Statements 1 and 3 are correct and hence option (a) is correct.

14. We do not have information about the global production in 2008 and hence we should mark that the data is incomplete.

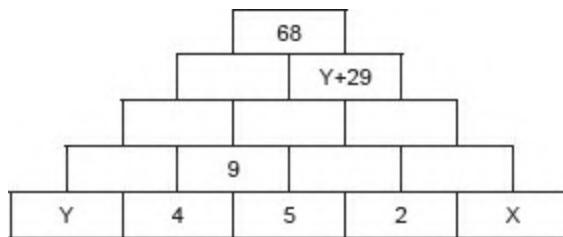
Option (d) is correct.

15. Since Tata Chemicals has a production of 5.4 MT (13.5% of the total market share) we can conclude that Nirma has a production of 3.4 MT (8.5% of the total market share).

Thus, since Solvay produced more than Tata Chemicals, it's market share would be more than 13.5%. Similarly, FMC's market share has to be less than 13.5% (as it is lower than Tata Chemicals' market share). Thus, Statements 2 and 4 are correct. Hence, Option (c) is the correct answer.

## 12 XAT 2008

1. In the figure, the number in any cell is obtained by adding two numbers in the cells directly below it. For example, 9 in the second row is obtained by adding the two numbers 4 and 5 directly below it. The value of  $X-Y$  is



- (a) 2
- (b) 3
- (c) 4
- (d) 5
- (e) 6

**Directions for Questions 2 to 3:** In the second year, students at a business school can opt for any one of Systems, Operations, or HR electives only. The number of girls opting for Operations and the number of boys opting for Systems electives adds up to 37. Twenty-two students opt for Operations elective. Twenty girls opt for Systems or Operations elective. The number of students opting for Systems electives and the number of boys opting for Operations elective adds up to 37. Twenty-five students opt for HR electives.

2. The number of students in the second year is:
- (a) 73

- (b) 74  
 (c) 75  
 (d) 76  
 (e) 77
3. If 20% of the girls opt for HR electives, then the total number of boys in the second year is:  
 (a) 50  
 (b) 51  
 (c) 52  
 (d) 53  
 (e) 54

**Directions for Questions 4 to 8:** On the basis of the data given below:

| Area/Month        |            | January | February | March |
|-------------------|------------|---------|----------|-------|
| Sale in Bistnupur |            |         |          |       |
|                   | Television | 900     | 1050     | 1200  |
|                   | Ipods      | 15750   | 16800    | 17850 |
| Sales in Sakchi   |            |         |          |       |
|                   | Television | 1800    | 2100     | 2400  |
|                   | Ipods      | 9450    | 10080    | 10710 |
| Sales in Kadma    |            |         |          |       |
|                   | Television | 6300    | 7350     | 8400  |
|                   | Ipods      | 6300    | 6720     | 7140  |

Units ordered = Units Sold + Ending Inventory – Beginning Inventory

All sales figures are in Rupees thousand.

All other things are constant

All Rupees figures are in thousands

4. In the period from January to March, Jamshedpur Electronics sold 3150 units of televisions having started with a beginning inventory of 2520 units and ending with an inventory of 2880. What was the value of order placed (in thousands) by Jamshepur Electronics during the three month period? [Profits are 25% of cost price, uniformly.]
- (a) 28080  
 (b) 2808  
 (c) 26325

- (d) 22320
  - (e) 25200
5. What was the total value of surcharge paid (in thousand)— at the rate of 14% of sales value— by Jamshedpur Electronics, over the period of three months?
- (a) Cannot be calculated
  - (b) 18522
  - (c) 18548
  - (d) 18425
  - (e) 18485
6. 10% of sales price of Ipods and 20% of sales price of televisions contribute to the profits of Jamshedpur Electronics. How much profit did the company earn in the month of January from Bistupur and Kadma from the two products?
- (a) 513
  - (b) 4410
  - (c) 3645
  - (d) 5230
  - (e) 5350
7. In the period from January to March, consider that Jamshedpur Electronics ordered 7560 units of Ipods for all three areas put together. What was the unit sales price of an iPod during the period? The ending inventory was 6120 units and the beginning inventory stood at 5760.
- (a) 14.00
  - (b) 14.65
  - (c) 14.80
  - (d) 13.00
  - (e) 13.60
8. For Jamshedpur Electronics, the beginning inventory was 720 for televisions and 1800 for Ipods and ending inventory was 840 for televisions and 1920 for Ipods in the month of January. How many units of televisions and Ipods did Jamshedpur Electronics order for the month of January? (Additional data: In the month of February, 1050 units of televisions and 2400 units of Ipods were sold in all three areas

put together.)

- (a) 1020,2270
- (b) 1020,2370
- (c) 2270,1030
- (d) 1030,2370
- (e) 1020, 2280

**Directions for Questions 9 to 12** On the basis of the graph given below:

**Sales and Costs of XYZ Co.**



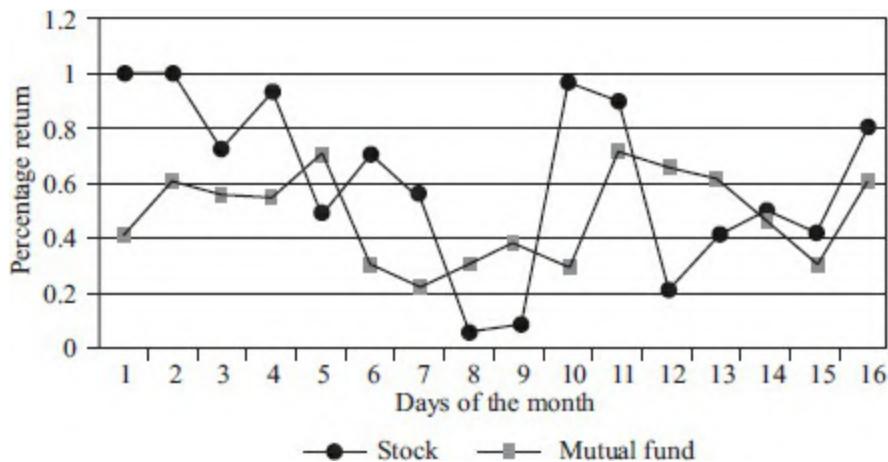
9. In which month did the company earn maximum profits?

- (a) 5
- (b) 4
- (c) 3
- (d) 2
- (e) 1

10. In which month did the company witness maximum sales growth?

- (a) 9
- (b) 6
- (c) 7
- (d) 4

- (e) 1
11. What were average sales and costs figures for XYZ Co. over the period of ten months?
- 1819, 1651
  - 1919, 1751
  - 1969, 1762
  - 1719, 1601
  - 1619, 1661
12. Interpret relationship between the returns of Stock X and Mutual Fund Y based on the following graph, where percentage return of Stock X and Mutual Fund Y are given for sixteen days of a month.



- Returns of stock X are directly proportional to mutual fund Y.
- Average returns from stock X and mutual fund Y are the same.
- Stock X is less volatile than mutual fund Y.
- Stock X is inversely proportional to mutual fund Y.
- Stock X is more volatile than mutual fund Y

**Directions for Questions 13 to 15:** On the basis of the following data.

Gender bias is defined as disproportion in percentage of drop-out rate of the two genders.

| Year    | Primary (I - V) Classes |       |       | Elementary (I-VIII) Classes |       |       | Secondary (I- X) Classes |       |       |
|---------|-------------------------|-------|-------|-----------------------------|-------|-------|--------------------------|-------|-------|
|         | Boys                    | Girls | Total | Boys                        | Girls | Total | Boys                     | Girls | Total |
| 1996–97 | 39.7                    | 40.9  | 40.2  | 54.3                        | 59.5  | 56.5  | 67.3                     | 73.7  | 70.0  |
| 1997–98 | 37.5                    | 41.5  | 39.2  | 53.8                        | 59.3  | 56.1  | 66.6                     | 73.0  | 69.3  |
| 1998–99 | 40.9                    | 41.3  | 41.5  | 54.2                        | 59.2  | 56.3  | 64.5                     | 69.8  | 66.7  |
| 1999–00 | 38.7                    | 42.3  | 40.3  | 52.0                        | 58.0  | 54.5  | 66.6                     | 70.6  | 68.3  |
| 2000–01 | 39.7                    | 41.9  | 40.7  | 50.3                        | 57.7  | 53.7  | 66.4                     | 71.5  | 68.6  |
| 2001–02 | 38.4                    | 39.9  | 39.0  | 52.9                        | 56.9  | 54.6  | 64.2                     | 68.6  | 66.0  |
| 2002–03 | 35.8                    | 33.7  | 34.8  | 52.3                        | 53.5  | 52.8  | 60.7                     | 65.0  | 62.6  |
| 2003–04 | 33.7                    | 28.6  | 31.5  | 51.9                        | 52.9  | 52.3  | 61.0                     | 64.9  | 62.7  |
| 2004–05 | 31.8                    | 25.4  | 29.0  | 50.4                        | 51.2  | 50.8  | 60.4                     | 63.8  | 61.9  |

13. Based on the data above, choose the true statement from the following alternatives:
- Gender bias in primary education has consistently decreased over the years.
  - Gender bias decreases as students move from primary to secondary classes.
  - Total drop-out rate decreased consistently for primary classes children from 1996–97 to 2004–05
  - Gender bias was consistently highest for secondary classes.
  - None of the above.
14. Assume that girls constituted 55% of the students entering school. In which year, as compared to the previous year, number of boys in secondary education would be more than the number of girls?
- 1997–98
  - 1996–97
  - 2000–01
  - 1998–99
  - 2001–02
15. Suppose, every year 7,000 students entered Class I, out of which 45% were boys. What was the average number (integer value) of girls, who remained in educational system after elementary classes, from 1996–97 to 2004–05?
- 1475
  - 1573
  - 1743

- 
- (d) 1830  
(e) 3853
- 

## ANSWER KEY

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1. (c)
  2. (d)
  3. (b)
  4. (a)
  5. (b)
  6. (c)
  7. (a)
  8. (b)
  9. (e)
  10. (d)
  11. (a)
  12. (e)
  13. (e)
  14. (b)
  15. (d)
- 

## SOLUTIONS

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### Question 1:

The following structure of the table can be worked out:

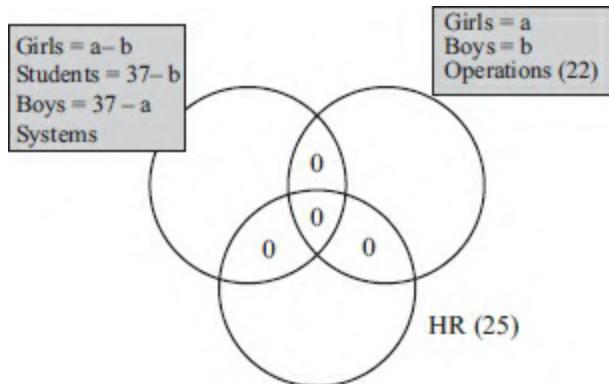
|      |   |    |      |     |
|------|---|----|------|-----|
| 68   |   |    |      |     |
| Y+29 |   |    | Y+29 |     |
| Y+13 |   | 16 | X+ 9 |     |
| Y+ 4 |   | 9  | 7    | X+2 |
| Y    | 4 | 5  | 2    | X   |

From the second row from the top, we can see that  $X + 25 = Y + 29 \rightarrow X - Y = 4$ .

Option (c) is correct.

## Questions 2 and 3:

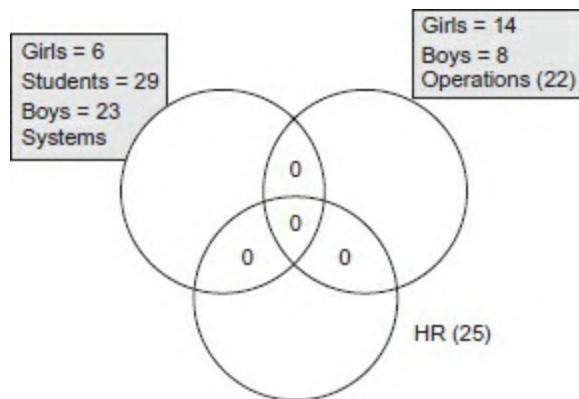
We can create the following venn diagram for this situation.



From the Operations numbers we have  $a + b = 22$ .

Further we know that Girls in Systems + Girls in Operations = 20 =  $2a - b$

Solving these two equations we have  $a = 14$  and  $b = 8$ . Consequently the figure changes to:



2. The total number of students in the second year =  $29 + 25 + 22 = 76$ . Option (d) is correct.
3. If 20% of the girls opt for HR, it means that 80% of the girls opt for either Systems or Operations. But we know this number to be equal to 20. Hence, the total number of girls in the B school is 25 and thus there must be  $76 - 25 = 51$  boys.

## Questions 4 to 8:

4. The total sales revenue for the shop during the period from January to March resulting out of televisions sales = ₦31500000.

Since, the total sales quantity is given as 3150 units it means that the per unit price of television sets is  $\text{₦}31500000/3150 = \text{₦}10000$  (sale

price).

The question also tells us that there is a profit of 25% of cost price uniformly for Jamshedpur Electronics. This means that the cost price of a television set would be: ₹8000.

Further, the number of units ordered would be:

$$\text{Closing inventory} + \text{Sales} - \text{Starting inventory} = \text{Order}$$

$$\text{Thus, Order} = 2880 + 3150 - 2520 = 3510 \text{ units}$$

$$\text{Value of order (in rupees thousands)} = 3510 \times 8 = 28080.$$

Option (a) is correct.

5. The total sales value over the three month period is got by adding the sales of all the three shops for both televisions and Ipods. This value comes out to be ₹132300 thousand. 14% of the sales value is the value of the surcharge. Value of surcharge =  $0.14 \times 132300$  thousand = 18522 thousand. Option (b) is correct.

6. Profits in January from Bistupur and Kadma = 10% of  $(15750 + 6300)$  + 20% of  $(900 + 6300)$   
 $= 2205 + 1440 = 3645$ . Option (c) is correct.

7. The total sales value for Ipods over the three month period = 100800 thousand (Note: This value is got by adding all the individual values of iPod sales in the table).  
Total unit sales =  $7560 + 5760 - 6120 = 7200$   
Per unit price =  $100800 / 7200 = 14$ .

Option (a) is correct.

8. From the information about February we can calculate the selling price per unit for televisions and for Ipods for Jamshedpur Electronics.

$$\text{Television unit price} = (1050000 + 2100000 + 7350000) / 1050 = 10500 \text{ thousand} / 1050 = 10000$$

$$\text{IPod unit price} = (16800000 + 10080000 + 6720000) / 2400 = 33600 \text{ thousand} / 2400 = 14000$$

$$\text{Thus, sales units televisions in January} = 9000000 / 10000 = 900.$$

$$\text{Hence, order for television} = 900 + \text{increase in inventory} = 900 + 120 = 1020.$$

$$\text{Also, Sales units Ipods in January} = 31500000 / 14000 = 2250.$$

$$\text{Hence, order for Ipods} = 2250 + \text{increase in inventory} = 2250 + 120 =$$

2370.

Hence, option (b) is correct.

**Questions 9 to 11:**

9. The maximum profit of 400 can be seen in the very first month itself.  
Option (e) is correct.
10. The maximum sales growth is observed for month 4. Option (d) is correct.
11. The total sales over the 10 month period is approximately 18200 which means a monthly average of around 1820. Only option (a) matches this value and is hence correct.

**Question 12:**

12. Clearly Stock (X) is more volatile than mutual fund Y as there are larger variations in Stock X vis-a-vis Mutual Fund Y.

**Questions 13 to 15:**

13. Each of the first four statements can be seen to be false. Hence, Option (e) is correct.
14. It can be seen that for 1996–97, if the number of girls started with 55 then in the secondary classes we would have  $0.327 \times 55 = 14.715$  (because there is a 67.3% drop out rate in secondary classes boys it means that only 32.7% of the boys who joined school would reach the secondary classes).

Similarly, the girls would be  $0.263 \times 55 = 14.465$

The boys would outnumber girls in the very first year and hence 1996–97 is the correct answer.

15. The average drop-out rate for girls till elementary classes over the years is 52.45%.

This means that 47.55% of girls remained in education after elementary classes.

$$\text{Number of girls} = 7000 \times 0.55 \times 0.475555 = 1830$$

## PART 2

# IIFT Exam Paper

*IIFT Papers 2018 to  
2007*

### In This Part You will Learn:

- Data Interpretation is one of the critical elements of the IIFT examination, with a full section dedicated to it. The weightage of DI in IIFT over the past few years has been around 20% of the total marks. The Data Interpretation in the IIFT is mostly consisted of Calculative Traditional DI. In fact, in the current scenario, the IIFT examination is the most

**calculation intensive test.**

- **This part consists of IIFT Papers from 2018 to 2007 - and you should take this part as a learning opportunity to identify the specific skills tested in the IIFT exams - especially if you are aiming to appear in the IIFT examination this year.**
- **In the coming pages, we have provided you with a frequency analysis table to help you see the pattern of the IIFT over the past decade.**

# IIFT

- IIFT 2018
- IIFT 2017
- IIFT 2016
- IIFT 2015
- IIFT 2014
- IIFT 2013
- IIFT 2012
- IIFT 2011
- IIFT 2010
- IIFT 2009
- IIFT 2008
- IIFT 2007

## DI IN IIFT

### An INTRODUCTION

The IIFT exam has always given an important weightage to DI as can be seen from the following frequency analysis table.

**FREQUENCY ANALYSIS TABLE**

| Paper     | Total number of questions | Number of questions on DI | Marks carried | % of marks covered by DI |
|-----------|---------------------------|---------------------------|---------------|--------------------------|
| IIFT 2018 | 114                       | 20                        | 20            | 20                       |
| IIFT 2017 | 114                       | 20                        | 15            | 15                       |
| IIFT 2016 | 123                       | 20                        | 20            | 20                       |
| IIFT 2015 | 124                       | 18                        | 18            | 18                       |
| IIFT 2014 | 118                       | 15                        | 15            | 15                       |
| IIFT 2013 | 128                       | 19                        | 19            | 19                       |
| IIFT 2012 | 128                       | 19                        | 19            | 19                       |
| IIFT 2011 | 120                       | 16                        | 16            | 16                       |
| IIFT 2010 | 135                       | 20                        | 20            | 20                       |
| IIFT 2009 | 122                       | 30                        | 30            | 30                       |
| IIFT 2008 | 150                       | 26                        | 20.80         | 20.80                    |
| IIFT 2007 | 120                       | 26                        | 20.54         | 20.54                    |

In fact, DI has always been asked under an independent section or as an independent sub section in the IIFT examination. While looking at the above

frequency analysis table, and trying to analyse the importance of DI in the IIFT entrance exam, you should perhaps keep in mind that the IIFT exam has always had a qualifying score in the range of 26-28-30 marks out of 100. Seen in that context, the DI section's importance for cracking the IIFT test can be easily gauged.

The level of difficulty of the DI in IIFT has varied between LOD 1 to LOD 2 to LOD 3 (LOD = Level of Difficulty). However, LOD 1 questions have always been few and far between and normally you can expect to find questions in the range of LOD 2 and LOD 3. Unlike exams like the XAT, where the level of difficulty is similar, in IIFT questions have been more data and calculation-oriented rather than logic-oriented.

Hence, developing your calculation skills to that level so that you would be able to handle complex calculations should be a strong priority for any aspirant who aspires to crack this important examination in the MBA entrance exam calendar.

**Directions for Questions 1 to 4:** Based on the information given below, answer the questions which follow.

The data on select economic indicators for entire world comprising of 7 regions namely East Asia & Pacific, Europe & Central Asia, Latin America & Caribbean, Middle East & North Africa, North America, South Asia and Sub-Saharan Africa is presented in Table-1 for the year 2017. Further, Table-2 represents the economic indicators for select countries.

*GNI refers to Gross National Income (USD Billions), PPP refers to Purchasing Power Parity (USD Billions), POP refers to Population (Millions) and SA refers to Surface Area (Thousands sq. km)*

**Table-1:** Economic Indicators for Different Regions of World

| Regions/Indicators         | POP   | SA     | GNI    | PPP    |
|----------------------------|-------|--------|--------|--------|
| East Asia & Pacific        | 2,314 | 24,825 | 23,538 | 42,085 |
| Europe & Central Asia      | 915.5 | 28,461 | 20,738 | 29,793 |
| Latin America & Caribbean  | 644   | 20,426 | 5,282  | 9,838  |
| Middle East & North Africa | 444   | 11,371 | 3,220  | 8,890  |
| North America              | 363   | 19,816 | 20,561 | 21,291 |
| South Asia                 | 1,788 | 5,135  | 3,118  | 11,693 |
| Sub-Saharan Africa         | 1,061 | 24,291 | 1,543  | 3,908  |

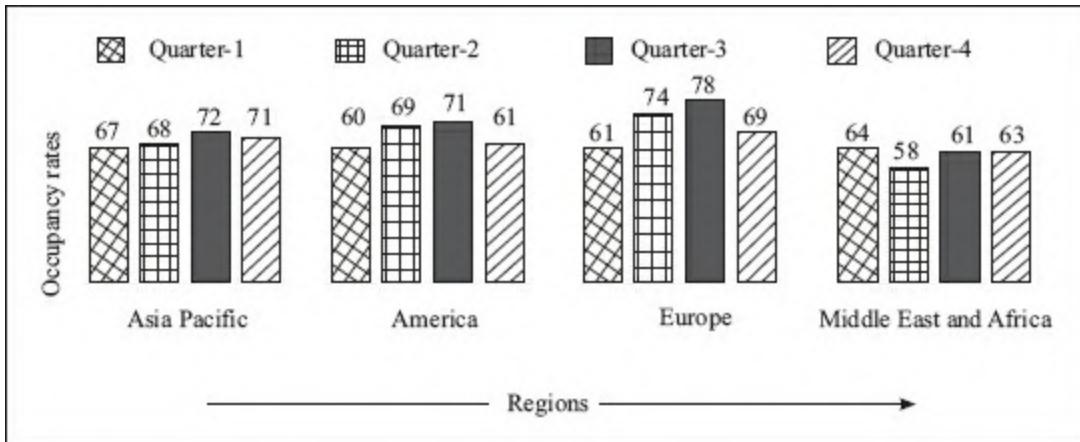
**Table-2:** Economic Indicators for Select Countries

| Countries/Indicators | POP  | SA    | GNI    | PPP    |
|----------------------|------|-------|--------|--------|
| India                | 1339 | 3,287 | 2,430  | 9,449  |
| Estonia              | 1.3  | 45    | 24     | 41     |
| Kyrgyz Republic      | 6.5  | 200   | 7      | 22     |
| Lao PDR              | 7    | 237   | 16     | 46     |
| Latvia               | 2    | 65    | 29     | 53     |
| United States        | 326  | 9,832 | 18,980 | 19,608 |

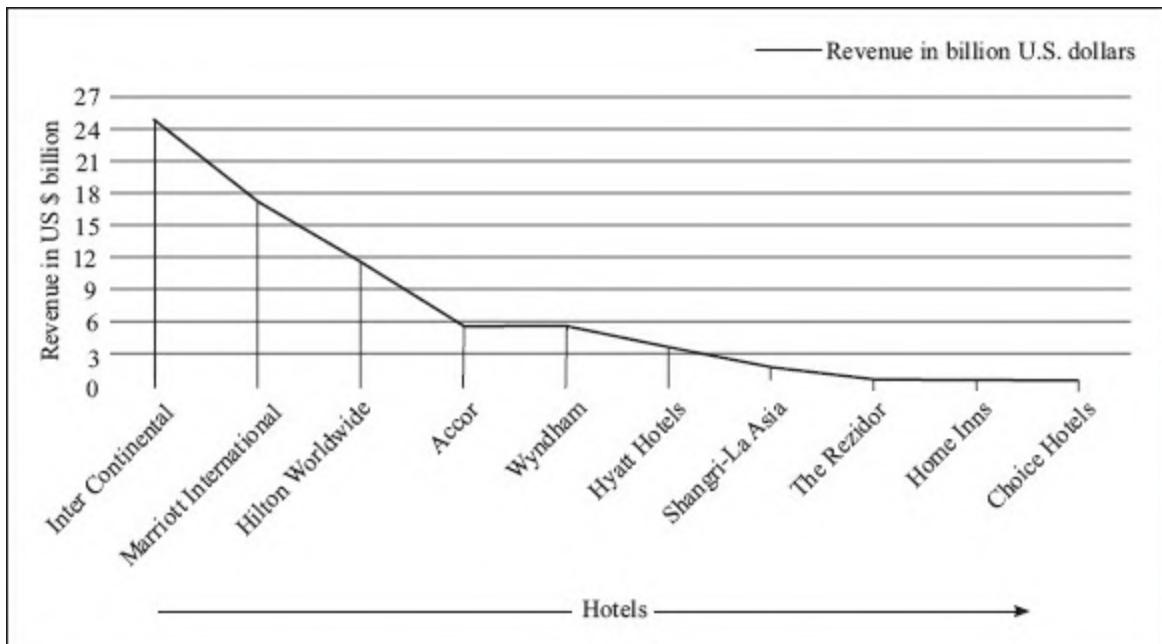
1. Arrange the countries in order of increasing population density (number of people per sq. kms).
  - (a) Estonia, Kyrgyz Republic, Lao PDR and Latvia
  - (b) Estonia, Latvia, Kyrgyz Republic and Lao PDR
  - (c) Estonia, Lao PDR, Kyrgyz Republic and Latvia
  - (d) Estonia, Lao PDR, Latvia and Kyrgyz Republic
2. For which of the region the ‘GNI per capita’ is closest to that of ‘GNI per capita’ of world?
  - (a) East Asia & Pacific
  - (b) Europe & Central Asia
  - (c) Latin America & Caribbean
  - (d) North America
3. What percentage of world’s GNI is represented by combined GNI of India and US?
  - (a) 28.98
  - (b) 28.42
  - (c) 27.45
  - (d) 30.19
4. Which region has third lowest difference between ‘PPP per capita’ and ‘GNI per capita’?
  - (a) Latin America & Caribbean
  - (b) South Asia
  - (c) Middle East & North Africa
  - (d) East Asia & Pacific

**Directions for Questions 5 to 8:** Based on the information given below, answer the questions which follow.

**Figure 1:** Region Wise Average Hotel Occupancy Rates



**Figure 2:** Revenue of Select Hotel Chains Worldwide



The occupancy rate of a hotel is the share of available rooms that are occupied during a given time. [Figure-1](#) presents quarter wise average hotel occupancy in four regions (Asia-Pacific, America, Europe and Middle East & Africa) for the year 2016. [Figure-2](#), shows the revenue of select hotel chains worldwide in 2016.

- 5 Considering the total revenue of the hotel industry in 2016 as 495.17 billion USD, what is the percentage contribution of revenue of select hotel chains to hotel industry revenue?

- (a) 13
  - (b) 14
  - (c) 15
  - (d) 16
- 6 For Hilton Worldwide, considering 70% average occupancy rate for 365 days of operations and average room rent of 350 USD per day, the total number of rooms available (in 000's) in Hilton Worldwide per day approximately are:
- (a) 150
  - (b) 130
  - (c) 160
  - (d) 170
- 7 If the number of available rooms in each of the four regions (Asia-Pacific, America, Europe and Middle East & Africa) are in the ratio 1:2:5:4, the average occupancy rate for Quarter-1 are:
- (a) 62
  - (b) 66
  - (c) 58
  - (d) 60
- 8 Assuming that there is no change in the number of available rooms in a given year in all four regions, the correct arrangement in the increasing order of average annual occupancy rates are:
- (a) Asia-Pacific, Europe, America and Middle East & Africa
  - (b) Middle East & Africa, America, Asia-Pacific and Europe
  - (c) Asia-Pacific America, Middle East & Africa and Europe
  - (d) Middle East & Africa, America, Europe and Asia-Pacific

**Directions for Questions 9 to 12:** Based on the information answer the questions which follow.

IBM is one of the most valuable technology brand in the world. Visualizing the trends, IBM has added and dropped business segments across years. For example, “*Technology Services and Cloud Platforms (TSCP)*” which started in 2015 only, generated a revenue of approximately 34280 million U.S.

Dollars in 2017. Tables shows the Global Revenue generated by IBM in nine different segments of its business from 2010 to 2017 in millions USD.

IBM's Global Revenue from 2010 to 2017 (in millions U.S. Dollars)

| Years | TSCP   | CS     | GBS    | SYS   | GF    | Other | SOFT   | GTS    | S&T    |
|-------|--------|--------|--------|-------|-------|-------|--------|--------|--------|
| 2010  |        |        | 18,220 |       | 2,240 | 750   | 22,490 | 38,200 | 17,970 |
| 2011  |        |        | 19,280 |       | 2,100 | 720   | 24,940 | 40,880 | 18,990 |
| 2012  |        |        | 18,570 |       | 2,010 | 580   | 25,450 | 40,240 | 17,670 |
| 2013  |        |        | 18,400 |       | 2,020 | 490   | 25,930 | 38,550 | 14,370 |
| 2014  |        |        | 17,800 |       | 2,000 | 500   | 25,400 | 37,100 | 10,000 |
| 2015  | 35,140 | 17,840 | 17,160 | 9,550 | 1,840 | 210   |        |        |        |
| 2016  | 35,340 | 18,190 | 16,700 | 7,710 | 1,690 | 290   |        |        |        |
| 2017  | 34,280 | 18,450 | 16,350 | 8,190 | 1,700 | 170   |        |        |        |

*TSCP-Technology Services & Cloud Platforms, CS-Cognitive Solutions, GBS-Global Business Services, SYS-Systems, GF-Global Financing, Other, SOFT-Software, GTS-Global Technology Services and S&T-Systems and Technology*

- 9 For the year 2017, if the revenue in different segments is represented on a pie-chart what sector angle would be represented by 'Global Business Services (GBS)'?
  - (a) 75 Degree
  - (b) 85 Degree
  - (c) 80 Degree
  - (d) 70 Degree
10. Which segment has earned third highest cumulative revenue in the time period 2010-2017?
  - (a) Global Business Services
  - (b) Software
  - (c) Global Technology Servies
  - (d) Systems and Technology
11. The profit booked by IBM in year 2012 is USD 49 billion. Considering equal percentage profit margins across all segments, then approximate profit made by 'Systems of Technology' in million USD is:
  - (a) 8200
  - (b) 8500

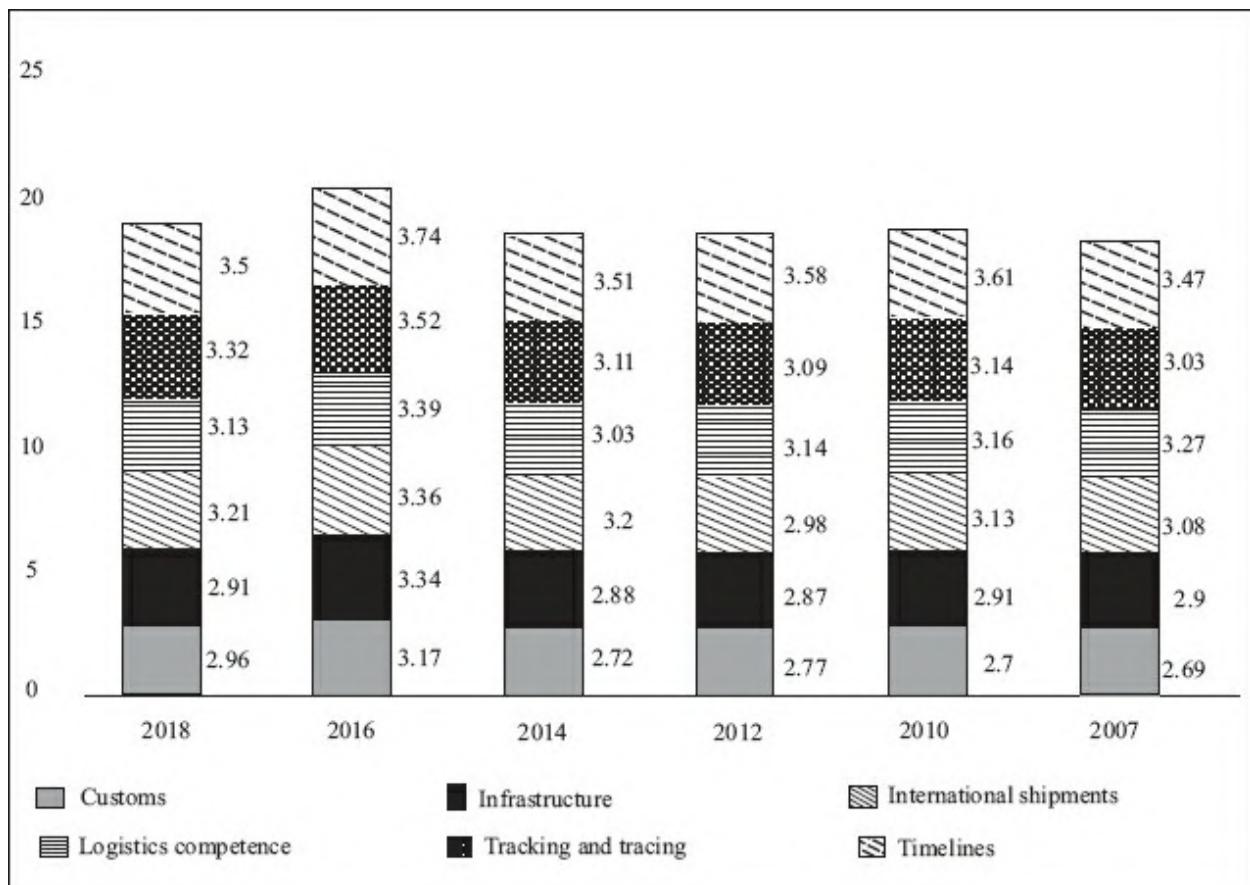
- (c) 8700  
 (d) 8900
- 12.** By how much is ratio of percentage of ‘revenue from Global Business Services’ to ‘Total Revenue’ lower than that ratio of percentage of ‘revenue from Cognitive Solutions’ to ‘Total Revenue’ for the year 2016?
- (a) 1  
 (b) 2  
 (c) 3  
 (d) 5

**Directions for Questions 13 to 16:** Based on the information answer the questions which follow:

The Logistics Performance Index (LPI) is an interactive benchmarking tool created by the World Bank to help countries identify the challenges and opportunities they face in their performance on trade logistics and what they can do to improve their performance. It is a measure of the country scores on six key indicators: Customs, Infrastructure, International Shipments, Logistics Competence, Tracking & Tracing and Timeliness. Table shows the LPI indicators (on the scale of 1 to 5) of select countries on these indicators. Figure below presents the perceived performance of these indicators (on the scale of 1 to 5) of India on these 6 indicators.

**Table:** LPI Indicators of Select Countries in 2018

| Countries/<br>Indicators | Customs | Infrastructure | International<br>shipments | Logistics<br>Competence | Tracking &<br>Tracing | Timeliness |
|--------------------------|---------|----------------|----------------------------|-------------------------|-----------------------|------------|
| Austria                  | 3.71    | 4.18           | 3.88                       | 4.08                    | 4.09                  | 4.25       |
| UK                       | 3.77    | 4.03           | 3.67                       | 4.05                    | 4.11                  | 4.33       |
| USA                      | 3.78    | 4.05           | 3.51                       | 3.87                    | 4.09                  | 4.08       |
| Switzerland              | 3.63    | 4.02           | 3.51                       | 3.97                    | 4.1                   | 4.24       |
| France                   | 3.59    | 4.00           | 3.55                       | 3.84                    | 4.00                  | 4.15       |



**Figure:** LPI Indicators for India

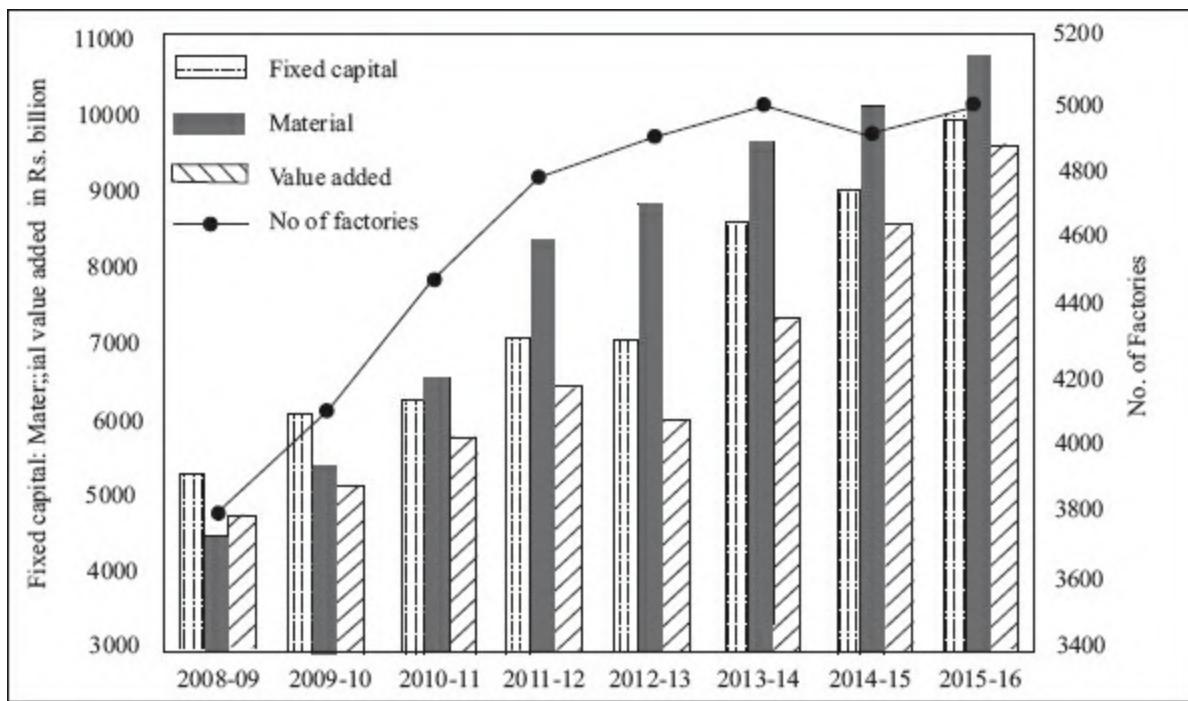
13. Considering Logistics performance Index as the average of the scores obtained on the six parameters, the correct sequence of the countries in increasing order of LPI in the year 2018 is:
  - (a) UK, Austria, USA, Switzerland and France
  - (b) Austria, UK, USA, Switzerland and France
  - (c) France, USA, Switzerland, UK and Austria
  - (d) UK, USA, Switzerland, Austria and France
14. Arrange the countries in ascending order on the basis of score obtained on (Timeliness) – (Logistics Competence)
  - (a) Austria, USA, Switzerland, UK and France
  - (b) Austria, USA, UK, Switzerland and France
  - (c) Austria, Switzerland, USA, UK and France
  - (d) Austria USA, UK, France and Switzerland
15. In which year the difference between the score obtained on Timeliness

between Germany and India is minimum considering the score obtained on Timeliness for Germany as 4.39, 4.45, 4.36, 4.32, 4.48 and 4.33 for 2018, 2016, 2014, 2012, 2010 and 2007 respectively?

- (a) 2016
  - (b) 2014
  - (c) 2012
  - (d) 2018
16. The difference in performance of which indicator in 2018 as compared to that of 2007 is minimum for India?
- (a) Customs
  - (b) International Shipments
  - (c) Timeliness
  - (d) Tracking & Tracing

**Directions for Questions 17 to 20:** Based on the information answer the questions which follow:

The data was collected for an industry in order to analyse the impact and importance of select parameters. The Figure represents performance of the industry on select parameters which are Fixed Capital, Materials, Value added and Number of Factories from the year 2008-09 to 2015-16. Total inputs = (Output – Value added). Table represents select performance indicators which are Output, Number of Workers and Emoluments from the year 2008-09 to 2015-16.



**Figure:** Industry Indicators from 2008-09 to 2015-16

**Table:** Industry Indicators from 2008-09 to 2015-16

| Year    | Output in Rs. Billion | No. of workers | Emoluments in Rs. Billion |
|---------|-----------------------|----------------|---------------------------|
| 2008-09 | 11442                 | 2,39,966       | 65                        |
| 2009-10 | 12241                 | 2,50,009       | 81                        |
| 2010-11 | 14993                 | 2,89,965       | 102                       |
| 2011-12 | 18250                 | 3,25,000       | 135                       |

| Year    | Output in Rs. Billion | No. of workers | Emoluments in Rs. Billion |
|---------|-----------------------|----------------|---------------------------|
| 2012-13 | 19249                 | 3,30,000       | 147                       |
| 2013-14 | 21493                 | 3,80,000       | 177                       |
| 2014-15 | 23251                 | 3,69,996       | 202                       |
| 2015-16 | 25506                 | 3,99,988       | 245                       |

17. In which of the following year annual growth rate in emoluments per

worker is highest?

- (a) 2009-10
- (b) 2011-12
- (c) 2014-15
- (d) 2015-16

18. In which of the following year fixed capital per factory is lowest?

- (a) 2008-09
- (b) 2011-12
- (c) 2013-14
- (d) 2015-16

19. In which of the following year Material as a proportion of ‘Total inputs’ is highest?

- (a) 2008-09
- (b) 2009-10
- (c) 2010-11
- (d) 2011-12

20. For how many years annual percentage growth in fixed capital is greater than annual percentage growth in number of factories?

- (a) 3
- (b) 4
- (c) 5
- (d) 6

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## ANSWER KEY

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- 1. (d)
- 2. (a)
- 3. (c)
- 4. (b)
- 5. (c)
- 6. (b)
- 7. (a)
- 8. (b)

- 9 (a)  
10 (b)  
11 (a)  
12 (b)  
13 (c)  
14 (a)  
15 (a)  
16 (c)  
17 (a)  
18 (a)  
19 (b)  
20 (c)
- 

## SOLUTIONS

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1. It can be seen that the ratio for Estonia is the given as the least in all the four options, so we can avoid calculating the value of Estonia and assume it to be the least. Between, Latvia (2/65); Kyrgyz Republic (6.5/200) and Lao PDR (7/237), you can observe that the ratios are Latvia (1/32.5); Kyrgyz Republic (1/30 to 31) and Lao PDR (1/33 to 34). The lowest ratio is for Lao PDR, followed by Latvia followed by Kyrgyz Republic. Hence, option (d) is the correct answer.
2. The GNI per capita of the world is: Total GNI/Total Population =

$$\frac{23538 + 20738 + 5282 + 3220 + 20561 + 3118 + 1543}{2314 + 915.5 + 644 + 444 + 363 + 1788 + 1061}$$

and as you can yourself observe, this would be a very difficult calculation followed by then working out which region of the four regions given in the options has the closest ratio. The best way to work with this would be to approximate – and bring down all the numbers to 2 and 3 digits. So this is how I would advise you to work on this calculation:

$$\frac{235 + 207 + 52 + 32 + 205 + 31 + 15}{23 + 9 + 6 + 4 + 3 + 17 + 10} = \frac{771}{72} \approx 10.7$$

to 10.8

We can now check the options in parallel →

$$\text{East Asia and Pacific} = 235/23 \approx 10+$$

$$\text{Europe and Central Asia} = 207/9 = 20+$$

$$\text{Latin America and Caribbean} = 52/6 = 8+ \text{ & North}$$

$$\text{America} = 205/3 = 60+$$

Clearly, the closest value is for East Asia & Pacific.

Hence, option (a) is correct.

**Note:** In the above approximations we have removed the last 2 digits of each number so that we are dealing with only 2 and 3 digit numbers while adding and dividing the numbers.

3. The required ratio would be given by:

$$\frac{24+189}{777} \approx 27.4\%.$$

**Note:** You should again have the confidence in this calculation, that even if we used the actual numbers, this answer would not change so much as to change to 28.98 and 28.42% given in the other options. Hence, option (c) is correct. Also, please review the calculations advisory through this book – to recollect how you should be able to calculate the 27.4% in the first place.

4. For this question again we would calculate by removing the last two digits of the numbers. The required difference for East Asia and Pacific would be:

$$\frac{420-235}{22} = \frac{185}{23} \approx 8+$$

Similar calculations would lead the following results:

$$\text{Europe and Central Asia} = 90/9+ = 9-10;$$

$$\text{Latin America and Caribbean} = 46/6+ = 7-8$$

$$\text{Middle East and North Africa} = 56/4+ = 12-13$$

$$\text{South Asia} = 85/17+ = 4-5$$

$$\text{North America} = 7/3.6 = 1-2$$

$$\text{Sub Saharan Africa} = 2-3.$$

The third lowest value is for South Asia. Hence, option (b) is correct.

### Questions 5 to 8:

5. The value of the given hotel chains adds up to 75 out of a total of

495.17 Billion USD. The required percentage is closest to 15. Option (c) is correct.

6. The revenues of Hilton is 12 billion USD. This should be equivalent to 70% of its' potential revenues at 100% occupancy. At 160000 rooms, the calculation involved would be:  $160000 \times 350 \times 365 \times 0.7$ . This calculation can be approximated as  $16 \times 3.5 \times 3.65 \times 0.7 \approx 14$  billion USD. (Note: in this question since all the options have similar values, you can directly conclude that the value of  $16 \times 3.5 \times 3.65 \times 0.7$  which turns out as around 140, would actually be 14 billion USD). For 130000 rooms, the value comes out to be around 11.5–12 billion USD, which is the correct range for the answer. Hence, option (b) is correct.

7. The average occupancy rate can be calculated as under:
- $$\frac{1 \times 67 + 2 \times 60 + 5 \times 61 + 4 \times 64}{12} \approx 62$$

Option (a) is correct.

8. The average occupancy rates would be simply the simple average of the occupancy rates for the four quarters. The simple average for each region would be derived by adding the values and dividing by 4. Since, we have to only compare the values amongst each other, we can ignore the step of dividing by 4 – and simply compare the totals of the four regions: In order to do this, we since most of the values are above 60, for each region we can simply assume a base value of sum as 240. Then the sum of Asia Pacific would be seen as:  $240 + 7 + 8 + 12 + 11 = 278$ ; America =  $240 + 0 + 9 + 11 + 1 = 261$ ; Europe =  $240 + 1 + 14 + 18 + 9 = 282$  & for Middle East and Africa =  $240 + 4 - 2 + 1 + 3 = 246$ . The increasing order required is seen in option (B). Hence, option (b) Is correct.

### Questions 9 to 12:

9. The total revenue in 2017 =  $342 + 184 + 163 + 81 + 17 + 1 = 788$  (we have again ignored the last two digits while doing this). GBS is  $163/788 \approx 21\%$ . The central angle on a pie chart would be  $21 \times 3.6 \approx 75$ . Option (a) is correct.
10. A quick look through the table shows us that the main revenue sources competing for the top 3–4 positions are GBS, SOFT, GTS, TSCP and S&T. Adding all the numbers in billions (1 billion = 1000 million) –

we see that the sum of GBS (ignoring the last 3 digits for this addition) is: 139; For SOFT = 121; For GTS = 193; For S&T = 76; For TSCP = 104. Clearly, the third highest is for Software (SOFT). Option (b) is correct.

11. In 2012 the total revenue is about 104.52 USD Billion (**Note:** 1 billion = 1000 million). With profit of 49 Billion USD, Profit margin is close to 47%. The closest profit at this profit percentage for a revenue of 17670 million USD in 2012, would be 8200 million USD (from amongst the options). Option (a) is correct.
12. Ratio of percentage of revenue from GBS to Total Revenue in 2016 =  $16.7/79.92 \approx 20.7\%$  is lower than  $18.19/79.92 \approx 22.7\%$  by around 2%. Hence, option (b) is correct.

### **Questions 13 to 16:**

13. In order to find the greatest average LPI over 5 parameters, we just need to add the sums of the six. Since the average would be derived by dividing the sum by 6 in all the cases – we can ignore the division by 6 if we just need a comparison of the average LPIs. The totals are:  
Austria = 24.19; UK = 23.96; USA = 23.38; Switzerland = 23.47;  
France = 23.13. The correct increasing order is given in option (c). Hence, it is the correct answer.
14. Timeliness – Logistics Competence scores are:  
Austria = 0.17; UK = 0.28; USA = 0.21; Switzerland = 0.27; France = 0.31. Option (a) gives the correct increasing order of this parameter. Hence, Option (a) is correct.
15. The required differences for the given years are: 2018:  $4.39 - 3.5 = 0.89$ ; 2016 =  $4.45 - 3.74 = 0.71$ ; 2014 = 0.85; 2012 = 0.74; 2010 = 0.87 and 2007 = 0.86. The least difference is 0.71 in 2016. Hence, option (a) is correct.
16. The closest amongst the given options is Timeliness where the difference is  $3.5 - 3.47 = 0.03$ . Although Infrastructure has an even smaller difference between the two years, but since it is not in the options given, we can ignore it. Hence, option (c) is correct.

### **Questions 17 to 20:**

17. The emoluments per worker is given by the ratios (**Note:** here that we have taken the ratios in their most convenient forms)

|         |          |      |
|---------|----------|------|
| 2008-09 | 65/23.9  | 2.72 |
| 2009-10 | 81/2.5   | 3.24 |
| 2010-11 | 102/28.9 | 3.52 |
| 2011-12 | 135/32.5 | 4.15 |
| 2013-14 | 177/38   | 4.65 |
| 2014-15 | 202/37   | 5.47 |
| 2015-16 | 245/40   | 6.12 |

The highest percentage growth of close to 20% is seen in 2009-10. Hence, option (a) is correct.

18. The required ratios for 2008–09, 2011–12, 2013–14 and 2015–16 are: 52/37; 70/48; 85/49; 100/50. 2008-09 exhibits the least ratio of approximately 1.4. Hence, option (a) is correct.
19. Total inputs for the years given in the options can be calculated as Output – Value added. The values for total inputs would be:

|         | Total Inputs        | Materials | Proportion of Materials/Total Inputs (approximate) |
|---------|---------------------|-----------|--|
| 2008-09 | 11442–4800 ≈ 6600   | 4500      | 45/66 ≈ 60–70%                                     |
| 2009-10 | 12241–5000 ≈ 7200   | 5200      | 52/72 ≈ 70 + %                                     |
| 2010-11 | 14993– 5600 ≈ 9400  | 6500      | 65/94 ≈ 60–70%                                     |
| 2011-12 | 18250– 6500 = 11750 | 8000      | 80/117.5 ≈ 60–70%                                  |

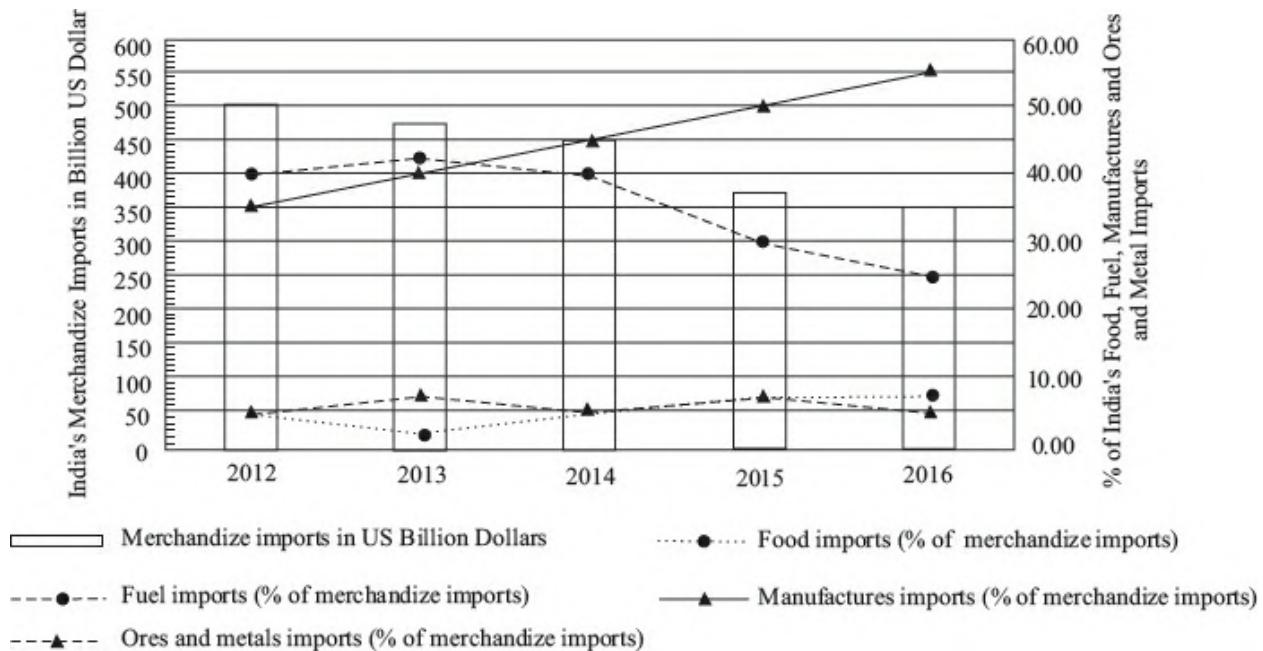
The highest value of the proportion is for 2009–10. Option (b) is correct.

20. The growth of fixed capital is greater than the growth in number of factories for the years: 2009-10; 2011–12; 2013–14; 2014–15 and 2015–16. A total of 5 years. Hence, option (c) is correct.

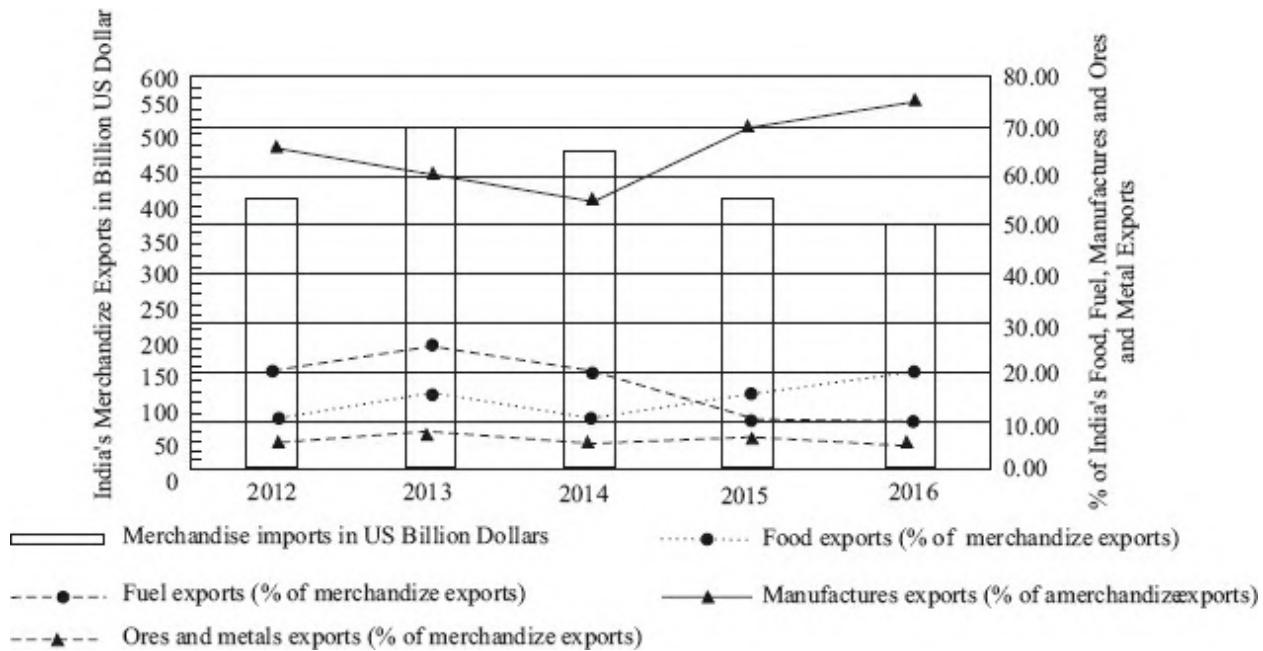
**Directions for Questions 1 to 5:** [Exhibit 1](#) as under provides the data of India's Merchandise Imports (Billion US Dollar) on left axis and Percentage of Food, Fuel, Manufactures and Ores & Metals Imports of India's on the right Axis. Similarly; Exhibit 2 provides data of India's Merchandise Exports (Billion US Dollar) on left axis and Percentage exports of Food, Fuel, Manufactures and Ores & Metals on the right axis. Attempt the questions in the context of information provided as under:

- (a) Trade Balance = Import Minus Exports
- (b) Trade Deficit = If Imports are more than Exports
- (c) Trade Surplus = If Exports are more than Imports

**Exhibit 1:** India's Total Merchandise Imports (US Dollar in Billion) and Percentage Imports of Food, Fuel, Manufactures and Ores & Metals  
(2012-2016)



**Exhibit 2:** India's Total Merchandise Imports (US Dollar in Billion) and Percentage Exports of Food, Fuel, Manufactures and Ores & Metals (2012-2016)



1. What shall be approximate Manufactures exports of India in the year 2016 based on average exports for the period 2012-2016?
  - (a) 221 Billion US Dollar
  - (b) 209 Billion US Dollar

- (c) 239 Billion US Dollar
  - (d) 236 Billion US Dollar
2. What is the proportion of positive and negative Manufactures trade balance in the period 2012–2016?
- (a) 3:2
  - (b) 2:3
  - (c) 1:4
  - (d) None of the above
3. In which year, trade deficit of fuel has been the second lowest?
- (a) 2015
  - (b) 2014
  - (c) 2013
  - (d) 2016
4. Assuming India's imports and exports grow by 10% in 2017 and sectoral share of fuel in both imports and exports grow by 5 percentage basis, what shall be the approximate deficit of fuel trade in the year 2017?
- (a) 88 Billion Fuel Trade Deficit
  - (b) 74 Billion Fuel Trade Deficit
  - (c) 85 Billion Fuel Trade Deficit
  - (d) 78 Billion Fuel Trade Deficit
5. Assuming India's absolute trade deficit grows by 54 billion US Dollar and exports become 324 billion US Dollar in the year 2017. What shall be India's absolute imports of food and fuel in 2017 if sectoral composition of food, fuel, manufactures, ores and metals remain same as that of 2016?
- (a) 36 Billion US Dollar & 119.5 Billion US Dollar
  - (b) 38 Billion US Dollar & 117.5 Billion US Dollar
  - (c) 34 Billion US Dollar & 118.5 Billion US Dollar
  - (d) 38 Billion US Dollar & 116.5 Billion US Dollar

**Directions for Question 6 to 7:** Table as under provides the monthly prices in US Dollars Per Tonne of Barley, Wheat, Maize and Sorghum for the period July 2016 to June 2017. Attempt the questions as under in the context

*of information provided.*

| <i>Month</i> | <i>Barley Price</i> | <i>Wheat Price</i> | <i>Maize Price</i> | <i>Sorghum Price</i> |
|--------------|---------------------|--------------------|--------------------|----------------------|
| Jul–16       | 140                 | 134                | 162                | 174                  |
| Aug–16       | 128                 | 128                | 150                | 141                  |
| Sep–16       | 125                 | 123                | 148                | 141                  |
| Oct–16       | 128                 | 123                | 153                | 139                  |
| Nov–16       | 132                 | 123                | 151                | 139                  |
| Dec–16       | 128                 | 123                | 153                | 139                  |
| Jan–17       | 132                 | 137                | 160                | 140                  |
| Feb–17       | 136                 | 147                | 163                | 141                  |
| Mar–17       | 137                 | 146                | 159                | 142                  |
| Apr–17       | 139                 | 138                | 156                | 143                  |
| May–17       | 142                 | 146                | 159                | 144                  |
| Jun–17       | 141                 | 157                | 158                | 167                  |

6. In which of the following month, Wheat has the third highest percentage growth in monthly prices?
  - (a) June 2017
  - (b) February 2017
  - (c) January 2017
  - (d) None of these
7. How many times, the double digit growth in monthly prices occurs across the commodities in the given time period?
  - (a) 2
  - (b) 3
  - (c) 5
  - (d) None of the above

***Directions for Questions 8 to 10:*** India has 13 major ports, out of which 6 ports are located in Eastern Coast and 6 ports are in Western Coast of India. 13th port is at Port Blair, located in Andaman Nicobar Island, which has negligible cargo traffic. Table below provides the traffic data handled by 12 major ports (thousand tonnes) of India for the period 2011–12 to 2015–16. Based on the table, answer the questions:

**Table:** Traffic Handled by Major Ports (Thousand Tonnes)

| <b>Ports</b>     | <b>2011–12</b> | <b>2012–13</b> | <b>2013–14</b> | <b>2014–15</b> | <b>2015–16</b> |
|------------------|----------------|----------------|----------------|----------------|----------------|
| 1. Kolkata       | 43248          | 39928          | 41386          | 46293          | 50195          |
| 2. Paradip       | 54254          | 56552          | 68003          | 71011          | 76386          |
| 3. Vizag         | 67420          | 59038          | 58504          | 58004          | 57033          |
| 4. Kamarajar     | 14956          | 17885          | 27337          | 30251          | 32206          |
| 5. Chennai       | 55707          | 53404          | 51105          | 52541          | 50058          |
| 6. Chidambaranar | 28105          | 28260          | 28642          | 32414          | 36849          |
| 7. Cochin        | 20090          | 19845          | 20886          | 21595          | 22099          |
| 8. New Mangalore | 32941          | 37036          | 39365          | 36566          | 35582          |
| 9. Mormugao      | 39049          | 17738          | 11739          | 14711          | 20776          |
| 10. Mumbai       | 56186          | 58038          | 59184          | 61660          | 61110          |
| 11. J.N.P.T.     | 65730          | 64488          | 62333          | 63801          | 64027          |
| 12. Kandla       | 82501          | 93619          | 87005          | 92497          | 100051         |

8. In which year, the average growth of all ports is the highest?
- 2014–15
  - 2015–16
  - 2013–14
  - 2012–13
9. Which of the following port has registered the third highest growth in traffic (000) from year 2011–12 to 2015–16?
- Paradip
  - Chidambaranar
  - Kandla
  - None of these
10. What shall be the total approximate traffic (000) of Kolkata, Vizag and Cochin Port in 2017–18 if traffic continues to grow at the annual growth rate of 10% per annum in each of these ports?
- 156500
  - 142300
  - 129500
  - 161775

**Directions for Questions 11 to 15:** The table below relates to data on Wholesale Price of India (WPI) for the period 2001–02 to 2015–16. WPI-based inflation is defined as percentage change in the value of the index. Based on the table, answer the following questions:

**Table : Wholesale Price Index – Annual Average**

| Year  | Index (Average of weeks) |       |       |          |       |       |    |
|---|--------------------------|-------|-------|----------|-------|-------|----|
|   | 1                        | AC    | PA    | of which |       | F&P   | MP |
|   |                          |       |       | FA       | NF    |       |    |
|   | 2                        | 3     | 4     | 5        | 6     | 7     |    |
| (Base : 1993-94 = 100)  |                          |       |       |          |       |       |    |
| 2001–02   | 161.3                    | 168.4 | 176.1 | 152.9    | 226.7 | 144.3 |    |
| 2002–03   | 166.8                    | 174.0 | 179.2 | 165.4    | 239.2 | 148.1 |    |
| 2003–04   | 175.9                    | 181.5 | 181.5 | 186.3    | 254.5 | 156.5 |    |
| 2004–05   | 187.3                    | 188.1 | 186.3 | 187.6    | 280.2 | 166.3 |    |
| (Base : 2004–05 = 100)  |                          |       |       |          |       |       |    |
| 2005–06   | 104.5                    | 104.3 | 105.4 | 96.7     | 113.6 | 102.4 |    |
| 2006–07   | 111.4                    | 114.3 | 115.5 | 102.3    | 120.9 | 108.2 |    |
| 2007–08   | 116.6                    | 123.9 | 123.6 | 114.4    | 121.0 | 113.4 |    |
| 2008–09   | 126.0                    | 137.5 | 134.8 | 129.2    | 135.0 | 120.4 |    |
| 2009–10   | 130.8                    | 154.9 | 155.4 | 136.2    | 132.1 | 123.1 |    |
| 2010–11   | 143.3                    | 182.4 | 179.6 | 166.6    | 148.3 | 130.1 |    |
| 2011–12   | 156.1                    | 200.3 | 192.7 | 182.7    | 169.0 | 139.5 |    |
| 2012–13   | 167.6                    | 220.0 | 211.8 | 201.9    | 186.5 | 147.1 |    |
| 2013–14   | 177.6                    | 241.6 | 238.9 | 213.2    | 205.4 | 151.5 |    |
| 2014–15   | 181.2                    | 248.8 | 253.4 | 212.1    | 203.5 | 155.1 |    |
| 2015–16   | 176.7                    | 249.6 | 262.1 | 219.5    | 179.8 | 153.4 |    |
| AC: All commodities<br>PA: Primary Articles<br>FA: Food Articles<br>NF: Non-food Articles<br>F & P: Fuel & Power<br>MP: Manufactured Products<br>FA and NF are part of PA |                          |       |       |          |       |       |    |

11. What is the approximate percentage change in the WPI of F&P between 2001-02 and 2015-16?
  - (a) 115.5
  - (b) 122.2
  - (c) 130.7
  - (d) 136.4
12. Between 2001–02 and 2015–16, which of the following components – PA, AC, F&P and MP – have shown the second highest percentage increase in WPI?

- (a) PA
  - (b) AC
  - (c) F&P
  - (d) MP
13. Between 2001–02 and 2015–16 which year has recorded the smallest percentage increase in WPI on FA?
- (a) 2003–04
  - (b) 2004–05
  - (c) 2015–16
  - (d) None of the above
14. If PA has a 40 percent weightage in the WPI-based inflation calculation in 2005–06, find the corresponding approximate percentage weights assigned to F&P and MP in the WPI-based inflation calculation for the same year.
- (a) 12 and 48
  - (b) 15 and 45
  - (c) 18 and 42
  - (d) 20 and 40
15. Which component(s) in WPI has registered a decline more than once between two consecutive years?
- (a) PA
  - (b) AC
  - (c) F&P
  - (d) None of the above

**Instructions for Questions 16 to 20:** Refer to the Table below. It provides quarterly output data of a company for four years (1998–2001) and its trend calculated through 4-quarter Moving Average Method.

| Quarter wise value of output and its trend |                 |           |           |           |
|--|-----------------|-----------|-----------|-----------|
|  | Value of output |           |           |           |
|  | Quarter 1       | Quarter 2 | Quarter 3 | Quarter 4 |
| 1998                                       | 65              | 58        | 56        | 61        |
| 1999                                       | 68              | 63        | 63        | 67        |
| 2000                                       | 70              | 59        | 56        | 52        |
| 2001                                       | 60              | 55        | 51        | 58        |
| 4 Quarter Moving Average (Trend)           |                 |           |           |           |
| 1998                                       |                 |           | 60.38     | 61.38     |
| 1999                                       | 62.88           | 64.5      | 65.5      | 65.25     |
| 2000                                       | 63.88           | 61.12     | 58.00     | 56.25     |
| 2001                                       | 55.12           | 55.25     |           |           |

16. In which year and which quarter the output has second highest positive deviation from its trend?
- 1999, Quarter 2
  - 1999, Quarter 1
  - 2001, Quarter 4
  - None of the above
17. In which quarter, on an average there is maximum negative deviation of the output from the average value of trend of that quarter?
- Quarter 3
  - Quarter 1
  - Quarter 4
  - Quarter 2
18. In which year the quarterly compound average growth rate (CAGR) is the second lowest?
- 2001
  - 1999
  - 2000
  - 1998
19. In which year the annual output growth has been the lowest and what is the value?
- 2001, 8.75%
  - 1999, -6.23%
  - 2000, -9.20%
  - 2000, -5.49%
20. Plot the quarterly output and its trend values. Identity the number of

times the trend curve intersects the output curve

- (a) 5 times
  - (b) 6 times
  - (c) 3 times
  - (d) Cannot be determined, more information required
- 

## ANSWER KEY

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- 1 (a)
  - 2 (a)
  - 3 (a)
  - 4 (b)
  - 5 (a)
  - 6 (b)
  - 7 (d)
  - 8 (a)
  - 9 (d)
  - 10 (a)
  - 11 (b)
  - 12 (c)
  - 13 (a)
  - 14 (a)
  - 15 (c)
  - 16 (b)
  - 17 (a)
  - 18 (d)
  - 19 (c)
  - 20 (b)
- 

## SOLUTIONS

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**Questions 1 to 5:**

- The average exports for the five – year period is  $1480/5 = 296$  Billion US Dollar (approximately, based on the fact that 1480 is an approximate sum of the exports for the given 5 years). Manufactures accounts for 75% of these exports  $\approx 221$ . Hence, the correct answer is option (a).
- The Manufactures trade balance can be calculated for each of the years and the values are provided in the table below:

|      | <i>Manufactures Imports</i>    | <i>Manufactures Exports</i>     | <i>Trade Balance</i> |
|------|--------------------------------|---------------------------------|----------------------|
| 2012 | $35\% \text{ of } 500 = 175$   | $65\% \text{ of } 275 = 178.75$ | Positive             |
| 2013 | $40\% \text{ of } 470 = 188$   | $60\% \text{ of } 350 = 210$    | Positive             |
| 2014 | $45\% \text{ of } 450 = 202.5$ | $55\% \text{ of } 325 = 178.75$ | Negative             |
| 2015 | $50\% \text{ of } 375 = 187.5$ | $70\% \text{ of } 275 = 192.5$  | Positive             |
| 2016 | $55\% \text{ of } 350 = 192.5$ | $75\% \text{ of } 250 = 187.5$  | Negative             |

We can see that there are three positive instances of trade balance and two negative instances of trade balance. Hence, the ratio required is 3:2. Hence, the correct answer is option (a).

- The trade deficit of fuel are respectively: For 2012:  $40\% \text{ of } 400 - 20\% \text{ of } 100 = 160 - 20 = 140$ ; For 2013:  $45\% \text{ of } 470 - 25\% \text{ of } 350 = 211.5 - 87.5 = 124$ .

$$\text{For 2014: } 40\% \text{ of } 450 - 20\% \text{ of } 330 = 180 - 66 = 114;$$

$$\text{For 2015: } 30\% \text{ of } 375 - 10\% \text{ of } 275 = 112.5 - 27.5 = 85;$$

$$\text{For 2016: } 25\% \text{ of } 350 - 10\% \text{ of } 250 = 87.5 - 25 = 62.5.$$

The second lowest trade deficit is clearly for the year 2015. Hence, option (a) is correct.

- The total import in 2017 would be  $1.1 \times 350 = 385$ . The share of fuel in this would go up to 30% from 25%. Hence, fuel imports = 30% of 385 = 115.5. The total export in 2017 would be  $1.1 \times 250 = 275$ . The share of fuel in this would be 15% (up 5% basis on 10% in 2016). Thus, total fuel exports would be: 15% of 275 = 41.25. The trade deficit would be about 74 Billion US Dollars. Option (b) is correct.

- Trade deficit in 2016 is 100 Billion US Dollars. In 2017, it would

grow to 154 Billion US Dollars (as given in the question – it grows by 54 Billion dollars). Now, since Exports would grow to become 324 Billion US Dollar in the year 2017 (as given in the question), Imports would be  $324 + 154 = 478$  Billion US Dollar in 2017. If the sectors have the same weight in 2017 as 2016, it means that food would account for 7.5% of 478  $\approx$  36 Billion Dollars. Fuel would account for 25% of 478 = 119.5 Billion Dollars. Hence, option (a) is correct.

### **Questions 6 to 7:**

6. The price of wheat has grown by >10% in Jan 17; By 7 – 8% in Feb – 17; By 5 – 6% in May – 17 and by 7 – 8% in Jun – 17. For the third highest percentage growth in prices we need to check between Feb – 17 and Jun – 17 for the lower value. It can be seen that the value is lower for Feb – 17. Hence, option (a) is correct.
7. Double digit growth of prices (not to be confused with double digit growth rate) is seen four times – three times for Wheat (Jan, Feb and Jun 2017) & once for Sorghum (Jun – 17). Hence, there are four such instances. Option (d) is correct.

### **Questions 8 to 10:**

8. In order to solve this question, we can first do a calculation of the sums of each of the columns by considering only the first three digits. The first column adds up to:  
2011 – 12:  
 $432 + 542 + 674 + 149 + 557 + 281 + 200 + 329 + 390 + 561 + 657 + 825 = 5597$ ;  
2012 – 13: = 5453; 2013 – 14: = 5550; 2014 – 15: = 5808; 2015 – 16: 6057. The highest growth for all ports is for the year 2014 – 15. Option (a) is correct.
9. The growth between 2011 – 12 to 2015 – 16 is the third highest for Kamarajar. Note: For this question do not make the mistake of calculating growth rates. The question is quite clear about asking for growth – and is not referring to growth rates. Hence, option (d) is correct.
10. The total value of the traffic in thousand tonnes in 2015 – 16 for these three ports combined is:  $50195 + 57033 + 22099 = 129327$ . Growing

by 10% per annum for two years this would be closest to 156500. Option (a) is correct.

### Questions 11 to 15:

11. The WPI for F & P was reset to 100 in 2004 – 05. This has grown to 179.8 in 2015 – 16 (a growth of 79.8%). If this reset of the Index had not been effected in 2004 – 5, the value of 280.2 would have also grown by 79.8% till 2015 – 16. Thus, without the base year reset, the index would have been  $280.2 \times 1.798 \approx 280 \times 1.8 = 504$ . In 2001 – 02, this index was at 226.7. The growth in the index would be given by:  
$$\frac{278}{226} \approx 122\%$$
  
Option (b) is correct.
12. In order to solve this question, we can simply increase the value of the last year's index by an estimate of the increase in the index for that segment between 2001 – 02 to 2004 – 05. For instance, PA has grown from 100 to 249.6 between 2004 – 05 to 2015 – 16. Also, it grew from 168.4 to 188.1 between 2001 – 02 to 2004 – 05 → This was an approximately 11% increase in those years. If we increase 249.6 by 11%, we will see a consolidated figure for the growth over the 15 year period for PA. Thus, if 2001 – 02 was 100, 2015 – 16 would be  $249.6 \times 1.11 \approx 277.1$  – a growth of around 177.1% in 15 years. We would need to do similar calculations for the other categories. For AC the approximate value comes to 205 – a growth of 105% over 15 years. There would be an approximate 122% increase in F&P. For MP, the growth would be around 76 – 77%. The second highest percentage increase would be for F &P. Option (c) is correct.
13. The smallest percentage increase is from 179.2 to 181.5, a growth of just 1 – 2%, for 2003 – 04. All other years are showing a much larger percentage increase in WPI on FA. Option (a) is correct.
14. We first need to recognize that the growth rate for AC is the weighted average growth rate for PA, F&P and MP. In 2005 – 06, while AC has grown by 4.5%, PA has grown by 4.3%, which is very close as a value to the average for AC. Thus, the weighted average of F&P (13.6% growth) and MP (2.4% growth) should be around 4.5% or just a little above that. Using alligation on 2.4, 13.6 and 4.6 we see that the

approximate ratio of weights needs to be 1:4 for F&P and MP. Thus, 12 and 48 are the weights respectively attached to F&P and MP. Option (a) is correct.

15. This is a visual question and we can see that F&P has declined more than once during the given years. Option (c) is correct.

### Questions 16 to 20:

16. For this question we just have to compare the value of the actual output for a quarter and it's 4 quarter moving average for the same quarter. The highest positive deviation is from 63.88 to 70 – a deviation of 6.12 for Quarter 1 of 2000. The second highest positive deviation is for Quarter 1 of 1999 (5.12) Hence, option (b) is correct.
17. Quarter 1 isn't to be considered since it shows a positive deviation from the trend for all three years for which we have trend data available for Quarter 1. Thus, it is not competing for the quarter that shows the maximum negative deviation of the output from the trend. For Quarter 2, the average negative deviation is:  $\frac{-1.5 - 2.12 - 0.25}{3}$ . The same calculation for Quarter 3 shows us:  $\frac{-4.38 - 2.5 - 2}{3} = -2.96$  and for Quarter 4, it is  $\frac{-0.38 + 1.75 - 4.25}{3} = -0.96$ . The maximum average negative deviation is seen for Quarter 3. Hence option (a) is correct.
18. In order to solve this question, we need the second lowest percentage reduction from quarter 1 to quarter 4. It can be seen that for 1998, the reduction is second highest – which means that the CAGR is second lowest for that year. Option (d) is correct.
19. The outputs for the years are the sum of the four quarters for any given year. For 1998, total output is:  $65 + 58 + 56 + 61 = 240$ ; For 1999, the total output is: 261; For 2000, the total output is 237 and 2001, the total output is 224. The least percentage growth, is equivalent to the largest percentage drop. That is – 9.2% from 261 to 237 for the year 2000. Hence, option (c) is correct.
20. The curves would intersect 6 times and in fact you do not need to plot the graphs to see that. You can read off the number of intersections directly from the tables using the following thought:  
There would be an intersection between the two curves when one of them goes from being larger to being smaller than the other. We can

observe that for quarters 2 and 3 of 1998, the 4 Quarter Moving average is larger than the actual output – hence for these two quarters, the Trend graph would be higher than the output graph. In the first quarter of 1999, however the value of the trend graph is lower than the value of the output graph – this can be interpreted as the first time the two graphs would cross each other. Looking through we can see that intersections would happen 6 times, since the value of the trend crosses over and goes above or goes below the value of output a total of six times in the tables. Hence, option (b) is correct.

### 3

## IIFT 2016

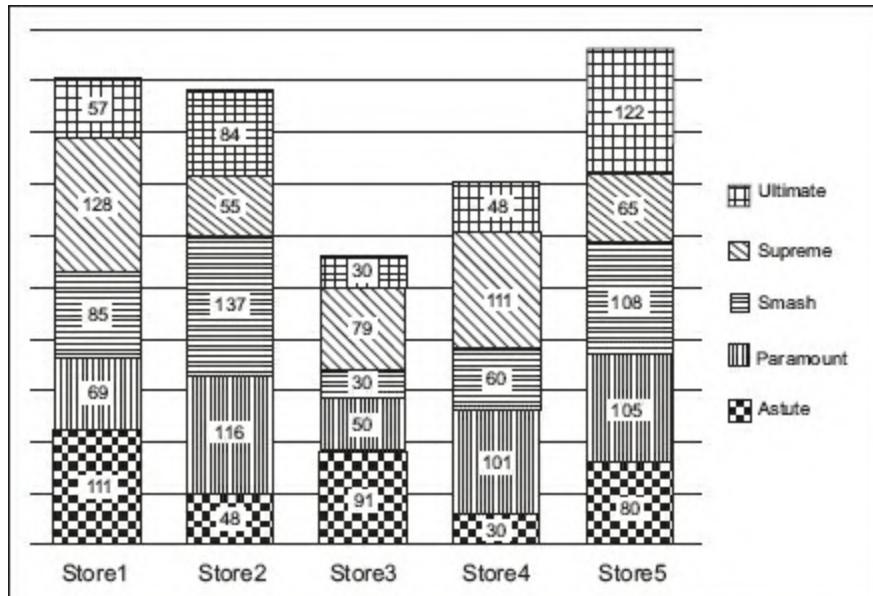
**Directions for Questions 1 to 5:** After receiving the disturbing news of falling standards the Supreme Council of Confederation of five kingdoms is considering to conduct joint entrance examination for all students in these kingdoms for Vaidya Ratna course. As a first step, it has been decided to review the past five-year data about the individual entrance examination of the kingdoms so that an appropriate action can be taken. Study the table given below and answer the questions.

|      |          | Anga | Banga | Chedi | Dwarka | Gandhar |
|------|----------|------|-------|-------|--------|---------|
| 2012 | Appeared | 5000 | 4000  | 2600  | 6000   | 4500    |
|      | Passed   | 850  | 640   | 468   | 780    | 765     |
| 2013 | Appeared | 5500 | 4500  | 2500  | 8000   | 3500    |
|      | Passed   | 770  | 810   | 275   | 1120   | 595     |
| 2014 | Appeared | 6000 | 6500  | 1900  | 6500   | 4500    |
|      | Passed   | 1200 | 1235  | 266   | 715    | 810     |
| 2015 | Appeared | 5000 | 5500  | 2500  | 5500   | 4000    |
|      | Passed   | 750  | 880   | 275   | 935    | 520     |
| 2016 | Appeared | 7000 | 6000  | 2000  | 7000   | 6000    |
|      | Passed   | 1190 | 660   | 400   | 1330   | 1200    |

1. What is the overall pass percentage from Anga kingdom for all the years together?
  - (a) 16.7
  - (b) 17.5

- (c) 18.7
  - (d) 15.5
2. In which of the following years, total number of candidates passed from all the kingdoms is lowest?
- (a) 2012
  - (b) 2013
  - (c) 2014
  - (d) 2015
3. In which of the following years, Banga kingdom recorded highest pass percentage?
- (a) 2012
  - (b) 2013
  - (c) 2014
  - (d) 2016
4. What is the overall pass percentage of all the kingdoms together in the year 2013?
- (a) 13.88
  - (b) 14.88
  - (c) 15.88
  - (d) 16.88
5. Highest number of candidates passed are from which of the following kingdoms for all the years together?
- (a) Anga
  - (b) Banga
  - (c) Gandhar
  - (d) Dwarka

**Directions for Questions 6 to 10:** T-Nation, a T-Shirt manufacturing company has unleashed 5-5-5 strategy, five brands (Ultimate, Supreme, Smash, Paramount, Astute), five sizes (S, M, L, XL, XXL), and five Stores (S1, S2, S3, S4, S5) to capture New Delhi market. Number of T-Shirts in each of the store is given in the stacked bar chart below.



**Note:** Visibility of a brand in a store is given by number of T-shirts of the brand in the store by total number of T-shirts in the store. Visibility across the stores is measured by sum of the scores of visibility of a brand in a store.

6. Which brand of T-shirts has more visibility across the stores?
  - (a) Astute
  - (b) Supreme
  - (c) Paramount
  - (d) Smash
7. Which brand has lowest visibility score in any of the stores?
  - (a) Astute
  - (b) Smash
  - (c) Paramount
  - (d) Ultimate
8. Suppose, size M constitutes 22% of all the T-shirts owned by T-nation. It is also given that ‘size M T-shirts’ in stores 1, 2 and 5 are 10% of the total T-shirts in these stores. Then, the total number of T-shirts of size M in store 4 cannot be less than
  - (a) 23
  - (b) 28
  - (c) 32
  - (d) 44

9. What is the approximate share of Supreme brand in all stores together?
- 19
  - 22
  - 18
  - 20
10. Approximately, by what percentage are Smash T-shirts greater than Ultimate T-shirts in all the stores together?
- 79
  - 50
  - 35
  - 23

**Directions for Questions 11 to 15:** Given below is the data about Domestic Investment (DI) and Foreign Investment (FI) in 9 different sectors over 5-year period.

(In Rs. Crores)

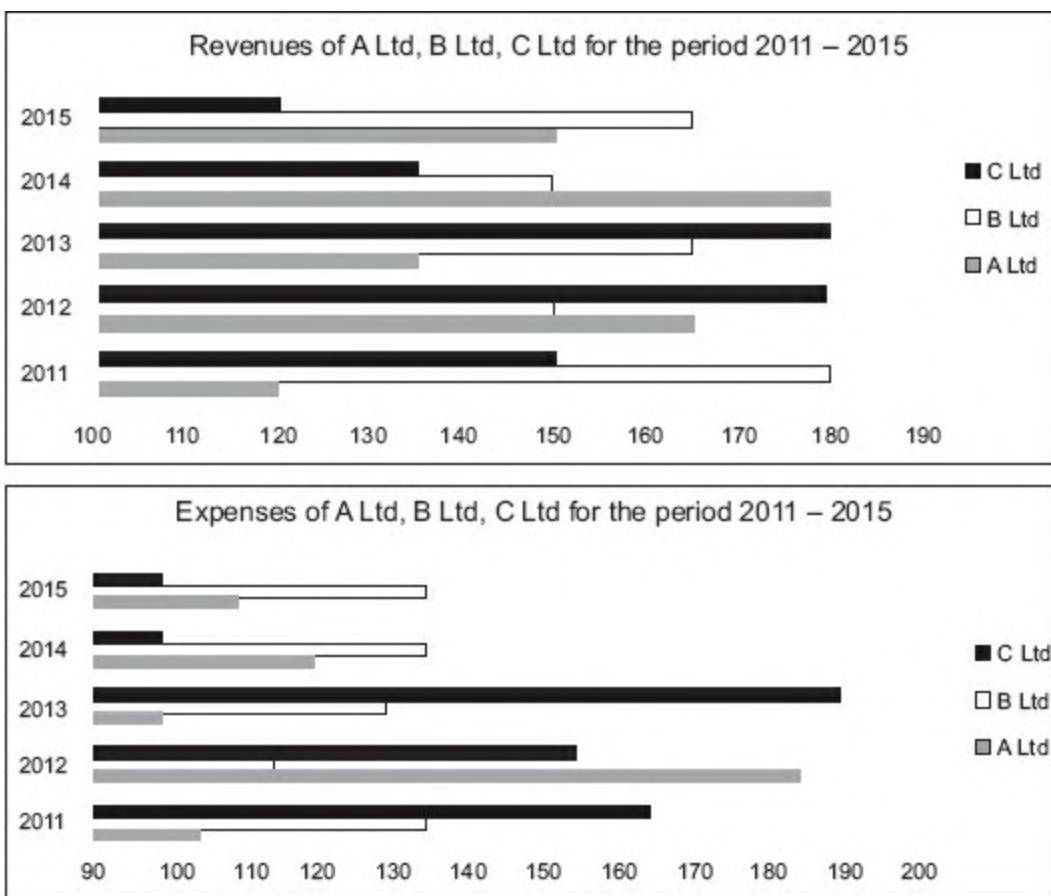
| Sectors                | 2009 |      | 2010 |      | 2011 |      | 2012 |      | 2013 |      |
|------------------------|------|------|------|------|------|------|------|------|------|------|
|                        | DI   | FI   |
| Basic Materials        | 1500 | 800  | 1500 | 1300 | 2500 | 1400 | 2000 | 900  | 2500 | 800  |
| Communication Services | 2000 | 1400 | 1200 | 1000 | 1600 | 1100 | 1000 | 300  | 500  | 1200 |
| Consumer Cyclical      | 1000 | 1500 | 1200 | 1500 | 1100 | 3000 | 500  | 700  | 900  | 1900 |
| Consumer Defensive     | 1300 | 1000 | 700  | 1600 | 1500 | 800  | 2000 | 500  | 1800 | 1600 |
| Energy                 | 800  | 1200 | 500  | 1400 | 700  | 2500 | 600  | 1000 | 1100 | 500  |
| Financial Services     | 1800 | 500  | 400  | 2000 | 1200 | 1600 | 1000 | 1500 | 700  | 1400 |
| Healthcare             | 2000 | 3000 | 600  | 3000 | 400  | 6000 | 1000 | 1500 | 3500 | 600  |
| Real Estate            | 500  | 2000 | 1000 | 1500 | 4000 | 3000 | 6000 | 1500 | 2000 | 2100 |
| Technology             | 1500 | 2500 | 1000 | 2800 | 1500 | 5000 | 1200 | 2000 | 3000 | 4000 |

Note: DI = Domestic Investment; FI = Foreign Investment

11. What is the approximate ratio of the total investment in Energy sector to that of Financial services sector?
- 1 : 1.2
  - 3 : 4.5
  - 1 : 0.5

- (d) 2 : 3.8
12. Absolute difference between the Total DI and Total FI is highest for which sector?
- (a) Technology
  - (b) Healthcare
  - (c) Basic Material
  - (d) None of the above
13. In which year the average DI is the highest?
- (a) 2013
  - (b) 2011
  - (c) 2010
  - (d) 2009
14. Which Sector has received the 2<sup>nd</sup> lowest investment from DI for the total period?
- (a) Consumer cyclical
  - (b) Consumer durable
  - (c) Energy
  - (d) None of the above
15. What is the approximate ratio of total DI to total FI?
- (a) 1 : 1.10
  - (b) 2 : 2.36
  - (c) 0.75 : 1
  - (d) 0.75 : 1.5

**Directions for Questions 16 to 20:** The following 2 bar charts represent revenues and expenses (In thousands) of A Ltd, B Ltd, and C Ltd over a period of five years.



Profit = Revenues – Expenses

16. For which company, the average annual expenses were maximum in the given period?
  - (a) A Ltd
  - (b) B Ltd
  - (c) C Ltd
  - (d) Both A Ltd and B Ltd
17. For which year, the average annual revenue (considering all three companies) was the maximum?
  - (a) 2011
  - (b) 2012
  - (c) 2013
  - (d) 2014
18. What was the approximate percentage decline in the revenue of C Ltd in 2015 as compared to the revenue in 2012?
  - (a) 16

- (b) 25
  - (c) 33
  - (d) 40
19. What was the approximate absolute difference between the average revenue of A Ltd in 2011, 2012 and 2013 and the average revenue of B Ltd in 2013, 2014 and 2015?
- (a) 20
  - (b) 160
  - (c) 20000
  - (d) 26000
20. For which of the following years the percentage of rise/fall in profit from the previous year was the maximum for A Ltd?
- (a) 2012
  - (b) 2013
  - (c) 2014
  - (d) 2015

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## ANSWER KEY

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- 1. (a)
- 2. (b)
- 3. (c)
- 4. (b)
- 5. (d)
- 6. (b)
- 7. (a)
- 8. (a)
- 9. (b)
- 10. (d)
- 11. (a)
- 12. (a)
- 13. (a)
- 14. (a)

- 15. (b)
  - 16. (c)
  - 17. (b)
  - 18. (c)
  - 19. (c)
  - 20. (b)
- 

## SOLUTIONS

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### Questions 1 to 5:

1. Pass percentage for Anga kingdom =  $(\text{Total pass}/\text{total population}) \times 100$   
 $= (850 + 770 + 1200 + 750 + 1190) \times 100/(5000 + 5500 + 6000 + 5000 + 7000)$   
 $= 16.7\%$ . Option (a).
2. 2015. Option (b).
3. Pass percentage for Banga kingdom for 2012  
 $= \frac{640}{4000} \times 100 = 16\%$

Pass percentage for Banga kingdom for 2013

$$= \frac{810}{4500} \times 100 = 18\%$$

Pass percentage for Banga kingdom for 2014

$$= \frac{1235}{6500} \times 100 = 19\%$$

Pass percentage for Banga kingdom for 2016

$$= \frac{660}{6000} \times 100 = 11\%$$

Hence, option (c) is correct.

4. Total pass candidates in 2013 =  $770 + 810 + 275 + 1120 + 595 = 3570$   
Total number of candidates in 2013 = 24000  
Required percentage =  $\frac{3570}{24000} \times 100 = 14.88\%$ .

Option (b) is correct.

5. Dwarka Kingdom has the highest number of passed candidates, when we consider all years together. Option (d) is correct.

### Questions 6 to 10:

The first question itself requires us to calculate the visibility of all the brands across the stores. Hence, before we start solving the questions, we can look at the visibility for each brand across the stores.

Visibility of Astute brand

$$= \frac{111}{450} + \frac{48}{440} + \frac{91}{280} + \frac{30}{350} + \frac{80}{480} \approx 0.94$$

Visibility of Supreme brand

$$= \frac{128}{450} + \frac{55}{440} + \frac{79}{280} + \frac{111}{350} + \frac{65}{480} \approx 1.13$$

Visibility of Paramount brand

$$= \frac{69}{450} + \frac{116}{440} + \frac{50}{280} + \frac{101}{350} + \frac{105}{480} \approx 1.1$$

Visibility of Smash brand

$$= \frac{85}{450} + \frac{137}{440} + \frac{30}{280} + \frac{60}{350} + \frac{108}{480} \approx 1.06$$

Visibility of ultimate brand

$$= \frac{57}{450} + \frac{84}{440} + \frac{30}{280} + \frac{48}{350} + \frac{122}{480} \approx 0.82$$

6. Supreme. Option (b) is correct.  
7. Astute in Store 4 has a visibility that is  $30/350 < 0.1$ . No other brand in any other store shows such low visibility. Hence, the correct answer is option (a).  
8. Total number of T-Shirts of size M =  $\frac{22}{100} \times 2000 = 440$

Total number of T-shirts of size M in Stores 1, 2, and 5 = 10% of 1370  
 $= 137$

Remaining T-shirts of size M to be distributed across Stores 3 and 4 =  $440 - 137 = 303$ .

To minimize the size M T-shirts in Store 4, we need to maximize size

M T-shirts in Store 3. The total number of T-shirts in Store 3 are 280 and hence this is the maximum number of T-shirts of size M, that could be in Store 3.

Hence, the minimum possible number of T-shirts in Store 4 = 303 – 280 = 23. Option (a) is correct.

9. Share of Supreme brand in all stores together  
 $= \frac{128 + 55 + 79 + 111 + 65}{2000} \times 100 \approx 22\%$ . option (b) is correct.

10. Required percentage =  $\frac{420 - 341}{341} \times 100 = 23.16\%$ . Option (d) is correct.

### Questions 11 to 15:

11. Required ratio

$$= \left( \begin{array}{l} 800 + 1200 + 500 + 1400 + 700 + 2500 \\ + 600 + 1000 + 1100 + 500 \end{array} \right) : \left( \begin{array}{l} 1800 + 500 + 400 + 2000 + 1200 + \\ 1600 + 1000 + 1500 + 700 + 1400 \end{array} \right)$$

$$= 10300 : 12100 = 1 : 1.2.$$

Option (a) is correct.

12. By checking the options we can see that the difference between DI and FI is highest for Technology sector. Option (a) is correct.

13. Since, the denominator while calculating the average DI is the same for all the four years, we can get the answer simply by adding the column for DI for the four years given in the options. Totals for 2009, 2010, 2011 and 2013 are respectively 12400, 8100, 14500 and 16000. Hence, the average would be the highest for 2013.

Option (a) is correct.

14. Consumer Cyclical at 4700 is the second lowest after Energy at 3700. Option (a) is correct.

15. 66300:78400 2: 2.36. Option (b) is correct.

### Questions 16 to 20:

16. We can easily solve this problem by checking the options.

Average annual expenses for

$$A = \frac{105 + 185 + 100 + 120 + 110}{5} = 124.$$

Average annual expenses for

$$B = \frac{135 + 115 + 130 + 125 + 135}{5} = 128$$

Average annual expenses for

$$C = \frac{165 + 155 + 190 + 100 + 100}{5} = 142$$

Average annual expenses are the maximum for company C. Option (c) is correct.

17. By checking the options we can see that average annual revenue is the maximum for the year 2012. Option (b) is correct.

18. Revenue of company C in 2012 = 180

Revenue of company C in 2015 = 120

Percentage decline in the revenue

$$= \frac{180 - 120}{180} \times 100 = 33.33\%. \text{ Option (c) is correct.}$$

19. Average revenue of A in 2011, 2012, 2013

$$= \frac{120 + 135 + 165}{3} = 140$$

Average revenue of B in 2013, 2014, 2015

$$= \frac{165 + 150 + 165}{3} = 160$$

Difference =  $(160 - 140) \times 1000 = 20,000$ . Option (c) is correct.

20. By checking the options we can see that the rise in profit is the maximum for 2013. Option (b) is correct.

**Directions for Questions 1 to 5:** Read the following information and tables and answer the questions that follow.

Torrent Enterprises sells air conditioners of Eagle Brand in the retail market of Delhi. The month-wise total number of Window Air Conditioner (WAC) units sold by Torrent during April 2014 to March 2015 are shown below in Table A. Table B shows the share of different types of WACs in total monthly sales for the said period.

### Number of Units Sold by Torrent Enterprises During the Period April 14 to March 15

**Table A**

| Month  | Units Sold | Month  | Units Sold | Month  | Units Sold |
|--------|------------|--------|------------|--------|------------|
| Apr-14 | 1266       | Aug-14 | 1296       | Dec-14 | 1300       |
| May-14 | 1268       | Sep-14 | 1296       | Jan-15 | 1330       |
| Jun-14 | 1272       | Oct-14 | 1298       | Feb-15 | 1340       |
| Jul-14 | 1292       | Nov-14 | 1300       | Mar-15 | 1350       |

**Table B**

| WAC Type (Tonnage) | April, May & Sep | Jun, Jul & Dec | Aug, Feb & Mar | Oct, Nov & Jan |
|--------------------|------------------|----------------|----------------|----------------|
| Two Ton            | 20.00%           | 25.00%         | 31.00%         | 25.00%         |
| One & Half Ton     | 19.00%           | 33.00%         | 19.00%         | 33.00%         |
| One Ton            | 14.00%           | 12.00%         | 34.00%         | 26.00%         |
| Half Ton           | 47.00%           | 30.00%         | 16.00%         | 16.00%         |

**Performance measures are as follows:**

**Half Yearly Sales Performance:**

Oct 14 to Mar 15 Average Sales – April 14 to

Sep 14 Average Sales

April 14 to Sep 14 Average Sales

**Monthly Sales Performance:**

Current Month Sales – Previous Month Sales

Previous Month Sales

**Sales Volatility:**

Maximum Monthly Sales – Minimum Monthly Sales

Average Monthly Sales

1. What is the closest average number of  $1\frac{1}{2}$  ton Window ACs sold by Torrent Enterprises during April 2014–March 2015?
  - (a) 342
  - (b) 338
  - (c) 350
  - (d) 330
2. The absolute difference between average annual sales (in units) of which pair of WACs type is the highest?
  - (a) 1 Ton and  $\frac{1}{2}$  Ton
  - (b) 1 Ton and 2 Ton
  - (c) 2 Ton and  $\frac{1}{2}$  Ton
  - (d)  $1\frac{1}{2}$  Ton and  $\frac{1}{2}$  Ton
3. Which type of WAC has performed the second best in Half Yearly Sales Performance?
  - (a)  $\frac{1}{2}$  Ton
  - (b) 1 Ton
  - (c)  $1\frac{1}{2}$  Ton
  - (d) 2 Ton
4. In which of the months given below, the total WAC Monthly Sales Performance was the highest?
  - (a) May 2014

- (b) June 2014
  - (c) October 2014
  - (d) February 2015
5. Which type of WAC has the least Sales Volatility?
- (a)  $\frac{1}{2}$  Ton
  - (b) 1 Ton
  - (c)  $1\frac{1}{2}$  Ton
  - (d) 2 Ton

**Directions for Questions 6 to 10:** Read the following information, graph and table and answer the questions that follow.

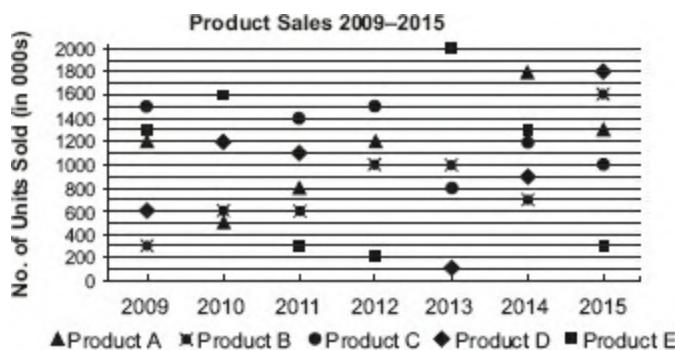
Ellen Inc. is a Mumbai-based company which sells five products branded as A, B, C, D and E In India. Anita looks after entire sales of North India working from regional office in Delhi. She was preparing for annual review meeting scheduled next day in Mumbai. She was attempting to analyse sales in North India for the seven year period from 2009 to 2015. She first calculated average sales in rupees of all the five brands and constructed a table exhibiting the difference between average sales of each pair of brands as shown in the following table:

**Difference between Average Sales of Products for the 7-year Period 2009-15 in Rs Crores**

|           | Product A | Product B | Product C | Product D | Product E |
|-----------|-----------|-----------|-----------|-----------|-----------|
| Product A | 0         | 214.29    | -128.57   | 142.86    | 42.86     |
| Product B |           | 0         | -342.86   | -71.43    | -171.43   |
| Product C |           |           | 0         | 271.43    | 171.43    |
| Product D |           |           |           | 0         | -100      |
| Product E |           |           |           |           | 0         |

Average Sales of Product A minus Average Sales of Product B

After taking a print out to the above table, she attempted to look at the trend of sales and plotted a graph in MS Excel. Later she took a printout of the graph and left for a meeting. While on her way she figured out that due to some printer cartridge problem sales of Product A in 2013, Product C in 2010, and Product D in 2012 were not visible in the graph as reproduced below. Anita had to make some quick calculations to arrive at the information outlined in the following questions:



6. What are the sales of Product A in 2013, Product C in 2010 and Product D in 2012?
  - (a) Rs. 550 Crores, Rs. 800 Crores and Rs. 500 Crores
  - (b) Rs. 500 Crores, Rs. 700 Crores and Rs. 600 Crores
  - (c) Rs. 500 Crores, Rs. 800 Crores and Rs. 600 Crores
  - (d) Rs. 400 Crores, Rs. 800 Crores and Rs. 600 Crores
7. Annual sales average of all products is the least in which year?
  - (a) 2010
  - (b) 2011
  - (c) 2012
  - (d) 2013
8. Which product has the least average sales for the seven-year period 2009–15?
  - (a) Product A
  - (b) Product B
  - (c) Product D
  - (d) Product E
9. The difference between average sales of products for the period 2009–15 is the least for which pair of products?

- (a) Product A and Product B  
 (b) Product B and Product C  
 (c) Product C and Product D  
 (d) Product D and Product E
- 10.** If Year on Year (YoY) Growth is

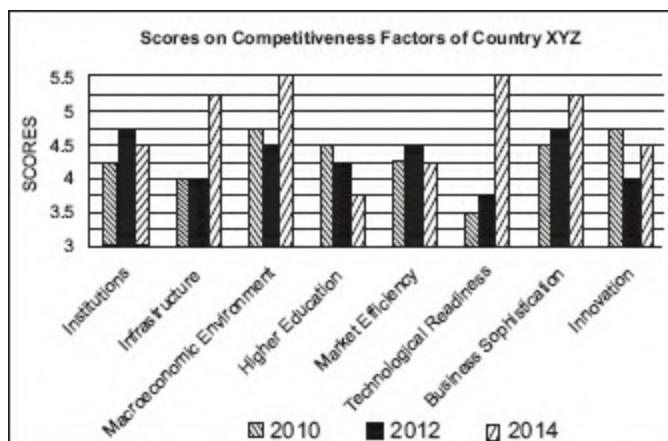
$$\left\{ \frac{\text{Current Year Sales} - \text{Previous Year Sales}}{\text{Previous Year Sales}} \right\}$$

then the YoY growth of combined sales of all products has suffered maximum decline in which year?

- (a) 2010  
 (b) 2011  
 (c) 2013  
 (d) 2015

**Directions for Questions 11 to 14:** Read the following information and graph, and answer the questions that follow.

An International Organisation produces a Competitive Index of countries every two years based on eight factors (Institutions, Infrastructure, Macroeconomic Environment, Higher Education, Market Efficiency, Technological Readiness, Business Sophistication and Innovation). The last three indices were developed in 2010, 2012 and 2014. The scores for all eight factors of XYZ country are shown in the graph below:



- 11.** If Factor Performance is measured as  $0.30 \times \text{Factor Score in 2014} + 0.35 \times \text{Factor Score in 2012} + 0.35 \times \text{Factor Score in 2010}$ , then which

of the following has best Factor Performance?

- (a) Innovation
- (b) Business Sophistication
- (c) Infrastructure
- (d) Macroeconomic Environment

12. If Factor Performance is measured as

$$\left\{ \frac{\text{Factor Score 2014} - \text{Factor Score 2012}}{\text{Factor Score 2010}} \right\}$$

then which of the following has best Factor Performance?

- (a) Innovation
- (b) Business Sophistication
- (c) Infrastructure
- (d) Macroeconomic Environment

13. Which of the following factors has the highest average score across indices 2010, 2012 and 2014?

- (a) Infrastructure
- (b) Institutions
- (c) Technological Readiness
- (d) Market Efficiency

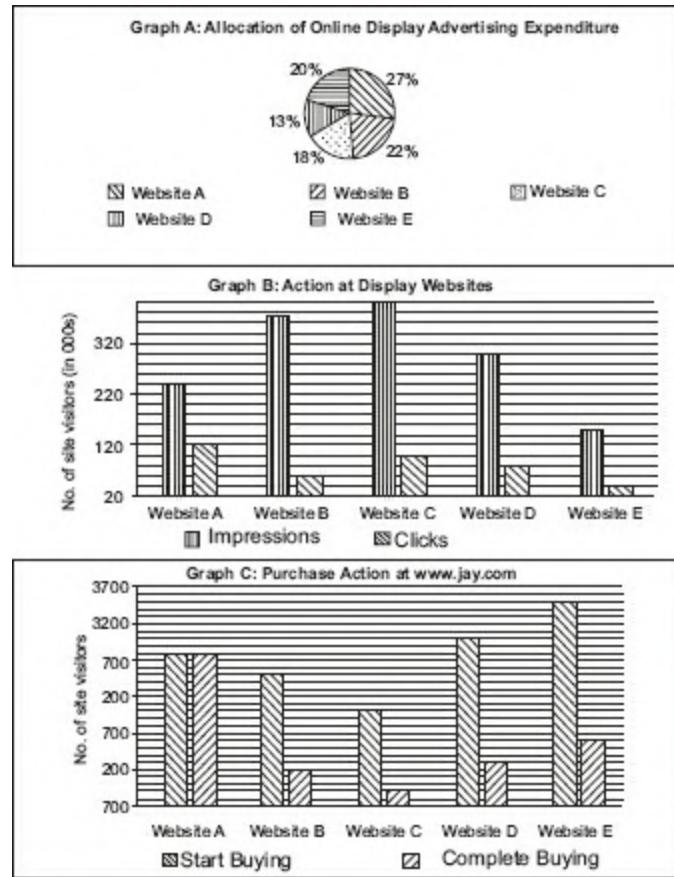
14. Which among the following factors had the least growth rate in 2014 versus scores of 2010?

- (a) Business Sophistication
- (b) Institutions
- (c) Technological Readiness
- (d) Infrastructure

**Directions for Questions 15 to 18:** Read the following information and the accompanying graphs to answer the questions that follow.

[www.jay.com](http://www.jay.com) spent \$ 5,57,000 during last 12 months for online display advertisements, also called impressions, on five websites (Website A, Website B, Website C, Website D and Website E). In this arrangement, [www.jay.com](http://www.jay.com) is the Destination Site, and the five websites are referred to as the Ad Sites. The allocation of online display advertising expenditure is

shown in Graph A. The online display advertisements helped [www.jay.com](http://www.jay.com) to get visitors on its site. Online visitors, visiting the Ad Sites, are served display advertisements of [www.jay.com](http://www.jay.com) and on clicking they land on the Destination Site (Graph B). Once on the Destination Site, some of the visitors complete the purchase process (Graph C).



Quality traffic =

$$\frac{\text{No. of site visitors who start purchase on destination site}}{\text{No. of visitors who click the online display advertisement}}$$

Leakage in online buying = 1

$$= \frac{\text{Complete buying on the destination website}}{\text{Start buying on the destination website}}$$

Efficiency of online display advertising expenditure on an Ad Site =

$$\frac{\text{No. of visitors from the Ad site who complete the purchase process}}{\text{Amount spent on the Ad Site}}$$

15. Which of following Ad Sites provide facility of least cost per

advertisement?

- (a) Website A
- (b) Website B
- (c) Website D
- (d) Website E

16. Which Ad Site has provided maximum quality traffic?

- (a) Website A
- (b) Website B
- (c) Website D
- (d) Website E

17. Which Ad Site sent traffic to [www.jay.com](http://www.jay.com) with maximum leakage?

- (a) Website B
- (b) Website C
- (c) Website D
- (d) Website E

18. On which Ad Site is the advertising budget spent most efficiently?

- (a) Website A
- (b) Website B
- (c) Website C
- (d) Website E

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## ANSWER KEY

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- 1. (b)
- 2. (d)
- 3. (c)
- 4. (d)
- 5. (d)
- 6. (c)
- 7. (b)
- 8. (b)
- 9. (d)

10. (b)  
 11. (d)  
 12. (c)  
 13. (b)  
 14. (b)  
 15. (c)  
 15. (d)  
 17. (c)  
 18. (a)
- 

## SOLUTIONS

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### **Questions 1 to 5:**

Based on the two tables, we can make a consolidated table with sales of each type of air conditioner in each month. The following values would come out (based on rounding off to the nearest integer):

|                            | 2 Tons | 1.5 tons | 1 ton | 0.5 ton |
|----------------------------|--------|----------|-------|---------|
| April                      | 253    | 241      | 177   | 595     |
| May                        | 254    | 241      | 177   | 596     |
| June                       | 318    | 420      | 152   | 381     |
| July                       | 323    | 426      | 155   | 387     |
| August                     | 402    | 246      | 440   | 207     |
| September                  | 259    | 246      | 181   | 609     |
| October                    | 324    | 428      | 337   | 207     |
| November                   | 325    | 429      | 338   | 208     |
| December                   | 325    | 429      | 156   | 390     |
| January                    | 332    | 439      | 346   | 213     |
| February                   | 415    | 254      | 455   | 214     |
| March                      | 418    | 256      | 459   | 216     |
| Average sales<br>(approx.) | 302    | 338      | 282   | 252     |

1. 338. Option (b).
2. From the solution table we have constructed, we can see that the largest difference in average sales is between 1.5 ton and 0.5 ton ACs. Hence, option (d) is correct.

3. 1.5 tons. For this purpose we need to see the total sales from April 2014 to September 2014. The second best total is for 1.5 ton ACs (with the best being for 0.5 ton ACs). Hence, option (c) is correct.
4. February 2015. The total for February 2015 works out to  $415 + 254 + 455 + 214 = 1328$ . This total is larger than the total sales for any other month. Hence, option (d) is correct.
5. Sales volatility would be measured using the difference between the maximum sales in any month to the minimum sales in any month. The correct answer would be 2 ton ACs. Option (d).

### **Questions 6 to 10:**

6. Average sales of product

$$B = \frac{300 + 600 + 600 + 1000 + 1000 + 700 + 1600}{7} \\ = 828.57$$

Average sales of A =  $214.29 + 828.57 = 1042.86$

Total sales of A =  $1042.86 \times 7 = 7300$

Let the sales of A in 2013 be x.

$$1200 + 500 + 800 + 1200 + 1800 + 1300 + x = 7300$$

X = Rs. 500 crores.

Using similar method we can calculate that the sales of C in 2010 was Rs. 800 crores and sales of D in 2012 was Rs. 600 crores. Hence, option (c) is correct.

7. Average sales of all product in 2010 = Rs. 940 crores.

Average sales of all product in 2011 = Rs. 840 crores.

Average sales of all product in 2012 = Rs. 900 crores.

Average sales of all product in 2013 = Rs. 880 crores.

Hence, the required answer is 2011. Hence, option (b) is correct.

8. B. Option (b).

9. By checking the options we can see that the difference between average sales of D and E is minimum. Option (d) is correct.

$$10. \text{ YoY growth in 2010} = \frac{4700 - 4900}{4700} \times 100 \\ = -4.08\%$$

$$\text{YoY growth in 2011} = \frac{4200 - 4700}{4700} \times 100 = -10.63\%$$

$$\text{YoY growth in 2013} = \frac{4400 - 4500}{4500} \times 100 = -2.2\%$$

$$\text{YoY growth in 2015} = \frac{6000 - 5900}{5900} \times 100 = +1.69\%$$

Maximum decline was in 2011. Hence, option (b) is correct.

### Questions 11 to 14:

11. Factor performance of innovation

$$= 0.3 \times 4.5 + 0.35 \times 4 + 0.35 \times 4.75 = 4.4125$$

Factor performance of business sophistication

$$= 0.3 \times 5.25 + 0.35 \times 4.75 + 0.35 \times 4.5 = 4.8125$$

Factor performance of infrastructure

$$= 0.3 \times 5.25 + 0.35 \times 4 + 0.35 \times 4 = 4.375$$

Factor performance of macroeconomic environment

$$= 0.3 \times 5.5 + 0.35 \times 4.5 + 0.35 \times 4.75 = 4.8875$$

Option (d).

12. Factor performance of innovation =  $\frac{4.5 - 4}{4.75} = 0.105$

Factor performance of business sophistication

$$= \frac{5.25 - 4.75}{4.5} = 0.11$$

Factor performance of infrastructure

$$= \frac{5.25 - 4}{4} = 0.3125$$

Factor performance of macroeconomic environment

$$= \frac{5.5 - 4.5}{4.75} = 0.21$$

Option (c).

13. Average score of Infrastructure

$$= \frac{4 + 4 + 5.25}{3} = 4.416$$

Similarly by calculating the averages for other parameters as well we can see that option (b), Institutions had the highest average score.

14. Option (b).

**Questions 15 to 18:**

15. Cost/advertisement for

$$A = 27\% \text{ of } 557000/240000 = 0.63$$

$$B = 22\% \text{ of } 557000/370000 = 0.33$$

$$D = 13\% \text{ of } 557000/300000 = 0.24$$

$$E = 20\% \text{ of } 557000/150000 = 0.74$$

Option (c) is correct.

16. Quality traffic:

$$A: 2800/120000 = 0.023$$

Similarly by calculating the quality traffic for B, D, E we get E had maximum quality traffic.

17. Leakage:

$$\text{For } B = 1 - 1200/2500 = 1 - 0.48 = 0.52$$

Similarly by calculating for other options we get D had maximum leakage. Option (c) is correct.

18. Note: For this question, since the amount spent on the Ad site would be a percentage of 557000 and that would be constant for each of the four options based calculations, we can actually ignore that part of the calculation (since we are only comparing the efficiencies of the four options. Thus, we can see which Ad Site would give the highest efficiency, simply by the proxy calculations shown below:

$$A = 2700/27 = 100$$

$$B = 1200/22 = 54.54$$

$$C = 900/18 = 50$$

$$E = 1600/20 = 80$$

Option (a) is correct.

**Directions for Questions 1 to 5:** Read the following information and Tables and answer the questions.

BHUBANESWAR, CHENNAI, KANYAKUMARI, KOCHI, MUMBAI and VIZAG are 6 major Indian cities. For some reason people use only a certain mode of transport between a pair of cities. The modes of transport are provided in [Table 1](#), while in [Table 2](#) the distances between different pairs of cities are given. [Table 3](#) provides the speed of the mode of transport and the cost associated with each of them.

**Table 1:** Mode of Transport between Cities

| Origin      | Destination |         |             |          |           |          |
|-------------|-------------|---------|-------------|----------|-----------|----------|
|             | BHUBANESWAR | CHENNAI | KANYAKUMARI | KOCHI    | MUMBAI    | VIZAG    |
| BHUBANESWAR | —           | Ship    | Train       | Airplane | Bus       | Train    |
| CHENNAI     | Ship        | —       | Train       | Ship     | Ship      | Train    |
| KANYAKUMARI | Train       | Train   | —           | Train    | Bus       | Ship     |
| KOCHI       | Airplane    | Ship    | Train       | —        | Train     | Airplane |
| MUMBAI      | Bus         | Ship    | Bus         | Train    | —         | Airplane |
| VIZAG       | Train       | Train   | Ship        | Airplane | Airplane- | —        |

**Table 2:** Distance between Cities (KM)

| Origin      | Destination |         |             |       |        |       |
|-------------|-------------|---------|-------------|-------|--------|-------|
|             | BHUBANESWAR | CHENNAI | KANYAKUMARI | KOCHI | MUMBAI | VIZAG |
| BHUBANESWAR | -           | 950     | 700         | 798   | 701    | 1002  |
| CHENNAI     | 950         | -       | 999         | 901   | 1000   | 300   |
| KANYAKUMARI | 700         | 999     | -           | 1100  | 950    | 250   |
| KOCHI       | 798         | 901     | 1100        | -     | 300    | 600   |
| MUMBAI      | 701         | 1000    | 950         | 300   | -      | 500   |
| VIZAG       | 1002        | 300     | 250         | 600   | 500    | -     |

**Table 3:** Mode of Transport and Cost

| Mode of Transport I | KMPH | Cost per KM (in rupees) |
|---------------------|------|-------------------------|
| Airplane            | 60   | 5                       |
| Bus                 | 40   | 2                       |
| Ship                | 30   | 1.5                     |
| Train               | 25   | 2.5                     |

1. For which of the following options, travel time is the least?
  - (a) MUMBAI - KANYAKUMARI
  - (b) BHUBANESWAR - CHENNAI
  - (c) CHENNAI - KOCHI
  - (d) MUMBAI - CHENNAI
2. Mr. Ranjith lives in MUMBAI and wants to travel to KOCHI. However, the train services are on halt due to laying of track for bullet trains across the country. In this scenario, which of the following is the least cost route to reach KOCHI?
  - (a) MUMBAI - BHUBANESWAR - KOCHI
  - (b) MUMBAI - CHENNAI - KOCHI
  - (c) MUMBAI - KANYAKUMARI - KOCHI
  - (d) MUMBAI - VIZAG - KOCHI
3. A school in Chennai is planning for an excursion tour for its students. They want to show them KANYAKUMARI, VIZAG, and BHUBANESWAR, not necessarily in the same order. What is the

minimum travel cost (in Rs.) the school should charge from each of the student for the entire tour?

- (a) Rs. 4300
  - (b) Rs. 5000
  - (c) Rs. 7500
  - (d) Rs. 6800
- 4.** Which of the following cities can be reached from BHUBANESWAR in least time?
- (a) CHENNAI
  - (b) KANYAKUMARI
  - (c) MUMBAI
  - (d) VIZAG
- 5.** What is the least cost way to reach to VIZAG from KOCHI?
- (a) Take a flight from KOCHI to VIZAG
  - (b) Take a ship from KOCHI to CHENNAI and then take a train to VIZAG
  - (c) Take a train from KOCHI to KANYAKUMARI and then take a ship to VIZAG
  - (d) Take a train from KOCHI to MUMBAI and then take a flight to VIZAG

**Directions for Questions 6 to 10:** Read the following information on Sectoral Trends in Mergers & Acquisitions in India (2001-02 to 2006-07) given in tables below and answer the questions.

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**Table:** Sector wise Number of ‘Mergers & Acquisitions’

| Sectors              | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
|----------------------|---------|---------|---------|---------|---------|---------|
| Food & Beverage      | 113     | 77      | 77      | 74      | 63      | 61      |
| Textile              | 57      | 59      | 59      | 64      | 77      | 55      |
| Chemicals            | 134     | 98      | 112     | 99      | 79      | 62      |
| Drugs & Pharma       | 64      | 60      | 44      | 50      | 60      | 72      |
| Cement               | 11      | 7       | 8       | 22      | 0       | 0       |
| IT & Telecom         | 153     | 114     | 84      | 80      | 109     | 103     |
| Diversified          | 15      | 8       | 13      | 4       | 7       | 5       |
| Financial Services   | 194     | 201     | 160     | 116     | 193     | 177     |
| Other Services       | 297     | 280     | 287     | 281     | 271     | 293     |
| Misc Manufacturing   | 31      | 36      | 31      | 35      | 35      | 24      |
| Non Mineral Products | 32      | 24      | 27      | 27      | 47      | 34      |

**Table:** Sector wise Number of ‘Mergers’

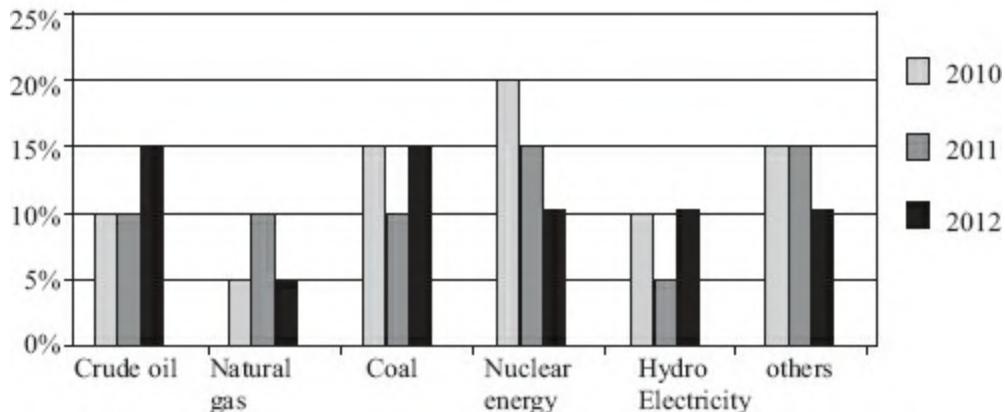
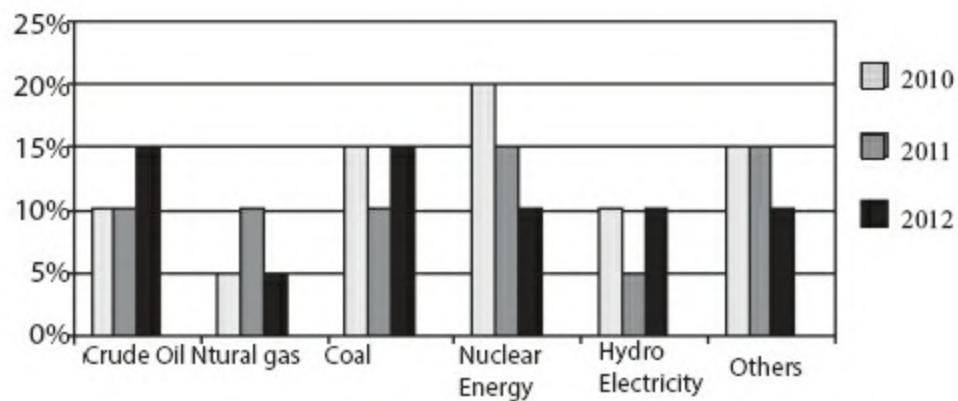
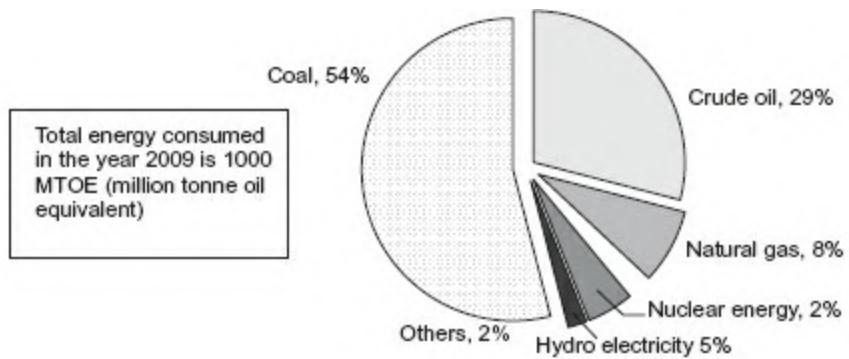
| Sectors              | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
|----------------------|---------|---------|---------|---------|---------|---------|
| Food & Beverage      | 17      | 23      | 10      | 19      | 20      | 8       |
| Textile              | 7       | 7       | 8       | 11      | 21      | 23      |
| Chemicals            | 27      | 15      | 12      | 23      | 24      | 15      |
| Drugs & Pharma       | 6       | 17      | 14      | 10      | 15      | 12      |
| Cement               | 0       | 2       | 1       | 3       | 0       | 0       |
| IT & Telecom         | 19      | 19      | 13      | 16      | 17      | 12      |
| Diversified          | 1       | 0       | 1       | 0       | 0       | 0       |
| Financial Services   | 91      | 107     | 87      | 41      | 75      | 51      |
| Other Services       | 90      | 92      | 105     | 81      | 61      | 83      |
| Misc Manufacturing   | 3       | 13      | 0       | 4       | 11      | 3       |
| Non Mineral Products | 3       | 5       | 1       | 5       | 8       | 11      |

6. What is the approximate proportion of ‘mergers’ to ‘acquisitions’ for the entire period (2001 - 02 to 2006 - 07)?
  - (a) 26%
  - (b) 36%
  - (c) 30%
  - (d) 20%
7. For how many sectors is the proportion of ‘mergers’ to mergers & acquisitions’ greater than 20% for the entire period (2001 - 02 to 2006 - 07)?
  - (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
8. For how many sectors merger activity (measured by number of

mergers) is more in the first 3 years as compared to the last 3 years?

- (a) 7
  - (b) 3
  - (c) 6
  - (d) 5
- 9.** If the turbulence over a period is defined by the sum of each of the differences (in absolute terms) in number of mergers & acquisitions on a year-on-year basis, then which sector is considered most turbulent for the entire period (2001 – 02 to 2006 – 07)?
- (a) Financial Services
  - (b) IT & Telecom
  - (c) Food & Beverages
  - (d) Other services
- 10.** In which year maximum sectors have exhibited higher number of acquisitions compared to previous year?
- (a) 2003 – 04
  - (b) 2004 – 05
  - (c) 2005 – 06
  - (d) 2006 – 07

**Directions for Questions 11 to 15:** Charts given below describe the energy scenario of a country. Assume that the country does not export any form of energy and whatever is produced and imported is consumed in the same year. Go through the Charts and answer the questions.



- 11.** What was the approximate total import of energy in 2010?
  - 400 MTOE
  - 300 MTOE
  - 360 MTOE
  - 430 MTOE
  
- 12.** The import of natural gas in 2012, when compared to 2010, is approximately:
  - Reduced by 10 MTOE
  - Reduced by 13 MTOE

- (c) Increased by 10 MTOE  
(d) Increased by 5 MTOE
- 13.** What is the approximate domestic production of crude oil in 2011?  
(a) 220 MTOE  
(b) 190 MTOE  
(c) 160 MTOE  
(d) 280 MTOE
- 14.** What is the approximate proportion of coal in the domestic consumption of energy in 2012?  
(a) 52  
(b) 54  
(c) 58  
(d) 56
- 15.** What is the sum of the approximate domestic production of nuclear energy and hydroelectricity in 2011?  
(a) 75 MTOE  
(b) 80 MTOE  
(c) 90 MTOE  
(d) 100 MTOE

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## ANSWER KEY

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1. (a)
2. (b)
3. (a)
4. (c)
5. (b)
6. (b)
7. (d)
8. (d)
9. (d)
10. (c)
11. (c)

12. (b)  
 13. (b)  
 14. (d)  
 15. (b)

## SOLUTIONS

- 1.** The travel time would be given by distance/speed. In order to solve this question, we need to find the least travel time amongst the given options.

The following ratios need to be compared:

$$\text{Mumbai- Kanyakumari} = \frac{950}{40}, \quad \text{Bhubaneshwar- Chennai} = \frac{950}{30},$$

$$\text{Chennai-Kochi} = \frac{901}{30}, \quad \text{Mumbai - Chennai} = \frac{1000}{30}$$

Mumbai- Kanyakumari has a ratio of <24, while the time for each of the other journeys is >30. Clearly, the Mumbai- Kanyakumari journey takes the minimum amount of time amongst the given options. So option (a) is correct.

- 2.** The Cost of travel would be given by the product of the Distance and the Cost per km of each of the four alternatives provided in the options for Mr. Ranjith.

Considering the cost of travel in each option.

The cost of each of the options can be worked out as under:

| Mumbai-<br>Bhu-<br>baneswar-<br>Kochi        | Mumbai-<br>Chennai<br>- Kochi          | Mumbai-<br>Kanyaku-<br>mari- Kochi   | Mumbai-<br>Vizag- Ko-<br>chi      |
|--|--|--------------------------------------|-----------------------------------|
| $(701 \times 2) + (798 \times 5) \times 1.5$ | $(1000 \times 1.5) + (901 \times 2.5)$ | $(950 \times 2) + (1100 \times 2.5)$ | $(500 \times 5) + (600 \times 5)$ |

Looking across the table, it is quite evident that the Mumbai-Chennai-Kochi route is the cheapest.

Hence, option (b) is the correct answer.

- 3.** There are multiple ways in which this movement can be organized. However, blindly checking all possible routes would be a wrong thing

to do, as it is likely to lead to a very tedious solution. We should realise to start with that the cost would essentially depend on two aspects—the mode of travel and the distance that is to be traveled on a particular route.

In terms of cost of travel the increasing order of costs is:

Ship < Bus < Train < Airplane

Also, the route would involve a round trip to Chennai and can be visualized as:

Chennai – city 1 – city 2 - city 3 - Chennai

A brief look at the relevant distances gives us:

Chennai – Bhubaneswar = 950 (ship);

Chennai – Vizag = 300 (train);

Chennai – Kanyakumari = 999 (train);

Bhubaneswar – Vizag = 1002 (train);

Bhubaneswar – Kanyakumari = 700 (train);

Vizag- Kanyakumari = 250 (ship)

Looking through the above options, the Chennai- Vizag – Kanyakumari – Bhubaneswar – Chennai route (Route 1) or the Chennai- Bhubaneswar – Kanyakumari – Vizag – Chennai route (Route 2) would be the best. The cost of both these would be the same since the legs of the journey are the same:

Cost of Route 1:  $300 \times 2.5 + 250 \times 1.5 + 700 \times 2.5 + 950 \times 1.5 = 4300$

Hence, option (a) is correct.

4. It can be observed that Bhubaneswar- Mumbai has almost the lowest distance, while at the same time it will also give the fastest travel speed – since the travel is by bus – as compared to travel by ship or train on the journey to the other cities. Hence, Bhubaneswar- Mumbai will take the least travel time.

Hence, option (c) is correct.

5. The individual cost estimates in each of the four options are:

Kochi to Vizag by flight:  $(600 \times 5) = 3000$

Kochi- Chennai (ship) & Chennai- Vizag(train) :  $(901 \times 1.5) + (300 \times 2.5) = 2100$  (approx.)

Kochi- Kanyakumari (train) & Kanyakumari- Vizag (ship) > 2100

The fourth option need not be considered, since Mumbai Vizag by flight itself would cost 2500.

Hence, option (b) is the cheapest route.

6. To find the proportion of ‘mergers’ to ‘acquisitions’ for the entire period, we need to add up the total M&A table and the total Mergers table. The remaining would correspond to the number of acquisitions.

The number of mergers and acquisitions row-wise are:

465; 371; 584; 350; 48; 643; 52; 1041; 1709; 192; 191 = 5646

The number of mergers row-wise is:

97; 77; 116; 74; 6; 96; 2; 452; 512; 34; 33 = 1499

The number of acquisitions would be:  $5646 - 1499 = 4147$ .

So the required percentage =  $\frac{\text{Total Merger} \times 100}{\text{Total Acquisitions}} \frac{1499}{4147} \times 100 = 36\%$ .

Hence, option (b) is correct.

7. From the sector-wise sums we have calculated for the previous question, we can see that the values of  $97/465$ ;  $77/371$ ;  $74/350$ ;  $452/1041$  and  $512/1709$  are all above 20%. There are a total of 5 such sectors.

Hence, option (d) is correct.

8. It can be visually verified from the second table that the sum of the first three columns is greater than the sum of the last 3 columns in the table in 5 cases. Hence, option (d) is correct.
9. Since the turbulence is defined as sum of the differences between the number of mergers and number of acquisitions from 2001-02 to 2006-07, we need to realise that difference is always a positive value. So if  $M > A$ , the difference would be  $M - A$ , while if  $A > M$ , then the turbulence would be given by  $A - M$ .

Mathematically this can be written by taking the absolute values of the subtraction between mergers and acquisitions for any particular year:  $\text{Turbulence} = |\text{Number of mergers in 2001-02} - \text{Number of acquisitions in 2001-02}| + |\text{Number of mergers in 2002-03} - \text{Number of acquisitions in 2002-03}| + \dots + |\text{Number of mergers in 2006-07} - \text{Number of acquisitions in 2006-07}|$

Turbulence for financial services =  $(103 - 91) + (107 - 94) + (87 -$

$$73) + (75 - 41) + (118 - 75) + (126 - 51) = 12 + 13 + 14 + 34 + 43 + 75 = 191.$$

$$\text{Turbulence for other services} = (207 - 90) + (198 - 92) + (182 - 105) + (200 - 81) + (210 - 61) + (210 - 83) = 117 + 106 + 77 + 119 + 149 + 127 = 685.$$

It can be seen that for the other two options, the value of turbulence is below 685. Option (d) is the correct answer.

- 10.** By observing the two tables, it can be seen that in 2005-06 the maximum number of sectors exhibited higher number of acquisitions compared to the previous year.

Hence, option (c) is the correct answer.

- 11.** Total consumption of coal in the year 2010 has grown by 15%. Thus, the total consumption of energy due to coal in 2010 =  $540 \times 1.15 = 621$ . Now imports = 25% of this = 155.25.

Similarly, the total energy consumption from crude oil in 2010 would be 10% more than 290 = 319. 50% of this is imported. Hence, imports = 159.5.

For natural gas, a 5% increase on 80 would mean total consumption = 84. 50% of this = 42.

Similarly for hydro electricity: total consumption in 2010 = 10% more than 50 = 55. Imports = 5% of this = 2.75.

Thus, total energy import in 2010 =  $155.25 + 159.5 + 42 + 2.75 = 359.5$ . Option (3) is the correct answer.

- 12.** The import of natural gas in the year 2010 = 50% of  $80 \times 1.05 = 42$ .

For the year 2012, the import is = 30% of  $80 \times 1.05 \times 1.1 \times 1.05 = 30\% \text{ of } 97.02 = 29.11 \text{ MTOE}$

Thus, the import of natural gas has reduced by approximately 13 MTOE.

Hence, option (b) is correct.

- 13.** The total consumption of crude oil in 2011 =  $290 \times 1.1 \times 1.1 = 350.09 \text{ MTOE}$

Domestic production = 55% of the total consumption = 55% of  $350.09 = 175.04 + 17.50 = 192.54$  (approximately). Since, none of the options matches this, we need to select the closest answer

Hence, option (b) is the correct answer.

14. The required answer would be got by the percentage value of the ratio:

$$\frac{\text{Total domestic consumption of coal energy in 2012}}{\text{Total domestic consumption of energy in 2012}}$$

The consumption of coal energy in the year 2012 =  $540 \times 1.15 \times 1.1 \times 1.15 = 540 + 81 + 62.1 + (68.31 + 34.155) = 785.56$  (Note: Here we have converted a multiplication to an addition calculation – when we are multiplying by 1.15, we can add 15% of the number to itself. When we multiply 540 with 1.15, we will thus get the answer as 540 + 81. Further, when we are multiplying 621 by 1.1, we can just add 10% of 621 = 62.1 to 621 to get 683.1 as the next value. Lastly, we need to finally multiply 683.1 by 1.15, which is the same as adding 15% of 683.1 to 683.1. 15% of 683.1 = 10% of 683.1 + 5% of 683.1 = 68.31 + 34.155 = 102.465)

Thinking in a similar fashion we can solve the equation for the total consumption of energy in the year 2012 =  $540 \times 1.15 \times 1.1 \times 1.15 + 290 \times 1.1 \times 1.1 \times 1.15 + 80 \times 1.05 \times 1.05 \times 1.1 + 20 \times 1.2 \times 1.15 \times 1.1 + 50 \times 1.1 \times 1.05 \times 1.1 + 20 \times 1.15 \times 1.15 \times 1.1$  to get the total consumption of energy in 2012 as 1409.1 MTOE

The proportion of coal in the total domestic consumption =  $785.56/1409.1 \times 100 = 55.75\%$ . Again we need to choose the closest option, since the exact answer match is not there in the options.

Hence, option (d) is correct.

15. Sum of the approximate domestic production of nuclear energy ( $20 \times 1.2 \times 1.15 = 20 + 3 + 4.6 = 27.6$ ) and hydro electricity ( $50 \times 1.1 \times 1.05 \times 0.95 = 50 + 5 + 2.75 - 2.88 = 55$  (approx.)) in 2011 = 80 (approximately)

Hence, option (b) is correct.

**Directions for Questions 1 to 5:** Given below are the shares of sectoral FDI inflow to India in different years (figures in percentage). Answer the questions on the basis of the following data.

| Sector                             | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------------------------------------|------|------|------|------|------|------|
| Services Sector                    | 18.2 | 24.3 | 20.8 | 16.8 | 4.9  | 20.8 |
| Construction Development           | 7.6  | 8.1  | 12.2 | 11.7 | 5.9  | 10.5 |
| Telecommunications                 | 5.5  | 8.3  | 9.4  | 7.2  | 6.6  | 0.4  |
| Drugs and Pharmaceuticals          | 1.4  | 0.8  | 0.7  | 1    | 9.1  | 2.7  |
| Computer Software and Hardware     | 12.8 | 5.6  | 2.5  | 4.7  | 2    | 2.8  |
| Chemicals (other than Fertilizers) | 1.3  | 1.9  | 1.7  | 2.1  | 16.6 | 1.5  |
| Automobile Industry                | 1.9  | 3.4  | 5.1  | 5.9  | 2.5  | 4.9  |
| Power                              | 1.3  | 3.9  | 5.8  | 5.1  | 4.9  | 3.2  |
| Metallurgical Industries           | 2.5  | 4.5  | 1.8  | 4.9  | 4.7  | 6.9  |
| Hotel and Tourism                  | 1.3  | 1.6  | 2.2  | 2.4  | 2.6  | 14.9 |

1. Among the four sectors mentioned below, the increase in share of FDI inflows between the terminal years 2007 and 2012 has been **highest** for
  - (a) Services Sector
  - (b) Construction Development
  - (c) Automobile Industry
  - (d) Power
2. Over 2007 to 2012, the simple average share of FDI inflows has been **Second lowest** for
  - (a) Chemicals (Other than Fertilizers)
  - (b) Automobile Industry

- (c) Metallurgical Industries
  - (d) Hotel and Tourism
3. Identify the **false** statement from the following sentences:
- (a) During 2009 to 2012 the percentage share of FDI inflow in power sector has witnessed a continuous decline.
  - (b) During 2007 to 2009 the percentage share of FDI inflow in drugs and pharmaceuticals sector has witnessed a continuous decline.
  - (c) During 2009 to 2011 the percentage share of FDI inflow in hotel and tourism sector has witnessed a continuous increase.
  - (d) During 2007 to 2010 the percentage share of FDI inflow in chemicals (other than fertilizers) sector has witnessed a continuous increase.
4. Identify the **True** alternative from the given options based on the following statements:
- (i) In 2011, the construction development sector was ranked fifth in terms of percentage share of FDI inflow in the country.
  - (ii) In 2009, the computer software and hardware sector was ranked sixth in terms of percentage share of FDI inflow in the country.
  - (iii) In 2012, the drugs and pharmaceuticals sector was ranked fourth lowest from the bottom in terms of percentage share of FDI inflow in the country.
- (a) Statement ii only
  - (b) Both statements i and ii
  - (c) Statement iii only
  - (d) All three statements
5. Mark the **highest** figure among the following options
- (a) Increase in FDI inflow percentage share for telecommunications sector between 2007 and 2008
  - (b) Increase in FDI inflow percentage share for computer software and hardware sector between 2009 and 2010
  - (c) Increase in FDI inflow percentage share for automobile sector between 2011 and 2012
  - (d) Increase in FDI inflow percentage share for power sector between 2007 and 2008

**Directions for Questions 6 to 10:** Given below are the shares of India's export basket to different regions (figures in percentage). Answer the questions on the basis of the following data.

| Region                                   | 2002–2003 | 2003–2004 | 2004–2005 | 2005–2006 | 2006–2007 | 2007–2008 | 2008–2009 | 2009–2010 | 2010–2011 | 2011–2012 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| EU countries                             | 22.55     | 22.74     | 21.85     | 22.53     | 21.21     | 21.17     | 21.32     | 20.16     | 18.33     | 17.17     |
| West Africa                              | 2.02      | 1.99      | 1.98      | 1.80      | 1.93      | 2.13      | 1.84      | 1.76      | 1.71      | 2.12      |
| East Africa                              | 1.20      | 1.35      | 1.37      | 1.39      | 2.33      | 2.58      | 2.40      | 1.97      | 2.13      | 2.17      |
| North Africa                             | 1.28      | 1.21      | 1.62      | 1.55      | 1.47      | 1.63      | 1.84      | 1.75      | 1.59      | 1.54      |
| North America                            | 22.49     | 19.61     | 17.96     | 18.25     | 16.23     | 13.85     | 12.57     | 11.89     | 10.98     | 12.48     |
| Latin America                            | 2.06      | 1.40      | 2.15      | 2.47      | 2.95      | 3.11      | 2.96      | 3.13      | 3.72      | 4.00      |
| ASEAN                                    | 8.76      | 9.12      | 10.09     | 10.10     | 9.98      | 10.05     | 10.29     | 10.16     | 10.21     | 12.00     |
| West Asia-Gulf Cooperation council (GCC) | 9.32      | 11.07     | 11.75     | 11.42     | 12.96     | 13.35     | 17.21     | 17.06     | 16.90     | 14.85     |
| West Asia (Other than GCC)               | 3.68      | 3.68      | 3.67      | 3.26      | 3.81      | 3.66      | 3.32      | 3.22      | 3.09      | 3.12      |
| North East Asia                          | 14.92     | 14.70     | 15.83     | 15.74     | 15.33     | 16.23     | 13.80     | 16.12     | 14.83     | 14.86     |
| South Asia                               | 5.28      | 6.73      | 5.51      | 5.38      | 5.12      | 5.90      | 4.62      | 4.69      | 4.64      | 4.37      |

6. Among the four options mentioned below, export share of India witnessed **highest** year-to-year decline in absolute terms in which of the region-period combinations?
  - (a) In ASEAN region from 2005–06 to 2006–07
  - (b) In South Asian region from 2004–05 to 2005–06
  - (c) In West Asia (GCC) region from 2008–09 to 2009–10
  - (d) In North African region from 2009–10 to 2010–11
7. Among the four options mentioned below, for which region have the export shares declined the maximum number of times in a year-on-year basis?
  - (a) South Asia
  - (b) North Africa
  - (c) North America
  - (d) West Africa
8. Between 2009-10 and 2010-11, the annual growth rate in India's (percentage) export share has been **lowest** for
  - (a) North Africa
  - (b) North East Asia
  - (c) North America
  - (d) EU Countries
9. Mark the **highest** figure from the following options:

- India's simple average export share to North Africa during 2008–09 and 2009–10
- (a) India's simple average export share to East Africa during 2004–05 and 2007–08
- (b) India's simple average export share to Latin America during 2002–03 and 2004–05
- (c) India's simple average export share to West Africa during 2007–08 and 2010–11

**10.** Identify the **false** statement

- (a) In 2011–12, South Asia was ranked sixth in India's export basket.
- (b) The export share of North Africa in India's export basket has been the lowest for maximum number of years
- (c) In 2004–05, Latin America was ranked fourth from the bottom in India's export basket
- (d) Between 2002–03 and 2003–04, the annual growth rate in India's (percentage) export share has been highest for West Africa (GCC) market.

**Directions for Questions 11 to 15:** Given below are the detailed characteristics of select Indian industries. Answer the questions on the basis of the following data.

|                                 | Industry 1 | Industry 2 | Industry 3 | Industry 4 | Industry 5 | Industry 6 | Industry 7 |
|---------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Number of Factories             | 65         | 110        | 32         | 30         | 78         | 39         | 300        |
| Number of Workers               | 9066       | 877        | 5656       | 1099       | 7508       | 3333       | 15670      |
| Total Number of Persons Engaged | 9466       | 1255       | 6830       | 1330       | 9088       | 4271       | 19159      |
| Wages to Workers (₹ Lakh)       | 1875       | 420        | 3706       | 596        | 5800       | 3117       | 6966       |
| Total Emoluments (₹ Lakh)       | 2095       | 747        | 6479       | 1024       | 9284       | 6084       | 15053      |
| Fuels Consumed (₹ Lakh)         | 88         | 762        | 10817      | 1384       | 14790      | 6461       | 32178      |
| Material Consumed (₹ Lakh)      | 2519       | 4135       | 57275      | 34027      | 327400     | 123275     | 106233     |
| Total Inputs (₹ Lakh)           | 3256       | 5990       | 80238      | 41037      | 371605     | 138780     | 171246     |
| Depreciation (₹ Lakh)           | 41         | 149        | 6667       | 1044       | 25674      | 3515       | 11246      |
| Net Value Added (₹ Lakh)        | 3178       | 2284       | 23640      | 5831       | 71739      | 42434      | 72290      |
| Profit (₹ Lakh)                 | 816        | 913        | 9356       | 3990       | 34943      | 31219      | 45392      |

- 11.** If total managerial wage bill is defined as the difference between total emoluments and total wage to workers, and total managerial staff is defined as the difference between total persons engaged and total number of workers, then average managerial wage would be **highest** for:

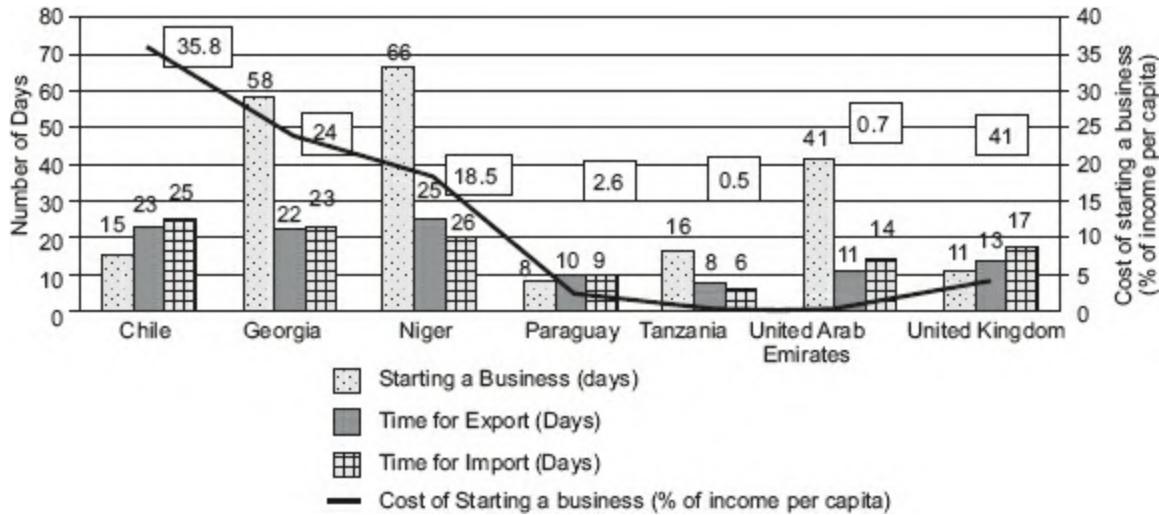
- (a) Industry 5
  - (b) Industry 6
  - (c) Industry 3
  - (d) Industry 7
12. Profit expressed as a ratio of net value added is **highest** for
- (a) Industry 6
  - (b) Industry 7
  - (c) Industry 4
  - (d) Industry 5
13. If gross value added is defined as the sum of net value added and depreciation, then the difference in gross value added per worker is maximum between which of the following pairs?
- (a) Industry 6 and Industry 3
  - (b) Industry 7 and Industry 1
  - (c) Industry 5 and Industry 2
  - (d) Industry 6 and Industry 4
14. Expense on fuel consumption as a percentage of input cost has been **highest** for
- (a) Industry 3
  - (b) Industry 7
  - (c) Industry 2
  - (d) Industry 6
15. Identify the **true** statement.
- (a) Number of workers per factory is third highest for Industry 6.
  - (b) Expense on materials consumption expressed as a percentage of input cost is second highest for Industry 4.
  - (c) Profit earned expressed as a percentage of emolument is second highest for Industry 7.
  - (d) Emoluments expressed as a percentage of net value added is lowest for Industry 5.

**Directions for Questions 16 to 19:** Given below is information relating to cost of starting a business and number of days required for

*specific business activities in select countries.*

Answer the questions on the basis of the data in the following figure.

The data labels for the bars are placed above them, while the same for the line graph are placed in boxes. Legend for the bars is given in the order of left bar to right bar.



16. If countries were ranked according to the number of days required to start a business, (with the country requiring least number of days being ranked highest), which of the top three countries would have the least cost to per capita income ratio?
  - (a) Chile
  - (b) Tanzania
  - (c) Paraguay
  - (d) None of the above
17. Ratio of number of days required for export to import is the least for which country?
  - (a) UK
  - (b) UAE
  - (c) Chile
  - (d) Georgia
18. Identify the **true** Statement
  - (a) In Tanzania, the number of days required for exporting is lower than the number of days required for importing.
  - (b) The sum of number of days required for exporting and the

- number of days required for importing is the third lowest for UK.
- (c) In Paraguay, the number of days required for starting a business is higher than the number of days required for importing.
  - (d) In Georgia, the number of days required for exporting is lower than the number of days required for importing.

**19. Identify the **false** statement**

- (a) The number of days required for starting a business in Chile is lower than the corresponding figure in Tanzania.
- (b) The number of days required for starting a business in UK is equal to the number of days required for exporting in UAE.
- (c) The number of days required for importing in Georgia is higher than the number of days required for exporting in Niger.
- (d) The cost of starting a business as percentage of per capita income in Tanzania is lower than the corresponding figure in UAE.

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**ANSWER KEY**

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- 1. (c)
- 2. (b)
- 3. (d)
- 4. (a)
- 5. (a)
- 6. (d)
- 7. (c)
- 8. (a)
- 9. (c)
- 10. (d)
- 11. (b)
- 12. (a)
- 13. (c)
- 14. (b)
- 15. (d)
- 16. (b)

17. (a)
  18. (d)
  19. (c)
- 

## SOLUTIONS

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### Questions 1 to 5:

1. The increase can be seen to be: 2.6 for Services Sector (20.8 -18.2); 2.9 for Construction Development (10.5 - 7.6); 3 for Automobile Industry (4.9-1.9) and 1.9 for Power (3.2 -1.3). It can be clearly seen that it is maximum for Automobile Industry. Hence, Option (c) is the correct answer.
2. The simple average of FDI inflows can be ranked directly on the basis of the additions of the individual FDI inflows for the values across the 6 years for any sector. We thus calculate the individual FDI inflow totals for each of the four options. We see that the totals are:  
Chemicals = 25.1; Automobile = 23.7  
Metallurgical Industries = 25.3 & Hotel and Tourism = 25.

However, the question has asked us for the second lowest overall (and not the second lowest amongst the given options). Hence, if we look through the other sectors in the table, we can see that the total for Drugs and Pharmaceuticals is the least. Hence, we will select Automobiles (@23.7 that sector is the second lowest after Drugs and Pharmaceuticals @14.7). Hence, Option (b) is the correct answer.

3. The fourth statement is clearly false, since during 2007 to 2010 we do not see a continuous rise for Chemicals (other than fertilisers).
4. Statement (i) can be seen as false since the value of construction development in 2011 was ranked fourth and not fifth. Statement (iii) is also false, since in 2012 Drugs and Pharmaceuticals was ranked third lowest from the bottom and not fourth lowest from bottom.  
Statement (ii) is correct as Computer software and hardware was indeed ranked sixth in 2009. Hence, Option (a) is the correct answer.
5. The figures for the given options would be: a) = 2.8; b) = 2.2; c) = 2.4 and d) = 2.6. The highest amongst these is Option (a).

Hence, Option (a) is the correct answer.

### Questions 6 to 10:

6. The respective year-to-year absolute declines for the given options are:  
Option a) ASEAN 2005–06 to 2006–07 → 10.1 to 9.98 = 0.12;  
Option b) South Asia 2004–05 to 2005–06 → 5.51 to 5.38 = 0.13;  
Option c) West Asia (GCC) from 2008–09 to 2009–10 → 17.21 to 17.06 = 0.15;  
Option d) North Africa 2009–10 to 2010–11 → 1.75 to 1.59 = 0.16.  
Clearly the value for North Africa is the highest amongst the four mentioned options. Hence, Option (d) is the correct answer.
7. The export shares have declined six times each for South Asia, North Africa and West Africa. For North America it has declined 7 times. Hence, Option (c) is the correct answer.
8. If we look at the values of the annual growth rate for the regions given in the options, we can clearly see that there is negative growth for each of the four regions given in the options. Since we are looking for the lowest annual growth rate amongst the given options, we will need to look for the highest percentage reduction. The reductions can be seen to be:
  - (a) North Africa – from 1.75 to 1.59 → -9.14%;
  - (b) North East Asia – from 16.12 to 14.83 → -8%
  - (c) North America – from 11.89 to 10.98 → -7.65%
  - (d) EU countries – from 20.16 to 18.33 → -9.07%.Option (a) is the correct answer.
9. Since each of the options is an average of 2 numbers, we can do this by comparing the sums of the two given numbers and looking for the highest sum to get the highest average.
  - (a) North Africa 2008–09 & 2009–10 = 1.84 + 1.75 = 3.59
  - (b) East Africa 2004–05 & 2007–08 = 1.37 + 2.58 = 3.95
  - (c) Latin America 2002–03 & 2004–05 = 2.06 + 2.15 = 4.21
  - (d) West Africa 2007–08 & 2010–11 = 2.13 + 1.71 = 3.84.The value is highest for Latin America's two given years. Hence, Option (c) is the correct answer.

10. The statements in Options (a), (b) and (c) are clearly true as:

For Option (a) we can see that South Asia was ranked sixth in India's export basket in 2011–12;

For Option (b) we can see that North Africa's share of India's export basket was least for 7 of the ten years and hence would be the least for the maximum number of years.

For Option (c) we can see that in 2004–05 Latin America was indeed ranked fourth from bottom in India's export basket with a share of 2.15 %, as there are exactly three regions with a lower market share than 2.15. These are East Africa (1.37), North Africa (1.62) and West Africa (1.98). Option (d) has to be true and can be marked without any calculations.

Hence, Option (d) is the correct answer.

### Questions 11 to 15:

11. For Industry 3, the ratio would be 2773/1174, for Industry 5 it would be 3484/1580, for Industry 6 2967/938 and for Industry 7 8087/3489. The ratio is highest for Industry 6 as the value of 2967/938 is  $>3$  and all the other ratios are  $<3$ . Hence, Option (b) is the correct answer.
12. Again, for this question, since the options are close ended we need to consider only the ratios for the four industries given in the options. The ratios to be compared to get the highest value are: Industry 4:3990/5831; Industry 5: 34943/71739, Industry 6: 31219/42434 & Industry 7: 45392/72290. The highest amongst these ratios is 31219/42434, which is  $> 0.7$  while all the other ratios are  $<0.7$ . Hence, Option (a) is correct.
13. The respective ratios are:

| Industry                     | 1    | 2    | 3     | 4    | 5     | 6     | 7     |
|------------------------------|------|------|-------|------|-------|-------|-------|
| Gross value added            | 3219 | 2433 | 30307 | 6875 | 97413 | 45949 | 83536 |
| Number of workers            | 9066 | 877  | 5656  | 1099 | 7508  | 3333  | 15670 |
| Gross value added per worker |      |      |       |      |       |       |       |

Based on the above table, if we start comparing the industry pairs as given in the options we get:

Option (a)  $45949/3333 - 30307/5656 \approx 459.4/33.33 - 303/56 \approx 13.7 - 5.4 \approx 8.3$

Option (b)  $83536/15670 - 3219/9066 \approx 835/156 - 32/90 \approx 5.36 - 0.35 \approx 5.01$

Option (c)  $97413/7508 - 2433/877 \approx 974/75 - 24/8.7 \approx 12.99 - 2.7 \approx 10.29$

Option (d)  $45949/3333 - 6875/1099 \approx 459.4/33.33 - 68.75/11 \approx 13.7 - 6.25 \approx 7.45$

From the above approximate calculations we can make out that the difference between Industry 5 and Industry 2 is the maximum. Hence, Option (c) is the correct answer.

14. The required ratios are: Industry 2 –  $762/5990$ , Industry 3 –  $10817/80238$ , Industry 6 –  $6461/138780$  and Industry 7 –  $32178/171246$ . The values can be compared basis their percentage values where  $762/5990$  is around 12-13%,  $10817/80238$  is also around 13%,  $6461/138780$  is below 10% while  $32178/171246$  is also over 10% but close to 20%. Hence, Industry 7 exhibits the highest percentage for this parameter. Hence, Option (b) is the correct answer.
15. The Statement in Option (a) is false, as the number of workers per factory is fourth highest for Industry 6. [ $3333/39 \approx 80+$ , which is lower than the values for Industries 1 and 3 which have this ratio over 100 each while Industry 5 has a ratio of over 90].

The Statement in Option (b) is also false, since the expense on material consumption as a percentage of input cost for Industry 4 is third highest behind the percentages for Industries 6 and 5 respectively.

The Statement in Option (c) is also false as the profit earned as a percentage of emoluments is 4<sup>th</sup> highest for industry 7, behind Industries 6, 4 and 5 respectively.

The Statement in Option (d) has to be correct. Hence, Option (d) is the correct answer.

### Questions 16 to 19:

16. The three countries with the least number of days required to start a business are Paraguay, Tanzania and United Kingdom. Of these, the least cost to per capita income ratio would be for Tanzania. Hence, Option (b) is correct.
17. We need to find the least ratio amongst  $13/17$  (UK);  $11/14$  (UAE);

23/25 (Chile) and 22/23 (Georgia). Amongst these 13/17 is the least ratio. Hence, Option (a) is the correct answer.

18. The first three options can be rejected as:

Option (a) is incorrect because in Tanzania the number of days required for exporting is higher than the number of days required for importing.

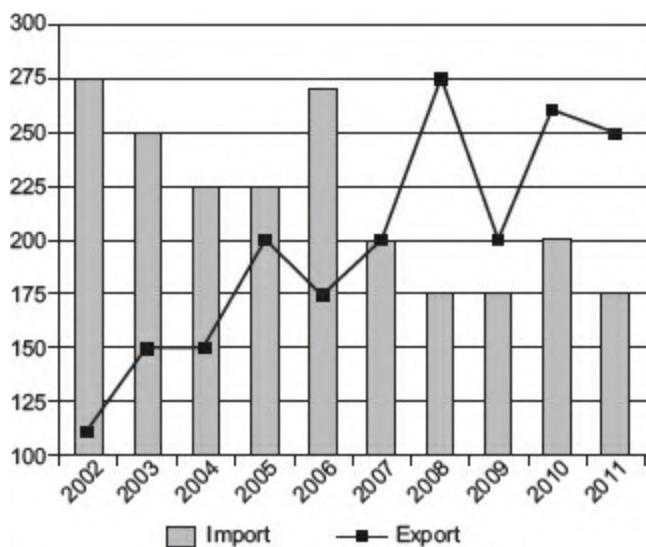
Option (b) is incorrect because the sum is 4<sup>th</sup> lowest for United Kingdom (after Tanzania, Paraguay and UAE).

Option (c) is incorrect as in Paraguay the number of days required for starting a business is lower than the number of days required for importing.

Only Option (d) is correct and hence it is the correct answer.

19. The statement in Option (c) can be identified as false. Hence, Option (c) is correct.

**Directions for Questions 1 to 5:** Analyse the following chart showing the exports and imports of Sono Ltd. and answer the questions based on this Chart.



1. Approximately by what percentage are the total exports greater/smaller than the total imports for the given period?
  - (a) Greater by 9 percent
  - (b) Smaller by 10 percent
  - (c) Smaller by 9 percent
  - (d) Greater by 10 percent
2. If the absolute difference between imports and exports are ranked in ascending order, which year gets 4<sup>th</sup> rank?
  - (a) 2010
  - (b) 2008

- (c) 2009  
 (d) None of the above
3. In which year was the fifth largest annual percentage increase in exports recorded?
- (a) 2007  
 (b) 2005  
 (c) 2009  
 (d) None of the above
4. Which year saw the second largest annual percentage increase in imports?
- (a) 2010  
 (b) 2005  
 (c) 2006  
 (d) None of the above
5. What is the approximate percentage point difference in the maximum annual percentage increase in export and the minimum annual percentage decrease in imports?
- (a) 28  
 (b) 48  
 (c) 64  
 (d) 12

**Directions for Questions 6 to 11:** Answer the questions on the basis of the table given below:

**Table :** Production of Major Minerals and Metals (Million Tonnes)

| Year | Aluminium | Coal | Copper | Gold | Iron ore |
|------|-----------|------|--------|------|----------|
| 2005 | 69        | 91   | 71     | 15   | 100      |
| 2006 | 75        | 88   | 75     | 18   | 120      |
| 2007 | 81        | 97   | 79     | 21   | 102      |
| 2008 | 98        | 107  | 88     | 25   | 131      |
| 2009 | 93        | 110  | 92     | 24   | 143      |
| 2010 | 99        | 116  | 97     | 20   | 154      |
| 2011 | 105       | 122  | 103    | 25   | 163      |

6. Which mineral/metal witnessed highest growth rate in production from 2005 to 2011?

  - (a) Iron Ore
  - (b) Aluminium
  - (c) Gold
  - (d) Copper
7. Which year has witnessed highest absolute increase in total production of minerals and metals?

  - (a) 2006
  - (b) 2008
  - (c) 2011
  - (d) None of the above
8. Highest annual growth rate in production is recorded in

  - (a) Iron ore in 2008
  - (b) Gold in 2011
  - (c) Aluminium in 2008
  - (d) Gold in 2006
9. If annual average growth rate in production exhibited during 2006 to 2011 continues for next 4 years, then what will be the approximate production of aluminium in the year 2015?

  - (a) 125 million tonnes
  - (b) 140 million tonnes
  - (c) 155 million tonnes
  - (d) 160 million tonnes
10. In which year is the proportion of copper production in the total mineral and metal production the highest?

  - (a) 2010
  - (b) 2008
  - (c) 2009
  - (d) 2007
11. Which mineral/metal witnessed the minimum growth rate in production from 2006 to 2010?

  - (a) Aluminium

- (b) Coal
- (c) Copper
- (d) Gold

**Directions for Questions 12 to 14:** Answer the questions on the basis of the following table:

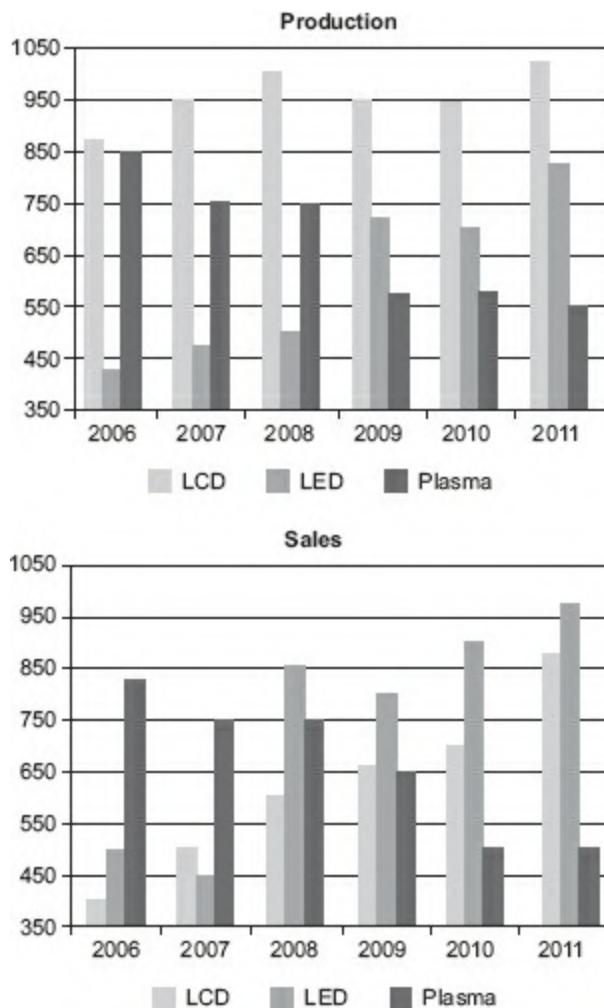
**Table :** Region-wise Origin of Foreign Tourists Arriving into India

| Region                      | Number of Arrivals |           |           |           |
|-----------------------------|--------------------|-----------|-----------|-----------|
|                             | 2007               | 2008      | 2009      | 2010      |
| 1 North America             | 1,007,276          | 1,027,297 | 1,051,209 | 1,173,664 |
| 2 Central and South America | 42319              | 43,505    | 46,604    | 54,728    |
| 3 Western Europe            | 1,686,083          | 1,709,525 | 1,634,042 | 1,750,342 |
| 4 Eastern Europe            | 152,764            | 185,110   | 183,475   | 227,650   |
| 5 Africa                    | 157,485            | 141,750   | 164,474   | 204,525   |
| 6 West Asia                 | 171,661            | 210,542   | 204,843   | 235,317   |
| 7 South Asia                | 982,428            | 1,051,846 | 1,001,401 | 1,047,444 |
| 8 South East Asia           | 303,475            | 332,925   | 360,191   | 409,043   |
| 9 East Asia                 | 352,037            | 355,230   | 322,797   | 411,947   |
| 10 Australasia              | 167,063            | 178,308   | 182,451   | 210,275   |
| 11 Other                    | 58,913             | 35,565    | 16,212    | 12,757    |

12. Which region witnessed the highest compound annual growth rate (CAGR) of tourists arriving into India?
  - (a) Eastern Europe
  - (b) Central and South America
  - (c) West Asia
  - (d) South East Asia
13. Tourists arriving into India from how many regions experienced CAGR of more than 10%?
  - (a) Three
  - (b) Four
  - (c) Five
  - (d) Two
14. The highest annual growth rate recorded in tourists arriving from any region in any year is
  - (a) Africa

- (b) Eastern Europe
- (c) West Asia
- (d) East Asia

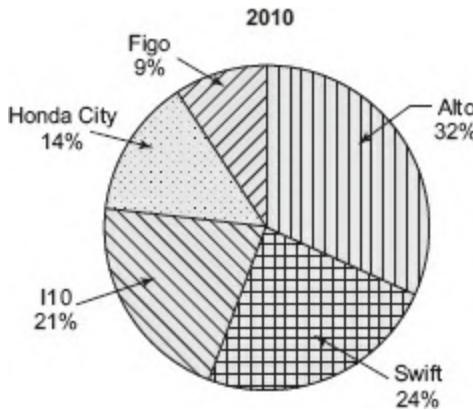
**Directions for Questions 15 to 17:** Read the information given below, analyse the following chart of domestic sales and production of a country and answer the questions. The following charts present data about the domestic sales and production of LCD, LED and plasma TVs produced and sold in a country (in number of units). Differences in production and sales will be bridged through external trade (i.e., exports and imports) of the TV category during a given year.

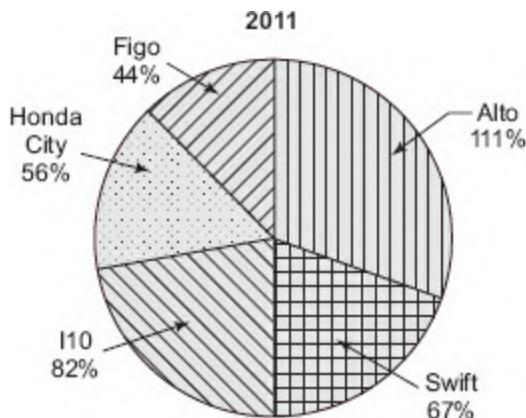


15. Which year has registered the highest external trade in total number of TV units?

- (a) 2006
  - (b) 2007
  - (c) 2008
  - (d) 2010
16. In which year are the net exports (exports – imports) of all the categories taken together the highest?
- (a) 2006
  - (b) 2007
  - (c) 2009
  - (d) 2010
17. Examine the following statements:
- I. LCD TVs were always exported
  - II. Net exports of all the categories of TVs for all the years is 1275
  - III. In only one year the production of plasma TVs fell short of sales.
- Select the best option
- (a) Statement I alone is correct
  - (b) Statement I and II are correct
  - (c) Statement I and III are correct
  - (d) All three statements are correct

**Directions for Questions 18 to 19:** Study the following pie charts regarding sales of 5 models of cars for the years 2010 and 2011, and answer the questions





18. If the 2010 sales for all car models is 80,000 and these have grown by 25% in 2011, then what is the approximate increase in the number of Figo cars sold in 2011 over 2010?
- 4,860
  - 12,200
  - 4,500
  - 2,200
19. If the 2010 sales for all car models is 80,000 and these have grown by 25% in 2011, then how many models have grown more than the average growth rate for all the models taken together?
- 2
  - 3
  - 4
  - None of the above

## ANSWER KEY

1. (c)
2. (a)
3. (a)
4. (c)
5. (a)
6. (c)
7. (b)

8. (a)
  9. (b)
  10. (d)
  11. (d)
  12. (a)
  13. (a)
  14. (d)
  15. (c)
  16. (b)
  17. (c)
  18. (a)
  19. (b)
- 

## SOLUTIONS

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### Questions 1 to 5:

1. The total exports for the period is 1970, while the total imports for the given period is 2170. Thus, exports is lower than imports by  $200 \times 100 \div 2170\% = 9.2\%$  approx. Option (c) is the correct answer.
2. The absolute difference can be seen to be the least visually for the year 2007 (200-200). 2005 and 2009 rank joint second (in ascending order) as the difference is exactly 25 for each of these years. The fourth rank would go to the year 2010, and hence Option (a) is the correct answer.
3. There are exactly 5 years in which there has been a growth of exports. In 2007, the percentage growth is  $(25 \times 100 \div 175)\% = 14.28\%$  which happens to be the least percentage growth amongst the five years where there is growth recorded. The percentage growth in the other years can be seen to be lower than this. Hence, Option (a) is the correct answer.
4. There are only two years when there is an increase in imports viz. 2006 and 2010. For the year 2010, the percentage growth in imports is  $(25 \times 100 \div 175)\% = 14.28\%$ . This is the second highest recorded percentage growth in imports (as the highest can be seen for the year

2006). 225 to 270 represents a 20% increase in the imports for that year.

5. The maximum annual percentage increase in export is 37.5% (for 2008) and the minimum annual percentage decrease in import is 9.09% (for 2003). The approximate percentage point difference between these two values is 28. Hence, Option (a) is correct.

### Questions 6 to 11:

6. Gold has grown from 15 to 25, a percentage growth of 66.66%, which is higher than that of iron ore, which has grown from 100 to 163 (a growth of 63%). The percentage growth of aluminum and copper can be seen to be much lower for the same period. Hence, Option (c) is the correct answer.
7. The value of total production of minerals and metals is as follows:

|      |     |
|------|-----|
| 2005 | 346 |
| 2006 | 386 |
| 2007 | 380 |
| 2008 | 449 |
| 2009 | 462 |
| 2010 | 486 |
| 2011 | 518 |

The highest growth can be seen for the year 2008. Hence, Option (b) is the correct answer.

8. Iron ore in 2008 has grown from 102 to 131 (a growth of over 28%). This is higher than any of the other options. Hence, Option (a) is the correct answer.
9. Aluminium production has grown by 40% over the 5-year period from 2006 to 2011. Hence, for the 4-year period from 2011 to 2015 it can be expected to grow by approximately 32% or thereabouts. (Note we can use the simple average here as a rough approximation of the compounded average annual growth rate – since the options are not too close to each other). Making a value of 105 grow by 32% would

take it close to 140 (you would need to do  $105 \times 1.32$  to do this).

Hence, Option (b) is the correct answer.

10. Copper production as a percentage of total mineral and metal production can be estimated as follows:

| Year | Copper Production | Total Mineral and Metal Production |
|------|-------------------|------------------------------------|
| 2005 | 71                | 346                                |
| 2006 | 75                | 386                                |
| 2007 | 79                | 380                                |
| 2008 | 88                | 449                                |
| 2009 | 92                | 462                                |
| 2010 | 97                | 486                                |
| 2011 | 103               | 518                                |

The highest ratio can be visualised to be  $79/380$  for the year 2007. That is the only year when the value is greater than 20%. Hence, Option (d) is the correct answer.

11. Of the given four options, the lowest ratio is for gold, which has grown from 18 to 20 between 2006 to 2010—a growth percentage of  $(2 \times 100 \div 18)\% = 11.11\%$ . The other metals/minerals have growth rates clustered around  $30\% \pm$ . Hence, Option (d) is the correct answer.

### Questions 12 to 14:

12. In order to find out the highest CAGR, we can just find out the highest ratio between the numbers of arrivals in 2010 to the number of arrivals in 2007. This ratio is the highest for Eastern Europe – as its ratio can be estimated using the ratio  $227/152$  which is close to 1.5. Hence, Option (a) is the correct answer.
13. For a CAGR of  $>10\%$ , it is necessary to have a ratio between the numbers of arrivals in 2010 to the number of arrivals in 2007 to be greater than 1.331. This ratio is achieved for Eastern Europe, West Asia and South East Asia. Hence, Option (a) is the correct answer.
14. The numbers from East Asia have grown from 322797 to 411947—an

increase of over 27%. This is the highest growth for any region in any year.

### Questions 15 to 17:

15. The highest external trade would have to be looked at category wise. Amongst the given years, 2008 has the highest total external trade as the values for external trade for 2008 are:

$$\text{LCD} = 1000 - 600 = 400; \text{LED} = 500 - 850 = -350 \text{ (imports)}; \text{Plasma} = 750 - 750 = 0$$

$$\text{Thus, total external trade in 2008} = 400 + 350 = 750.$$

Similar calculations can be carried out for 2006, 2007 and 2010.

For 2006 the numbers are:

$$\text{LCD} = 870 - 400 = 470; \text{LED} = 420 - 500 = -80 \text{ (imports)}; \text{Plasma} = 850 - 830 = 20$$

$$\text{Thus, total external trade in 2006} = 470 + 80 + 20 = 570.$$

For 2007 the numbers are:

$$\text{LCD} = 950 - 500 = 450; \text{LED} = 460 - 450 = 10; \text{Plasma} = 750 - 750 = 0$$

$$\text{Thus, total external trade in 2007} = 450 + 10 + 0 = 460.$$

For 2010 the numbers are:

$$\text{LCD} = 950 - 700 = 250; \text{LED} = 700 - 900 = -200 \text{ (imports)}; \text{Plasma} = 560 - 500 = 60$$

$$\text{Thus, total external trade in 2008} = 250 + 200 + 60 = 510.$$

Clearly, the total external trade is highest for the year 2008. Hence, Option (c) is the correct answer.

16. We can make the following table for the net external trade (exports – imports):

|      | Total Production | Total Sales | Net External Trade |
|------|------------------|-------------|--------------------|
| 2006 | 2150             | 1720        | 430                |
| 2007 | 2170             | 1700        | 470                |
| 2008 | 2250             | 2200        | 50                 |
| 2009 | 2240             | 2100        | 140                |
| 2010 | 2220             | 2100        | 120                |
| 2011 | 2390             | 2320        | 70                 |

The year 2007 shows the highest net export and hence Option (b) is the correct answer.

17. Statements I and III are clearly correct while the value for the net

exports from the table for Question 16 above comes out as 1280 – which strictly speaking makes the statement incorrect. However, if we look back at our value assumptions for the individual values of the bar charts in the given figure, there could easily be a variance in the value actually perceived from the bar chart and it is easily possible for the Statement II to become correct.

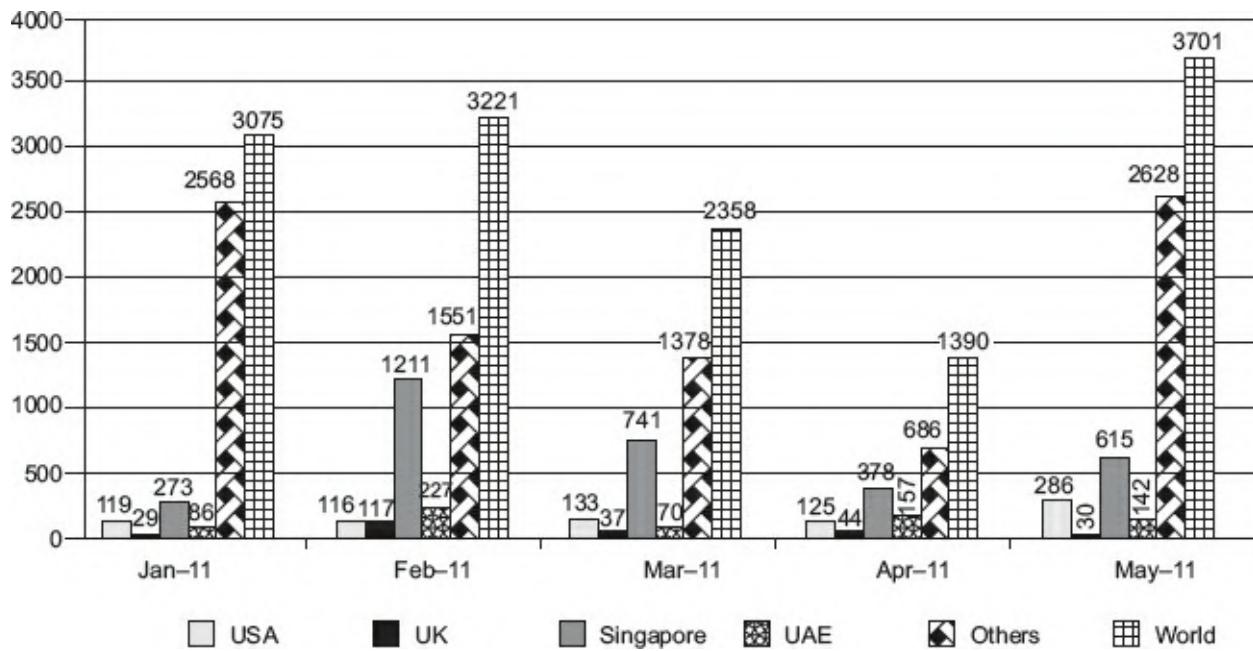
In this scenario it becomes difficult to take a call on the correct answer as only statement II's correctness or incorrectness differentiates Option (c) and (d). In the examination, you could ideally leave this question – as the risk involved is too high. However, for the sake of this exercise, we can mark the answer as Option (c) considering our value assumptions to be exactly correct.

18. The sales of Figo cars in 2010 would be 9% of 80000 = 7200, while the sales of Figo cars in 2011 would be  $(44/360) \times 100\% = 12.22\%$  of the total sales of 100000 units of cars sold. This would amount to 12220 cars being sold. A growth of 5020 units, in the numbers of cars sold. Option (a) is the closest answer and hence is correct.
19. All the car models that have increased their market shares would have grown more than the average growth rate for all models taken together (25% as given in the question). Calculating the values for the market shares we get that Figo, Honda City and I10 have increased their market shares. Swift and Alto have lost market share in 2011 as compared to 2010 and hence their growth would be below 25%. Hence Option (b) is the correct answer.

**Directions for Questions 1 to 5:** Answer the following questions based on the following bar diagram.

The diagram gives us Country XX's Monthly Outward Investment Flows to various countries and the world. The FDI figures are given in US \$ Million.

1. What is the compound average growth rate of Country XX's Overall Outward Investment during the period January to May 2011?
  - (a) 6 percent (approx.)
  - (b) 3.5 percent (approx.)
  - (c) 5.75 percent (approx.)
  - (d) None of the above
2. In which month there was a maximum drop in Country XX's Outward Investment to Singapore and what is the 'month on month' growth in that period?
  - (a) April, approximately negative growth of 39 percent
  - (b) March, approximately negative growth of 49 percent
  - (c) April, approximately negative growth of 49 percent
  - (d) None of the above



3. Of its total investment in the world, what is the share of Country XX's Outward Investment together in USA and UK in February 2011?
  - 7.24 percent
  - 8.30 percent
  - 6.79 percent
  - None of the above
4. In which month did the share of Country XX's Total Outward Investment together in Singapore and UAE achieve the highest level and what is the value?
  - April, 40 percent
  - February, 45 percent
  - March, 45 percent
  - None of the above
5. Between February to April 2011, to which country did the Outward Investment from XX witness the highest decline?
  - Singapore
  - UK
  - UAE
  - Others

**Directions for Questions 6 to 10:** Answer the following questions based on the following table, which reports certain data series from National Accounts Statistics of India at Current Prices.

6. The annual growth rate in the GNP series at factor cost was *highest* between
  - (a) 2008–09 and 2009–10
  - (b) 2006–07 and 2007–08
  - (c) 2007–08 and 2008–09
  - (d) 2005–06 and 2006–07
7. The GDP is sum total of the contributions from primary, secondary and the tertiary sectors. If that be the case, then over 2004–05 to 2009–10, the share of tertiary sector at factor cost in GDP has increased from:
  - (a) 53.05 percent to 55.27 percent
  - (b) 52.86 percent to 54.20 percent
  - (c) 53.04 percent to 55.83 percent
  - (d) 52.70 percent to 56.14 percent

| Year    | Value of GDP<br>From Primary<br>Sector (at Fac-<br>tor Cost) | Value of GDP From<br>Secondary (Manu-<br>facturing) Sector<br>(at Factor Cost) | Value of GDP<br>(at Factor Cost) | Value of<br>GDP<br>(at Market<br>Prices) | Value of GNP<br>(at Factor Cost) | Gross Domestic<br>Savings | Gross Domestic<br>Capital Formation |
|---------|--|--|----------------------------------|--|----------------------------------|---------------------------|-------------------------------------|
|         | ₹ Crore  | ₹ Crore  | ₹ Crore                          | ₹ Crore                                  | ₹ Crore                          | ₹ Crore                   | ₹ Crore                             |
| A       | B  | C  | D                                | E  | F                                | G                         | H                                   |
| 2004–05 | 650454   | 744755   | 2971464                          | 3242209                                  | 2949089                          | 1050703                   | 1052232                             |
| 2005–06 | 732234   | 859410   | 3389621                          | 3692485                                  | 3363505                          | 1235288                   | 1266245                             |
| 2006–07 | 829771   | 1033410  | 3952241                          | 4293672                                  | 3919007                          | 1486044                   | 1540749                             |
| 2007–08 | 961330   | 1205464  | 4581422                          | 4986426                                  | 4560910                          | 1837498                   | 1896563                             |
| 2008–09 | 1067592  | 1351795  | 5282086                          | 5582623                                  | 5249163                          | 1798347                   | 1973535                             |
| 2009–10 | 1243566  | 1499601  | 6133230                          | 6550271                                  | 6095230                          | 2207423                   | 2344179                             |

8. If between 2008–09 and 2009–10 Gross Domestic Savings (GDS) have increased by 30 percent, then during 2009–10, GDS expressed as a percentage of GDP at market prices would have been:
  - (a) 33.70 percent
  - (b) 36.85 percent
  - (c) 35.69 percent

(d) None of the above

9. Mark the highest figure from the following:

- (a) Percentage change in GDP from Secondary sector (at Factor Cost) between 2006–07 and 2007–08.
- (b) Percentage change in GDP at Market Prices between 2008–09 and 2009–10.
- (c) Percentage change in Gross Domestic Savings between 2004–05 and 2005–06.
- (d) Percentage change in Gross Domestic Capital Formation between 2008–09 and 2009–10.

10. Identify the *correct* Statement:

- (a) GDP (at Factor Cost) expressed as a percentage of GNP (at Factor Cost) has increased consistently between 2004–05 and 2009–10.
- (b) GDP (at Factor Cost) expressed as a percentage of GDP (at Market Prices) has increased consistently between 2004–05 and 2008–09.

| Exporting Countries | Percentage Shares of selected countries in Global Exports |      |                   |      |                     |      |                              |      |   |      |
|---------------------|---|------|-------------------|------|---------------------|------|------------------------------|------|---|------|
|                     | Sectors   |      |                   |      |                     |      |                              |      |   |      |
|                     | Clothing Products   |      | Chemical Products |      | Automotive Products |      | Office and Telecom Equipment |      | Integrated Circuits and Electronic Components |      |
|                     | 2000  | 2009 | 2000              | 2009 | 2000                | 2009 | 2000                         | 2009 | 2000  | 2009 |
| EU(27)              | 28.5  | 30.7 | 53.9              | 54.1 | 49.7                | 53.8 | 29.2                         | 24.8 | 19.1  | 13.5 |
| USA                 | 4.4   | 1.3  | 14.1              | 11.0 | 11.6                | 8.6  | 15.8                         | 8.5  | 20.4  | 10.7 |
| Canada              | 1.1   | 0.3  | 2.5               | 1.9  | 10.5                | 4.0  | 2.1                          | 0.8  | 1.1   | 0.6  |
| China               | 18.3  | 34.0 | 2.1               | 4.3  | 0.3                 | 2.3  | 4.5                          | 26.2 | 1.7   | 11.4 |
| Thailand            | 1.9   | 1.2  | 0.7               | 0.9  | 0.4                 | 1.4  | 1.9                          | 2.2  | 1.9   | 2.1  |
| Malaysia            | 1.1   | 1.0  | 0.4               | 0.7  | 0.1                 | 0.1  | 5.4                          | 4.3  | 6.1   | 7.5  |
| India               | 3.0   | 3.6  | 0.7               | 1.3  | 0.1                 | 0.6  | 0.1                          | 0.3  | 0.1   | 0.1  |
| Mexico              | 4.4   | 1.3  | 0.2               | 0.3  | 5.3                 | 4.3  | 3.5                          | 3.8  | 1.0   | 0.5  |
| Japan               | 0.3   | 0.2  | 6.0               | 4.2  | 15.2                | 12.2 | 11.2                         | 5.9  | 13.8  | 10.3 |
| South Korea         | 0.1   | 0.1  | 2.4               | 2.6  | 2.6                 | 4.4  | 6.1                          | 5.8  | 8.0   | 7.6  |

| Importing Countries | Percentage Shares of selected countries in Global Imports |      |                   |      |                     |      |                              |      |   |      |
|---------------------|---|------|-------------------|------|---------------------|------|------------------------------|------|---|------|
|                     | Clothing Products   |      | Chemical Products |      | Automotive Products |      | Office and Telecom Equipment |      | Integrated Circuits and Electronic Components |      |
|                     | 2000  | 2009 | 2000              | 2009 | 2000                | 2009 | 2000                         | 2009 | 2000  | 2009 |
| EU(27)              | 41.0  | 48.5 | 43.8              | 44.9 | 42.3                | 45.0 | 33.8                         | 30.7 | 22.6  | 15.2 |
| USA                 | 33.1  | 21.8 | 12.2              | 10.4 | 29.4                | 15.5 | 21.2                         | 16.6 | 14.9  | 5.2  |
| Canada              | 1.8   | 2.3  | 3.2               | 2.5  | 8.0                 | 5.1  | 3.0                          | 1.9  | 2.5   | 0.9  |
| China               | 0.6   | 0.6  | 4.9               | 7.5  | 0.7                 | 3.6  | 4.4                          | 15.1 | 6.3   | 32.8 |
| Thailand            | 0.1   | 0.1  | 0.9               | 1.4  | 0.4                 | 0.6  | 1.4                          | 1.4  | 2.5   | 2.2  |
| Malaysia            | 0.3   | 0.6  | 1.2               | 1.6  | 0.3                 | 0.5  | 3.2                          | 2.6  | 7.4   | 5.3  |
| India               | 0.4   | 0.9  | 0.8               | 1.8  | 0.1                 | 0.4  | 0.3                          | 1.2  | 0.2   | 0.5  |
| Mexico              | 1.8   | 0.6  | 2.4               | 1.9  | 3.5                 | 2.5  | 2.9                          | 3.1  | 4.2   | 2.3  |
| Japan               | 9.7   | 7.7  | 4.2               | 3.3  | 1.7                 | 1.2  | 6.0                          | 4.4  | 6.0   | 4.45 |
| South Korea         | 0.6   | 1.0  | 2.2               | 2.1  | 0.3                 | 0.7  | 3.3                          | 2.9  | 6.1   | 6.1  |

- (c) Gross Domestic Capital Formation expressed as a percentage of GDP (at Market Prices) has increased consistently between 2004–05 and 2007–08
- (d) Contribution to GDP from Primary Sector (at Factor Cost) expressed as a percentage of GDP (at Factor Cost) has decreased consistently between 2004–05 and 2009–10.

**Directions for Questions 11 to 16:** Answer these questions based on the following tables, which reports global market share of Leading Exporting and Importing countries for select product groups.

11. Identify the highest number:

- (a) Increase in Malaysia's share in global Chemical Products export between 2000 and 2009
- (b) Increase in India's share in Global Office and Telecom Equipment export between 2000 and 2009
- (c) Increase in Mexico's share in Global Chemical Products export between 2000 and 2009
- (d) Increase in Thailand's share in Global Integrated Circuits and Electronic Components export between 2000 and 2009

12. Choose the correct statement:

- (a) Barring the exception of Integrated Circuits and Electronic Components, the share of the EU has increased in global import

- for all other product groups.
- (b) Between 2000 and 2009, global export share has remained unchanged only for five countries.
  - (c) Between 2000 and 2009, global import share has remained unchanged only for five countries.
  - (d) Among all reported product groups between 2000 and 2009, the increase in global import share in case of India has been highest for Chemical Products.
13. Identify the *false* statement:
- (a) India's global export share for Clothing Products between 2000 and 2009 has increased by 20 percent.
  - (b) Japan's global export share for Chemical Products between 2000 and 2009 has decreased by 30 percent.
  - (c) South Korea's global export share for Integrated Circuits and Electronic Components between 2000 and 2009 has decreased by 6 percent.
  - (d) Malaysia's global import share for Clothing Products between 2000 and 2009 has increased by 100 percent.
14. If between 2000 and 2009, India's export market share in Integrated Circuits and Electronic Components had increased by 600 percent, the rank of the country in terms of market share in 2009 would have been:
- (a) Sixth
  - (b) Eighth
  - (c) Seventh
  - (d) None of the above
15. Considering both global export and import market dynamics, China has witnessed highest percentage change in its market share between 2000 and 2009 in the following product groups:
- (a) Integrated Circuits and Electronic Components imports
  - (b) Office and Telecom Equipment exports
  - (c) Integrated Circuits and Electronic Components exports
  - (d) Automotive Products imports
16. Suppose the ten countries mentioned in the table are arranged according to their continent: North America, EU and Asia, then in

terms of *export* market share for (i) Chemical Products, (ii) Automotive Products, (iii) Office and Telecom Equipment Products and (iv) Integrated Circuits and Electronic Components respectively, the continent-wise ranking in 2009 would be:

- (a) (i) EU, Asia, North America;  
(ii) EU, Asia, North America;  
(iii) Asia, EU, North America;  
(iv) Asia, EU, North America.
- (b) (i) Asia, EU, North America;  
(ii) EU, Asia, North America,  
(iii) Asia, EU, North America  
(iv) Asia, North America, EU
- (c) (i) EU, Asia, North America,  
(ii) EU, North America, Asia;  
(iii) Asia, EU, North America,  
(iv) Asia, EU, North America
- (d) (i) EU, Asia, North America  
(ii) EU, North America, Asia;  
(iii) Asia, EU, North America;  
(iv) Asia, North America, EU.

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## ANSWER KEY

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- 1. (d)
- 2. (d)
- 3. (a)
- 4. (b)
- 5. (a)
- 6. (d)
- 7. (a)
- 8. (c)
- 9. (d)
- 10. (c)

- 
- 11. (a)
  - 12. (d)
  - 13. (c)
  - 14. (b)
  - 15. (c)
  - 16. (a)
- 

## SOLUTIONS

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### Questions 1 to 5:

- 1. We need to solve this by checking the options and seeing whether any of the values in the options match the given data. Checking for option (c), @3.5%, 3075 would become 3182, 3182 would become 3293, 3293 would become 3408 and 3408 would reach somewhere in the 3500s after the fourth time period. Thus, 3.5% is too low a value for the compound average growth rate. Checking similarly for 6% and 5.75%, you can see that the numbers do not work out at this rate.  
Thus, option (d) is correct.
- 2. The maximum drop can be seen to have happened during March from 1211 to 741; a drop of 470 on a starting value of 1211. This is close to 39% of the value. None of the three options matches this and hence Option (d) is correct.
- 3. The required percentage would be given by the percentage value of the ratio of:  $233/3221 = 7.24\%$ . Option (a) is correct.
- 4. The highest value is for February @  $(1211 + 247)$  out of 3221 which is approximately 45%.  
Option (b) is correct.
- 5. The maximum decline is from 1211 to 378— which is a decline of 833 which is higher than all other declines during that period. This is for Singapore. Hence, Option (a) is correct.

### Questions 6 to 10:

- 6. For the numbers for 2005–06 to 2006–07, we can take an approximation of 3363 to 3919, a growth of 556 on 3363 which is

around 16.5%.

Between 2006–07 and 2007–08 the growth is from 3919 to 4560, a growth of 641 on 3919 which is around 16.3 to 16.4%.

Between 2007–08 and 2008–09, the growth is from 4560 to 5249, a growth of 689 on 4560 which is in the range of 15 to 16%.

Between 2008–09 and 2009–10 the growth is from 5249 to 6095, a growth of 846 on 5249 which is around 16.1 to 16.2%.

Thus, the highest growth is for 2005–06 to 2006–07. Hence, option (d) is correct.

7. If you look at the options, it is clear that you should calculate the value for 2009–10 because the four options give us different values for that year.

The GDP from primary and secondary sector in 2009–10 is  $1243 + 1499 = 2742$  out of a total of 6133. This means that GDP from tertiary sector is 3391 out of 6133, which translates to around 55.3%. Thus, we choose Option (a) as the correct answer.

8. The value of GDS would have grown from 1798 to  $1798 \times 1.3 = 2337.4$ . The percentage value would have been:

$$2337.4 \times 100/6550 = 35.69\%.$$

Option (c) is correct.

9. GDP from secondary sector grows from 1033 to 1205 between 2006–07 and 2007–08—a growth of 172 on 1033, approx 16.6%.

GDP at market prices grows from 5582 to 6550 between 2008–09 and 2009–10, a growth of 968 on 5582, a growth of 17.1% approx.

GDS between 2004–05 and 2005–06 grows from 1050 to 1235, a growth of 185 on 1050, a growth of 17.6%.

Gross Domestic Capital formation grows from 1973 to 2344, a growth of 371 on 1973, a growth in excess of 18%. Thus, Option (d) is correct.

10. This is a calculation intensive question and hence one should try to start solving by checking the option which involves least calculations. Option (c) is the option with the least possible calculations as it requires us to check the given ratio for only 3 years. For the ratio Gross Domestic Capital Formation to GDP at market prices to be

continuously increasing between the given years, the opposite ratio of GDP at market prices to Gross Domestic Capital Formation should continuously decrease. This reverse ratio starts from a value of 3242/1052 which is more than 3, then moves to 3692/1266 which might be better seen as 369.2/126.6. This ratio is 2.9+.

For 2006–07, the ratio is 4293/1540, which seen as 429.3/154 might be more convenient. This value is just below 2.8, so there is again a decrease in this ratio.

Finally, for 2007–08 also; we can see that the ratio becomes 498.6/189.6, which is between 2.6 and 2.7 and hence it again decreases. Thus, Option (c) is the correct answer.

### Questions 11 to 16:

11. Malaysia's share as given in Option (a) increases from 04 to 0.7, an increase of 0.3, which is more than the increases for the other values specified by Options (b), (c) and (d).

Thus, Option (a) is correct.

12. The first and fourth options are easier to check and hence we should check these first before we move to the other options in case both these options seem to be incorrect.

Option (a) is incorrect because the share of EU in global import has decreased not only for Integrated Circuits and Electronic Components but also for Office and Telecom Equipment.

Option (d) can be seen to be correct, as the increase for India in Chemical Products Imports from 0.8 to 1.8 (an increase of 1 percentage point) is the highest amongst all categories for India.

Thus, Option (d) is the answer.

13. Option (a) is true because a change from 3 to 3.6 represents a 20% increase as stated by the option.

Similarly Option (b) is also true because the decrease from 6 to 4.2 is indeed a 30% decrease.

Option (c) can be seen to be false as the drop in South Korea's global export share for integrated circuits and electronic components is from 8 to 7.6 which represents a 5% drop and not 6% as stated by the option. Thus, Option (c) is the correct answer.

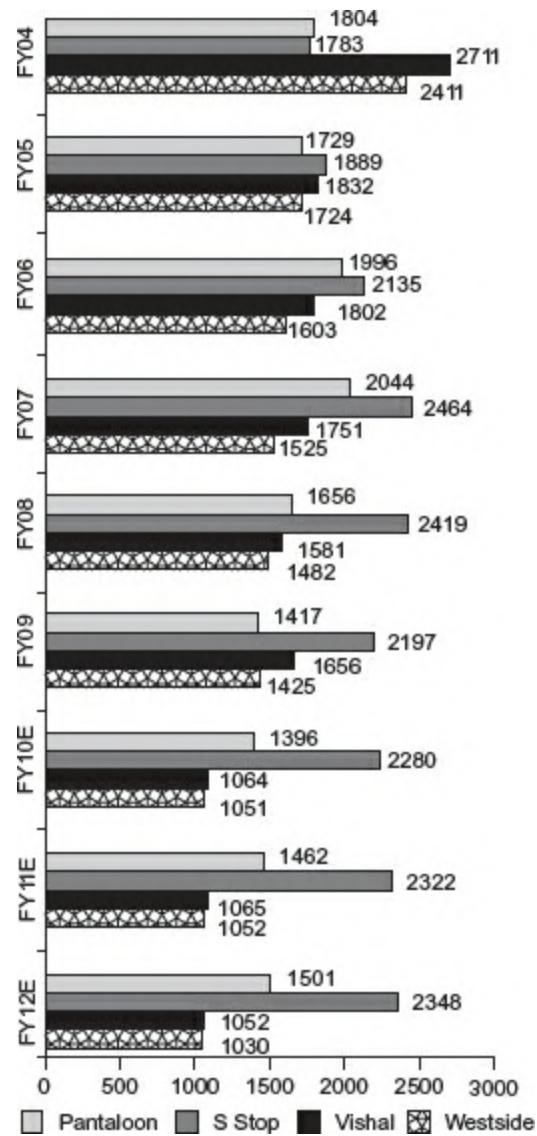
14. India's export market share for Integrated circuits and electronic components would become 0.7 in 2009 if it grows by 600%. This value would rank India at the 8<sup>th</sup> position out of 10 as only Mexico and Canada are below 0.7.
15. Comparing the options for the highest ratio (note that the highest ratio is symptomatic of the highest percentage change), we can clearly see that the ratio for option (c)— Integrated circuits and electronic components exports stands at  $11.4/1.7$  which is greater than 6. For the other options stated in the question, the ratio is lower than 6 in all cases. Thus, the highest percentage change for China is for Integrated circuits and electronic components exports and Option (c) is thus the correct answer.
16. It can be observed that for export market share for chemical products, EU would be the highest and hence Option (b) is rejected.  
Also, for automotive products, Asia is greater than North America and hence we can reject Options (c) and (d).  
Thus, Option (a) has to be correct.

**Directions for Questions 1 to 3:** The following graph represents the cost per square feet of four retailers from the financial years 2004 to 2012. The expected cost per square feet for the years 2010, 2011 and 2012 are forecasted figures.

1. Which retailer shows the sharpest decline in cost per square feet and in which year?
  - (a) Westside, 2005
  - (b) Pantaloon, 2008
  - (c) S. Stop, 2009
  - (d) Vishal, 2010
2. Which retailer has shown the maximum increase in its cost per square feet and in which year?
  - (a) S. Stop, 2006
  - (b) S. Stop, 2007
  - (c) Pantaloon, 2006
  - (d) Vishal, 2006
3. What is the average rate of change in the cost per square feet of the retail sector, if the sector is represented by the above four retailers in the period FY07 to FY10E?
  - (a) -8.12
  - (b) -10.86
  - (c) -6.73
  - (d) None of these

**Directions for Questions 4 to 7:** The table on next page represents the

information collected by TRAI about the Service Area wise Access of (Wireless + Wire line) subscribers in India. On the basis of the information provided in the table answer the questions that follow.



| Service Area          | Subscribers (in Millions) |            | Service Area      | Subscribers (in Millions) |            |
|-----------------------|---------------------------|------------|-------------------|---------------------------|------------|
|                       | Dec 2009                  | March 2010 |                   | Dec 2009                  | March 2010 |
| U.P.(E)               | 39.68                     | 45.53      | Orissa            | 13.57                     | 15.89      |
| Bihar                 | 33.17                     | 38.36      | Mumbai            | 27.21                     | 29.43      |
| Karnataka             | 35.5                      | 39.91      | Kerala            | 25.69                     | 27.65      |
| Andhra Pradesh        | 44.99                     | 48.09      | Punjab            | 20.03                     | 21.7       |
| TN (Chennai Included) | 53.17                     | 57.26      | Delhi             | 29.38                     | 31.01      |
| Madhya Pradesh        | 29.89                     | 33.65      | Haryana           | 13.59                     | 14.96      |
| Maharashtra           | 43.02                     | 46.53      | Kolkata           | 16.55                     | 17.87      |
| U.P(W)                | 28.47                     | 31.97      | Assam             | 8.11                      | 9.06       |
| West Bengal           | 22.68                     | 26.07      | North East        | 4.94                      | 5.64       |
| Gujarat               | 31.37                     | 34.43      | Jammu and Kashmir | 5.22                      | 5.78       |
| Rajasthan             | 32.22                     | 35.27      | Himachal Pradesh  | 4.83                      | 5.34       |

4. Which service area has observed maximum rate of change from Dec 2009 to March 2010 (in percentage)?
- U.P (E)
  - Bihar
  - Orissa
  - Haryana
5. As a result of the decision to allow only two or three telecom operators in a particular service area, TRAI allocates R-Com and Vodafone to operate only in the east of India and Idea and Airtel to operate only in south. R-Com has got 28% subscribers in the east while Vodafone has 72% subscribers; similarly Idea has 48% subscribers in the south while Airtel has 52% subscribers. How many subscribers do these four players have in 2010?
- R-Com-28.03, Vodafone-73.22, Idea-86.22 Airtel-89.5
  - R-Com-30.03, Vodafone-72.82, Idea-85.03, Airtel-80.04
  - R-Com 28.03, Vodafone-76.25, Idea-84.01, Airtel-85.76
  - R-Com-30.03, Vodafone-77.22, Idea-82.99, Airtel-89.91
6. Due to operability issues early in 2010, Madhya Pradesh and entire UP were added to the eastern telecom circle. The telecom operators in Madhya Pradesh and entire UP namely R-Com, Vodafone and Idea had 28%, 40% and 32% subscribers respectively. What is the percentage of subscribers that each player has in the newly formed eastern circle in March 2010?
- R-Com-30.01%, Vodafone-55.72%, Idea 14.27%
  - R-Com-32.01%, Vodafone-53.72%, idea 14.27%

- (c) R-Com-28%, Vodafone-55.72%, Idea-16.27%
- (d) None of these
7. The all India rate of change in number of subscribers from December 2009 to March 2010 is?
- (a) 10.7%
- (b) 10.5%
- (c) 11.8%
- (d) 12.4%

**Directions for Questions 8 to 12:** In order to quantify the intangibles and incentives to the multi brand dealers (dealers who stock multiple goods as well as competing brands) and the associated channel members, a Company(X) formulates a point score card, called as brand building points. The brand building point added to the sales target achieved points for redemption. The sales target achieved point is allotted as per the table 3 of this question. The sum of brand building points and sales achieved points is the total that can be redeemed by the dealer against certain goods, as shown in the second table.

**The detail of the system is shown in the tables below:**

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**Table 1**      Brands Building Score Card

| Brand Building Criteria                                       |   | Points that are allotted if any of the below is achieved           |   |  |                                      |  |  |
|---|---|--|---|--|--------------------------------------|--|--|
| <b>Company (X)'s Signage</b>                                  | Only Company X's signage on main entrance on the store  | Company X's signage on the main entrance along with other brands   | Company X's signage in the corner of the counter      | Company X's signage Outside the counter                        | No signage of Company (X)'s          | Other brands signage only                |  |
| <b>Points</b>   | 20  | 10   | 5   | 5  | 0                                    | -20                                      |  |
| <b>Company X's Wall painting in the exterior of the store</b> | Only Company X's painting in the walls of the store     | Company X's painting on main entrance with other brands            | Company X's painting on the side wall of the store    | Company X's painting outside the store on some other structure | No painting of Company X             | Other brands painting only               |  |
| <b>Points</b>   | 20  | 5  | 2.5   | 2.5  | 0                                    | -10                                      |  |
| <b>Company X's painting in the interior of the store</b>      | The interior of the store has only Company X's painting | Company X's painting in the Back side of the counter               | Company X's painting on the side wall in the interior | Not painted  | Others' painting only                |  |  |
| <b>Points</b>   | 10  | 5  | 2.5   | 2.5  | -10                                  |  |  |
| <b>POP (point of purchase) display of Company X</b>           | All POP display is of company X                         | The POP display of company X is at the eye level with other brands | Above the eye level with other                        | Below the eye level with other brands                          | Store does not have any POP material | Store has only Other brands POP material |  |
| <b>Points</b>   | 25  | 10   | 5   | 5  | 0                                    | -20                                      |  |
| <b>Stacking of Company X goods in the shelves</b>             | Goods of Company X's only in the front row              | Goods of Company X's share front row with other brands             | Company X's goods are only in the back row            | Goods of other brands in the front row only                    |                                      |  |  |
| <b>Points</b>   | 25  | 10   | 0   | -20  |                                      |  |  |

**Table 2** Point Redemption Options

| SI. No. | Goods on offer      | Total Points required for Redemption |
|---------|---------------------|--------------------------------------|
| 1       | Umbrella            | 40                                   |
| 2       | Nike Cap            | 100                                  |
| 3       | T-Shirt             | 200                                  |
| 4       | Tupperware Set      | 600                                  |
| 5       | Ray Ban Glasses     | 800                                  |
| 6       | Banarasi Silk Saree | 2000                                 |
| 7       | Kanjivaram Saree    | 4000                                 |

**Table 3** The point Calculation on Sales Target Achieved is

| <i>Sales Target</i>                         | <i>Points Assigned</i> |
|---|------------------------|
| <50% of the Sales Target                    | 0                      |
| 50%–75%                                     | 10                     |
| 75%–99%                                     | 12                     |
| 100%  | 15                     |
| Each extra unit sold above the sales target | 0.25                   |

There are 10 multi brand dealers in Nasik and the sales that they have achieved at the end of a quarter are:

| <i>Dealers</i>       | <i>Sales Target (July–Sep) in units</i> | <i>Actual Sales</i> |
|----------------------|---|---------------------|
| Bhoumik Brothers     | 25,000                                  | 24,378              |
| Subhajit Traders     | 28,000                                  | 29,241              |
| Srikrishna Traders   | 40,000                                  | 42,000              |
| Nikil Choudhary & Co | 43,000                                  | 42,000              |
| M/s Dinesh Kumar     | 25,000                                  | 25,000              |
| Variety Stores       | 22,000                                  | 23,000              |
| Rajib & Co           | 22,000                                  | 22,000              |
| Malling Enterprise   | 23,000                                  | 24,000              |
| Saha H/W             | 24,000                                  | 24,512              |
| Maheswari & Co       | 50,000                                  | 56,241              |

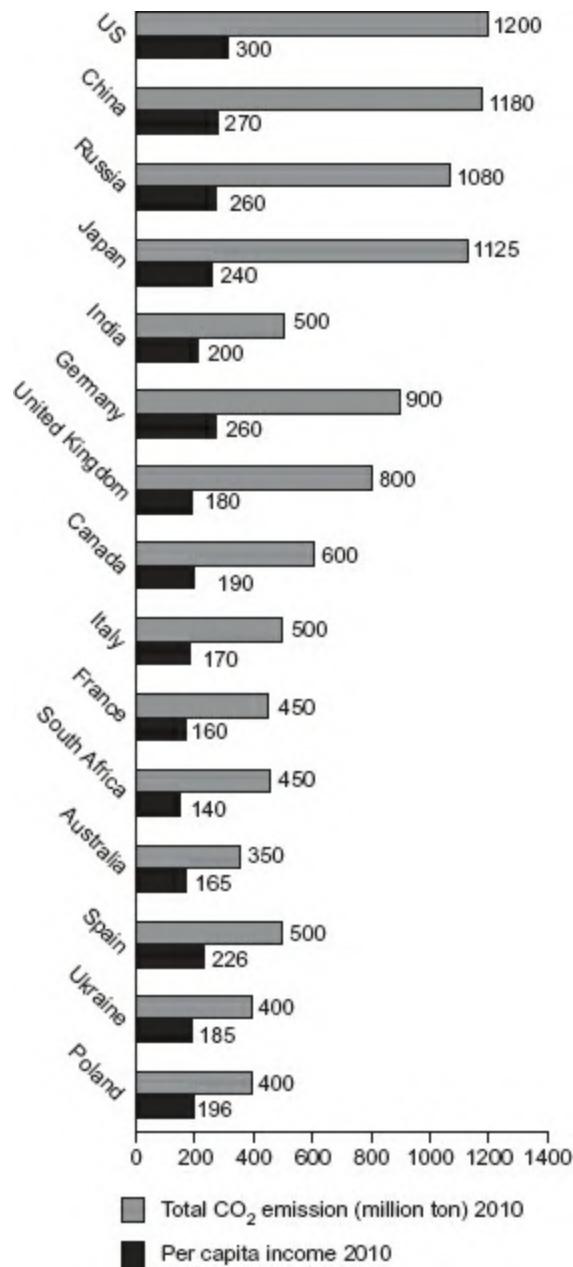
8. Maheshwari & Company has Company X's signage alongwith other brand's signage at the main entrance of the store, the exterior walls of the store have the painting of only company X's, the side wall in the interior has the painting of Company X's. The POP display of Company X's is above the eye level with other brands while the stacking of goods of Company X's is in the back row of the shelves. The brand building points when combined with the sales achieved points amount to the total points that a dealer can accumulate in a quarter. The number of Tupperware Sets that Maheshwari & Co can redeem after the quarter (July to September) is?

- (a) 2
  - (b) 3
  - (c) 4
  - (d) 5
9. Bhowmik Brothers has only other brands signage in the front of the store, and Company X's painting on the side wall in the exterior of the store, Company X's painting on the side wall in the interior of the store, no POP display of any other company and the goods of Company X's are stacked in the front row with other brands. What is the total point Bhowmik Brothers need to accumulate to make them eligible for minimum redemption?
- (a) 27
  - (b) 37
  - (c) 38
  - (d) 33
10. The Brand building points of Saha H/W is 85, and Mr. Saha the proprietor of the store wants to redeem a Kanjivaram Saree in the next quarter by carrying forward the points accumulated this quarter. The sales target of Saha H/W is 25,000 units in the next quarter. It is assumed that the brand building points for the next quarter is also going to be 85. How many extra units Saha H/W has to sell in order to get the Kanjivaram Saree?
- (a) 14688
  - (b) 12668
  - (c) 13658
  - (d) 16288
11. Malling Enterprise exhausted all its points while redeeming three Nike Caps and an Umbrella. What is its brand building points?
- (a) 75
  - (b) 80
  - (c) 85
  - (d) 90
12. If Srikrishna Trader has 80 brand building points then the goods that it can redeem are \_\_\_\_?

- (a) Tupperware set, Kanjivaram
- (b) Umbrella and Tupperware set
- (c) Tupperware set, Nike Cap
- (d) Nike Cap and T-Shirt

**Directions for Questions 13 to 16:** Study the following graph and answer the questions that follow.

13. If the world energy council formulates a norm for high emission countries to reduce their emission each year by 12.5% for the next two years then what would be the ratio of CO<sub>2</sub> emission to per capita income of US, China and Japan after two years? (The per capita income of China, Japan and US is expected to increase every year by 4%, 3% and 2% respectively.)
  - (a) 3.5, 3.8, 4.1
  - (b) 3.4, 3.5, 3.4
  - (c) 2.9, 3.1, 3.4
  - (d) None
14. If US and China decide to buy carbon credits, from Spain and Ukraine to make up for their high emissions, then in how many years US and China would be able to bring down their ratio of CO<sub>2</sub> emission (million ton) to per capita income to the world standard benchmark of 0.75 (per capita income of the given countries remain same, 0.5 CO<sub>2</sub> emissions [million ton] is compensated by purchase of 1.25 units of carbon credit, and a country can buy carbon credit units in three lots of 15, 20 and 30 units in a single year.)

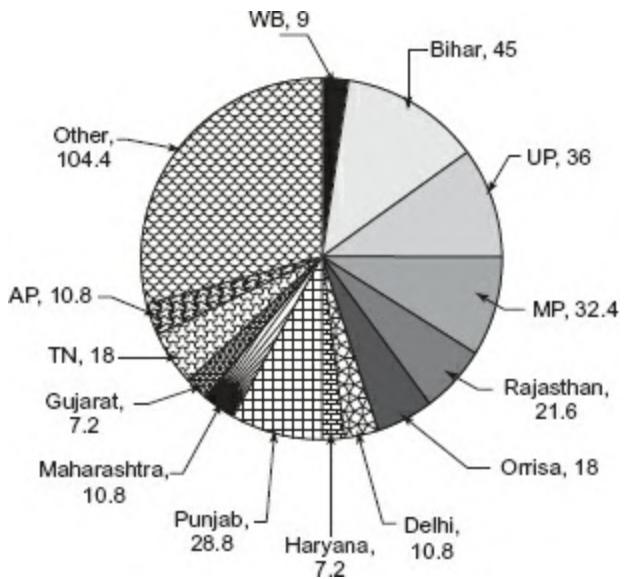


- (a) 3.8 years  
 (b) 38 years  
 (c) 30 years  
 (d) None
15. France, South Africa, Australia, Ukraine and Poland form an energy consortium which declares CO<sub>2</sub> emission of 350 million ton per annum as standard benchmark. The energy consortium decides to sell their carbon emission savings against the standard benchmark to high

carbon emission countries. It is expected that the per capita income of each country of the energy consortium increases by 2%, 2.5% and 3.5% p.a. for the next three years respectively. The ratio of CO<sub>2</sub> emission to per capita income of each energy consortium country reduces by 50% and remains constant for the next three years. If by selling 0.5 CO<sub>2</sub> emissions [million ton] the energy consortium earns 1.25 carbon credits, then determine the total carbon credits earned by the energy consortium in three years.

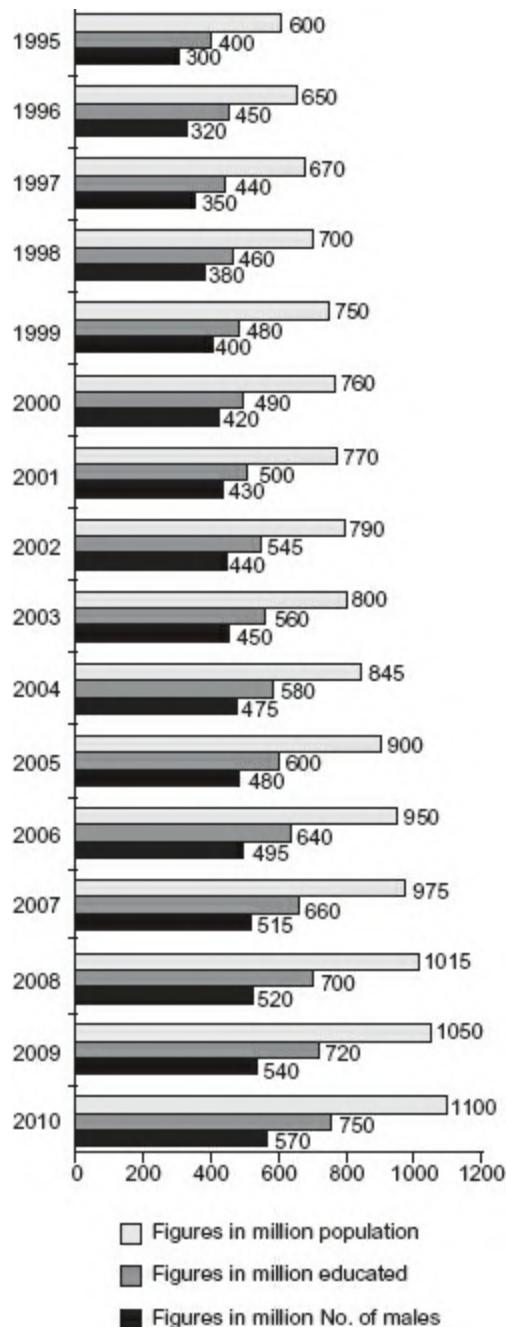
- (a) 3560
  - (b) 4506
  - (c) 5060
  - (d) None
16. Select the wrong statement in reference to the position of India vis-à-vis other countries in the graph in terms of the ratio of CO<sub>2</sub> emission to per capita income (increasing order).
- (a) India stands at 5<sup>th</sup> position at the given CO<sub>2</sub> emission level and per capita income of each country.
  - (b) India stands at 5<sup>th</sup> position if 200 million ton CO<sub>2</sub> emission is deducted from the given CO<sub>2</sub> emission figures of each country.
  - (c) India stands at 5<sup>th</sup> position if 50 is added to the given per capita income figures of each country.
  - (d) India stands at 5<sup>th</sup> position if 200 million ton CO<sub>2</sub> emission is deducted from the given CO<sub>2</sub> emission figures of each country and 50 is added to the given per capita income of each country.

**Directions for Questions 17:** Refer to the following pie chart and answer the question that follows. The chart shows the number of units produced in degrees, by Company X in different States of India for the quarter July–Sep 2010.



17. By how many units does the number of units produced in Bihar exceed the number of units produced in Madhya Pradesh, if the total production in the quarter is 72,000 units?
- 2300 units
  - 2560 units
  - 3516 units
  - 2860 units

**Directions for Questions 18 to 20:** The following graph shows population data (males and females), educated people data (males and females) and number of male in the population for a given period of 1995 to 2010. All data is in million.



From the information given in the graph answer the questions that follow.

18. In which year is the percentage increase in the number of females over the previous year the highest?
- 1996
  - 1999
  - 2004
  - 2005

19. In 2002 the ratio of number of educated males to professionally educated females was 5 : 4. If the number of educated males increased by 25% in 2003, what is the percentage change in number of uneducated females in 2003?
- (a) +25%
  - (b) +30%
  - (c) +34%
  - (d) +56%
20. In the year 2005, the total population living in urban area is equal to sixty eight percent of educated population. The ratio of number of people living in urban area to people living in rural area is 43:12 in 2010. What is the ratio of the rural population in 2005 to that in 2010?
- (a) 0.8
  - (b) 0.47
  - (c) 2.05
  - (d) None

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## ANSWER KEY

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- 1. (a)
- 2. (b)
- 3. (d)
- 4. (c)
- 5. (d)
- 6. (d)
- 7. (b)
- 8. (a)
- 9. (d)
- 10. (a)
- 11. (a)
- 12. (d)
- 13. (c)
- 14. (b)

- 
- 15. (d)
  - 16. (d)
  - 17. (b)
  - 18. (d)
  - 19. (d)
  - 20. (c)
- 

## SOLUTIONS

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### Questions 1 to 3:

- 1. Checking the four options it can be clearly seen that the maximum percentage drop is for Westside which goes from 2411 to 1724 which can be seen as a proxy calculation using 241 to 172—a drop of 69 on 241 which is close to 29%. (Note: The sharpest decline also means the largest percentage drop.)  
Hence, Option (a) is correct.
- 2. Shoppers Stop in 2007 has grown by 329 which is the highest increase amongst the four options.  
Hence, Option (b) is correct.
- 3. We do not have information about the cost per square feet of the entire retail sector—even if the 4 retailers represent the entire retail sector we still would need to know the respective retail space that each of them has in 2007 and in 2010 in order to be able to calculate the retail cost per square feet for the retail sector.  
Hence, option (d) is the correct answer.

### Questions 4 to 7:

- 4. Checking the four options it can be seen that the maximum rate of growth is for Orissa from 13.57 to 15.89 which is a growth of over 17%.  
Option (c) is correct.
- 5. Since the market shares for R-Com and Vodafone refer to the same regions, the ratio of number subscribers for Vodafone to the number of subscribers for R-Com should be  $72/28 = 18/7 = 2.57$ .

Looking at the options, only the first and the fourth options give us a ratio of around 2.5 to 2.6 between the number of subscribers for Vodafone to the number of subscribers for R-Com. Thus, we can reject options (b) and (c). Also, based on the same logic, the ratio between Airtel and Idea should be  $52/48 = 13/12$ . In other words, the number of subscribers for Airtel should be 8.33% more than the number of subscribers for Idea.

In option (a) the value of Airtel (89.5) is just about 4-5% more than the value for Idea and we can reject this as the correct answer. Thus, option (d) is correct.

6. We are not aware of the market shares in the other states of the Eastern telecom circle and hence cannot find this out. Option (d) is hence correct.
7. The number of subscribers have grown from 562.08 to 621.30 (in millions). This implies a 10.5% increase approximately.  
Option (b) is correct.

### **Questions 8 to 12:**

8. The main points earned by Maheshwari and Company will be for the sales above the target. Since it sells 6241 units above the target, it would earn  $6241 \times 0.25 = 1560.25$  points for the excess sales. Apart from the points the other things would contribute small number of points for redemption and do not have the potential to cross 1800 points when a third Tupperware Set can be redeemed. Thus, Maheshwari & Co. can redeem 2 Tupperware sets. Hence, option (a) is the correct answer.
9. The points got by Bhowmick Brothers would be  $12 - 20 + 2.5 + 2.5 + 10 = 7$ . It would need at least 33 more points to reach the minimum number of points required for redemption. Thus, option (d) is correct.
10. The total points for Saha H/W carried forward would be  $85 + 15$  (for achieving 100% of target)  $+ 512 \times 0.25$ . Besides it expects to get another  $85 + 15$  points in the next quarter. Thus, the total points it would have for redemption would be 328. It would need to get another 3672 points by achieving sales over the target values. For 3672 points through excess sales, Saha H/W would need to sell  $3672 \times 4 = 14688$

units above the target.

Option (a) is correct.

11. Malling Enterprise would have redeemed  $100 \times 3 + 40 = 340$  points. Out of these, they would generate 15 points for achieving the target and  $1000 \times 0.25 = 250$  points for excess sales.

Thus, the remaining 75 points would be got through brand building points.

Option (a) is correct.

12. Srikrishna trader would have  $2000 \times 0.25 = 500$  points for sales over the target, plus 15 points for 100% target achievement. After adding the brand building points (80) as given in the question, the trader would have a total of 595 points, which would not be sufficient for redemption to get a Tupperware set. Thus, none of the first three options can be the goods that can be redeemed. Option (d) is the only possible set of items that Srikrishna traders can redeem.

Thus, option (d) is correct.

### Questions 13 to 16:

13. For the US, the  $\text{CO}_2$  emissions would drop to  $1200 \times 7/8 \times 7/8 = 1200 \times 49/64 =$  a drop of 1/8th of its value twice  $\rightarrow 1200$  would become 1050 and then approx 918.

Its per capita income in the same time would move from 300 to 306 and then to 312.12.

The required ratio of  $\text{CO}_2$  emissions to per capita GDP would be given by  $918/312 = 2.9$  approx.

For China a similar analysis would give us  $903/292 = 3.1$  approx.

For Japan the same ratio would be  $861/255 = 3.4$  approx.

Option (c) is correct.

14. The target reduction for the two countries can be seen to be:

For US: drop from 1200 to 225 — a drop of 975 units.

For China: drop from 1180 to 202 — a drop of around 978 units.

It can also be estimated that since the number of carbon credits that can be purchased per year is 65 (at the max.), the emission can only be compensated by around  $65/2.5 = 25-26$  units per year approx.

It would take close to 38 years to get the CO<sub>2</sub> emissions for these countries to the desired level.

15. Let us first do a sample calculation for France.

France's current CO<sub>2</sub> emission is 450, which would drop by 50% as the ratio of Carbon emission to per capita income is becoming half as per the problem. This value would become 225 and give it a carbon saving of 125 tonnes against the benchmark standard of 350.

For all the five countries the benchmark standard would be 1750, against which the total carbon emission after the 50% drop would be 1025, a carbon saving of 725 units.

In the next year when per capita income rises by 2%, since the ratio of CO<sub>2</sub> emissions to per capita income remains constant, the CO<sub>2</sub> emission would also rise by 2%. Thus, the CO<sub>2</sub> emissions for all the 5 countries in the first year would be 1045, a saving of 705 tonnes.

The next year this value of 1045 would rise by 2.5% to 1071, a saving of 679 tonnes and in the third year the savings would be dependent on an increase of 3.5% in carbon emissions from 1071. The carbon emission would become 1103, a saving of 1750 – 1103 = 647 tonnes.

The total saving in the three year period is: 2031 tonnes. Since the ratio of conversion of a CO<sub>2</sub> emission saved to a carbon credit earned is 0.5:1.25 i.e. 1:2.5, 2031 tonnes of carbon saving would mean 5077 carbon credits. Option (c) is close to this value but we would choose option (d) as the none of these option is a better choice in this situation.

16. Option (d) can be seen to be false as if you make the reduction of 200 to CO<sub>2</sub> emissions and add 50 to GDP for all countries the ratio for the countries would be as shown in the table.

| <i>US</i>    | <i>China</i>   | <i>Russia</i>    | <i>Japan</i>     |
|--------------|----------------|------------------|------------------|
| 1000/350     | 980/320        | 870/310          | 925/290          |
| <i>Italy</i> | <i>France</i>  | <i>S. Africa</i> | <i>Australia</i> |
| 300/220      | 250/210        | 250/190          | 150/215          |
| <i>India</i> | <i>Germany</i> | <i>UK</i>        | <i>Canada</i>    |
| 300/250      | 700/310        | 600/230          | 400/240          |
| <i>Spain</i> | <i>Ukraine</i> | <i>Poland</i>    |                  |
| 300/275      | 200/235        | 200/245          |                  |

It can be seen that Poland, Ukraine, Australia having a ratio less than 1 would rank above India. Since India's ratio is 1.2, France and Spain would also be ranked above India. Hence, India would not be fifth in this situation in terms of the ranking with respect to the CO<sub>2</sub> to per capita income ratio.

**Question 17:**

17. Since 360° corresponds to 72000, 1° corresponds to 200. Since the difference between MP and Bihar is 12.6° the difference in terms of the number of units would be  $12.6 \times 200 = 2520$  units.

Option (b) is correct.

**Questions 18 to 20:**

18. Number of females would be given by: Total population – Number of males.

In 1996, the number of females has gone up to 330 from 320 in the previous year.

In 1999, the number of females has gone up to 350 from 320 in the previous year.

In 2004, the number of females has gone up to 370 from 350 in the previous year.

In 2005, the number of females has gone up to 420 from 370 in the previous year.

2005 is clearly the year with the highest percentage increase in the number of females

Option (d) is correct.

19. The number of uneducated females in 2002 would be given by:

Total number of females in 2002 – Educated females in 2002 = 350 – Educated females in 2002.

In order to find the number of educated females we use the ratio given between educated male to educated female (5:4) to divide the total educated population for 2002.

Thus, the number of educated females would be  $4 \times 545/9 = 242$  approx.

The number of uneducated females in 2002 =  $350 - 242 = 108$  approx.

This also means that there must have been approximately 303 educated

males in 2002.

This number grows by 25% in 2003 and would thus become  $303 \times 1.25 = 379$  = number of educated males in 2003.

Thus, in 2003 there would be  $560 - 379 = 181$  educated females.

The total number of females in 2003 is 350 out of which 181 are educated. Thus, there must have been 169 uneducated females in 2003.

The growth in uneducated females would be from 108 to 169— a growth of approximately 56%. Option (d) is the correct answer.

20. Since the total population in 2005 is 900 and the urban population @ 68% of the educated population is equal to 68% of 600 = 408, the rural population in 2005 is 492.

Further, the population of 1100 in 2010, has a ratio of 43:12 in terms of it's division of urban to rural. Thus, the rural population in 2010 would be  $12 \times 1100/55 = 12 \times 20 = 240$ .

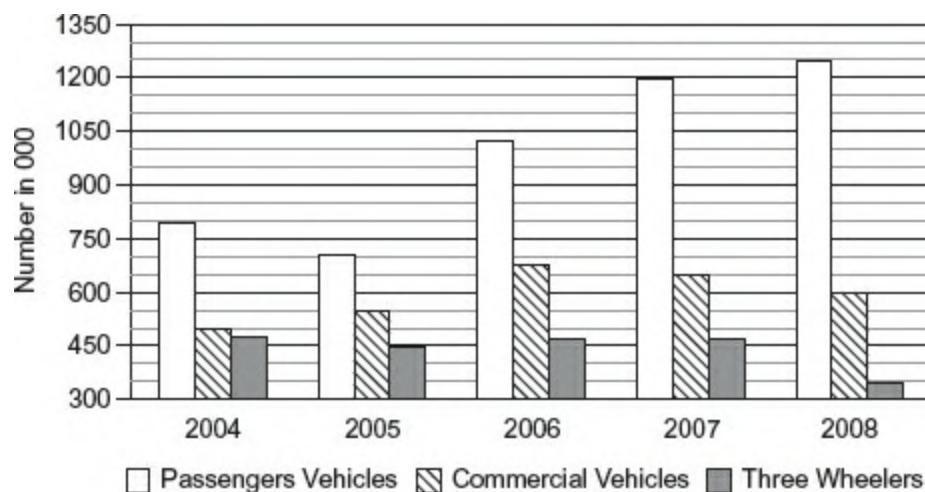
The ratio of rural population in 2005 to rural population in 2010 =  $492/240 = 2.05$ .

Option (c) is correct.

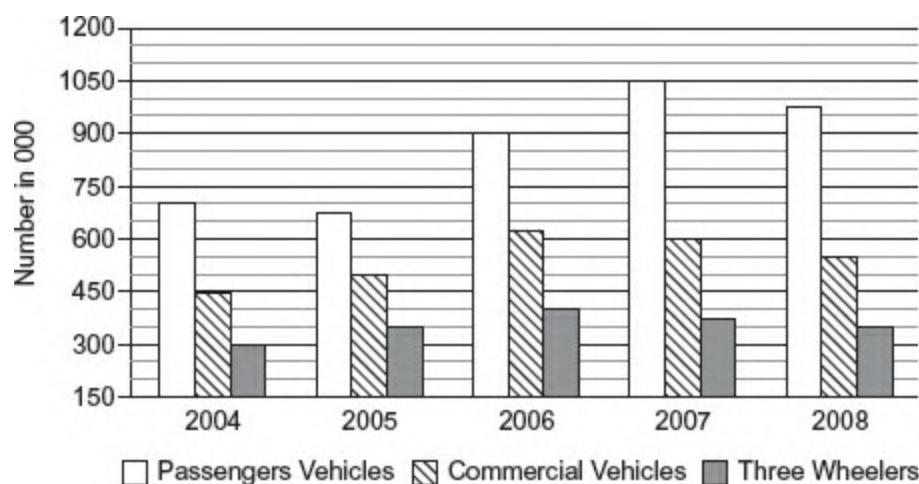
# 10 IIFT 2009

**Directions for Questions 1 to 6:** Answer these questions on the basis of the following graphs.

**Automobile Production Trends**



**Automobile Domestic Sales Trends**



1. Which of the following years exhibited the highest percentage decrease over the preceding year in the automobile production?

  - (a) 2005
  - (b) 2006
  - (c) 2007
  - (d) 2008
2. Assuming whatever is not sold domestically was exported, then which year has registered highest growth in exports of automobiles?

  - (a) 2005
  - (b) 2006
  - (c) 2007
  - (d) 2008
3. If the ratio of the domestic sale price of a commercial vehicle, a passenger vehicle, and a three-wheeler is 5 : 3 : 2; then what percent of earnings (approximately) is contributed by commercial vehicle segment to the overall earnings from domestic sales during the period 2004–2008?

  - (a) 45%
  - (b) 43%
  - (c) 11%
  - (d) 27%
4. For which year were the domestic sales of automobiles closest to the average (2004–2008) domestic sales of automobiles?

  - (a) 2005
  - (b) 2006
  - (c) 2007
  - (d) 2008
5. Which of the following years exhibited highest percentage increase over the preceding year in the automobile sales?

  - (a) 2005
  - (b) 2006
  - (c) 2007
  - (d) 2008

6. The ratio between absolute increase in domestic sales over preceding year and absolute increase in production over the preceding year is highest during which year?
- 2005
  - 2006
  - 2007
  - 2008

**Directions for Questions 7 to 9:** Answer the questions based on the following information.

The following table gives the details of money allocation by three Mutual funds namely, Alpha, Beta, and Gama. The return for each fund depends on the money they allocate to different sectors and the returns generated by the sectors. The last column of the table gives return for each of the sectors for a one year period.

| Sl.No. | Sectors       | Money Allocation |        |        | Sectoral Return |
|--------|---------------|------------------|--------|--------|-----------------|
|        |               | Alpha            | Beta   | Gamma  |                 |
| 1      | Automobile    | 1.49             | 5.98   | 0.00   | 5%              |
| 2.     | Chemicals     | 3.01             | 2.01   | 5.00   | 12%             |
| 3.     | Communication | 7.01             | 5.00   | 4.00   | -5%             |
| 4.     | Construction  | 1.51             | 0.00   | 6.01   | 15%             |
| 5.     | Diversified   | 7.48             | 6.99   | 9.50   | 11%             |
| 6.     | Energy        | 9.99             | 17.50  | 20.50  | 21%             |
| 7.     | Engineering   | 9.01             | 10.99  | 15.50  | 8%              |
| 8.     | Financial     | 25.98            | 24.00  | 17.01  | 6%              |
| 9.     | FMCG          | 14.50            | 2.00   | 2.00   | 25%             |
| 10.    | Health Care   | 5.98             | 0.00   | 3.00   | 18%             |
| 11.    | Metals        | 0.00             | 10.99  | 9.98   | -8%             |
| 12.    | Services      | 4.50             | 7.04   | 4.00   | 10%             |
| 13.    | Technology    | 5.51             | 7.50   | 3.50   | -2%             |
| 14.    | Textiles      | 4.03             | 0.00   | 0.00   | 17%             |
|        |               | 100.00           | 100.00 | 100.00 |                 |

7. Which fund has received more return per rupee of investment for a one year period?
- Alpha
  - Beta

- (c) Gamma  
(d) Both Beta and Gamma gives same return
8. If the allocation of money by the fund managers to different sectors is based on the internal ranking, i.e. Sector with 1<sup>st</sup> rank gets highest allocation, sectors with 0 allocation of money should be considered as 14<sup>th</sup> rank irrespective of the number of sectors in that category. In the light of these examine the following statements:
- I Automobile is ranked by both Alpha and Beta as same  
II Financial is most favoured by all three Mutual Funds  
III Services is ranked by all three Mutual Funds within top 9 ranks
- Select the best option:
- (a) Statements I and II are correct  
(b) Statements I and III are correct  
(c) Statements I alone is correct  
(d) Statements III alone is correct
9. Ms. Hema invested ₹ 10.00 lakhs in fund Gama in the year beginning of the period. What will be the value of the investment at the end of 1 year period?
- (a) Approximately ₹ 10.40 lakhs  
(b) Approximately ₹ 10.95 lakhs  
(c) Approximately ₹ 11.24 lakhs  
(d) Approximately ₹ 11.38 lakhs

**Directions for Questions 10 to 14:** Answer the questions based on the following table

10. What is the ratio between Jowar yield (2007) and Soyabean yield (2008)?
- (a) 1.00 : 2.10  
(b) 1.21 : 1.89  
(c) 0.89 : 2.00  
(d) 0.78 : 1.61

| Crops            | Area under production<br>('000 Hectare) |      |      | Quantity of Production<br>('000 Tonne) |      |      |
|------------------|---|------|------|--|------|------|
|                  | 2006                                    | 2007 | 2008 | 2006                                   | 2007 | 2008 |
| <b>Cereals</b>   |   |      |      |  |      |      |
| Rice             | 107                                     | 108  | 110  | 153                                    | 170  | 190  |
| Jowar            | 598                                     | 673  | 720  | 173                                    | 368  | 380  |
| Bajra            | 4992                                    | 4890 | 4800 | 2172                                   | 3421 | 3350 |
| Maize            | 1004                                    | 1020 | 1101 | 1102                                   | 1116 | 1182 |
| Millets          | 16                                      | 16   | 15   | 5                                      | 4    | 4    |
| <b>Pulses</b>    |   |      |      |  |      |      |
| Moong            | 799                                     | 751  | 725  | 130                                    | 270  | 260  |
| Urad             | 124                                     | 101  | 102  | 31                                     | 30   | 35   |
| Moth             | 1228                                    | 1151 | 1199 | 149                                    | 191  | 250  |
| Arhar (Tur)      | 20                                      | 19   | 19   | 13                                     | 9    | 9    |
| Chaula           | 126                                     | 110  | 101  | 26                                     | 45   | 30   |
| Other Pulses     | 5                                       | 5    | 5    | 2                                      | 3    | 2    |
| <b>Oil Seeds</b> |   |      |      |  |      |      |
| Sesamum          | 422                                     | 273  | 280  | 63                                     | 89   | 70   |
| Groundnut        | 317                                     | 302  | 298  | 491                                    | 396  | 374  |
| Soyabean         | 744                                     | 641  | 650  | 856                                    | 771  | 799  |
| Sunflower        | 472                                     | 350  | 325  | 880                                    | 751  | 699  |
| Castor Seed      | 106                                     | 79   | 80   | 135                                    | 104  | 106  |

**Note:** Yield (or Productivity) is defined as quantity produced per hectare

11. The top 3 crops by yield in the year 2006 are:
  - (a) Castor Seed, Groundnut, Maize
  - (b) Sunflower, Groundnut, Rice
  - (c) Castor Seed, Sunflower, Rice
  - (d) Bajra, Maize, Castor Seed
12. Bottom 3 crops by yield in the year 2008 are:
  - (a) Moth, Sesamum, Millets
  - (b) Moong, Moth, Millets
  - (c) Arhar, Urad, Moong
  - (d) Moong, Sesamum, Chaula
13. Examine the following statements:
  - I Total productivity of pulses has gone down over the years
  - II Maize is the most stable cereal in terms of productivity over the years
  - III Percentage growth in area and quantity of production is highest in the case of Jowar during the entry period.

Select the best option:

- (a) Statements I and II are correct
- (b) Statements I and III are correct
- (c) Statements II and III are correct
- (d) Statements III alone is correct

**14.** Examine the following statements:

- I Over the period total cereal productivity has gone up
- II Area, production and yield of the total oil seeds is on decline
- III Though there is a decline in the area under Urad production but the quantity of production and yield has gone up over the years.

Select the best option:

- (a) Statements I and III are correct
- (b) Statements I and II are correct
- (c) Statements I alone is correct
- (d) Statements III alone is correct

**Directions for Questions 15 to 19:** Study the following table carefully and answer the questions.

| Year | Household | Oil Sales by Type of Use and Production Loss (MT) |           |            | Oil Production Loss |  |
|------|-----------|---|-----------|------------|---------------------|--|
|      |           | Oil Used  |           | Industrial |                     |  |
|      |           | Metro City  | Transport |            |                     |  |
| 1996 | 10        | 700   |           | 1794       | 650                 |  |
| 1997 | 16        | 920   |           | 1864       | 732                 |  |
| 1998 | 22        | 1012  |           | 1732       | 834                 |  |
| 1999 | 22        | 1054  |           | 1668       | 1102                |  |
| 2000 | 20        | 1092  |           | 1700       | 702                 |  |
| 2001 | 22        | 1320  |           | 1752       | 492                 |  |
| 2002 | 14        | 1854  |           | 1618       | 386                 |  |
| 2003 | 6         | 2046  |           | 1270       | 444                 |  |
| 2004 | 16        | 2118  |           | 1480       | 506                 |  |
| 2005 | 4         | 2252  |           | 1132       | 1032                |  |
| 2006 | 4         | 2384  |           | 1228       | 1142                |  |
| 2007 | 8         | 2096  |           | 1672       | 1454                |  |
| 2008 | 0.2       | 2240  |           | 1646       | 1428                |  |

**Note:** Whatever is produced in a year is either used or lost in the production in the same year.

**15.** During which year is the Oil used for Household as a percentage of

Total Oil used the highest?

- (a) 1998
- (b) 1999
- (c) 2000
- (d) 2001

16. During which year the ‘Oil Production Loss’ as a proportion of ‘Total Oil Produced’ is the lowest?
- (a) 2002
  - (b) 2003
  - (c) 2004
  - (d) 2006
17. During which year use of oil by ‘Suburban’ as a proportion of ‘Total Oil Used’ was the highest?
- (a) 2005
  - (b) 2006
  - (c) 2007
  - (d) 2008
18. For how many number of years the growth rate in ‘Production of Oil’ is more than the growth rate in ‘Total Oil Used’?
- (a) 3 years
  - (b) 4 years
  - (c) 5 years
  - (d) 6 years
19. Which of the below statements are true, based on the data given in the table?
- (a) Oil is used for ‘Transport’ purpose by Metro City is increasing every year since 1996.
  - (b) Oil is used for ‘Industrial’ purpose by Metro City is increasing every year since 1996.
  - (c) Oil used by ‘Suburban’ is increasing every year since 2000.
  - (d) ‘Total Oil Produced’ is increasing every year since 2003.

**Directions for Questions 20 to 23:** Study the information given

below and answer the questions.

The table contains the pre- and post-revision pay structure of a Government department:

The revision has been done base on the following terms:

- In pre-revised pay scale, the basic pay is the sum of the minimum pay in the appropriate pay scale and the admissible increment. After revision, the basic pay is the sum of minimum pay in the appropriate pay scale and the respective grade pay and the admissible increments.
- Annual increment of 3% of the basic pay (on a compounded basic) is paid under the revised pay rules.
- Monthly Dearness Allowance (DA) is calculated as percentage of basic pay.
- In pre-revised pay scales, the increment was given after the completion of each year of service, but, after revision annual increments are given only in the month of July every year and there should be a gap of six months between the increments. The employees who had joined the department in the month of September, October, November and December are given an increment at the time of revised pay fixation in September, 2008.

The revised pay is applicable from 1<sup>st</sup> September, 2008.

20. Abhijit joins the department on November 10, 2006 in the pay scale of ₹ 18400-500-22400 with the pay of ₹ 18400 plus 2 increments. What is his basic salary after revision, on August 1, 2009?
- (a) ₹ 53010
  - (b) ₹ 53349
  - (c) ₹ 54950
  - (d) ₹ 54903
21. Nitin joined the department on November 24, 2004 in the pay scale of ₹ 8000-275-13500, at the minimum pay. At the time of pay revision, due to some error, his pay was fixed at the base (minimum) of the corresponding revised pay scale. The loss in his total emoluments for September 2008 due to this error, will be:
- (a) ₹ 3915
  - (b) ₹ 3982

- (c) ₹ 4164  
 (d) No loss.
22. Sunitha joined the department at the basic pay of ₹ 13500 in the pay scale of ₹ 12000–16500. On completion of her four years of service in December 2008, she was promoted to the next higher pay scale. The percentage increase in her gross salary is:
- (a) 53%  
 (b) 43%  
 (c) 50%  
 (d) 60%
23. Dinesh joined on July 1, 2008 in the pay scale of ₹ 16400–20,000 at a basic pay of ₹ 16850. On August 10, 2009, the department revised the rates of DA to 31% with effect from January 2009 and further to 36% effective from July 2009. How much arrear will Dinesh get in August, 2009 because of these revisions?
- (a) ₹ 12981  
 (b) ₹ 10395  
 (c) ₹ 17052  
 (d) ₹ 13302

| Components                 | Pre-revised      |          |                  | Revised            |         |           |
|----------------------------|------------------|----------|------------------|--------------------|---------|-----------|
|                            | Minimum          | Maximum  | Annual Increment | Minimum            | Maximum | Grade Pay |
| Pay Scale                  | ₹ 8000           | ₹ 13500  | ₹ 275            | ₹ 15600            | ₹ 39100 | ₹ 5400    |
|                            | ₹ 12000          | ₹ 16500  | ₹ 375            | ₹ 15600            | ₹ 39100 | ₹ 7600    |
|                            | ₹ 16400          | ₹ 20,000 | ₹ 450            | ₹ 37400            | ₹ 67000 | ₹ 8900    |
|                            | ₹ 18400          | ₹ 22,400 | ₹ 500            | ₹ 37400            | ₹ 67000 | ₹ 10000   |
| Dearness Allowance (DA)    | 78%              |          |                  | 28%                |         |           |
| House Rent Allowance (HRA) | 30% of Basic pay |          |                  | 30% of Basic pay   |         |           |
| Transport Allowance (TA)   | ₹ 800            |          |                  | ₹ 3200 + ₹ 3200*DA |         |           |

## ANSWER KEY

1. (d)
2. (c)
3. (a)
4. (d)
5. (b)

- 6. (b)
  - 7. (a)
  - 8. (d)
  - 9. (b)
  - 10. (c)
  - 11. (b)
  - 12. (a)
  - 13. (c)
  - 14. (d)
  - 15. (b)
  - 16. (a)
  - 17. (d)
  - 18. (d)
  - 19. (d)
  - 20. (b)
  - 21. (c)
  - 22. (c)
  - 23. (d)
- 

## SOLUTIONS

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### Questions 1 to 6:

1. This question can be visually solved as it can be seen that the automobile production has gone down twice during the period which is for the years 2005 and 2008. Of these the year 2008 shows a higher percentage decrease.

Option (d) is correct.

2. The production for the five years is seen as: 1725, 1700, 2175, 2325, 2200.

In the same years, the domestic sales were: 1450, 1525, 1925, 2025, 1875.

Based on  $\text{Exports} = \text{Production} - \text{Domestic Sales}$  we see that the exports for the 5 years were:

275, 175, 225, 300 and 325

From these numbers it can be seen that the highest growth in exports has been registered for 2007 when it has gone from 225 to 300.

Option (c) is correct.

3. The total revenues can be calculated by assuming passenger vehicles to cost 3 each, commercial vehicles to cost 5 each and three wheelers cost 2 each.

In such a case, the revenues from each of these can be tabulated as under:

| Year           | Passenger vehicles | Commercial vehicles | 3 Wheelers |
|----------------|--------------------|---------------------|------------|
| 2004           | 2100               | 2250                | 600        |
| 2005           | 2025               | 2500                | 700        |
| 2006           | 2700               | 3125                | 800        |
| 2007           | 3150               | 3000                | 750        |
| 2008           | 2925               | 2750                | 700        |
| Total Revenues | 12900              | 13625               | 3550       |

Commercial vehicles contribute 13625 out of 30075, or 136 out of 300 which is close to 45%.

Option (a) is correct.

4. In the years 2004 to 2008, the domestic sales were: 1450, 1525, 1950, 2025, 1875. This is a total of 8825 over 5 years which gives an average of 1765. 2008 is the year closest to this value of the average.

Option (d) is correct.

5. From the numbers for domestic sales viz:1450, 1525, 1925, 2025, 1875 we can clearly see that the highest percentage increase in sales was for the year 2006 when the value went from 1525 to 1925 a growth of close to 30% which is much higher than the other growth percentages in this series of numbers.

Option (b) is correct.

6. The production for the five years is seen as: 1725, 1700, 2175, 2325, 2200.

In the same years, the domestic sales were: 1450, 1525, 1925, 2025, 1875.

The required ratios are:

2005: need not be considered because production increase is a negative value in this year.

2006:  $425/425 = 1$

2007:  $75/200 = 0.3+$

2008: need not be considered because production increase is a negative value in this year.

2006 is the year when the ratio is maximum.

Option (b) is correct.

### Questions 7 to 9:

7. A visual inspection shows us that the return for Alpha should be the highest because Alpha has invested higher amounts in the sectors where the sectoral returns are high. The highest sectoral returns are for FMCG (25%), Energy (21%), Health Care (18%), Textiles (17%) and Construction (15%). Of these five, Alpha has invested the maximum percentage of its portfolio in four sectors. It is only in the Energy sector where Beta and Gamma have invested higher percentages of their money. But the lead they would get in Energy would be nullified by Alpha's significantly higher investment in FMCG.

Thus, option (a) is correct.

8. Statements I and II can both be seen to be wrong as:

Statement I gets rejected on the logic that Automobile is ranked 13th by Alpha while it is ranked much higher by Beta.

Statement II gets rejected because for Gamma, Energy is the most preferred than Financial.

This leaves us only with option (d) as the correct alternative as it says that only statement III is correct. It can be verified by looking at the rank of Services in each column too.

Thus, option (d) is the correct answer.

9. Gamma's percentage return would be given by:

$$0.0598 \times 5 + 0.0201 \times 12 + 0.05 \times (-5) + 0.0699 \times 11 + 0.1750 \times 21 + 0.1099 \times 8 + 0.24 \times 6 + 0.02 \times 25 + 0.1099 \times (-8) + 0.0704 \times 10 + 0.0750 \times (-2)$$

Calculating approximately we get the values as:

$$0.3 + 0.24 - 0.25 + 0.77 + 3.67 + 0.88 + 1.44 + 0.5 - 0.88 + 0.70 -$$

0.15

This yields a return of approximately 7.3% which means 10 lacs invested would become around 10.73 lacs.

However, the closest option is 10.95 lacs and hence we choose option (b) as the correct answer.

### Questions 10 to 14:

10. Jowar yield in 2007 is 368/673, Soyabean yield in 2008 is 799/650.

The ratio between the two would be  $(368 \times 650)/(673 \times 799)$

This ratio is clearly lower than 1:2. Looking at the options the two values between which we need to choose are 1:2.1 and 0.89:2. The second ratio is a closer approximation of the above ratio because we can clearly see that the ratio 368/799 itself is around 1:2.2 and when this ratio is further multiplied by 650/673; the value of 2.2 in the denominator is going to further increase.

Thus, option (c) is the correct answer.

11. In 2006 the yields above 1 are for Rice (153/107), Maize (1102/1004), groundnut (491/317), soyabean (856/744), sunflower (880/472) and castor seed (135/106).

The highest amongst these ratios are sunflower, groundnut and rice in that order. Thus, Option (b) is correct.

12. Moth (250/1199 which is equal to approximately 0.21–0.22), Sesamum ( $70/280 = 0.25$ ) and Millets ( $4/15 = 0.2666$ ) are the worst yield crops for 2008.

Option (a) is correct.

13. We need to examine each of the statements to verify it's correctness:

Productivity of pulses changes from:  $351/2302$  to  $548/2137$  to  $586/2151$ . The productivity of pulses is actually increasing over the years. Thus, statement I is incorrect.

Once we make this conclusion we are left with options (c) and (d). We need to check Statement II in order to choose between these two options.

The productivity of maize is just below 1.1 for all 3 years and it is clearly the most stable amongst the cereals in terms of it's productivity.

Option (c) is correct.

14. The total cereal productivity over the years varies from: 3605/6717 to 5079/6707 to 5106/6746.

It can be seen that while the ratio has gone up from 2006 to 2007, the value of the ratio has reduced fractionally from 2007 to 2008. Thus, statement I is incorrect and the correct answer then has to be option (d) as that is the only one which does not state that Statement I is true.

### Questions 15 to 19:

Looking at the direction of the questions it makes sense to first add the relevant columns in the table before we start solving the questions.

Based on our additions we will get two additional columns as below:

| Year | Total Oil Used<br>(= Oil Used In Metro City<br>+ Oil Used In Suburban) | Total Oil Produced<br>(= Total Oil Used + Oil<br>Production Loss) |
|------|--|---|
| 1996 | 2608   | 3258  |
| 1997 | 2914   | 3646  |
| 1998 | 2870   | 3704  |
| 1999 | 2834   | 3936  |
| 2000 | 2920   | 3622  |
| 2001 | 3162   | 3654  |
| 2002 | 3658   | 4044  |
| 2003 | 3500   | 3944  |
| 2004 | 3822   | 4328  |
| 2005 | 3618   | 4650  |
| 2006 | 3826   | 4968  |
| 2007 | 4030   | 5484  |
| 2008 | 4152.2   | 5580.2  |

15. The highest value is for 1999, as the total oil used for household consumption in that year is the highest over the years in the options and the total oil used is the least amongst the four options.

Hence, option (b) is correct.

16. The ratios are  $386/4044$ ,  $444/3944$ ,  $506/4328$  and  $1142/4968$ .

Clearly 2002 is the lowest ratio and hence option (a) is correct.

17. The ratios to be compared are:

$230/3618$ ,  $210/3826$ ,  $254/4030$  and  $266/4152.2$

The ratio  $266/4152.2$  is marginally higher than the ratio  $230/3618$ .

2008 shows us the highest ratio and hence option (d) is correct.

18. It is clearly greater for 1998, 1999, 2004, 2005, 2006 and 2007. Thus it is greater for 6 years.

Option (d) is correct.

19. The statements in Options (a), (b) and (c) can be seen to be incorrect. It can also be seen that the total oil produced has increased every year since 2003.

Hence, Option (d) is correct.

### Questions 20 to 23:

20. Abhijit would get a basic pay of  $37400 + 10000 = 47400$  at the start of the scale. Besides, he would also get the benefit of 2 increments which he got when he joined the department, 1 additional increment as he joined in November and 2 additional increments— one each in July 2007 and July 2008. Thus a total of 5 increments are due to him but the fifth increment cannot be accommodated in this time frame as there is a condition of a minimum of 6 months period between 2 increments.

His basic pay on 1<sup>st</sup> August 2008 would thus amount to:

$$47400 + 3\% \text{ of } 47400 = 48822 \text{ (after first increment)}$$

$$48822 + 3\% \text{ of } 48822 = 50286 \text{ approximately (after second increment)}$$

$$50286 + 3\% \text{ of } 50286 = 51795 \text{ approximately (after third increment)}$$

$$51795 + 3\% \text{ of } 51795 = 53349 \text{ approximately (after fourth increment)}$$

Thus, option (b) is correct.

21. He would be eligible for his annual increment every July (2005, 2006, 2007 and 2008) plus 1 increment because of his joining in November. However, due to the 6-month constraint between increments he would not be able to avail his 5th increment. Consequently his basic pay should have been  $21000 + 4$  increments. 4 increments at the

compounded rate of 3% per annum would mean approximately 12% + increase in basic.

His basic pay should have been around 23520 (if we calculate 4 increments @ 3% simple interest) which can be rounded off to 23600 (to accommodate for compounding).

Due to this loss, in his September 2008 salary, he would lose:

₹ 2600 + the loss due to the miscalculation of his HRA + loss due to miscalculation of DA.

$$= 2600 + 0.58 \times 2600 = 4108.$$

We mark 4164 as there are approximations on the lower side in this calculation.

Option (c) is correct.

22. Sumitha's gross salary without promotion in December 2008 would have been:

₹ 23200 + 8 increments @ 3% of basic pay per increment + 58% of basic pay as DA & HRA + ₹ 3200

$$= 30270 + 8475 + 9081 + 3200 = 51026$$

After promotion her salary would become:

$$₹ 46300 + 58\% \text{ of } ₹ 46300 + ₹ 3200 = ₹ 76354$$

The increase in her salary due to promotion is close to 50%.

Option (c) is correct.

23. His arrears would be 3% of basic pay for January to June and 8% of basic pay in July and for 10 days in August.

= 3% of ₹ 46300 × 1.03 for 6 months + 8% of ₹ 46300 × 1.03 × 1.03 for 40 days

$$= ₹ 8584 + ₹ 5209 = ₹ 13793.$$

The value comes closest to 13302 and hence we would need to select that as the correct answer.

Option (d) is correct.

# 11 IIFT 2008

**Directions for Questions 1 to 6:** Answer the questions based on the following table.

| Year | Growth Trend in Rail Wagons |                |                        |                       |                     |                     |                      |                        |
|------|-----------------------------|----------------|------------------------|-----------------------|---------------------|---------------------|----------------------|------------------------|
|      | Total Wagons                | Covered Wagons | Open High sided wagons | Open Low sided wagons | Departmental wagons | Special type wagons | Total wagon capacity | Average wagon capacity |
|      | Number                      | Number         | Number                 | Number                | Number              | Number              | (Million Tones)      | (Tonnes)               |
| 1993 | 337562                      | 157581         | 105469                 | 12221                 | 12009               | 50282               | 11.79                | 34.9                   |
| 1994 | 312405                      | 138642         | 101160                 | 11922                 | 11473               | 49208               | 11.32                | 36.2                   |
| 1995 | 291360                      | 121946         | 98795                  | 11507                 | 11185               | 47927               | 10.76                | 36.9                   |
| 1996 | 280791                      | 114065         | 98297                  | 11196                 | 11008               | 46225               | 10.62                | 37.8                   |
| 1997 | 272127                      | 106634         | 98906                  | 10601                 | 10645               | 45341               | 10.64                | 39.1                   |
| 1998 | 263981                      | 102217         | 97616                  | 9726                  | 10569               | 43853               | 10.69                | 40.5                   |
| 1999 | 252944                      | 96371          | 95613                  | 9106                  | 9612                | 42242               | 10.7                 | 42.3                   |
| 2000 | 234397                      | 86024          | 91415                  | 7735                  | 8907                | 40316               | 10.26                | 43.8                   |
| 2001 | 222193                      | 75768          | 91099                  | 7999                  | 8443                | 38884               | 10.19                | 45.9                   |
| 2002 | 216717                      | 71950          | 90371                  | 7585                  | 9536                | 37275               | 10.09                | 46.6                   |
| 2003 | 214760                      | 68467          | 90765                  | 7160                  | 10718               | 37650               | 9.98                 | 46.5                   |
| 2004 | 227752                      | 67870          | 100211                 | 8882                  | 11388               | 39401               | 10.66                | 46.8                   |
| 2005 | 222379                      | 64417          | 101757                 | 8787                  | 10964               | 36454               | 10.6                 | 47.7                   |

1. Find the True statement:
  - (a) The number of covered wagons expressed as a percentage of total wagons declined consistently from 1993 to 2002, but increased marginally in 2003 as compared to the previous year's level.
  - (b) The special type wagons expressed as a percentage of total wagons is maximum during 2003.
  - (c) The open high sided wagons expressed as a percentage of total

wagons increased during 1994 to 2001, but declined from the 2001 level in 2002.

- (d) None of the above.
- 2. The special type wagons expressed as a percentage of total wagons were at almost same level during the following pair of years:
  - (a) 1995 and 2001
  - (b) 1998 and 2004
  - (c) 2000 and 2002
  - (d) 1993 and 1994
- 3. The Departmental wagons expressed as a percentage of total wagons was maximum during:
  - (a) 2002
  - (b) 2005
  - (c) 2004
  - (d) 2003
- 4. Find out the Lowest annual growth rate among the following
  - (a) Annual growth rate of total wagons in 1999
  - (b) Annual growth rate of covered wagons in 1998
  - (c) Annual growth rate of special type wagons in 2002
  - (d) Annual growth rate of total wagon capacity in 2000
- 5. Find out the FALSE statement:
  - (a) The annual growth rate of covered wagons in 1996 was higher than the same in 2000.
  - (b) The annual growth rate of open high sided wagons in 1997 was higher than the same in 2003
  - (c) The annual percentage growth rate of average wagon capacity has been maximum in 1999.
  - (d) None of the above.
- 6. Find out the Highest annual growth rate among the following
  - (a) Annual growth rate of total wagons in 1995.
  - (b) Annual growth rate of covered wagons in 2002.
  - (c) Annual growth rate of open low-sided wagons in 1998.
  - (d) Annual growth rate of departmental wagons in 2000.

**Directions for Questions 7 to 11:** Answer the question based on the following graph.

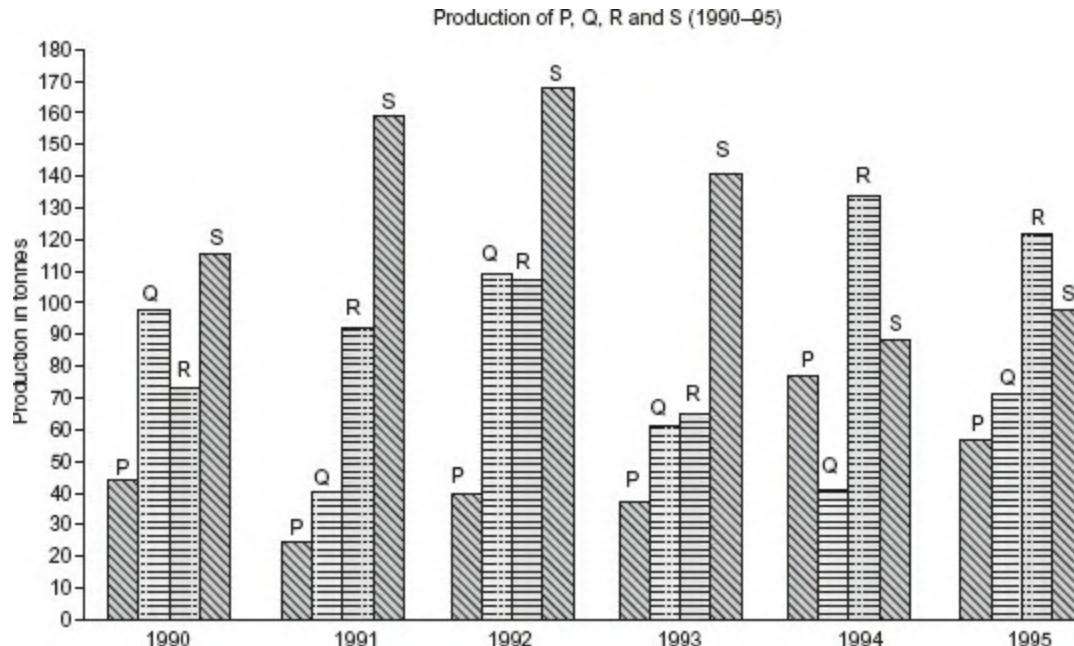
7. In which year the annual growth rate of total production (of all products) is highest?
  - (a) 1991
  - (b) 1992
  - (c) 1993
  - (d) 1995
8. If the stability of the production during 1990 to 1995 is defined as,

$$\frac{\text{Average Production}}{\text{Maximum Production} - \text{Minimum Production}}$$

then which product is most stable?

- (a) Product P
  - (b) Product Q
  - (c) Product R
  - (d) Product S
9. If four products P,Q,R and S shown in the graph are sold at a price of ₹ 9, ₹ 4, ₹ 13, and ₹ 3 respectively during 1990 –1995, then in which year is the total revenue of all the products the lowest?
    - (a) 1991
    - (b) 1992
    - (c) 1993
    - (d) None of the above
  10. Individual revenue of P, Q, R and S for the entire period (1990–1995) is calculated based on the price of ₹ 9, ₹ 4, ₹ 13 and ₹ 3 respectively. Which product fetches the lowest revenue?
    - (a) Product P
    - (b) Product Q
    - (c) Product R
    - (d) Product S
  11. Four products P,Q,R and S shown in the graph are sold at price of ₹ 9, ₹ 4, ₹ 13 and ₹ 3 respectively during 1990–1995. Which of the following statements is True?

- (a) Product R fetches second highest revenue across products in 1991.
- (b) Sum of revenue of P,Q and S is more than the revenue of R in 1994.
- (c) Cumulative revenue of P and Q is more than the revenue of S in 1993.
- (d) None of the above



**Directions for Questions 12 to 16:** Answer the questions based on the table

| State          | State-wise FDI Inflow |       |       |       |       |       |       |        |
|----------------|-----------------------|-------|-------|-------|-------|-------|-------|--------|
|                | 2000                  | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  | 2007   |
| Andhra Pradesh | 3707                  | 34522 | 14566 | 8708  | 16256 | 15819 | 17311 | 47828  |
| Bihar          | 659                   | 5586  | 52    | 346   | 1878  | 10849 | 58002 | 40107  |
| Gujarat        | 14193                 | 10889 | 10781 | 10020 | 32043 | 29648 | 82793 | 72093  |
| Haryana        | 3414                  | 1201  | 800   | 834   | 8345  | 2685  | 5577  | 16095  |
| Karnataka      | 3299                  | 3553  | 4101  | 2164  | 14071 | 10904 | 15066 | 71844  |
| Kerala         | 376                   | 535   | 197   | 70    | 199   | 290   | 600   | 1141   |
| Madhya Pradesh | 7099                  | 2726  | 2472  | 13891 | 17761 | 56138 | 58679 | 131267 |
| Maharashtra    | 37275                 | 14442 | 9780  | 21440 | 6909  | 10675 | 24480 | 60864  |
| Orissa         | 6144                  | 2342  | 897   | 3477  | 17718 | 45565 | 38255 | 97185  |
| Punjab         | 13657                 | 2184  | 11274 | 627   | 1747  | 3894  | 6340  | 9228   |
| Rajasthan      | 4204                  | 3236  | 2823  | 710   | 1096  | 2162  | 5077  | 10034  |
| Tamil Nadu     | 5906                  | 4066  | 2867  | 1424  | 2622  | 54107 | 11365 | 19850  |
| Uttar Pradesh  | 5160                  | 1936  | 2899  | 2419  | 3483  | 24058 | 37405 | 48622  |
| West Bengal    | 6706                  | 2111  | 1933  | 8584  | 7569  | 13994 | 12028 | 51830  |

12. Mark the highest FDI inflow growth rate among the following:

- (a) Annual FDI inflow growth rate in Gujarat in 2006.
  - (b) Annual FDI inflow growth rate in Kerala in 2004.
  - (c) Annual FDI inflow growth rate in Haryana in 2007.
  - (d) Annual FDI inflow growth rate in Punjab in 2004.
13. Mark the lowest FDI inflow growth rate among the following
- (a) Annual FDI inflow growth rate in West Bengal in 2001.
  - (b) Annual FDI inflow growth rate in Kerala in 2002.
  - (c) Annual FDI inflow growth rate in Maharashtra in 2004.
  - (d) Annual FDI inflow growth rate in Haryana in 2005.
14. Mark the True statement:
- (a) The decline in annual FDI growth rate for Gurjarat in 2001 was smaller than the corresponding figure for Karnataka in 2005.
  - (b) The annual growth rate of FDI in Kerala in 2001 was greater than the corresponding figure for Uttar Pradesh in 2004.
  - (c) The annual growth rate of FDI in Kerala in 2005 was greater than the corresponding figure for Punjab in 2007.
  - (d) None of the above
15. Mark the False statement:
- (a) The absolute annual increase in FDI inflow in Bihar in 2001 is lower than the corresponding figure for Rajasthan in 2007.
  - (b) The annual FDI growth rate in West Bengal in 2006 was higher than the corresponding figure for Uttar Pradesh in 2003.
  - (c) The absolute annual increase in FDI inflow in Madhya Pradesh in 2004 is lower than the corresponding figure for Maharashtra in 2005.
  - (d) None of the above.
16. Mark the True statement:
- (a) The absolute annual increase in FDI inflow in Haryana in 2006 is lower than the corresponding figure for Punjab in 2007.
  - (b) Among all States in 2003 the absolute annual increase in FDI inflow was maximum for Madhya Pradesh.
  - (c) The absolute annual increase in FDI inflow in Bihar in 2003 is higher than the corresponding figure for Karnataka in 2001.
  - (d) The FDI inflow in Kerala over 2002 to 2007 was consistently the

lowest across all the states.

**Directions for Questions 17 to 21:** Answer the questions based on the table given on next page:

17. Mark the Lowest percentage among the following:
  - (a) Export from Canada expressed as a proportion of export from North American in 2000.
  - (b) Export from Germany expressed as a proportion of export from Europe in 2004.
  - (c) Export from China expressed as a proportion of export from Asia in 2004.
  - (d) Export from Japan expressed as a proportion of export from Asia in 2003.
18. Identify the True statement:
  - (a) The annual export growth rate of Argentina in 2003 was lower than the corresponding figure for US in 2006.
  - (b) The annual export growth rate of Africa in 2004 was lower than the corresponding figure for Latin America during the same period.
  - (c) The annual export growth rate of US in 2004 was lower than the corresponding figure for Canada in 2005.
  - (d) None of the above.

| World Merchandise Exports by Regions and Selected Economics |         |         |         |         |         |          |          |
|---|---------|---------|---------|---------|---------|----------|----------|
| Region/Country  | 2000    | 2001    | 2002    | 2003    | 2004    | 2005     | 2006     |
| <b>World</b>  | 6454000 | 6187000 | 6487000 | 7580000 | 9210000 | 10472000 | 12083000 |
| <b>North America</b>  | 1224975 | 1147545 | 1106240 | 1162965 | 1324235 | 1479330  | 1678315  |
| Canada  | 276635  | 259858  | 252394  | 272739  | 316548  | 359399   | 389538   |
| US  | 781918  | 729100  | 693103  | 724771  | 818520  | 905978   | 1038278  |
| <b>Latin America</b>  | 195800  | 188600  | 190700  | 219100  | 284700  | 355000   | 429900   |
| Argentina   | 26341   | 26543   | 25650   | 29566   | 34576   | 40351    | 46569    |
| Brazil  | 55086   | 58223   | 60362   | 73084   | 96475   | 118308   | 137470   |
| <b>Europe</b>   | 2633930 | 2654555 | 2839440 | 3386490 | 4051000 | 4396895  | 4962980  |
| Germany.  | 551818  | 571645  | 615831  | 751560  | 909887  | 970915   | 1111969  |
| UK  | 285429  | 272715  | 280195  | 305627  | 347493  | 384477   | 448291   |
| <b>Africa</b>   | 147800  | 137400  | 141100  | 176400  | 229900  | 299500   | 363300   |
| Nigeria   | 20975   | 17261   | 15107   | 22605   | 31148   | 42277    | 52000    |
| South Africa  | 29983   | 29258   | 29723   | 36482   | 46146   | 51626    | 58412    |
| <b>Asia</b>   | 1837300 | 1674400 | 1807800 | 2138300 | 2653100 | 3059000  | 3577700  |
| China   | 249203  | 266098  | 325596  | 438228  | 593326  | 761953   | 968936   |
| India   | 42379   | 43361   | 49250   | 58963   | 76427   | 99376    | 120254   |
| Japan   | 479249  | 403496  | 416726  | 471817  | 565675  | 594905   | 649931   |

19. Mark the highest annual growth rate among the following:

- (a) Annual growth rate of World export in 2005.
- (b) Annual growth rate of North American export in 2004.
- (c) Annual growth rate of India's export in 2002.
- (d) Annual growth rate of Japan's export in 2003.

20. Mark the False statement:

- (a) The exports from Argentina expressed as a proportion of export from Latin America in 2001 was grater than the exports from Nigeria expressed as a proportion of exports from Africa in 2004.
- (b) The exports from UK expressed as a proportion of exports from Europe in 2000 is lower than the exports from Argentina expressed as a proportion of exports from Latin America in 2005.
- (c) The annual export growth rate of Argentina in 2004 was higher than the corresponding figure for Asia in 2005.
- (d) The exports from South Africa in 2001 expressed as a proportion of exports from Africa is lower than the exports from China expressed as a proportion of exports from Asia in 2003.

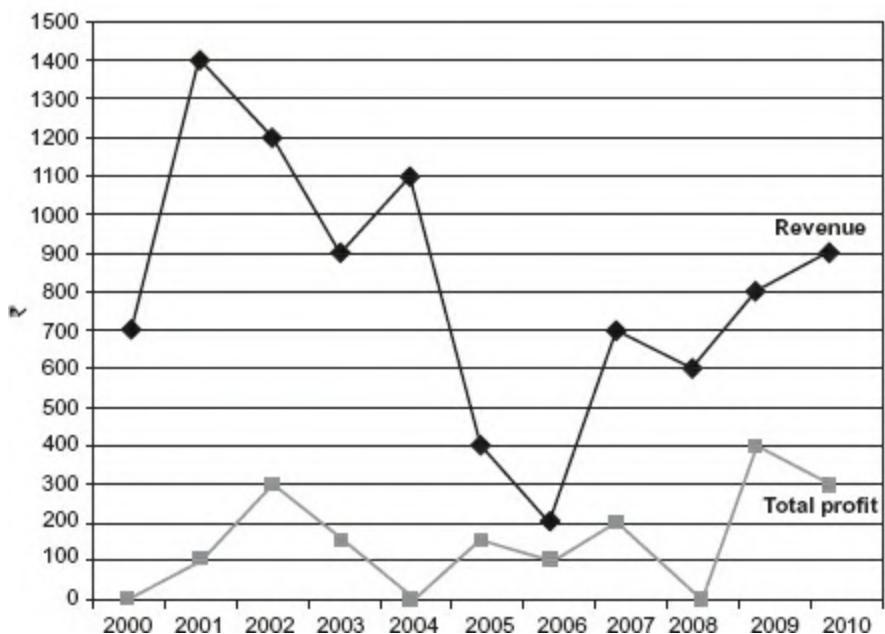
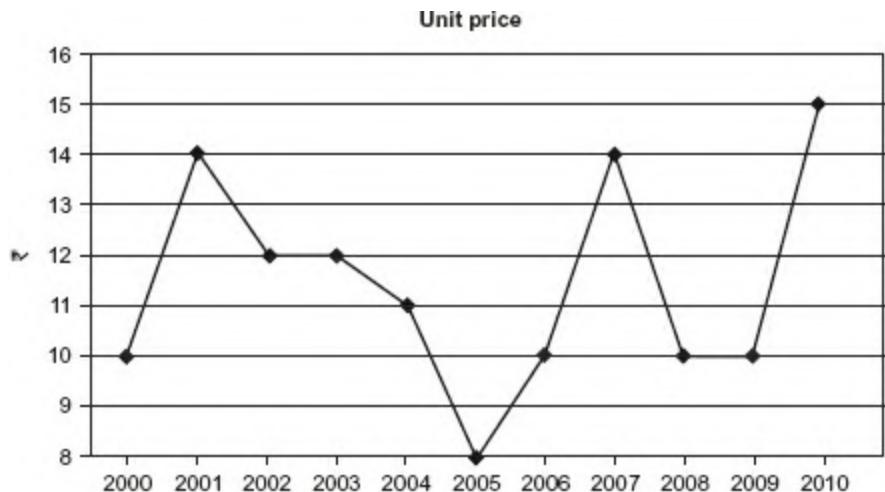
21. Mark the False statement:

- (a) The absolute annual increase in exports from Asia in 2003 was less than the corresponding figure in 2006.

- (b) The absolute annual increase in exports from Germany in 2001 was higher than the corresponding figure for US in 2003.
- (c) The absolute annual increase in exports from Brazil in 2005 was higher than the corresponding figure for Japan in 2002.
- (d) None of the above.

**Directions for Questions 22 to 26:** Answer the questions based on the following two graphs (given on next page) assuming that there is no fixed cost component and all the units produced are sold in the same year.

22. In which year is the per unit cost the highest?
- (a) 2002
  - (b) 2001
  - (c) 2005
  - (d) 2007
23. What is the approximate average quantity sold during the period 2000–2010?
- (a) 64 units
  - (b) 70 units
  - (c) 77 units
  - (d) 81 units
24. If volatility of a variable during 2000–2010 is defined as  $\frac{\text{Maximum Value} - \text{Minimum Value}}{\text{Average Value}}$ , then which of the following is TRUE?
- (a) Price per unit has highest volatility
  - (b) Cost per unit has highest volatility
  - (c) Total profit has highest volatility
  - (d) Revenue has highest volatility
25. If the price per unit decreases by 20% during 2000–2004 and cost per unit increases by 20% during 2005–2010, then during how many number of years there is loss?
- (a) 3 years
  - (b) 4 years
  - (c) 5 years
  - (d) 7 years



26. If the price per unit decreases by 20% during 2000–2004 and cost per unit increases by 20% during 2005–2010, then the cumulative profit for the entire period 2000–2010 decreases by:
- ₹ 1650
  - ₹ 1550
  - ₹ 1300
  - ₹ 1250

**ANSWER KEY**

1. (b)
  2. (c)
  3. (c)
  4. (a)
  5. (c)
  6. (c)
  7. (b)
  8. (d)
  9. (c)
  10. (b)
  11. (c)
  12. (c)
  13. (a)
  14. (c)
  15. (c)
  16. (c)
  17. (d)
  18. (c)
  19. (b)
  20. (d)
  21. (b)
  22. (b)
  23. (b)
  24. (c)
  25. (c)
  26. (b)
- 
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## SOLUTIONS

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### Questions 1 to 6:

1. It can be clearly seen that the number of covered wagons as a percentage of total wagons has decreased even from 2002 to 2003-hence, the statement in Option (a) is incorrect.

The statement in option (c) can be similarly rejected because the ratio  $90371/216717$  is higher than the ratio  $91099/222193$ .

Option (b) is correct because the ratio  $376/24$  (which is an approximation of the ratio  $37650/214760$ ) is substantially higher than the other ratios.

2.  $37275/216717$  is almost the same value as  $40316/234397$ .  
Option (c) is correct.
3. The only ratio amongst 2002, 2003, 2004 and 2005 which is above 5% is for 2004. Hence, Option (c) is correct.

**Note:** In order to check the value of the numbers as to which ratio is above 5%, you need to multiply the numerator by 20 in order to see whether the multiplication is greater than the denominator or not. If the multiplication by 20 is greater than the denominator the ratio is greater than 5%. In this case  $11388 \times 20$  is greater than 227752 and hence we can confirm that the ratio for 2004 is greater than 5%. For the other years the ratio can be seen to be below 5% by the same logic.

4. There is a 4.18% drop in the total wagons in 1999 which is the least growth rate as in terms of growth rate this value would be  $-4.18\%$ . The other drops are lesser than 4.18% and hence their values in terms of percentage growth would be higher than  $-4.18\%$ . Option (a) is thus the correct answer.
5. Option (c) is clearly the correct answer as the annual percentage growth rate of average wagon capacity has been maximum not in 1999 but clearly in 2004. Since we are looking for the false statement, this statement is clearly false and hence is the correct answer.
6. Annual growth rate of open low-sided wagons is the highest as it has dropped by just around 1% while the others have dropped by more than that.

Option (c) is correct.

### Questions 7 to 11:

7. The highest growth rate is clearly for 1992 as the value grows from around 313 to 420 in that year – which is much higher in terms of percentage terms than the other percentage changes for the years 1991

(where the total production changes from 328 to 313 – a negative change), 1993 (420 to 299 again a negative change) and 95 (332 to 340 — a small change in comparison to the change in 1992).

Option (b) is thus the correct answer.

8. Based on the table below the highest stability is for S (126/79)

|       | 90  | 91  | 92  | 93  | 94  | 95  |
|-------|-----|-----|-----|-----|-----|-----|
| Total | 328 | 313 | 420 | 299 | 332 | 340 |
| P     | 45  | 23  | 40  | 38  | 75  | 55  |
| Q     | 98  | 40  | 108 | 60  | 40  | 70  |
| R     | 72  | 91  | 107 | 62  | 131 | 120 |
| S     | 113 | 159 | 165 | 139 | 86  | 95  |

9. The total revenue would be given by the following formula:

Number of units of P  $\times$  9 + Number of units of Q  $\times$  4 + Number of units of R  $\times$  13 + Number of units of S  $\times$  3.

In 1991 the value is:  $23 \times 9 + 40 \times 4 + 91 \times 13 + 159 \times 3 = 207 + 160 + 1183 + 477 = 2027$

In 1992 the value is:  $40 \times 9 + 108 \times 4 + 107 \times 13 + 165 \times 3 =$  clearly greater than 1991— so we do not need to calculate this.

In 1993 the value is:  $38 \times 9 + 60 \times 4 + 62 \times 13 + 139 \times 3 = 342 + 240 + 806 + 417 = 1805$

In 1990, 1994 and 1995 the value is greater than 1805 and hence 1993 would give us the least revenues.

Option (c) is correct.

10. The total revenue of the four products would depend on:

Average sale  $\times$  revenue per unit  $\times$  6

For Product P =  $46 \times 9 \times 6 = 414 \times 6$

For Product Q =  $69.33 \times 4 \times 6 = 277.33 \times 6$

For Product R we do not need to check for least revenue because both the sales and also the price are high.

For Product S =  $126.16 \times 3 \times 6 = 378.5 \times 6$

Clearly Product Q has the least revenue over the period.

Option (b) is correct.

11. The statement in Option (c) is clearly true as the revenue of P & Q is greater than the revenue of S in 1993 (through visual inspection this

aspect is clear).

**Questions 12 to 16:**

12. We have to compare the growth rates (annual) for:

Gujarat 2006: 29648 to 82793

Kerala 2004: 70 to 199

Haryana 2007: 5577 to 16095

Punjab 2004: 627 to 1747

In order to look at the growth rates, we can also look for the ratios between these values. The highest growth rate would also be represented by the highest ratio.

A closer look at each of the above ratios gives us that each ratio is between 2.8 to 2.9.

Amongst these the ratio for Haryana for 2007 is closest to 2.9 and hence is the highest growth rate.

13. The respective changes are:

Option (a) 6706 to 2111— a ratio of 0.31– 0.32

Option (b) 535 to 197— a ratio of 0.36 – 0.37

Option (c) 21440 to 6909— a ratio of 0.32 – 0.33

Option (d) 8345 to 2685— a ratio of 0.32 – 0.33

Option (a) being the least ratio is also the highest drop and hence the lowest percentage growth.

Option (a) is the correct answer.

14. Statement (c) is true as the increase in FDI inflow to Kerala in 2005 (from 199 to 290) is slightly greater than 45.7% while the corresponding increase for Punjab in 2007 (from 6340 to 9228)  $\frac{2884}{6340}$  is just around 45.5%.

Option (c) is the correct answer.

15. Statement (c) is false because we have a situation where the increase for Madhya Pradesh (viz:3970) is not lower than the increase for Maharashtra for the given years. In fact, the increase for Maharashtra (3966) is lower than the increase for Madhya Pradesh. Option (c) is thus false and hence is the correct answer.

16. The absolute increase for Bihar in 2003 is  $346 - 52 = 294$  which is higher than the corresponding figure for Karnataka in 2001:  $3553 -$

$3299 = 254$ .

Option (c) is thus correct.

### Questions 17 to 21:

17. The ratio for Japan expressed as a proportion of export from Asia in 2003 viz: $471817/2138300$  would be just greater than 22% and less than 22.1% while the other ratios are all above 22.1%.

Option (d) is correct.

18. The statement in Option (c) is correct because the ratio  $818520/724771$  which is lower than 13%, would be lower than the ratio  $359399/316548$  which is higher than 13%.

Hence, Option (c) is correct.

19. All the four values given are between 13 to 14% growth. However, the growth for North America is closest to 14%. Option (b) is correct.

20. The statement in Option (d) is false as the ratio for South Africa as a proportion of Africa in 2001 ( $29258/137400$ ) is more than 0.21 while the ratio for China as a proportion of Asia in 2003 ( $438228/2138300$ ) is between 0.20 to 0.21. Thus, the ratio for South Africa is not lower but is more than the corresponding ratio for China.

21. Statements in option (a) and (c) can be seen to be true while the statement in option (b) is false—as the increase for Germany in 2001 (around 20000) is clearly lower than the increase for US in 2003 (around 31000).

Option (b) is the correct answer.

### Questions 22 to 26:

The sales values and the other variables that can be derived can be first represented on a table as below in order to see the required answers to the questions:

|                   |             | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|
| GIVEN VARIABLES   | Price       | 10   | 14   | 12   | 12   | 11   | 8    | 10   | 14   | 10   | 10   | 15   |
|                   | Revenues    | 700  | 1400 | 1200 | 900  | 1100 | 400  | 200  | 700  | 600  | 800  | 900  |
| DERIVED VARIABLES | Profit      | 0    | 100  | 300  | 150  | 0    | 150  | 100  | 200  | 0    | 400  | 300  |
|                   | Sales Units | 70   | 100  | 100  | 75   | 100  | 50   | 20   | 50   | 60   | 80   | 60   |
|                   | Cost        | 700  | 1300 | 900  | 750  | 1100 | 250  | 100  | 500  | 600  | 400  | 600  |

22. The per unit cost is 13 in 2001 and that is the highest value. Option (b) is correct.

23.  $765/11 = 70$ . Option (b) is correct.
24. For total profit the volatility is greatest as it is above 2 ( $400/154$ ) which is much higher than the other values.
25. Between 2000 and 2004, there would be a loss in 2000, 2001, 2003 and 2004 as in each of these years the revenue would go down below the cost—if we drop the price by 20% the revenue would also drop by 20% and hence in each of these years there would be a loss.  
Between 2005 to 2010, if the cost per unit goes up by 20%, the cost would also go up by 20%. This would result in a loss in the year 2008 as the cost would go above revenues.
26. There would be a drop of  $140 + 280 + 240 + 180 + 220 = 1060$  in the revenues between 2000 to 2004 and an increase of  $50 + 20 + 100 + 120 + 80 + 120 = 490$  in the cost between the years 2005-2010.  
The total drop in profit would be  $1060 + 490 = 1550$ . Option (b) is correct.

## 12 IIFT 2007

**Directions for Questions 1 to 5:** Study Table 1 and answer the questions that follow:

**Table 1** Word Merchandise Exports by Select Countries

| Countries   | 1999   | 2000   | 2001   | 2002   | 2003   | 2004   | 2005   | (Million Dollars) |
|-------------|--------|--------|--------|--------|--------|--------|--------|-------------------|
| Cambodia    | 1129   | 1389   | 1500   | 1923   | 2218   | 2798   | 3100   |                   |
| China       | 194931 | 249203 | 266098 | 325596 | 438228 | 593326 | 761954 |                   |
| India       | 35667  | 42379  | 43361  | 49250  | 57085  | 75562  | 95096  |                   |
| Japan       | 417610 | 479249 | 403496 | 416726 | 471817 | 565675 | 594905 |                   |
| South Korea | 143686 | 172267 | 150439 | 162471 | 193817 | 253845 | 284419 |                   |
| Myanmar     | 1136   | 1646   | 2381   | 3046   | 2483   | 2380   | 2925   |                   |
| Singapore   | 114680 | 137804 | 121751 | 125177 | 159902 | 198637 | 229649 |                   |
| Thailand    | 58440  | 69057  | 64968  | 68108  | 80324  | 96248  | 110110 |                   |
| VietNam     | 11540  | 14449  | 15029  | 16530  | 20176  | 25625  | 31625  |                   |

1. The third highest average annual growth over the entire period (1999–2005) has been experienced by:
  - (a) Cambodia
  - (b) India
  - (c) Myanmar
  - (d) Vietnam
2. Which of the following statement is **not true**?

- (a) During 1999–2000, Myanmar registered the highest annual export growth
  - (b) India witnessed second highest annual export growth rate during 2003–04
  - (c) Cambodia registered third highest annual export growth rate during 2001–02
  - (d) The change in Thailand’s export growth rate from 2000–01 to 2001–02 was more than 10 percent
3. Which of the following statement is not *false*?
- (a) South Korea registered the third lowest export growth rate during the year 2000–01.
  - (b) The sum of the export growth rates of India and Vietnam during 2001–02 is lower than the export growth rate of China during that particular year.
  - (c) Myanmar witnessed maximum number of years of positive export growth rate during the entire period.
  - (d) The difference between the export growth rate of China and Japan during 2004–05 was lower than the export growth rate of Vietnam during that particular year.
4. If we calculate the difference between the highest and the lowest average annual growth rate experienced by the countries between 1999–00 and 2004–05 \_\_\_\_\_ would get the second rank among all countries.
- (a) South Korea
  - (b) India
  - (c) China
  - (d) Japan
5. If we calculate the difference between the highest and the lowest average annual export growth rate experience by the countries year-wise, the difference would be minimum during \_\_\_\_\_.
- (a) 1999–00
  - (b) 2001–02
  - (c) 2004–2005
  - (d) 2003–04

**Directions for Questions 6 to 10:**

**Table 2** Industrial Emission Level of SO<sub>2</sub> in Select City Points (1997–2003)

| City         | Annual Mean Concentration Range ( $\mu\text{g}/\text{m}^3$ ) |       |      |      |      |      |      |
|--------------|--|-------|------|------|------|------|------|
|              | 1997   | 1998  | 1999 | 2000 | 2001 | 2002 | 2003 |
| Anpara       | 54.1   | 57.9  | 59.3 | 64.6 | 53   | 30.1 | 18.7 |
| Bangalore    | 28.1   | 37.2  | 37.9 | 19.1 | 19.3 | 12.1 | 7.6  |
| Bombay       | 36   | 21.7  | 22.3 | 11.8 | 12   | 9.7  | 7.4  |
| Calcutta     | 33.2   | 40.8  | 66.9 | 25.3 | 21.9 | 13.3 | 18.1 |
| Cochin       | 7.4  | 4.9   | 10.5 | 41.6 | 24.6 | 31.5 | 23.4 |
| Faridabad    | 37.8   | 35.7  | 31.3 | 37.3 | 23.1 | 13.1 | 9.5  |
| Gajroula     | 25.8   | 19.7  | 25.7 | 26.6 | 35.5 | 41.1 | 39.3 |
| Madras       | 26.3   | 14.2  | 11.7 | 20.1 | 26.1 | 40.9 | 26.3 |
| Mysore       | 32.4   | 32.1  | 31   | 30.7 | 24.1 | 20.6 | 11.2 |
| Nagda        | 81.8   | 55.2  | 26.9 | 52.6 | 46.5 | 36.5 | 36.5 |
| Pondicherry  | 112.3  | 114.9 | 93.3 | 37.6 | 17.5 | 19.8 | 25.3 |
| Solapur      | 19.4   | 17.2  | 18   | 18.9 | 19.4 | 20.1 | 19.9 |
| Yamuna Nagar | 27.8   | 32.2  | 9.8  | 18.9 | 22.1 | 28.6 | 28.2 |

6. Which of the following statements is false?
  - (a) Average annual level of SO<sub>2</sub> emission for Pondicherry over 1998–2003 is approximately 51.40  $\mu\text{g}/\text{m}^3$ .
  - (b) Average annual level of SO<sub>2</sub> emission for Anpara over 1997–2003 is approximately 48.24  $\mu\text{g}/\text{m}^3$ .
  - (c) Average annual level of SO<sub>2</sub> emission for Madras over 1999–2003 is approximately 25.02  $\mu\text{g}/\text{m}^3$ .
  - (d) Average annual level of SO<sub>2</sub> emission for Yamuna Nagar during 1997–2003 is approximately 23.74  $\mu\text{g}/\text{m}^3$ .
7. If the highest level of SO<sub>2</sub> emission among the given cities is noted year-wise, then their difference would be maximum for the following pair for years:
  - (a) 1998 and 2003

- (b) 1997 and 2001
  - (c) 1997 and 2003
  - (d) 1998 and 2002
8. Which of the following statement is true?
- (a) Bangalore in 2003 registered the lowest level of SO<sub>2</sub> emission in relation to the given dataset.
  - (b) The difference between the average annual level of SO<sub>2</sub> emission during 1997–2003 for Pondicherry and Gajroula is lower than the corresponding average annual level for Mysore.
  - (c) The average annual level of SO<sub>2</sub> emission during 1997–2000 for Faridabad is higher than the average annual level for the city for the entire period (1997–2003)
  - (d) The sum of the average annual level of SO<sub>2</sub> emission during 1997–2003 for Bombay and Calcutta is lower than the corresponding average annual level for Anpara.
9. If the SO<sub>2</sub> emission level change for the given cities is noted year-wise, the difference would be maximum for which of the following option?
- (a) Cochin and Pondicherry during 1999–2000.
  - (b) Calcutta and Nagda during 1998–1999.
  - (c) Madras and Anpara during 2001–2002.
  - (d) Nagda and Pondicherry during 1997–98
10. Which of the following statements is true?
- (a) While for Anpara, the SO<sub>2</sub> annual emission level declined consistently during 2000–2001 and 2002–2003, the same increased consistently for Yamuna Nagar between 1998–99 and 2001–02.
  - (b) During 2002–2003, the SO<sub>2</sub> annual emission level declined for maximum number of cities.
  - (c) The absolute decline in annual SO<sub>2</sub> emission level for Bombay during 1997–1998 was lower than the corresponding figure for Faridabad during 2000–2001
  - (d) The number of cities which experienced a decline in their annual

$\text{SO}_2$  emission level during 1999–2000 was more than the corresponding figure during 1998–1999.

### Directions for Questions 11 to 15:

**Table 3** Estimate of Some Important Characteristics of Select Industries

| Characteristics                      | Industry Groups and Year |        |        |        |        | 2004–05 |        |         |          |         |
|--------------------------------------|--------------------------|--------|--------|--------|--------|---------|--------|---------|----------|---------|
|                                      | 2003–04                  |        |        |        |        | A       |        | B       |          |         |
|                                      | A                        | B      | C      | D      | E      | A       | B      | C       | D        | E       |
| Number of Factories                  | 1085                     | 916    | 652    | 239    | 403    | 5252    | 567    | 12656   | 3513     | 1152    |
| Working Capital (₹ Lakh)             | 281895                   | 149780 | 29662  | 28921  | 17729  | 401385  | 101370 | 600909  | 1884332  | 480972  |
| Invested Capital (₹ Lakh)            | 464446                   | 217230 | 421005 | 156983 | 121030 | 1862522 | 557576 | 4055974 | 9832961  | 2438776 |
| Number of Workers                    | 43977                    | 34972  | 24259  | 13394  | 16169  | 139918  | 41274  | 381337  | 294973   | 57463   |
| Wages to Workers (₹ Lakh)            | 42082                    | 24245  | 13858  | 9691   | 8192   | 55829   | 20584  | 140109  | 293126   | 56924   |
| Total input (₹ Lakh)                 | 1060692                  | 474480 | 682340 | 197711 | 161375 | 2862201 | 425601 | 3209790 | 14046464 | 3729397 |
| Depreciation (₹ Lakh)                | 23095                    | 14544  | 27412  | 12619  | 12476  | 145745  | 43264  | 277640  | 636351   | 140743  |
| Net Value Added (₹ Lakh)             | 303706                   | 145547 | 53441  | 65180  | 42672  | 382864  | 128489 | 1062762 | 3944815  | 820172  |
| Net Fixed Capital Formation (₹ Lakh) | 4789                     | 604    | -12531 | -250   | 464    | 168539  | 52500  | 100152  | 374612   | 220840  |
| Profit (₹ Lakh)                      | 131337                   | 55952  | -41774 | 35223  | 11756  | 142098  | 67338  | 563800  | 2735760  | 615832  |

**11.** Which of the following statement is **not false**?

- (a) Between 2003–2004 and 2004–2005, the average no. of workers per factory increased for industry B and C, but decreased for A.
- (b) The percentage change in no. of workers between 2003–2004 and 2004–2005 is higher in industry A than industry E.
- (c) The average no. of workers per factory between industries D and E jointly increased by more than corresponding figure for B.
- (d) The average no. of workers per factory for factory C decreased between 2003–2004 and 2004–2005 by 6.

**12.** Which of the following statements is **True**?

- (a) The increase in invested capital per worker for industries B and D over the period is jointly higher than the same for E.
- (b) The invested capital per worker has remained second highest for industry D both between 2003–04 and 2004–05.
- (c) The working capital per worker has been highest for industry B during 2003–04 but not the lowest during 2004–05.

- (d) The working capital to worker ratio has declined by more than 50 percent in case of industry A over the period, but by less than 50 percent for industry B.
13. Which of the following statement is **false**?
- (a) Working capital to invested capital ratio has been second highest for industry E during 2004–05.
  - (b) Industry C is the only industry for which the net value added to total input ratio has increased between 2003–04 and 2004–05.
  - (c) If the average wage rate is defined by total wage bill divided by number of workers, then for a total number of three industries, the average wage rate declined between 2003–04 and 2004–05.
  - (d) Net value added to total input ratio has been highest for industry B during 2004–05.
14. If gross fixed capital formation is defined as net fixed capital formation plus depreciation, then which of the following statements is **true**?
- (a) Gross fixed capital formation has been third highest for industry C during 2004–05.
  - (b) Gross fixed capital formation is the lowest for industry E during 2003–04.
  - (c) The increase in gross fixed capital formation between 2003–04 and 2004–05 for industry D is higher than the sum total of the same for industries C and E.
  - (d) The increase in average depreciation per factory 2003–04 and 2004–05 has been highest for industry D.
15. Which of the following statements is **false**?
- (a) Average profit per factory is second highest for industry A during 2003–04 but lowest during 2004–05
  - (b) Average profit earned per unit of input cost incurred is second highest for industry A and C between 2003–04 and 2004–05.
  - (c) The average profit to the number of workers ratio is second highest for industry D both between 2003–04 and 2004–05.
  - (d) The increase in average expenditure on input per factory between 2003–04 and 2004–05 has been highest for industry D.

**Directions for Questions 16 to 19:** The following table shows the export growth rate for various product categories between 2003–2005 with respect to specific pairs of export–import destinations.

| Region                  | Chemicals |      |      | Iron and Steel |      |      | Automotive Parts |      |      |
|-------------------------|-----------|------|------|----------------|------|------|------------------|------|------|
|                         | 2003      | 2004 | 2005 | 2003           | 2004 | 2005 | 2003             | 2004 | 2005 |
| Intra –Europe           | 22        | 21   | 11   | 27             | 45   | 10   | 24               | 20   | 1    |
| Intra –Asia             | 23        | 33   | 19   | 31             | 42   | 22   | 39               | 23   | 12   |
| Europe to North America | 19        | 11   | 6    | -9             | 81   | 21   | 14               | 8    | 6    |
| Intra –North America    | 11        | 18   | 14   | 4              | 41   | 23   | 0                | 9    | 6    |
| Europe to Asia          | 18        | 24   | 8    | 0              | 16   | 39   | 0                | 9    | -1   |

16. If the region-wise increase in the export growth rate of the three industries during 2003–04 is noted, \_\_\_\_\_ would be ranked second.
- (a) Intra–North America iron and steel export.
  - (b) Intra–Europe iron and steel export.
  - (c) Intra–Asia chemicals exports
  - (d) None of the above.
17. If the region-wise decline in the export growth rate of the three industries during 2004–05 is noted, \_\_\_\_\_ would be ranked second.
- (a) Intra–Europe automotive part export
  - (b) Intra–Europe iron and steel export
  - (c) Intra–Asia chemicals export
  - (d) Europe to Asia chemicals export.
18. The difference between the highest and the lowest average growth rate during 2005 among all three industries and regions is:
- (a) 40 percent
  - (b) 33 percent
  - (c) 29 percent
  - (d) None of the above
19. If the region wise average export growth rate of the three industries are analyzed, \_\_\_\_\_ would be ranked second
- (a) Intra–Asia average export of chemicals during 2003–05
  - (b) Intra–Europe average export of iron and steel parts during 2004–05.

- (c) Intra-Asia average export of automotive parts during 2003–05.
- (d) Intra-North America average export of iron and steel during 2003–05.

**Directions for Questions 20 to 26:** Read the table below and answer the questions.

**Table 5** FDI Projects, by Investor/Destination Region

| Country              | World as Destination |      |                |      | World as Source |      |      | (in Numbers) |  |
|----------------------|----------------------|------|----------------|------|-----------------|------|------|--------------|--|
|                      | 2002                 | 2003 | 2004           | 2005 | 2002            | 2003 | 2004 |              |  |
|                      |                      |      |                |      |                 |      |      |              |  |
|                      | By Source            |      | By Destination |      |                 |      |      |              |  |
| Total World          | 5685                 | 9348 | 9927           | 9488 | 5685            | 9348 | 9927 | 9488         |  |
| Developed Countries  | 4903                 | 7735 | 8443           | 8057 | 2746            | 3867 | 4144 | 3981         |  |
| France               | 322                  | 475  | 525            | 502  | 140             | 159  | 229  | 385          |  |
| Germany              | 473                  | 833  | 862            | 919  | 131             | 272  | 251  | 221          |  |
| UK                   | 438                  | 709  | 746            | 752  | 326             | 414  | 490  | 541          |  |
| US                   | 1604                 | 2397 | 2507           | 2479 | 417             | 589  | 584  | 527          |  |
| Japan                | 472                  | 878  | 1025           | 744  | 106             | 133  | 155  | 118          |  |
| Developing Countries | 707                  | 1440 | 1294           | 1243 | 2362            | 4467 | 4806 | 4296         |  |
| China                | 35                   | 107  | 96             | 128  | 586             | 1303 | 1547 | 1196         |  |
| South Korea          | 117                  | 179  | 169            | 173  | 60              | 110  | 104  | 115          |  |
| India                | 89                   | 175  | 199            | 182  | 249             | 452  | 688  | 564          |  |
| Singapore            | 57                   | 90   | 103            | 79   | 108             | 154  | 174  | 154          |  |
| Russian Federation   | 51                   | 119  | 108            | 126  | 199             | 429  | 380  | 479          |  |

**Note:** FDI projects ‘by source’ is defined as ‘outflow’ while the same ‘by destination’ is defined as ‘inflow’.

- 20. During 2003–04, which pair of developed and developing countries registered the highest growth rate in their number of FDI outflow projects?
  - (a) France, India
  - (b) France, Singapore
  - (c) Japan, Singapore
  - (d) UK, India
- 21. An analysis of the annual FDI projects inflow growth rate reveals that the second largest decline has occurred for \_\_\_\_\_ during \_\_\_\_\_.

- (a) India, 2004–05
  - (b) Russian Federation, 2003–04
  - (c) China, 2004–05
  - (d) Germany, 2004–05.
22. The absolute difference between Singapore's highest growth rate in number of FDI projects inflow in a single year during 2002–05 and UK's highest growth rate in FDI projects outflow in a single year during the same period is:
- (a) 19.28 percent
  - (b) 15.28 percent
  - (c) 21.26 percent
  - (d) None of the above.
23. Which of the following statements is **true**?
- (a) The growth rate of FDI projects inflow in UK was lower than the same in Japan during 2002–03.
  - (b) The average FDI projects inflow growth rate in Germany between 2002–03 and 2004–05 has been higher than its average FDI projects outflow growth rate over the same period.
  - (c) The growth rate of FDI projects outflow from the US during 2002–03 has been higher than the corresponding figure for France.
  - (d) The growth rate in FDI projects inflow from the UK during 2003–04 has been lower than the corresponding figure for Japan.
24. Which of the following statements is **false**?
- (a) The growth rate of FDI projects outflow from the developed countries during 2004–05 has been lower than the same for the world as a whole.
  - (b) The growth rate of FDI projects inflow to Singapore during 2003–04 has been higher than the same for South Korea during 2004–05.
  - (c) The average growth rate of FDI projects inflow from developing countries between 2002–03 and 2004–05 has been higher than their corresponding figure for FDI projects outflow.
  - (d) The growth rate of FDI projects inflow to Singapore during

2004–05 has been more negative as compared to the corresponding figure for Russian Federation during 2003–04.

25. Which of the following statements is **true**?
- (a) The average growth rate of FDI projects outflow from India between 2002–03 and 2004–05 has been higher than its corresponding figure for FDI project inflow.
  - (b) The average growth rate of FDI projects outflow from Germany between 2002–03 and 2004–05 has been lower than the average growth rate of FDI project inflow to South Korea over the same period.
  - (c) The average absolute FDI projects outflow from the UK during 2002–05 has been higher than the average absolute FDI projects inflow to India over the same period.
  - (d) Germany is the only country which did not experience a decline in FDI project outflow during 2002–05.
26. Which of the following statements is **false**?
- (a) The average FDI project outflow from South Korea expressed as a percentage of the total FDI project outflow from the developing countries during 2002–05 was higher than the average FDI project inflow to the UK expressed as a percentage of the FDI projects inflow to the developed countries during the same period.
  - (b) The FDI project outflow from the US expressed as a percentage of the total FDI project outflow from the developed countries in 2002 was higher than the FDI project inflow to China expressed as a percentage of the FDI project inflow to the developing countries in 2004.
  - (c) The average FDI project outflow from Germany expressed as a percentage of the total FDI project outflow from the developed countries during 2002–05 is higher than the average FDI project inflow to Russian Federation expressed as a percentage of the FDI project inflow to the developing countries during the same period.
  - (d) The FDI project outflow from India expressed as a percentage of the total FDI project outflow from the developed countries in 2004 is lower than the FDI project inflow to the US expressed as

a percentage of the FDI project inflow to the developed Countries in 2003.

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## ANSWER KEY

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1. (a)
2. (b)/(c)
3. (d)
4. (a)
5. (c)
6. (d)
7. (a)
8. (c)
9. (a)
10. (b)
11. (d)
12. (b)
13. (a)
14. (c)
15. (d)
16. (a)
17. (b)
18. (a)
19. (a)
20. (c)
21. (c)
22. (a)
23. (c)
24. (c)
25. (a)
26. (d)

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## SOLUTIONS

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### Questions 1 to 5:

1. The average annual growth rate would be highest for the country which has the highest ratio between the 2005 value and the 1999 value. Cambodia has a ratio of  $3100/1129$ ; India has a ratio of  $95096/35667$ , Myanmar has a ratio of  $2925/1136$  and Vietnam has a ratio of  $31625/11540$ .

Myanmar is definitely lower than Cambodia because the numerator for Myanmar is lower while the denominator is higher.

Further India's ratio is between 2.6 to 2.7 while the ratios of Cambodia and Vietnam are between 2.7 to 2.8.

The comparison needs to be thus between Cambodia and Vietnam which means we are comparing  $3100/1129$  with  $31625/11540$  which can be seen as  $31/11.29$  against  $31.62/11.54$ . The numerator grows from 31 to 31.62 which means a 2% increase in the numerator while the denominator grows from 11.29 to 11.54—a growth of slightly more than 2%. Thus,  $3100/1129 > 31625/11540$ .

Hence, Cambodia shows the highest average annual growth rate.

Option (a) is correct.

2. For this question we have to see which statement is not true. Statement (a) can be seen to be true as the growth in 1999–2000 is the highest for Myanmar (as 1136 to 1646 is a higher percentage change than 1646 to 2381).

Statement (b) is not true because India's growth rate in 2003–04 was the highest.

Statement (c) is also not true as Cambodia's growth rate in 2001–02 is not its third highest growth rate.

Clearly this question has two answers and we can mark either options (b) or (c).

3. The statements in options (a), (b) and (c) can be seen to be false based on the following observations:

Option (a) is false because: South Korea's growth in 2000–01 was not

the third lowest.

Option (b) is false because the sum of India and Vietnam's growth rates in 2001–02 ( $13.5 + 9.9$ ) is actually greater than the growth of China in that year.

Option (c) is also false because the maximum number of years of positive growth was seen for Cambodia and not for Myanmar.

Option (d) is not false as the difference between the growth rates of China and Japan  $28.4 - 5.1 = 23.3$  is lower than Vietnam.

Option (d) is thus correct.

4. The highest difference is for Myanmar (around 63%) while the second highest is for South Korea (around 43%). Option (a) is correct.
5. The least difference is for 2004–05. Option (c) is correct.

### **Questions 6 to 10:**

6. Option (d) is false because the average for Yamuna Nagar is  $167.6/7 = 23.9$  which is not equal to 23.74.
7. The difference between 1998 and 2003 (which is  $114.9 - 39.3 = 75.6$ ) is the highest difference.
8. Statement (a) is not true as the least level is not for Bangalore in 2003 but for Bombay in 2003.

Statement (b) is also not true as the difference between Pondicherry's average  $418.7/7$  and Gajroula's average  $213.7/7$  is actually higher than the average (and not lower than the average) of Mysore  $205/7$ .

Statement (c) is obviously true as the numbers for Faridabad are higher during the phase 1997 to 2000 and lower after that. Hence, the average of Faridabad for the period 1997 to 2003 would be lower than 1997 to 2000.

Thus, option (c) is correct.

9. For the first option, the change in emission level for Cochin is +31.1 while for Pondicherry it is  $-55.7$ . The difference is 86.8.  
For the second option, Calcutta's level changes by +26.1 in 1998–99, while Nagda changes by  $-28.3$ . The difference is 54.4.  
For the third option, Madras's level changes by +14.8 in 2001–02 while Anpara changes by  $-22.9$ . The difference is 37.7.

For the fourth option, Nagda changes by  $-26.6$  in 1997–98 while Pondicherry changes by  $+2.6$ . The difference is 29.2.

The highest value of this change is for the first option. Hence, option (a) is correct.

10. Option (a) can be seen to be incorrect as it can be seen that Yamuna Nagar does not increase consistently between the years 1998–99 to 2001–02.

Option (b) can be seen to be correct as in the year 2002–03, ten of the 13 cities have shown a decrease in their  $\text{SO}_2$  emission levels.

Option (b) is correct.

### Questions 11 to 15:

11. For this question we are looking for the statement which is not false—which means we are looking for what is true. The statement in option (a) is false as it can be seen clearly that the number of workers per factory decreased for C (as the ratio  $24259/652$  is greater than the ratio  $381337/12656$ ).

Similarly option (b) is also incorrect as the percentage increase in the number of workers for A is given by the ratio  $139918/43977$ , while for E it is  $57463/16169$ . The second ratio being higher, we can conclude that E has shown a higher percentage change than A. Thus, option (b) is also rejected.

The average number of workers for D and E changes from  $29563/642$  to  $352436/4665$ , while for B it changes from  $34972/916$  to  $41274/567$ . The value for D & E jointly increases by less than the corresponding value for B.

Thus, option (d) must be correct. The change in option (d) is from  $24259/652$  to  $381337/12656$ —a change of around 6 to 7.

12. Option (a) is incorrect because the increase in invested capital per worker has been higher for industry E than B & D combined together. Thus, option (a) is rejected.

The invested capital per worker is second highest for D in both years shown in the table. Hence, option (b) is correct.

Option (b) is the correct answer.

13. When you check the statement in option (a) we can see that the ratio of

working capital to invested capital is second highest for industry (a) in 2003–04. Hence, this statement is false.

But in this question we are solving for the false statement.

Since we have identified that option (a) is false we can mark this as the correct answer at this stage without checking the other options.

Option (a) is the correct answer.

14. Option (a) is incorrect as the gross fixed capital formation for industry C during 2004–05 is the second highest and not the third highest as desired by the option.

Option (b) is also rejected because the gross fixed capital formation is the lowest for Company D in 2003–04 and not for company E in 2003–04.

Option (c) is true as the difference between the gross fixed capital formation for D between its values in 2004–05 and 2003–04 is higher than the same for the totals of Industries C and E.

Option (c) is thus the correct answer.

15. Option (d) can be seen as false as the increase for D in average expenditure on input per factory is not the highest for D.

Option (d) is hence the correct answer.

### Questions 16 to 19:

16. Iron and Steel for Europe to North America grows from -9 to 81 → a growth of 90 and this represents the maximum growth. For Intra-North American iron and steel export, the growth is from 4 to 41— a growth of 37 which is the second highest growth.

Option (a) is correct.

17. The greatest decline between 2004–05 is for Europe to North America iron and steel export (from 81 to 21 the decline is 60). Intra Europe iron and steel shows a decline of 35 from 45 to 10— and this is the second highest decline over all regions for all three industries. Option (b) is correct.

18. The highest growth rate during 2005 is 39 (for Europe to Asia iron and steel); the lowest is -1 (Europe to Asia Automotive parts). The difference is 40 and hence 40 percent is the correct answer.

Option (a) is correct.

19. This question is framed incorrectly as the question asks us to find the second highest average amongst all averages, and yet in this question, we have to compare the 4 averages described and see which one is ranked second. Note, since the second option talks about a 2-year average for Intra Europe iron and steel export, there can be many averages that can be looked at—and hence we cannot be sure about which averages we need to compare in order to decide which is ranked second. In this scenario, we have no option but to compare the four averages as described.

In the given options, option (a) gives the second highest ratio at  $75/3 = 25$ .

#### **Questions 20 to 26:**

20. Japan shows the highest percentage growth amongst developed countries and hence only option (c) could be the correct answer.
21. The highest drop is for Japan between 2004–05 (it is between 23 to 24%) while for China in the same year the drop is the second highest drop (between 22 to 23%). Option (c) is correct.
22. Singapore's highest growth rate in inflows is for 2002 to 2003 where it grows from 108 to 154—a growth rate of 42.59%. At the same time, the highest growth rate for UK (in outflows) is for 2002 to 2003 where it grows from 438 to 709—a growth rate of 61.87%. The difference between the two is 19.28%. Option (a) is correct.
23. The statement in option (a) is false, as the growth rate for FDI projects inflow in 2002–03 for Japan is lower than that for UK.

The statement in option (b) is also false as the FDI projects inflow growth rate for Germany in 2004–05 is lower than the corresponding figure for FDI projects outflow for the same year.

The statement in option (c) can be verified to be true, as the growth rate for US (FDI project outflows during 2002–03) is from 1604 to 2397 which is close to 50%. At the same time the corresponding growth rate for France for the same year is represented by the percentage change from 322 to 475—a growth of 153 on 322 which is definitely lower than the growth rate for US.

Thus, option (c) is correct.

24. The statement in option (a) is true—as the negative growth from 8443

to 8057 represents a growth rate of 4.6% which is a lower growth rate than the growth rate from 9927 to 9488 which is around 4.4%. Since we are looking for what is false we reject this statement as it is true.

The statement in option (b) is also correct—as the growth rate for Singapore for the given year from 154 to 174 is around 13% which is higher than the growth rate for South Korea for the given year—as it grows from 104 to 115—a growth between 10 to 11%. Thus, we reject option (b) too as it is not false.

The statement in option (c) is false as the growth rate of FDI projects inflows between 2002–03 has been lower than the corresponding figure for FDI projects outflows for the same year.

Hence, since option (c) is false it is the correct answer.

25. Option (a) can be seen to be true as the growth rate of India in 2002–03 for outflows (represented by the percentage growth from 89 to 175) is greater than the corresponding figure for growth rate of FDI inflows in 2002–03 (represented by the percentage growth from 249 to 452)

Similarly for 2004–05, the growth rate of India in 2004–05 for outflows (represented by the percentage growth from 199 to 182—a growth rate of around –8.5%) is greater than the corresponding figure for growth rate of FDI inflows in 2004–05 (represented by the percentage growth from 688 to 564—which is clearly lower than –10%).

Option (a) is correct.

26. Option (d) is clearly false as India's FDI outflow as a percentage of developing countries outflows in 2004 is represented by the ratio  $199/1294$  which is around 15.37%. At the same time US FDI project inflows as a percentage of the developed countries FDI inflows is given by the ratio  $589/3867$  which is around 15.23%.

The other options can be checked to be true.

Option (d) is thus correct.

## PART 3

# CAT Exam Paper

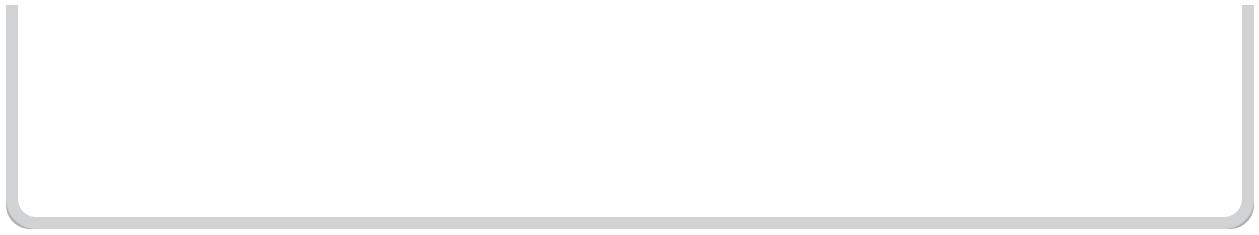
*CAT Papers 2019 to  
2008*

### In This Part You will Learn:

- Presented in this part of the book are the original CAT papers of 2017 and 2018 (both morning and evening shifts) with the ideal thought process you should adopt to solve each of the question sets in the exams. In the current pattern of the CAT, DI accounts for half of the DI- LR section of the exam – and you can expect 4 sets of 4 questions each – totalling 48 marks. The reason we have included papers only for 2017 and 2018, is because

**CAT did not release the original papers between 2009 to 2016.**

- **CAT 2017, was the first online exam of the CAT whose paper was actually released. But inspite of the limitations of the availability of past CAT papers - the learning opportunity in DI, provided by the CAT 2017 and CAT 2018 papers is immense, because in both these years, the CAT exam was dominated by Logical DI. Hence, each question set in this part (along with it's solution) should be taken as an invaluable resource for you to test your solving skills first (by trying to tackle each set in 12 minutes). Next, you should carefully go through the provided solutions to these questions to understand that in actual truth, the DI of the CAT is extremely logical and can get solved very smoothly if you can break down a question's solution into smaller thought processes. Have a happy and fruitful learning experience with each question set in this part!**



**Directions for Questions 1 to 4:** An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her.

1. In how many different ways can the ATM serve a customer who gives 500 rupee notes as her preference?
2. If the ATM could serve only 10 customers with a stock of fifty 500 rupee notes and a sufficient number of notes of other denominations, what is the maximum number of customers among these 10 who could have given 500 rupee notes as their preferences?
3. What is the maximum number of customers that the ATM can serve with a stock of fifty 500 rupee notes and a sufficient number of notes of other denominations, if all the customers are to be served with at most 20 notes per withdrawal?
  - (a) 13
  - (b) 12
  - (c) 16
  - (d) 10
4. What is the number of 500 rupee notes required to serve 50 customers with 500 rupee notes as their preferences and another 50 customers with 100 rupee notes as their preferences, if the total number of notes to be dispensed is the smallest possible?
  - (a) 750

- (b) 800
- (c) 900
- (d) 1400

**Directions for Questions 5 to 8:** A company administers a written test comprising of three sections of 20 marks each – Data Interpretation (DI), Written English (WE) and General Awareness (GA), for recruitment. A composite score for a candidate (out of 80) is calculated by doubling her marks in DI and adding it to the sum of her marks in the other two sections. Candidates who score less than 70% marks in two or more sections are disqualified. From among the rest, the four with the highest composite scores are recruited. If four or less candidates qualify, all who qualify are recruited.

Ten candidates appeared for the written test. Their marks in the test are given in the table below. Some marks in the table are missing, but the following facts are known:

1. No two candidates had the same composite score.
2. Ajay was the unique highest scorer in WE.
3. Among the four recruited, Geeta had the lowest composite score.
4. Indu was recruited.
5. Danish, Harini, and Indu had scored the same marks in GA.
6. Indu and Jatin both scored 100% in exactly one section and Jatin's composite score was 10 more than Indu's.

| Candidate | Marks out of 20 |    |    |
|-----------|-----------------|----|----|
|           | DI              | WE | GA |
| Ajay      | 8               |    | 16 |
| Bala      |                 | 9  | 11 |
| Chetna    | 19              | 4  | 12 |
| Danish    | 8               | 15 |    |
| Ester     | 12              | 18 | 16 |
| Falak     | 15              | 7  | 10 |
| Geeta     | 14              |    | 6  |
| Harini    | 5               |    |    |
| Indu      |                 | 8  |    |
| Jatin     |                 | 16 | 14 |

5. Which of the following statements MUST be true?

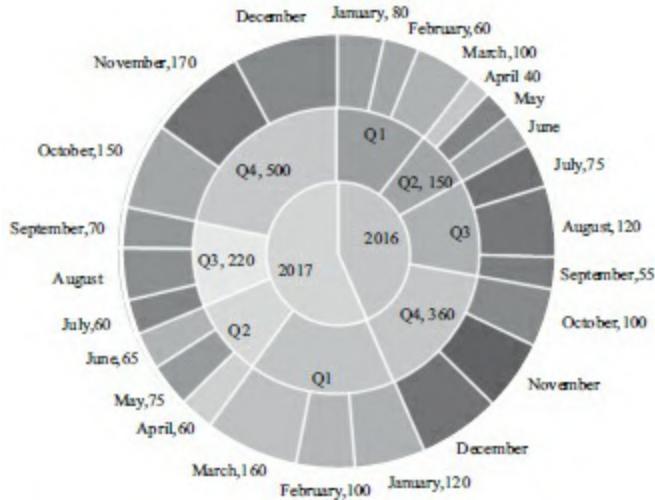
1. Jatin's composite score was more than that of Danish.
2. Indu scored less than Chetna in DI.
3. Jatin scored more than Indu in GA.
  - (a) Both 1 and 2
  - (b) Both 2 and 3
  - (c) Only 1
  - (d) Only 2
6. Which of the following statements MUST be FALSE?
  - (a) Harini's composite score was less than that of Falak
  - (b) Bala scored same as Jatin in DI
  - (c) Bala's composite score was less than that of Ester
  - (d) Chetna scored more than Bala in DI
7. If all the candidates except Ajay and Danish had different marks in DI, and Bala's composite score was less than Chetna's composite score, then what is the maximum marks that Bala could have scored in DI?
8. If all the candidates scored different marks in WE then what is the maximum marks that Harini could have scored in WE?

**Directions for Questions 9 to 12:** Twenty four people are part of three committees which are to look at research, teaching, and administration respectively. No two committees have any member in common. No two committees are of the same size. Each committee has three types of people: bureaucrats, educationalists, and politicians, with at least one from each of the three types in each committee. The following facts are also known about the committees:

1. The numbers of bureaucrats in the research and teaching committees are equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee.
2. The number of educationalists in the teaching committee is less than the number of educationalists in the research committee. The number of educationalists in the research committee is the average of the number of educationalists in the other two committees.
3. 60% of the politicians are in the administration committee, and 20% are in the teaching committee.

9. Based on the given information, which of the following statements MUST be FALSE?
- (a) The size of the research committee is less than the size of the administration committee
  - (b) In the teaching committee the number of educationalists is equal to the number of politicians
  - (c) The size of the research committee is less than the size of the teaching committee
  - (d) In the administration committee the number of bureaucrats is equal to the number of educationalists
10. What is the number of bureaucrats in the administration committee?
11. What is the number of educationalists in the research committee?
12. Which of the following CANNOT be determined uniquely based on the given information?
- (a) The size of the teaching committee
  - (b) The size of the research committee
  - (c) The total number of educationalists in the three committees
  - (d) The total number of bureaucrats in the three committees

**Directions for Questions 13 to 16:** The multi-layered pie-chart below shows the sales of LED television sets for a big retail electronics outlet during 2016 and 2017. The outer layer shows the monthly sales during this period, with each label showing the month followed by sales figure of that month. For some months, the sales figures are not given in the chart. The middle-layer shows quarter-wise aggregate sales figures (in some cases, aggregate quarter-wise sales numbers are not given next to the quarter). The innermost layer shows annual sales. It is known that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression, as do the three monthly sales figures in the fourth quarter (October, November, December) of that year.



13. What is the percentage increase in sales in December 2017 as compared to the sales in December 2016?
- 22.22
  - 28.57
  - 38.46
  - 50.00
14. In which quarter of 2017 was the percentage increase in sales from the same quarter of 2016 the highest?
- Q1
  - Q2
  - Q3
  - Q4
15. During which quarter was the percentage decrease in sales from the previous quarter's sales the highest?
- Q2 of 2016
  - Q1 of 2017
  - Q2 of 2017
  - Q4 of 2017
16. During which month was the percentage increase in sales from the previous month's sales the highest?
- March of 2016
  - October of 2016
  - March of 2017

(d) October of 2017

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## ANSWER KEY

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1. 7
  2. 6
  3. (b)
  4. (c)
  5. (a)
  6. (b)
  7. 13
  8. 14
  9. (c)
  10. 4
  11. 3
  12. (a)
  13. (b)
  14. (a)
  15. (c)
  16. (d)
- 

## SOLUTIONS

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### Questions 1 to 4:

1. For a customer with a 500 Rupee preference, the ATM can do the following:

| <i>Option Number</i> | <i>500</i> | <i>200</i> | <i>100</i> |  |
|----------------------|------------|------------|------------|--|
| 1                    | 10         | 0          | 0          |  |
| 2                    | 9          | 2          | 1          |  |
| 3                    | 9          | 1          | 3          |  |
| 4                    | 9          | 0          | 5          |  |
| 5                    | 8          | 5          | 0          |  |
| 6                    | 8          | 4          | 2          |  |
| 7                    | 8          | 3          | 4          |  |

We can clearly understand that with seven notes of Rs.500, there is no way to ensure that the condition is met. Hence, the correct answer is 7.

2. With fifty 500 rupee notes, the ATM would have 25000 in 500 rupee notes. From the solution of the previous question, we know that when someone gives a preference of 500 rupee notes, the minimum number of notes to be given to that person in 500 rupee denominations is 8. Thus, since  $50/8$  gives us a quotient of 6, the ATM can maximum serve six customers who could have given their preference as 500 rupee notes.
3. The only constraint in this problem is the use of minimum 500 rupee notes so that the maximum number of customers can be services. If we use five notes of 500 rupees to service a customer, we would be able to cater to 10 customers ( $50/5 = 10$ ). Of course, you should be able to see that with 15 notes of 500 and 12 notes of 200 and 1 note of 100, we can make 5000 rupees without exceeding the number of notes beyond 20.

On the other hand if we try to use 4 notes of 500 each, we can still see that with  $4 \times 500 + 15 \times 200 = 5000$ , we can create the amount using less than 20 notes. However, if we try to use only three 500 rupee notes, we will not be able to create a sum of 5000 rupees using less than 20 notes ( $3 \times 500 + 17 \times 200 + 1 \times 100 = 5000$ , requires the use of 21 notes here). Thus, since we have a total of only 50, 500 rupee notes, the total number of customers who can be serviced by using less than 20 notes would be  $50/4 = 12$ . Option (b) is correct.

4. In order to service the given customers using the minimum number of notes, we should use 10 notes of 500 rupees each for the 50 customers who preferred 500 rupee notes. Also, for the fifty customers who preferred 100 rupee notes, the most optimal distribution would be  $10 \times$

$100 + 8 \times 500 = 5000$ . [Note: While doing this we need to remember that we would need to use more 100 rupee notes than 500 and 200 rupee notes combined.]

Thus, the total number of 500 rupee notes required is:  $50 \times 10 + 50 \times 8 = 500 + 400 = 900$ . Option (c) is correct.

### Questions 5 to 8:

We can make the following table to identify the scores of the individuals in the missing values. Note: In this table, DNQ is marked for those students who are not eligible for selection because they have scored less than 70% in two or more subjects.

|         | Composite Scores in Each Subject |         |         | Composite |
|---------|----------------------------------|---------|---------|-----------|
|         | DI (40)                          | WE (20) | GA (20) | Scores    |
| A       | 16                               | a       | 16      | 32+a      |
| B (DNQ) | b                                | 9       | 11      | 20+b      |
| C (DNQ) | 38                               | 4       | 12      | 54        |
| D       | 16                               | 15      | d       | 31+d      |
| E       | 24                               | 18      | 16      | 58        |
| F (DNQ) | 30                               | 7       | 10      | 47        |
| G       | 28                               | g       | 6       | 34+g      |
| H       | 10                               | h       | z       | 10+h+z    |
| I       | i                                | 8       | y       | 8+i+y     |
| J       | j                                | 16      | 14      | 30+j      |

If we now use the additional clues provided in the question we get the following deductions:

**Deduction 1 from Clue 2:** Ajay must have scored 19 or 20 in WE. This means that  $a = 19$  or  $20$ . His total score would hence be 51 or 52.

**Deduction 2 from clues 3 and 4:** Geeta and Indu were recruited. Also, Geeta had the least score amongst all the 4 recruited people. This means that Ester (E) with a score of 58 and who is not disqualified since she has scored above 70% in two subjects must also be selected. So, we know that G, I and E are selected.

**Deduction 3 from Clue 6:** Jatin's score in DI must be 100%. Hence, the value of j, in the above table would be 40 and Jatin's total score would be  $30 + j = 70$ . Hence, Jatin would be the fourth recruited person in the group.

**Deduction 4 from Clue 6:** Since Jatin has scored a composite score of

70, Indu must have a composite score of 60. This can occur in two ways-

- (i) She scores 100% in DI to get 40 and she scores 12 marks in GA. But this possibility is rejected since if she scores 12 in GA she would get disqualified from recruitment due to the 70% rule. Hence, she did not score 100% in DI.
- (ii) Consequently she must have scored 100% in GA and got a composite score of 32 in DI to score a composite score of 60.

**Deduction 4 from Clue 5:** Since Danish, Harini and Indu score the same marks in GA, Harini and Danish must also score 20 marks in GA.

**Deduction 5 from Deduction 4:** Since the total of Danish would become  $16 + 15 + 20 = 51$ , the total composite score of Ajay cannot be 51. Hence, Ajay must have scored 20 in WE.

Placing all these deductions into the composite score table we get (the four qualified people are marked in the table):

|         | Composite Scores in Each Subject |         |         | Com-<br>posite<br>Scores |
|---------|----------------------------------|---------|---------|--------------------------|
|         | DI (40)                          | WE (20) | GA (20) |                          |
| A       | 16                               | 20      | 16      | 52                       |
| B (DNQ) | b                                | 9       | 11      | 20+b                     |
| C (DNQ) | 38                               | 4       | 12      | 54                       |
| D       | 16                               | 15      | 20      | 51                       |
| E (Q)   | 24                               | 18      | 16      | 58                       |
| F (DNQ) | 30                               | 7       | 10      | 47                       |
| G (Q)   | 28                               | g       | 6       | 34+g                     |
| H       | 10                               | h       | 20      | 30+h                     |
| I (Q)   | 32                               | 8       | 20      | 60                       |
| J (Q)   | 40                               | 16      | 14      | 70                       |

We can now read the answers off this table:

5. Of the three statements, we can see that the first is true and the second is also true. The third statement can be seen to be false from the table. Hence, option (a) is correct.
6. Checking each option one at a time: For option (a) we can see that Harini's score maybe less equal or more than Falak's composite score of 47 (since, h can be below 17, equal to 17 or greater than 17.); In option (b) we can see that if Bala scored the same in DI as Jatin,

Bala would have a composite score of  $20 + 40 = 60$ , which is not possible since the problem tells us that no two people had the same composite score – and Indu has already got a composite score of 60. At this point, we can stop looking at the other options, since we have identified the statement that must be false. Hence, option (b) is the correct answer.

7. If Bala's composite score was less than Chetna's, it means that Bala must have a composite score that is less than 54. The maximum Bala can score in DI would be 26 (in composite score terms), since 28, 30 and 32 are already used up as composite scores in DI. Thus, Bala would score a maximum of  $26/2=13$  marks in DI.
8. If all candidates scored different marks in WE,  $g = 19$  so that Geeta qualifies with a composite score of 53 (she must score a composite score larger than 52 in order to beat Ajay, who is also in the race.) So, we see that the scores of 20, 19 and 18 are already taken. We cannot have  $h = 17$ , since that would create a duplicate composite score of 47 in the table. Next, we see that 16 and 15 have already been scored in WE. Thus, the maximum that Harini can score in WE is 14 marks.

### Questions 9 to 12:

Based on the clues in the data, the following table can be drawn:

|                 | <i>RESEARCH</i> | <i>TEACHING</i> | <i>ADMINISTRATION</i>  | <i>TOTAL</i> |
|-----------------|-----------------|-----------------|------------------------|--------------|
| Bureaucrats     | $3x$            | $3x$            | $4x$                   | $10x$        |
| Educationalists | $(a + b)/2$     | $a$             | $b$ (B greater than a) |              |
| Politicians     | $y$             | $y$             | $3y$                   |              |
|                 |                 |                 |                        |              |

At this point, we realise that the number of bureaucrats must be a multiple of 10, while the number of politicians must be a multiple of 5. This can only occur with the number of bureaucrats as 10, the number of politicians as 5 and the number of educationalists as 9 (to complete the total of 24 people).

The numbers in the table switch to:

|                 | <i>RESEARCH</i> | <i>TEACHING</i> | <i>ADMINISTRATION</i> | <i>TOTAL</i> |
|-----------------|-----------------|-----------------|-----------------------|--------------|
| Bureaucrats     | 3               | 3               | 4                     | 10           |
| Educationalists | 3               | 1 or 2          | 5 or 4                | 9            |
| Politicians     | 1               | 1               | 3                     | 5            |
|                 | 7               | 5 or 6          | 11 or 12              |              |

The answers can be read off this table then:

9. The size of the research committee is definitely more than the size of the teaching committee. Hence, the statement in option (c) is definitely false. Hence, option (c) is the correct answer.
10. There are 4 bureaucrats in the administration committee.
11. There are 3 educationalists in the research committee.
12. From amongst the four given options, only the size of the teaching committee cannot be determined uniquely. Hence, option (a) is correct.

### **Questions 13 to 16:**

Based on the information provided in the Pie chart, we can create the following table to show us the number of units sold in each month.

|           | 2016 | 2017                    |     |
|-----------|------|-------------------------|-----|
| January   | 80   | QUAR-<br>TER 1<br>(240) | 120 |
| February  | 60   |                         | 100 |
| March     | 100  |                         | 160 |
| April     | 40   | QUAR-<br>TER 2<br>(150) | 60  |
| May       | 50   |                         | 75  |
| June      | 60   |                         | 65  |
| July      | 75   | QUAR-<br>TER 3<br>(250) | 60  |
| August    | 120  |                         | 90  |
| September | 55   |                         | 70  |
| October   | 100  | QUAR-<br>TER 4<br>(360) | 150 |
| November  | 120  |                         | 170 |
| December  | 140  |                         | 180 |

This table has been made based on the following deductions:

1. The numbers in the months of April, May and June 2016 are in an Arithmetic Progression. With April being 40, the only way this can happen is if May and June are 50 and 60 respectively to give a total of 150.
2. Similar thinking gives us that the sales numbers for October, November and December would be 100, 120 and 140 respectively.
3. For 2017, the only missing numbers are for August – which can be easily derived as:  $220 - 60 - 70 = 90$  & December – which can be easily derived as  $500 - 150 - 170 = 180$ .

Based on the above table, the questions can be solved directly.

13. The sales of December grows from 140 to 180 from 2016 to 2017. That is an increase of 40 on 140, which corresponds to 28.57%. Option

(b) is correct.

14. The highest percentage increase can be seen to occur in the first quarter (it grows from 240 in 2016 to 380 in 2017 which is greater than the percentage increases in the second and the fourth quarters.) Hence, option (a) is correct.
15. Q2 of 2016 drops from 240 to 150 – a drop of 30-40%. Q2 of 2017 drops from 380 to 200, a drop of 40–50%. The quarters mentioned in the other options are actually showing an increase instead of a drop. Hence, Q2 of 2017 shows the highest percentage decrease in sales when compared to the previous quarter. Hence, option (c) is correct.
16. It can be clearly seen that the percentage increase in sales is the highest in October of 2017 (September 2017) as it is more than doubling when it goes from 70 to 150. All other months mentioned in the options have a smaller percentage increase in sales as compared to this. Hence, option (d) is correct.

**Directions for Questions 1 to 4:** *The base exchange rate of a currency X with respect to a currency Y is the number of units of currency Y which is equivalent in value to one unit of currency X. Currency exchange outlets buy currency at buying exchange rates that are lower than base exchange rates, the sell currency at selling exchange rates that are higher than base exchange rates.*

A currency exchange outlet uses the local currency L to buy and sell three international currencies A, B, and C but does not exchange one international currency directly with another. The base exchange rates of A, B and C with respect to L are in the ratio 100:120:1. The buying exchange rates of each of A, B, and C with respect to L are 5% below the corresponding base exchange rates, the their selling exchange rates are 10% above their corresponding base exchange rates.

The following facts are known about the outlet on a particular day:

1. The amount of L used by the outlet to buy C equals the amount of L it received by selling C.
2. The amounts of L used by the outlet to buy A and B are in the ratio 5:3.
3. The amounts of L the outlet received from the sales of A and B are in the ratio 5:9.
4. The outlet received 88000 units of L by selling A during the day.
5. The outlet started the day with some amount of L, 2500 units of A, 4800 units of B, and 48000 units of C.
6. The outlet ended the day with some amount of L, 3300 units of A, 4800 units of B, and 51000 units of C.

1. How many units of currency A did the outlet buy on that day?
2. How many units of currency C did the outlet sell on that day?
  - (a) 3000
  - (b) 6000
  - (c) 19000
  - (d) 22000
3. What was the base exchange rate of currency B with respect to currency L on that day?
4. What was the buying exchange rate of currency C with respect to currency L on that day?
  - (a) 0.95
  - (b) 1.1
  - (c) 1.90
  - (d) 2.20

**Directions for Questions 5 to 8:** An agency entrusted to accredit colleges looks at four parameters: faculty quality ( $F$ ), reputation ( $R$ ), placement quality ( $P$ ), and infrastructure ( $I$ ). The four parameters are used to arrive at an overall score, which the agency uses to give an accreditation to the colleges. In each parameter, there are five possible letter grades given, each carrying certain points: A (50 points), B (40 points), C (30 points), D (20 points), and F (0 points). The overall score for a college is the weighted sum of the points scored in the four parameters. The weights of the parameters are 0.1, 0.2, 0.3 and 0.4 in some order, but the order is not disclosed. Accreditation is awarded based on the following scheme:

| <b>Range</b>                   | <b>Accreditation</b> |
|--------------------------------|----------------------|
| Overall score $\geq 45$        | AAA                  |
| $35 \leq$ overall score $< 45$ | BAA                  |
| $25 \leq$ overall score $< 35$ | BBA                  |
| $15 \leq$ overall score $< 25$ | BBB                  |
| Overall score $< 15$           | Junk                 |

Eight colleges apply for accreditation, and receive the following grades in the four parameters ( $F$ ,  $R$ ,  $P$ , and  $I$ ):

|                | <i>F</i> | <i>R</i> | <i>P</i> | <i>I</i> |
|----------------|----------|----------|----------|----------|
| A-one          | A        | A        | A        | B        |
| Best Ed        | B        | C        | D        | D        |
| Cosmo-politan  | B        | D        | D        | C        |
| Domi-nance     | D        | D        | B        | C        |
| Educa-tion Aid | A        | A        | B        | A        |
| Fancy          | A        | A        | B        | B        |
| Global         | C        | F        | D        | D        |
| High Q         | C        | D        | D        | B        |

It is further known that in terms of overall scores:

1. High Q is better than Best Ed;
2. Best Ed is better than Cosmopolitan; and
3. Education Aid is better than A-one.
5. What is the weight of the faculty quality parameter?
  - (a) 0.1
  - (b) 0.2
  - (c) 0.3
  - (d) 0.4
6. How many colleges receive the accreditation of AAA?
7. What is the highest overall score among the eight colleges?
8. How many colleges have overall scores between 31 and 40, both inclusive?
  - (a) 0
  - (b) 1
  - (c) 2
  - (d) 3

**Directions for Questions 9 to 12:** There are only four brands of entry level smartphones called Azra, Bysi, Cxqi, and Dipq in a country. Details about their market share, unit selling price, and profitability (defined as the profit as a percentage of the revenue) for the year 2016 are given in the table

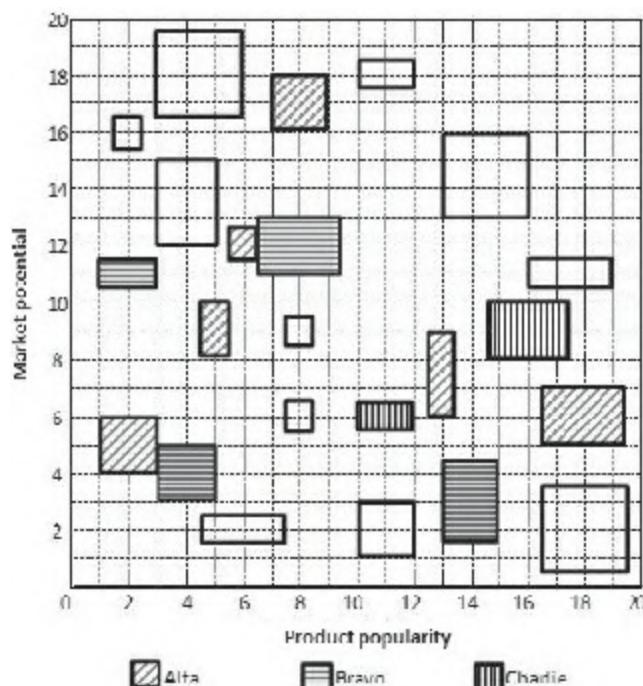
*below:*

| <i>Brand</i> | <i>Market share (%)</i> | <i>Unit Selling Price (Rs.)</i> | <i>Profitability (%)</i> |
|--------------|-------------------------|---------------------------------|--------------------------|
| Azra         | 40                      | 15,000                          | 10                       |
| Bysi         | 25                      | 20,000                          | 30                       |
| Cxqi         | 15                      | 30,000                          | 40                       |
| Dipq         | 20                      | 25,000                          | 30                       |

In 2017, sales volume of entry level smartphones grew by 40% as compared to that in 2016. Cxqi offered a 40% discount on its unit selling price in 2017, which resulted in a 15% increase in its market share. Each of the other three brands lost 5% market share. However, the profitability of Cxqi came down to half of its value in 2016. The unit selling prices of the other three brands and their profitability values remained the same in 2017 as they were in 2016.

9. The brand that had the highest revenue in 2016 is:
  - (a) Azra
  - (b) Bysi
  - (c) Cxqi
  - (d) Dipq
10. The brand that had the highest profit in 2016 is:
  - (a) Azra
  - (b) Bysi
  - (c) Cxqi
  - (d) Dipq
11. The brand that had the highest profit in 2017 is:
  - (a) Azra
  - (b) Bysi
  - (c) Cxqi
  - (d) Dipq
12. The complete list of brands whose profits went up in 2017 from 2016 is:
  - (a) Azra, Bysi, Cxqi
  - (b) Bysi, Cxqi, Dipq
  - (c) Cxqi, Azra, Dipq
  - (d) Azra, Bysi, Dipq

**Directions for Questions 13 to 16:** Each of the 23 boxes in the picture below represents a product manufactured by one of the following three companies: Alfa, Bravo and Charlie. The area of a box is proportional to the revenue from the corresponding product, while its centre represents the product popularity and market potential scores of the product (out of 20). The shadings of some of the boxes have got erased.



The companies classified their products into four categories based on a combination of scores (out of 20) on the two parameters – product popularity and market potential as given below:

|                          | Promising | Blockbuster | Doubtful  | No-hope   |
|--------------------------|-----------|-------------|-----------|-----------|
| Product popularity score | $> 10$    | $> 10$      | $\leq 10$ | $\leq 10$ |
| Market potential score   | $> 10$    | $\leq 10$   | $> 10$    | $\leq 10$ |

The following facts are known:

1. Alfa and Bravo had the same number of products in the Blockbuster category.
2. Charlie had more products than Bravo but fewer products than Alfa in the No-hope category.

3. Each company had an equal number of products in the Promising category.
  4. Charlie did not have any product in the doubtful category, while Alfa had one product more than Bravo in this category.
  5. Bravo had a higher revenue than Alfa from products in the Doubtful category.
  6. Charlie had a higher revenue than Bravo from products in the blockbuster category.
  7. Bravo and Charlie had the same revenue from products in the no-hope category.
  8. Alfa and Charlie had the same total revenue considering all products.
13. Considering all companies' products, which product category had the highest revenue?
- (a) Promising
  - (b) Doubtful
  - (c) Blockbuster
  - (d) No-Hope
14. Which of the following is the correct sequence of numbers of products Bravo had in no-hope, Doubtful, Promising and blockbuster categories respectively?
- (a) 2,3,1,2
  - (b) 1,3,1,3
  - (c) 1,3,1,2
  - (d) 3,3,1,2
15. Which of the following statements is NOT correct?
- (a) Alfa's revenue from blockbuster products was the same as Charlie's revenue from promising products
  - (b) Bravo and Charlie had the same revenues from No-hope products
  - (c) The total revenue from no-hope products was less than the total revenue from doubtful products
  - (d) Bravo's revenue from blockbuster products was greater than Alfa's revenue from Doubtful products
16. If the smallest box on the grid is equivalent to revenue of Rs. 1 crore,

then what approximately was the total revenue of Bravo in Rs. Crore?

- (a) 24
  - (b) 30
  - (c) 34
  - (d) 40
- 

## ANSWER KEY

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- 1. 1200
  - 2. (c)
  - 3. 240
  - 4. (c)
  - 5. (a)
  - 6. 3
  - 7. 48
  - 8. (a)
  - 9. (a)
  - 10. (c)
  - 11. (b)
  - 12. (d)
  - 13. (c)
  - 14. (c)
  - 15. (d)
  - 16. (c)
- 

## SOLUTIONS

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### Questions 1 To 4:

The information given to us talks about the base exchange rates of the three currencies being 100:120:1 with respect to currency L. Let the actual currency exchange rates be  $100n$ ,  $120n$  and  $n$  respectively.

We can make the buying and selling exchange rates based on the

information provided in the question:

|                 | Currency A |         | Currency B |         | Currency C |         |
|-----------------|------------|---------|------------|---------|------------|---------|
|                 | Buying     | Selling | Buying     | Selling | Buying     | Selling |
| Price           | 95n        | 110n    | 114n       | 132n    | 0.95n      | 1.10n   |
| Number of units | A          | D       | B          | E       | C          | S       |

According to the clues:

1. If the outlet bought 'C' units of C and sold 'S' units of C:  $0.95 \times n \times C = 1.10 \times n \times S \rightarrow S/C = 0.95/1.10 = 19/22$ .
2. Let the purchase of A be A and the purchase of B be B, then from the clue we have:  $(95 \times n \times A)/(114 \times n \times B) = 5/3 \rightarrow A/B = 2/1$ .
3.  $(110 \times n \times D)/(132 \times n \times E) = 5/9 \rightarrow D/E = 2/3$ .

Based on these deductions the table would convert as follows:

|  | Currency A |         | Currency B |         | Currency C |         |
|--|------------|---------|------------|---------|------------|---------|
|  | Buying     | Selling | Buying     | Selling | Buying     | Selling |
| Price  | 95n        | 110n    | 114n       | 132n    | 0.95n      | 1.10n   |
| Number of units  | 2y         | 2z      | y          | 3z      | 22x        | 19x     |
| Total amount of L used or collected while buying and selling | 190ny      | 220nz   | 114ny      | 396nz   | 20.9nx     | 20.9nx  |

The question tells us that the amount of L received by selling A during the day is: 88000. This means that  $220nz = 88000 \rightarrow nz = 400$ .

From Clues 5 and 6 we can see that the number of units of A grew from 2500 to 3300  $\rightarrow 2y - 2z = 800 \rightarrow y - z = 400$ . The number of units of B bought and sold must be equal since the number of units of B, at the start and the end of the day were equal. This means  $y = 3z$ . From these two equations, we can see that  $z = 200$  and  $y = 600$ .

Further, since the number of units of C increased by 3000 during the day, we can determine that  $C_{\text{bought}} - C_{\text{sold}} = 22x - 19x = 3000 \rightarrow x = 1000$ .

Also, since the clue 4 gives us that the outlet received 88000 units of L by selling A, we get that  $220nz = 88000$ . Since we know that  $n = 200$ , we get:  $n = 2$ .

We can insert all these values in the table to get a new table as follows:

|                 | Currency A |         | Currency B |         | Currency C |         |
|-----------------|------------|---------|------------|---------|------------|---------|
|                 | Buying     | Selling | Buying     | Selling | Buying     | Selling |
| Price           | 190        | 220     | 228        | 264     | 1.9        | 2.2     |
| Number of units | 1200       | 400     | 600        | 600     | 22000      | 19000   |

The answers can be read off the table:

1. 1200 units of A were bought
2. 19000 units of C were sold. Option (c) is correct.
3. The buying price of B is 228. This means that the base price would be:  $228/0.95 = 240$ . The base exchange rate of B on that day was 240.
4. The buying exchange rate of C was 1.9. Option (c) is correct.

### Questions 5 to 8:

This question is based on weighted averages – and the key hurdle is to allocate the correct weights to the correct parameters. The four parameters F,R,P and I have to get weights of 0.1, 0.2, 0.3 and 0.4 allocated to them – in random order.

The keys to solving this question set are given in the clues at the end of the question. Let us try to make our deductions based on what is given in these clues:

**Set of deductions from the use of Clue 1:** The first thing we should do is to convert the grades of Best Ed and High Q into numbers:

|             | F  | R  | P  | I  |
|-------------|----|----|----|----|
| Best Ed (B) | 40 | 30 | 20 | 20 |
| High Q (H)  | 30 | 20 | 20 | 40 |

Comparing B and H: Best Ed has a higher rating (by 10 points each) in F and R while High Q has a higher rating in I (by 20 points). Since, the problem says that High Q is better than Best Ed, the weights that need to be allocated to F, R, P and I should be such that the margin by which H is higher in I, should be greater than the sum of the margins by which B is higher in F and R.

This shows us that, if we put the weight on parameter I as 0.1 or 0.2, the positive margin gained by High Q would be only 2 or 4 in these two cases. This positive margin would not be sufficient to overcome the negative margins created under F and R. Sample this:

If we allocate 0.1 to I, we would need to allocate a minimum of 0.2

and 0.3 to F and R. The positive difference under parameter  $I = 0.1 \times 20 = 2$ ; The negative difference under F and R would be  $0.2 \times 10 + 0.3 \times 10 = 5$ . Since, the negative differences are larger, High Q's net score would be smaller than Best Ed, which is a contravention of the first clue.

Similarly, we can see that we cannot use 0.2 as the weightage of I. (Same problem would occur – you would not be able to get the score of High Q to be greater than the score of Best Ed).

Thus, from this clue, we conclude that the weightage of I cannot be 0.1 or 0.2.

However, if we put I as 0.3 or 0.4, it is possible for certain combinations that High Q has a higher score than Best Ed. Thus, the weightage of Parameter  $I = 0.3$  or  $0.4$ .

### **Next we move to the use of Clue 2:**

|              | <i>F</i> | <i>R</i> | <i>P</i> | <i>I</i> |
|--------------|----------|----------|----------|----------|
| Best Ed (B)  | 40       | 30       | 20       | 20       |
| Cosmopolitan | 40       | 20       | 20       | 30       |

In this case, we can see that: Since Best Ed > Cosmopolitan, the weightage of R should be greater than the weightage of I.

Combining this information from here to our earlier deduction that the weightage of I should be 0.3 or 0.4 only, we can conclude that the weightage of I cannot be 0.4 (as that would leave us with no option of putting the weightage of R as greater than the weightage of I).

Thus, the weightage of I = 0.3 and the weightage of R = 0.4. The weightage of F would need to be 0.1 (as only then would High Q be greater than Best Ed). And P = 0.2

By inserting these weightages and the points instead of grades on the table we will get the answers to the questions asked:

| COLLEGE       | F (0.1) | R (0.4) | P (0.2) | I (0.3) |
|---------------|---------|---------|---------|---------|
| A One         | 50      | 50      | 50      | 40      |
| Best Ed       | 40      | 30      | 20      | 20      |
| Cosmopolitan  | 40      | 20      | 20      | 30      |
| Dominance     | 20      | 20      | 40      | 30      |
| Education Aid | 50      | 50      | 40      | 50      |
| Fancy         | 50      | 50      | 40      | 40      |
| Global        | 30      | 0       | 20      | 20      |
| High Q        | 30      | 20      | 20      | 40      |

5. F has a weightage of 0.1. Option (a) is correct.
6. AAA accreditation would be given to A One ( $0.7 \times 50 + 0.3 \times 40 = 35 + 12 = 47$ ) ; Education Aid ( $0.8 \times 50 + 0.2 \times 40 = 40 + 8 = 48$ ); Fancy ( $0.5 \times 50 + 0.5 \times 40 = 45$ ). Three colleges receive AAA accreditation.
7. The highest score is for Education Aid and is equal to 48 (as calculated in the previous question).
8. It can be seen that none of the colleges has an overall score between 31 and 40. Hence, option (a) is correct.

### Questions 9 to 12:

Based on the information given, we can create table with some of the derived variables as shown below. In this table, we have assumed that the total market was only for 100 units:

**Note:** These numbers are for 2017

| Brand           | Sales volume (assuming 100 units sold) | Unit Selling Price | Revenue | Profit |
|-----------------|--|--------------------|---------|--------|
| Azra            | 40                                     | 15000              | 600000  | 60000  |
| Bysi            | 25                                     | 20000              | 500000  | 150000 |
| Cxqi            | 15                                     | 30000              | 450000  | 180000 |
| Dipq            | 20                                     | 25000              | 500000  | 150000 |
| <b>For 2018</b> |  |                    |         |        |
|                 | Total Units Sold = 140                 |                    |         |        |
| Azra            | 49                                     | 15000              | 735000  | 73500  |
| Bysi            | 28                                     | 20000              | 560000  | 168000 |
| Cxqi            | 42                                     | 18000              | 736000  | 147200 |
| Dipq            | 21                                     | 25000              | 525000  | 157500 |

All the answers can be read off this table:

9. Azra had the highest revenue. Option (a) is correct.
10. Cxqi had the highest profit in 2016 as can be seen from the table. Option (c) is correct.
11. Bysi had the highest profit in 2017 as seen from the table. Option (b) is correct.
12. It can be seen that apart from Cxqi, each of Azra, Bysi and Dipq have increased their profits. Hence, option (d) is correct.

### Questions 13 to 16:

It can be seen that there are:

- (a) 7 products in the Doubtful category. Out of these, Alfa = 2, Bravo = 2, Undetermined = 3;
- (b) 6 products in the No – hope category. Out of these, Alfa = 2, Bravo = 1, Undetermined = 3;
- (c) 7 products in the Blockbuster category. Out of these, Alfa = 2, Bravo = 1, Charlie = 2 and Undetermined = 2;
- (d) 3 products in the Promising category. Out of these, Undetermined = 3;

These deductions can be tabulated as under:

| Category        | Alfa | Bravo | Charlie | Un-deter-mined |
|-----------------|------|-------|---------|----------------|
| Doubtful (7)    | 2    | 2     |         | 3              |
| No – Hope (6)   | 2    | 1     |         | 3              |
| Blockbuster (7) | 2    | 1     | 2       | 2              |
| Promising       |      |       |         | 3              |

To this basic information we now need to start adding the clues given in the question:

**Clue 1:** The blockbuster category gets completely determined as Alfa = 2, Bravo = 2, Charlie = 3

**Clue 2:** The No – Hope category gets completely determined as Alfa = 3, Bravo = 1 and Charlie = 2.

**Clue 3:** The promising category gets determined as: Alfa = 1, Bravo = 1 and Charlie = 1.

**Clue 4:** The Doubtful category gets completely determined as: Alfa = 4, Bravo = 3 and Charlie = 0.

The table transforms into:

| <i>Category</i> | <i>Alfa</i> | <i>Bravo</i> | <i>Charlie</i> |
|-----------------|-------------|--------------|----------------|
| Doubtful (7)    | 4           | 3            | 0              |
| No – Hope (6)   | 3           | 1            | 2              |
| Blockbuster (7) | 2           | 2            | 3              |
| Promising       | 1           | 1            | 1              |

In order to make sense of the remaining clues, we need to use the information given to us that the revenue of a product is proportional to the area in the box that represents it.

**Using Clue 5 (Doubtful):** The revenue of Alfa is proportional to the area of the box. So for the two boxes pre – determined with respect to their belonging to Alfa, their area total =  $4 + 1 = 5$ , while for Bravo it is  $6 + 2 = 8$ . The three undetermined boxes have areas = 1, 6 and 9.

These would go two to Alfa and one to Bravo. The box with area 9, can only be belonging to Bravo.

So, Alfa =  $1 + 4$  (known earlier) +  $1 + 6 = 12$

Bravo =  $2 + 6$  (known earlier) +  $9 = 17$ .

**Using Clue 6 (Blockbuster):** Alfa's initial value of area in the Blockbuster category =  $3 + 6 = 9$ .

Bravo's initial value of area in the Blockbuster category = 6.

Charlie's initial value of area in the Blockbuster category =  $2 + 6 = 8$ .

There are two unmarked boxes in the Blockbuster category. From the tables above, it is clear that one should go to Bravo and another to Charlie.

The unmarked boxes have areas 9 and 4. Since, Charlie's revenue is higher than Bravo, we can clearly see that the box with an area 9 has to be allotted to Charlie and the box with area 4 should be allotted to Bravo. The final break up of this category would be:

Alfa:  $3 + 6 = 9$ ; Bravo  $6 + 4 = 10$ ; Charlie:  $2 + 6 + 9 = 17$ .

**Using Clue 7 and the tables (No – Hope):** There are three unmarked boxes in the No – Hope Category. These boxes have areas of 3, 1 and 1 respectively. From the tables, it is clear that two of the unmarked boxes should go to Charlie and one to Alfa. Also, since Bravo and

Charlie had the same total revenue and we know that the only box for Bravo has an area of 4, it means that the two boxes Charlie gets should be having areas 3 and 1. Since there are two boxes with an area of 1, we cannot determine which box of area 1 goes to Charlie and which one goes to Alfa. Thus, the No – Hope category would have a distribution of:

$$\text{Alfa: } 4 + 2 + 1 = 7; \text{ Bravo: } 4; \text{ Charlie: } 3 + 1 = 4.$$

**Using Clue 8 (Promising category determination):** From the tables, we know that for the Promising category, one unmarked box each should go to Alfa, Bravo and Charlie. If Alfa and Charlie had the same total revenue, we first need to look at their revenues in the first three categories that we have determined earlier.

$$12 + 9 + 7 + \text{Alfa}_{\text{Promising}} = 0 + 4 + 17 + \text{Charlie}_{\text{Promising}}$$

We can see that in the promising category, Charlie should be 7 more than Alfa. Since the Promising category has three unmarked boxes, with areas of 2, 3 and 9, it means that in the Promising category:

$$\text{Alfa} = 2; \text{ Bravo} = 3 \text{ and } \text{Charlie} = 9.$$

The answers can now be read off from the above deductions.

13. The total revenue is maximum for Blockbuster (36). Option (c) is correct.
14. From the second table, we can see that Bravo had 1, 3, 1 and 2 products respectively in the categories mentioned. Option (c) is correct.
15. Option (d) is not correct as Bravo's revenues from Blockbuster products was lower than Alfa's revenues from Doubtful products. Hence, option (d) is the correct answer.
16. The total revenue of Bravo would be: 10 (Blockbuster) + 17 (Doubtful) + 4 (No – Hope) + 3 (Promising) = 34. Hence, option (c) is correct.

**3**

## CAT 2017 Slot 1

**Directions for Questions 1 to 4:** A study to look at the early learning of rural kids was carried out in a number of villages spanning three states, chosen from the North East (NE), the West (W) and the South (S). 50 four-year old kids each were sampled from each of the 150 villages from NE, 250 villages from W and 200 villages from S. It was found that of the 30000 surveyed kids 55% studied in primary schools run by government (G), 37% in private schools (P) while the remaining 8% did not go to school (O).

The kids surveyed were further divided into two groups based on whether their mothers dropped out of school before completing primary education or not. The table below gives the number of kids in different types of schools for mothers who dropped out of school before completing primary education:

|       | G     | P    | O    | Total |
|-------|-------|------|------|-------|
| NE    | 4200  | 500  | 300  | 5000  |
| W     | 4200  | 1900 | 1200 | 7300  |
| S     | 5100  | 300  | 300  | 5700  |
| Total | 13500 | 2700 | 1800 | 18000 |

It is also known that:

1. In S, 60% of the surveyed kids were in G. Moreover, In S, all surveyed kids whose mothers had completed primary education were in school.
2. In NE, among the O kids, 50% had mothers who had dropped out before completing primary education.
3. The number of kids in G in NE was the same as the number of kids in G in W.

1. What percentage of kids from S were studying in P?

  - (a) 37%
  - (b) 6%
  - (c) 79%
  - (d) 56%
2. Among the kids in W whose mothers had completed primary education, how many were not in school?

  - (a) 300
  - (b) 1200
  - (c) 1050
  - (d) 1500
3. In a follow up survey of the same kids two years later, it was found that all the kids were now in school of the kids who were not in school earlier, in one region, 25% were in G now, whereas the rest were enrolled in R in the second region, all such kids were in G now; while in the third region, 50% of such kids had now joined G while the rest had joined P. As a result, in all three regions put together, 50% of the kids who were earlier out of school had joined G. It was also seen that no surveyed kid had changed schools.

What number of the surveyed kids now were in G in W?

- (a) 6000
  - (b) 5250
  - (c) 6750
  - (d) 6300
4. In a follow up survey of the same kids two years later, it was found that all the kids were now in school. Of the kids who were not in school earlier, in one region. 25% were in G now, whereas the rest were enrolled in P; in the second region, all such kids were in G now; while in the third region, 50% of such kids had now joined G while the rest had joined P. As a result, in all three regions put together, 50% of the kids who were earlier out of school had joined G. It was also seen that no surveyed kid had changed schools.

What percentage of the surveyed kids in S, whose mothers had dropped out before completing primary education, were in G now?

- (a) 94.7%
- (b) 89.5%
- (c) 93.4%
- (d) Cannot be determined from the given information

**Directions for Questions 5 to 8:** Applicants for the doctoral programmes of Ambi Institute of Engineering (AIE) and Bambi Institute of Engineering (BIE) have to appear for a Common Entrance Test (CET). The test has three sections: Physics (P), Chemistry (C), and Maths (M). Among those appearing for CET, those at or above the 80th percentile in at least two sections, and at or above the 90th percentile overall, are selected for Advanced Entrance Test (AET) conducted by AIE. AET is used by AIE for final selection.

For the 200 candidates who are at or above the 90th percentile overall based on CET, the following are known about their performance in CET:

1. No one is below the 80th percentile in all 3 sections.
2. 150 are at or above the 80th percentile in exactly two sections.
3. The number of candidates at or above the 80th percentile only in P is the same as the number of candidates at or above the 80th percentile only in C. The same is the number of candidates at or above the 80th percentile only in M.
4. Number of candidates below 80th percentile in P: Number of candidates below 80th percentile in C: Number of candidates below 80th percentile in M = 4: 2: 1.

BIE uses a different process for selection. If any candidate is appearing in the AET by AIE, BIE considers their AET score for final selection provided the candidate is at or above the 80th percentile in P. Any other candidate at or above the 80th percentile in P in CET, but who is not eligible for the AET, is required to appear in a separate test to be conducted by BIE for being considered for final selection. Altogether, there are 400 candidates this year who are at or above the 80th percentile in P.

5. What best can be concluded about the number of candidates sitting for the separate test for BIE who were at or above the 90th percentile

overall in CET?

- (a) 3 or 10
  - (b) 10
  - (c) 5
  - (d) 7 or 10
6. If the number of candidates who are at or above the 90th percentile overall and also at or above the 80th percentile in all three sections in CET is actually a multiple of 5, what is the number of candidates who are at or above the 90th percentile overall and at or above the 80th percentile in both P and M in CET?
7. If the number of candidates who are at or above the 90th percentile overall and also at or above the 80th percentile in all three sections in CET is actually a multiple of 5, then how many candidates were shortlisted for the AET for AIE?
8. If the number of candidates who are at or above the 90th percentile overall and also are at or above the 80th percentile in P in CET, is more than 100, how many candidates had to sit for the separate test for BIE?
- (a) 299
  - (b) 310
  - (c) 321
  - (d) 330

**Directions for Questions 9 to 12:** *Healthy Bites is a fast food joint serving three items: burgers, fries and ice cream. It has two employees Anish and Bani who prepare the items ordered by the clients. Preparation time is 10 minutes for a burger and 2 minutes for an order of ice cream. An employee can prepare only one of these items at a time. The fries are prepared in an automatic fryer which can prepare up to 3 portions of fries at a time, and takes 5 minutes irrespective of the number of portions. The fryer does not need an employee to constantly attend to it, and we can ignore the time taken by an employee to start and stop the fryer; thus, an employee can be engaged in preparing other items while the frying is on. However fries cannot be prepared in anticipation of future orders.*

Healthy Bites wishes to serve the orders as early as possible. The individual items in any order are served as and when ready; however, the order is considered to be completely served only when all the items of that order are served.

The table below gives the orders of three clients and the times at which they placed their orders:

| <b>Client no.</b> | <b>Time</b> | <b>Order</b>  |
|-------------------|-------------|---|
| 1                 | 10:00       | 1 burger, 3 portions of fries, 1 order of ice cream |
| 2                 | 10:05       | 2 portions of fries, 1 order of ice cream           |
| 3                 | 10:07       | 1 burger, 1 portion of fries                        |

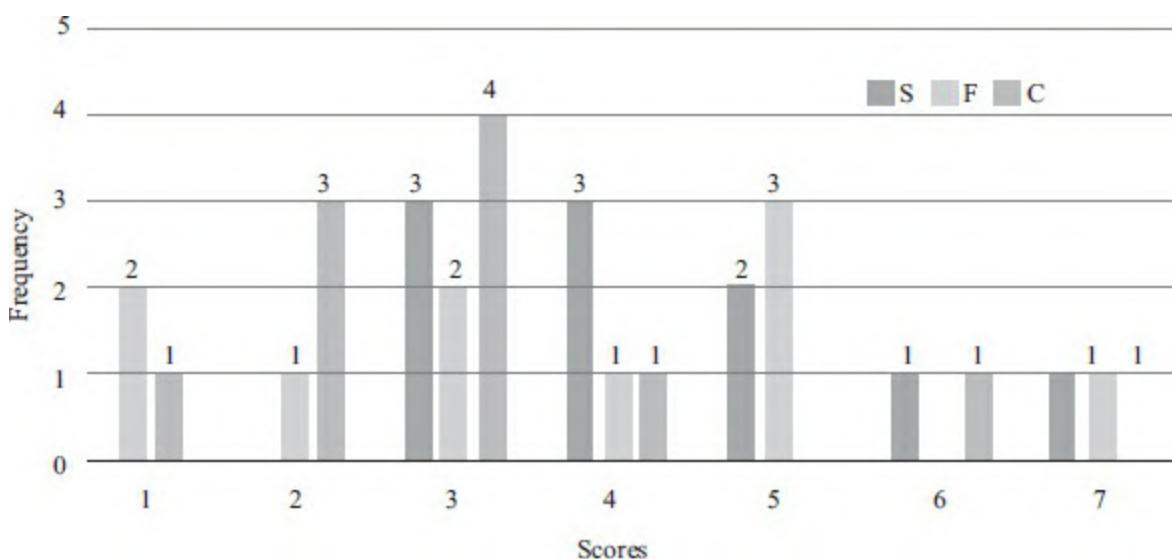
9. Assume that only one client's order can be processed at any given point of time. So, Anish or Bani cannot start preparing a new order while a previous order is being prepared. At what time is the order placed by Client 1 completely served?
  - (a) 10:17
  - (b) 10:10
  - (c) 10:15
  - (d) 10:20
10. Assume that only one client's order can be processed at any given point of time. So, Anish or Bani cannot start preparing a new order while a previous order is being prepared. At what time is the order placed by Client 3 completely served?
  - (a) 10:35
  - (b) 10:22
  - (c) 10:25
  - (d) 10:17
11. Suppose the employees are allowed to process multiple orders at a time, but the preference would be to finish orders of clients who placed their orders earlier. At what time is the order placed by Client 2 completely served?
  - (a) 10:10
  - (b) 10:12
  - (c) 10:15

- (d) 10:17
12. Suppose the employees are allowed to process multiple orders at a time, but the preference would be to finish orders of clients who placed their orders earlier. Also assume that the fourth client came in only at 10:35. Between 10:00 and 10:30, for how many minutes is exactly one of the employees idle?
- (a) 7  
 (b) 10  
 (c) 15  
 (d) 23

**Directions for Questions 13 to 16:** Simple Happiness index (SHI) of a country is computed on the basis of three parameters: social support(S), freedom to life choices (F) and corruption perception (C). Each of these three parameters is measured on a scale of 0 to 8 (integers only). A country is then categorised based on the total score obtained by summing the scores of all the three parameters, as shown in the following table:

| Total Score | 0–4          | 5–8     | 9–13    | 14–19 | 20–24      |
|-------------|--------------|---------|---------|-------|------------|
| Category    | Very Unhappy | Unhappy | Neutral | Happy | Very Happy |

Following diagram depicts the frequency distribution of the scores in S, F and C of 10 countries –Amda, Benga, Calla, Delma, Eppa, Varsa, Wanna, Xanda, Yanga and Zooma:



Further, the following are known:

1. Amda and Calla jointly have the lowest total score, 7, with identical scores in all the three parameters.
  2. Zooma has a total score of 17.
  3. All the 3 countries, which are categorised as happy, have the highest score in exactly one parameter.
- 13.** What is Amda's score in F?
- 14.** What is Zooma's score in S?
- 15.** Benga and Delma, two countries categorized as happy, are tied with the same total score. What is the maximum score they can have?
- (a) 14
  - (b) 15
  - (c) 16
  - (d) 17
- 16.** If Benga scores 16 and Delma scores 15, then what is the maximum number of countries with a score of 13?
- (a) 0
  - (b) 1
  - (c) 2
  - (d) 3

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## ANSWER KEY

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1. (b)
2. (c)
3. (b)
4. (a)
5. (c)
6. (d)
7. (d)
8. (a)
9. (c)

- 
- 10. (2)
  - 11. (90)
  - 12. 20 lacs
  - 13. (d)
  - 14. (19)
  - 15. (3)
  - 16. (d)
- 

## SOLUTIONS

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### Questions 1 to 4:

Let us take a look at the solution to this set as a series of reactions one should have while going through the question:

**Reaction 1:** From the first paragraph second sentence: “50 four – year old kids each were sampled from each of the 150 villages from NE, 250 villages from W and 200 villages from S” we know that:

Total kids surveyed from NE =  $150 \times 50 = 7500$ ; W =  $250 \times 50 = 12500$  and S =  $200 \times 50 = 10000$ . So total kids surveyed =  $7500 + 12500 + 10000 = 30000$ .

**Reaction 2:** From the statement: “It was found that of the 30000 surveyed kids 55% studied in primary schools run by government (G), 37% in private schools (P) while the remaining 8% did not go to school (O)”, we can get that: Number of kids surveyed who were in G = 55% of 30000 = 16500; P = 37% of 30000 = 11100 & O = 8% of 30000 = 2400.

**Reaction 3:** Once we read the information about the table and in the table: We should realize that there is a two way split of the 30000 surveyed kids viz: Kids whose mothers had completed primary education & Kids whose mothers had not completed primary education. If you look at the table given, it is for kids whose mothers had not completed primary education:

|       | G     | P    | O    | Total |
|-------|-------|------|------|-------|
| NE    | 4200  | 500  | 300  | 5000  |
| W     | 4200  | 1900 | 1200 | 7300  |
| S     | 5100  | 300  | 300  | 5700  |
| Total | 13500 | 2700 | 1800 | 18000 |

Based on this table and the overall figures of kids in various categories, we can determine the following table for kids whose mothers had completed primary education: **Note:** These numbers in the table are derived by using the total numbers for each category. For instance, the Number of kids in ‘G’ in the second table is found to be 3000, because we know that the total number of kids in G is 16500 and out of those, 13500 had mothers who had not completed Primary education and hence,  $16500 - 13500 = 3000$  would be kids in G whose mothers had completed primary education. Similar deductions give us the following values that have been used to fill the table at this point, for kids whose mothers had not completed primary education:

Kids in P =  $11100 - 2700 = 8400$ ; Kids in O =  $2400 - 1800 = 600$ ; Kids in Total =  $30000 - 18000 = 12000$ ; Kids in NE =  $7500 - 5000 = 2500$ ; Kids in W =  $12500 - 7300 = 5200$ ; Kids in S =  $10000 - 5700 = 4300$ .

|       | G    | P    | O   | TOTAL |
|-------|------|------|-----|-------|
| NE    |      |      |     | 2500  |
| W     |      |      |     | 5200  |
| S     |      |      |     | 4300  |
| TOTAL | 3000 | 8400 | 600 | 12000 |

From this point, if we use the clues provided in the text, we can determine each of the values in the table as follows:

**Reaction 4:** Filling the S row in the mothers completed primary education table: In S, 60% of the surveyed kids were in G → Total ‘G’ kids of S = 60% of 10000 = 6000. Also, since we know that the kids in S ‘whose mothers had not completed primary education’ was 5100, the kids in S whose mothers had completed primary education & were in G =  $6000 - 5100 = 900$ .

Moreover, In S, all surveyed kids whose mothers had completed primary education were in school → Kids in S whose mothers had completed primary education and were out of school ‘O’ = 0. The

remaining number in S (for the P column) for kids whose mothers had completed primary education =  $4300 - 900 - 0 = 3400$ .

**Reaction 5:** From the clue: ‘In NE, among the O kids, 50% had mothers who had dropped out before completing primary education’, we should deduce that in NE, the number of kids in O was equally split (50% – 50%) between those whose mothers had completed primary education and those whose mothers had not. Thus, the missing number in our new table = 300. Then, we can find the number of kids in O from W = 300.

**Reaction 6:** From the clue: ‘The number of kids in G in NE was the same as the number of kids in G in W’ we can split  $3000 - 900 = 2100$  into two equal parts. Thus, G – NE and G – W would be 1050 each. From this point we can complete the table as follows:

|       | G                     | P                      | O                     | TOTAL |
|-------|-----------------------|------------------------|-----------------------|-------|
| NE    | 1050                  | 1150                   | 300 (from reaction 5) | 2500  |
| W     | 1050                  | 3850                   | 300                   | 5200  |
| S     | 900 (from reaction 4) | 3400 (from reaction 4) | 0 (from reaction 4)   | 4300  |
| TOTAL | 3000                  | 8400                   | 600                   | 12000 |

Answers for questions 1 and 2 can be read off the table above.

1. Total kids of S = 10000, Kids from S in P = 300 (first table) + 3400 (derived table) = 3700. Required percentage = 37%. Option (a) is correct.
2. Total kids in W, O and mothers not completed primary education = 300 (from the derived table). Option (a) is correct.

Questions 3 and 4 give us additional data, from which we need to resolve which region had what story with respect to the percentage of kids who went to government school in the follow up survey. It is given to us that one region had 25% of its total ‘O’ students joining government schools (G), another region had 100% and the third region had 50%. We are also given that for the three regions combined, the movement to government schools was 50% i.e. of the total 2400 kids in O in the first survey, during the follow up survey, 50% meaning 1200 had moved to G. This, can only mean that the ratio of the total kids who had a 25% transfer to G and the total kids who had a 100% transfer to G = 2:1. We also know that the total number of ‘O’ (Out of school) students in NE =  $300 + 300 = 600$ ; W =  $1200 + 300 = 1500$

and in  $S = 300 + 0 = 300$ . So we can conclude that in NE, 25% of the O kids had moved to G, in W, 50% of the O kids had moved to G and in S, 100% of the O kids had moved to G (Using the concept of triple alligation).

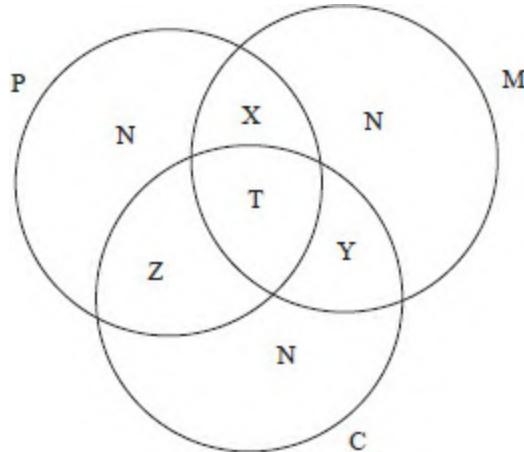
3. Total surveyed kids in G in W = Original kids in G in W + New kids in G in W =  $5250 + 750 = 6000$ . Hence, option (a) is correct.
4.  $5100 + 300$  out of  $5700$  were in G now.  $5400/5700$  constitutes a percentage value of 94.7% approximately. Hence option (a) is correct.

### Questions 5 to 8:

The following set of reactions goes towards solving this set of questions:

1. From the statement ‘For the 200 candidates who are at or above the 90th percentile overall based on CET’ we get that the number of candidates who appeared for CET must be 2000. The next set of information, focuses on the 200 people above the 90th percentile.
2. Clues 1 and 2 (especially clue 2) tells us that this problem has to be solved using a Venn Diagram. Using the clues 1, 2 and 3 the following starting Venn Diagram can be made:

**200 People in this Venn Diagram**



In the above diagram:

1.  $X + Y + Z = 150$
2.  $T + 3N = 50$
3. The main reaction and the point from where the problem starts getting solved is Clue 4. The clue tells us: ‘Number of candidates below 80th percentile in P: Number of candidates below 80th percentile in C:

Number of candidates below 80th percentile in M = 4: 2: 1.'

Breaking this statement down, we should realize that: 'The number of candidates below the 80th percentile in P' = 2N + Y, 'The number of candidates below the 80th percentile in C' = 2N + X & 'The number of candidates below the 80th percentile in M' = 2N + Z.

This means that the ratio of  $2N + Y : 2N + X : 2N + Z = 4:2:1$ .

This also means that  $6N + X + Y + Z$  should be a multiple of 7.

Since  $X + Y + Z = 150$ , it means that  $6N$  should be either 18 or 60 or 102 etc. in order for the value of  $6N + X + Y + Z$  to be a multiple of 7. But, looking at the constraint in the problem, we know that  $3N + T = 50$ . So,  $6N$  cannot be greater than 100. Hence,  $6N = 18$  or  $6N = 60$ . Naturally, then  $N = 3$  or 10.

4. For  $N = 3$ , the following further deductions can be made: If  $N = 3$ ,  $T + 3N = 50 \rightarrow T = 41$ .

$2N + Y:2N + X:2N + Z = 4:2:1 \rightarrow 6 + Y:6 + X:6 + Z = 4k:2K:k \rightarrow Y = 4k - 6$ ;  $X = 2k - 6$  and  $Z = k - 6$ . Since we know that  $X + Y + Z = 150$ , we get:  $(2k - 6) + (4k - 6) + (k - 6) = 150 \rightarrow 7k = 168 \rightarrow k = 24$ . Hence,  $Y = 90$ ,  $X = 42$  and  $Z = 18$ .

5. Similar thinking would give us the values for the Venn Diagram for  $N = 10$ :

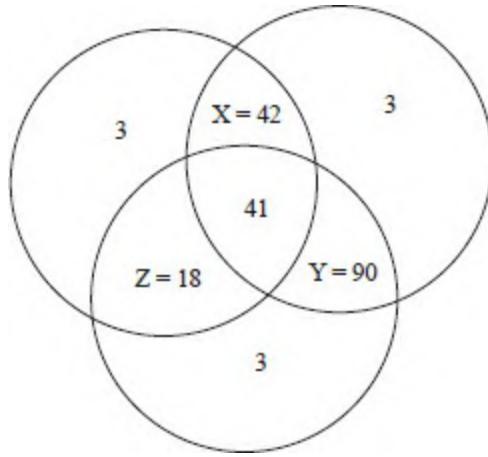
If  $N = 10$ ,  $T + 3N = 50 \rightarrow T = 20$ .

$2N + Y:2N + X:2N + Z = 4:2:1 \rightarrow 20 + Y:20 + X:20 + Z = 4k:2K:k \rightarrow Y = 4k - 20$ ;  $X = 2k - 20$  and  $Z = k - 20$ . Since we know that  $X + Y + Z = 150$ , we get:  $(2k - 20) + (4k - 20) + (k - 20) = 150 \rightarrow 7k = 210 \rightarrow k = 30$ . Hence,  $Y = 100$ ,  $X = 40$  and  $Z = 10$ .

With these changes the Venn Diagram would have two versions as below:

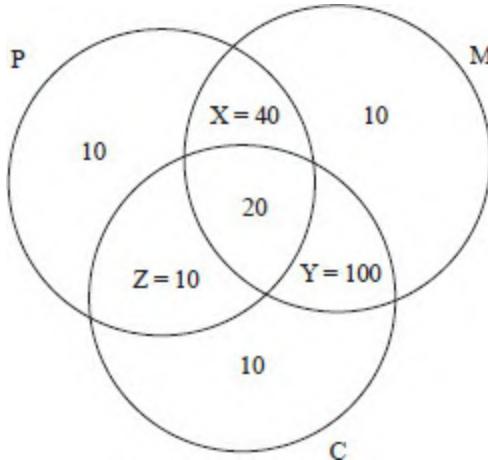
### Possibility 1:

#### Venn Diagram With $N = 3$



### Possibility 2:

**Venn Diagram With N = 10**



6. Before you move onto the questions, you also need to understand the selection criteria for the two colleges. This constitutes of three constructs in this question:
  - (i) Selection for Advanced Test (AET) from Common Test (CET) → Candidates with 90 percentile plus in the CET also having 80% + in at least two sections.
  - (ii) AIE final selection is based on AET.
  - (iii) BIE final selection: If a candidate appears in AET (which means he has 90 percentile overall and 80 percentile in at least two sections); then if the score in Physics (P) is above the 80th Percentile → Consider the AET score.
  - (iv) For those who do not appear for AET, but have 80 percentile in

Physics → Separate test conducted by BIE for final selection.

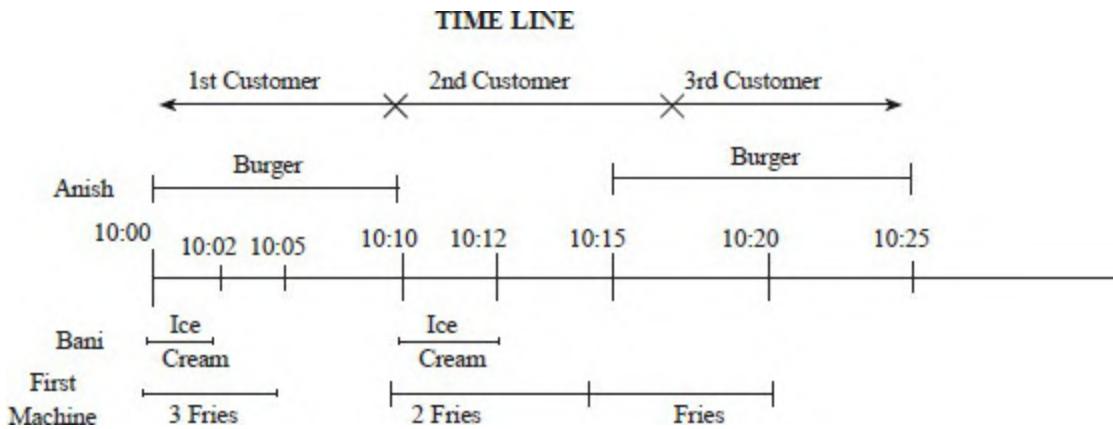
With this analysis you are now ready to answer the questions asked.

5. For students above the 90th percentile, the separate test for BIE would only be given by those people who scored over 80 percentile only in Physics. This means, that this question is asking us about the possible values of N. Our analysis has already shown that N can be 3 or 10. Hence, option (a) is correct.
6. Since this question talks to us about the number of candidates above 90 percentile overall and above 80 percentile in all three sections (This number is represented by T), being a multiple of 5, we go to the second possible figure above, where  $N = 10$ . The question is asking us the value of P & M i.e. X. From the Venn diagram above, we know that  $X = 40$ .
7. This question is again referring to N as 10. The number of candidates shortlisted for the AET =  $X + Y + Z + T = 150 + 20 = 170$ .
8. The number of candidates in the Venn diagram for P =  $42 + 41 + 18 + 3 = 104$  in Possibility & P =  $40 + 20 + 10 + 10 = 80$  in Possibility 2. Hence, this question is referring to Possibility 2. Also, total number of people above the 80th Percentile in Physics = 400. Out of this:  $X + Z + T = 42 + 18 + 41 = 101$  would be appearing for the AET. The rest would be appearing for the separate test of BIE. Required answer =  $400 - 101 = 299$ . Hence, option (a) is correct.

### Questions 9 to 12:

The following structure can be created based on the orders received. If you notice, the first two questions of the set tells us that only one client's order can be processed at any given point of time. So, the first time line we need to draw would require us to consider that as a constraint while starting and processing orders:

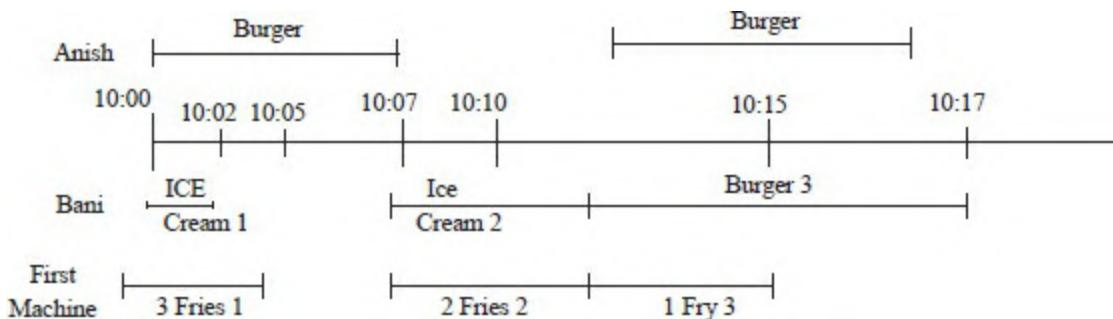
Timeline with only one order processed at a given point of time:



**Note:** In this case, the work distributions between Anish and Bani is interchangeable – i.e. the work distribution used in the given time line above need not be the only way to distribute the work. However, what you need to understand is that even if you change the work distribution it would have no effect on the finishing time of the individual orders and hence it would not have any effect on the answers to the questions. From the above timeline the first two questions can be answered.

9. The order of Client 1 gets fulfilled at 10:10. Hence, option (b) is correct.
10. Client 3's order is completely served only at 10:25. Hence, option (c) is correct.

For Questions 11 and 12, the time line would change as follows:



11. The order of Client 2 gets fulfilled at 10:10. Option (a) is correct.
12. The condition in the problem states that we have to look for a time when only one employee is free. From the timeline above, we can see that between 10 and 10:30, such a condition is occurring at 10:02 to 10:05 and 10:10 to 10:17. So, the total time for which only one employee is free is  $3 + 7 = 10$  minutes. Option (b) is correct. **Note:** We do not count 10:17 to 10:30 since during that time both the employees

are free.

### Questions 13 to 16:

This set of questions is completely based on identifying the logic of the frequency bar diagram given, by adding the clues given below the bar graph. Let the countries be denoted by A, B, C, D, E and V, W, X, Y, Z.

The frequencies available to us for each of the parameters and their scores can first be tabulated as below.

|   | 1       | 2       | 3 | 4       | 5 | 6 | 7 |
|---|---------|---------|---|---------|---|---|---|
| S | 0       | 0       | 3 | 3 (A,C) | 2 | 1 | 1 |
| F | 2 (A,C) | 1       | 2 | 1       | 3 | 0 | 1 |
| C | 1       | 3 (A,C) | 4 | 1       | 0 | 1 | 0 |

Based on the reading of the above frequencies and the individual clues below the bar chart we can make the following conclusions:

From Clue 1: Since Amda and Calla have scores of 7 each, this can only occur if their scores in the three parameters are 1, 2 and 4 in some order between S, F and C. Looking at the frequency table, we realize that this can only occur if we give 4 each of Amda and Calla on the Parameter (S). This is because, if we try to give 4 to Amda or Calla on either parameters F or C, it leads to a situation where these countries would need to have a score of 1 or 2 on S. But as we can see from the table there is no score of 1 or 2 in S. Thus, we would need to allocate 4 each on Parameter S to Amda and Calla. Thus, two of the three 4's in the table get explained. Also, since they have identical scores in all parameters, it means that their 1's and 2's should also be from the same parameters. Since, there is only a single '1' in C, it necessarily means that their 1's must be from F and their 2's must be from C.

From the Clue 2: If Zooma scored 17, it can basically happen in three ways numerically:  $7 + 6 + 4$ ;  $7 + 5 + 5$  or  $6 + 6 + 5$ . However,  $7 + 5 + 5$  is not possible since the parameter C does not have a score of 5 or 7 for any country. This leaves us with two possibilities:

**Possibility 1:**  $7 + 6 + 4$ : Can only happen with 4 in C. This would be necessary since if we try to allocate a 6 for C, it means that Zooma has the highest score in C. Further, since Zooma scores a 7 in one parameter, it would be the highest score in that parameter too – leading Zooma to getting the highest score in two parameters. This would not

allow us to give three different countries, the highest score in exactly one parameter (Clue 3). Thus, in this case Zooma's score is divided into  $7(F) + 6(S) + 4(C)$ . This would lead us to a table as follows:

|   | 1       | 2       | 3 | 4       | 5 | 6     | 7     |
|---|---------|---------|---|---------|---|-------|-------|
| S | 0       | 0       | 3 | 3 (A,C) | 2 | 1 (Z) | 1     |
| F | 2 (A,C) | 1       | 2 | 1       | 3 | 0     | 1 (Z) |
| C | 1       | 3 (A,C) | 4 | 1 (Z)   | 0 | 1     | 0     |

In this case, 16 and 15 would need to be built using: 6(C), 5(F) and 5(S) & 15 can be built using 7(S), 5(F) and 3 (C).

**Possibility 2:** Zooma has  $6 + 6 + 5$ : In this case Zooma would get a 6 in C (Since it has to get the highest in one parameter as it is one of the three happy cities). Also, F has no 6, so  $F = 5$  and  $S = 6$ . In this possibility, the table would look as follows:

|   | 1       | 2       | 3 | 4       | 5     | 6     | 7 |
|---|---------|---------|---|---------|-------|-------|---|
| S | 0       | 0       | 3 | 3 (A,C) | 2     | 1 (Z) | 1 |
| F | 2 (A,C) | 1       | 2 | 1       | 3 (Z) | 0     | 1 |
| C | 1       | 3 (A,C) | 4 | 1       | 0     | 1 (Z) | 0 |

At this stage we can answer the first two questions of the set.

13. Amda's score in F = 2 as it is the same in both the possibilities.
14. Zooma's score in S = 6, in both the possibilities.
15. In order to solve this question, we need to think further about maximum how much Benga and Delma could score under the two possibilities. Also, while doing this, we need to remember that the two countries need to share the two maximums for the parameters left in each case:

#### **Looking at possibility 1:**

In order to do this, let us count down from 17, in each possibility. In possibility 1, we can easily see that 17 cannot be built twice as there aren't enough 7's and 6's available to create two 17's. Aiming for 16 then, we see that If  $S = 7$ , it would need a 5 + 4 in F/C, but C does not have either a 5 or a 4. Hence, 16 isn't achievable. 15 as a total of course can be built using 7(S), 5(F) and 3(C). It can also be built with 6(C), 5(F) and 4 (C). So, the first possibility gives us a maximum total of 15. However, we would also need to look at the second possibility, since, if there was a higher value possible (16 or 17) for both Benga

and Delma in the second possibility, the answer would change upwards from 15.

In the second possibility, it is clear that the 7 for S and 7 for F need to be shared between Benga and Delma. The two 6's are already used for Zooma. So there is no possibility of  $7 + 6 + 3$ . The only way 16 can be built would be  $7 + 5 + 4$ . This would require the use of two 4's for Parameter C. However, we do not have two 4's in Parameter C, and hence we conclude that even if we can make 16 once, we cannot make 16 twice. Hence, Benga and Delma's maximum possible equal score is 15.

16. In the first possibility if we want to allocate 16 and 15 to Benga and Delma, we would need to use 6(C), 5(F) and 5(S) for 16 and 7(S), 5(F) and 3(C). In this case, 13 can only be made once with a  $5(S) + 5(F) + 3(C)$ .

In the second possibility if we want to allocate 16 and 15 to Benga and Delma, we can use 7(S), 5(F) and 4(C) for 16 and 7(F), 5(S) and 3(C) for 15. In this case too, 13 can only be made once with a  $5(S) + 5(F) + 3(C)$ . Thus, if Benga and Delma score 16 and 15 respectively, a maximum of only one country could score 13. Hence, option (b) is correct.

In this case, 16 and 15 would need to be built using: 6(C), 5(F) and 5(S) & 15 can be built using 7(S), 5(F) and 3 (C).

**Directions of Questions 1 to 4:** Funky Pizzaria was required to supply pizzas to three different parties. The total number of pizzas it had to deliver was 800, 70% of which were to be delivered to Party 3 and the rest equally divided between Party 1 and Party 2.

Pizzas could be of Thin Crust (T) or Deep Dish (d) variety and come in either Normal Cheese (NC) or Extra Cheese (E(c)) versions. Hence, there are four types of pizzas: T-NC, T-EC, D-NC and D-EC. Partial information about proportions of T and NC pizzas ordered by the three parties is given below:

|         | <i>Thin Crust (T)</i> | <i>Normal Cheese (N(c))</i> |
|---------|-----------------------|-----------------------------|
| Party 1 | 0.6                   |                             |
| Party 2 | 0.55                  | 0.3                         |
| Party 3 |                       | 0.65                        |
| Total   | 0.375                 | 0.52                        |

1. How many Thin Crust pizzas were to be delivered to Party 3?
  - (a) 398
  - (b) 162
  - (c) 196
  - (d) 364
2. How many Normal Cheese pizzas were required to be delivered to Party 1?
  - (a) 104
  - (b) 84
  - (c) 16

- (d) 20
3. For Party 2, if 50% of the Normal Cheese were of Thin Crust variety, what was the difference between the number of T-EC and D-EC pizzas to be delivered to Party 2?
- (a) 18  
(b) 12  
(c) 30  
(d) 24
4. Suppose that a T-NC pizza cost as much as a D-NC pizza, but  $\frac{3}{5}$ th of the price of a D-EC pizza. A D-EC pizza costs ₦50 more than a T-EC pizza, and the latter costs ₦500.  
If 25% of the Normal Cheese pizzas delivered to Party 1 were of Deep Dish variety, what was the total bill for Party 1?
- (a) ₦59480  
(b) ₦59840  
(c) ₦42520  
(d) ₦45240

### ***Directions for Questions 5 to 8:***

There were seven elective courses – E1 to E7 - running in a specific term in a college. Each of the 300 students enrolled had chosen just one elective from among these seven. However, before the start of the term, E7 was withdrawn as the instructor concerned had left the college. The students who had opted for E7 were allowed to join any of the remaining electives. Also, the students who had chosen other electives were given one chance to change their choice. The table below captures the movement of the students from one elective to another during this process. Movement from one elective to the same elective simply means no movement. Some numbers in the table got accidentally erased; however, it is known that these were either 0 or 1.

|               |    | To Elective |    |    |    |    |    |
|---------------|----|-------------|----|----|----|----|----|
|               |    | E1          | E2 | E3 | E4 | E5 | E6 |
| From Elective | E1 | 9           | 5  | 10 | 1  | 4  | 2  |
|               | E2 |             | 34 | 8  |    | 2  | 2  |
|               | E3 | 2           | 6  | 25 |    |    | 2  |
|               | E4 |             | 3  | 2  | 14 |    | 4  |
|               | E5 |             | 5  |    |    | 30 |    |
|               | E6 |             | 7  | 3  |    | 2  | 9  |
|               | E7 | 4           | 16 | 30 | 5  | 5  | 41 |

Further, the following are known:

1. Before the change process there were 6 more students in E1 than in E4, but after the reshuffle, the number of students in E4 was 3 more than that in E1.
2. The number of students in E2 increased by 30 after the change process.
3. Before the change process, E4 had 2 more students than E6, while E2 had 10 more students than E3.
5. How many elective courses among E1 to E6 had a decrease in their enrollments after the change process?
  - (a) 4
  - (b) 1
  - (c) 2
  - (d) 3
6. After the change process, which of the following is the correct sequence of number of students in the six electives E1 to E6?
  - (a) 19, 76, 79, 21, 45, 60
  - (b) 19, 76, 78, 22, 45, 60
  - (c) 18, 76, 79, 23, 43, 61
  - (d) 18, 76, 79, 21, 45, 61
7. After the change process, which course among E1 to E6 had the

largest change in its enrollment as a percentage of its original enrollment?

- (a) E1
  - (b) E2
  - (c) E3
  - (d) E6
8. Later, the college imposed a condition that if after the change of electives, the enrollment in any elective (other than E7) dropped to less than 20 students, all the students who had left that course will be required to re-enroll for that elective.

Which of the following is a correct sequence of electives in decreasing order of their final enrollments?

- (a) E2, E3, E6, E5, E1, E4
- (b) E3, E2, E6, E5, E4, E1
- (c) E2, E5, E3, E1, E4, E6
- (d) E2, E3, E5, E6, E1, E3

**Directions for Questions 9 to 12:** An old woman had the following assets:

- (a) ₹ 70 lakh in bank deposits
- (b) 1 house worth ₹ 50 lakh
- (c) 3 flats, each worth ₹ 30 lakh
- (d) Certain number of gold coins, each worth ₹ 1 lakh

She wanted to distribute her assets among her three children; Neeta, Seeta and Geeta.

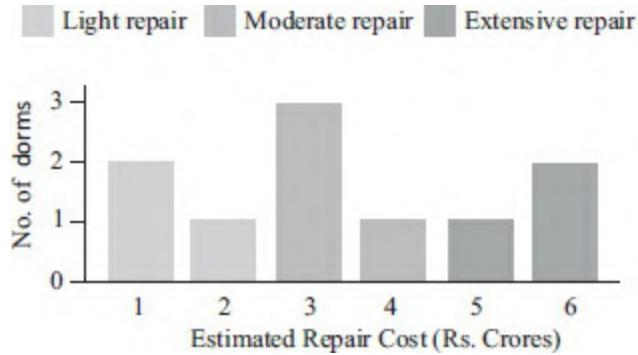
The house, any of the flats or any of the coins were not to be split. That is, the house went entirely to one child; a flat went to one child and similarly, a gold coin went to one child.

9. Among the three, Neeta received the least amount in bank deposits, while Geeta received the highest. The value of the assets was distributed equally among the children, as were the gold coins.

How much did Seeta receive in bank deposits (in lakhs of rupees)?

- (a) 30

- (b) 40  
(c) 20  
(d) 10
10. Among the three, Neeta received the least amount in bank deposit, while Geeta received the highest. The value of the assets was distributed equally among the children, as were the gold coins.  
How many flats did Neeta receive?
11. The value of the assets distributed among Neeta, Seeta and Geeta was in the ratio of 1:2:3, while the gold coins were distributed among them in the ratio of 2:3:4. One child got all three flats and she did not get the house. One child, other than Geeta, got ₹30 lakh in bank deposits.  
How many gold coins did the old woman have?
- (a) 72  
(b) 90  
(c) 180  
(d) 216
12. The value of the assets distributed among Neeta, Seeta and Geeta was in the ratio of 1:2:3, while the gold coins were distributed among them in the ratio of 2:3:4. One child got all three flats and she did not get the house. One child, other than Geeta, got ₹30 lakh in bank deposits.  
How much did Geeta get in bank deposits (in lakhs of rupees)?  
At a management school, the oldest 10 dorms, numbered 1 to 10, need to be repaired urgently. The following diagram represents the estimated repair costs (in ₹ Crores) for the 10 dorms. For any dorm, the estimated repair cost (in ₹ Crores) is an integer. Repairs with estimated cost ₹ 1 or 2 Crores are considered light repairs, repairs with estimated cost ₹3 or 4 crores are considered moderate repairs and repairs with estimated cost ₹5 or 6 Crores are considered extensive repairs.



Further, the following are known:

1. Odd-numbered dorms do not need light repair; even-numbered dorms do not need moderate repair and dorms, whose numbers are divisible by 3, do not need extensive repair.
  2. Dorms 4 to 9 all need different repair costs, with Dorm 7 needing the maximum and Dorm 8 needing the minimum.
- 13.** Which of the following is NOT necessarily true?
- Dorm 1 needs a moderate repair
  - Dorm 5 repair will cost no more than ₹ 4 Crores
  - Dorm 7 needs an extensive repair
  - Dorm 10 repair will cost no more than ₹ 4 Crores
- 14.** What is the total cost of repairing the odd-numbered dorms (in ₹ Crores)?
- 15.** Suppose further that:
1. 4 of the 10 dorms needing repair are women's dorms and need a total of ₹ 20 Crores for repair.
  2. Only one of Dorms 1 to 5 is a women's dorm.  
What is the cost for repairing Dorm 9 (in ₹ Crores)?
- 16.** Suppose further that:
1. 4 of the 10 dorms needing repair are women's dorms and need a total of ₹ 20 Crores for repair.
  2. Only one of Dorms 1 to 5 is a women's dorm?  
Which of the following is a women's dorm?
- Dorm 2
  - Dorm 5
  - Dorm 8

(d) Dorm 10

---

## ANSWER KEY

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1. (b)
  2. (c)
  3. (b)
  4. (a)
  5. (c)
  6. (d)
  7. (d)
  8. (a)
  9. (c)
  10. 2
  11. 90
  12. 20 lacs
  13. (d)
  14. 19
  15. 3
  16. (d)
- 

## SOLUTIONS

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### Questions 1 to 4:

Based on the data in the question we can realise that the table has two missing columns – viz: Deep Dish (D) and Extra Cheese. We also know that pizzas are either divided basis their crust – as thin crust and Deep dish; and on the basis of the cheese as Normal and Extra cheese.

Also, since we are given that there are a total of 800 pizzas to be delivered, we can replace the proportions given in the table with actual numbers. The completed table would look as follows:

|               | <i>Thin Crust</i>          | <i>Deep Dish</i>    | <i>Normal Cheese</i>      | <i>Extra Cheese</i> |
|---------------|----------------------------|---------------------|---------------------------|---------------------|
| Party 1 (120) | = $0.6 \times 120 = 72$    | = $120 - 72 = 48$   | = $416 - 364 - 36 = 16$   | = $120 - 16 = 104$  |
| Party 2 (120) | = $0.55 \times 120 = 66$   | = $120 - 66 = 54$   | = $0.3 \times 120 = 36$   | = $120 - 36 = 84$   |
| Party 3 (560) | = $300 - 72 - 66 = 162$    | = $560 - 162 = 398$ | = $0.65 \times 560 = 364$ | = $560 - 364 = 196$ |
| Total (800)   | = $0.375 \times 800 = 300$ | = $800 - 300 = 500$ | = $0.52 \times 800 = 416$ | = $800 - 416 = 384$ |

The answers to questions 1 and 2 can be simply read off the table:

- There were 162 Thin Crust pizzas delivered to Party 3. Option (b) is correct.
- Party 1 had a delivery of 16 normal cheese pizzas. Option (c) is correct.
- For Party 2 if 50% of the normal cheese pizzas were thin crust, it means that – of the 36 normal cheese pizzas delivered to party 2, 18 were thin crust. This means that of the 66 Thin Crust Pizzas, 18 were normal cheese, so 48 must be Extra Cheese. This would be the number for T-EC. Also, Of the total 84 extra cheese pizzas delivered to Party 2, if 48 were Thin Crust, it means that  $84 - 48 = 36$  would be deep dish (D-EC). Thus, the difference between T-EC and D-EC for Party 2 would be  $48 - 36 = 12$ . Option (b) is correct.
- The cost of a T-EC Pizza is 500. So the cost of a D-EC pizza is 550. Also,  $T-NC = D-NC = 3/5^{\text{th}}$  of 550 = 330 each.

For Party 1 if 25% of the normal cheese pizzas delivered were Deep Dish variety, we get the following numbers:

$$D-NC = 25\% \text{ of } 16 = 4; T-NC = 16 - 4 = 12; D-EC = 48 - 4 = 44; T-EC = 72 - 12 = 60.$$

The total bill for party 1 would be given by:

$$4 \times 330 + 12 \times 330 + 44 \times 550 + 60 \times 500 = 5280 + 24200 + 30000 = 59480. \text{ Option (a) is correct.}$$

### Questions 5 to 8:

The following set of deductions leads us to the correct answer.

**Deduction 1:** In the table given, the readings row wise show the choices of students before Elective 7 was withdrawn. The column wise readings show the numbers of students after the elective 7 was withdrawn. The numbers in the table have to be interpreted as follows:

Looking across the first row, we can see that there were 9 students who had

opted for Elective 1 and remained in Elective 1 after the switch; 5 students shifted from Elective 1 to Elective 2 and so on. In order to start our processing, we first need to take column and row totals in order to find out the numbers of students opting for each elective before and after.

|               |    | To Elective |                      |    |          |                      |              |                      |     |
|---------------|----|-------------|----------------------|----|----------|----------------------|--------------|----------------------|-----|
|               |    | E1          | E2                   | E3 | E4       | E5                   | E6           | Total                |     |
| From Elective | E1 | 9           | 5                    | 10 | 1        | 4                    | 2            | 31                   |     |
|               | E2 | A           | 34                   | 8  | B        | 2                    | 2            | $46 + A + B$         |     |
|               | E3 | 2           | 6                    | 25 | C        | D                    | 2            | $35 + C + D$         |     |
|               | E4 | E           | 3                    | 2  | 14       | F                    | 4            | $23 + E + F$         |     |
|               | E5 | G           | 5                    | H  | I        | 30                   | J            | $35 + G + H + I + J$ |     |
|               | E6 | K           | 7                    | 3  | L        | 2                    | 9            | $21 + K + L$         |     |
|               | E7 | 4           | 16                   | 30 | 5        | 5                    | 41           | 101                  |     |
|               |    | Total       | $15 + A + E + G + K$ | 76 | $78 + H$ | $20 + B + C + I + L$ | $43 + D + F$ | $60 + J$             | 300 |

**Deduction 2:** There are 12 missing values in the table, which are each 0 or 1. In the table above, we have denoted these as, A, B, C, D, E, F, G, H, I, J, K and L in the table. A quick addition of the numbers in the table tells us that the sum of all the given numbers in the table are 292. This means that of the 12 missing values in the table, 8 must be 1's and 4 must be 0's. With this understanding we need to move into the clues following the table.

**Deduction 3:** From Clue 2 – ‘The number of students in E2 increased by 30 after the change process’ we can see that  $46 + A + B + 30 = 76$ . This means that A and B are both 0. Hence, the number of students in E2 before the change was 46.

**Deduction 4:** From Clue 3 – ‘Before the change process, E2 had 10 more students than E3.’  $\rightarrow E3 = 36$  (since we have found E2 as 46). Hence,  $E3 = 35 + C + D = 36 \rightarrow C + D = 1$ . So one of C and D has to be 0 and the other one has to be 1.

From the other part of Clue 3: ‘E4 had 2 more students than E6’ we can deduce that  $E + F = K + L$ . Also, at this point we have already identified three of the four 0’s in the table (A, B and one of C or D). This means that we have only one 0 to allocate further. When we think of  $E + F = K + L$  with this, we realise that E, F, K and L can only be 1 each. **Note:** That  $E + F = 2$  can also be found out from the first clue’s first part.

With these deductions the table changes to the one given below:

|               |    | To Elective |          |    |          |              |          | Total                |     |
|---------------|----|-------------|----------|----|----------|--------------|----------|----------------------|-----|
|               |    | E1          | E2       | E3 | E4       | E5           | E6       |                      |     |
| From Elective | E1 | 9           | 5        | 10 | 1        | 4            | 2        | 31                   |     |
|               | E2 | 0           | 34       | 8  | 0        | 2            | 2        | 46                   |     |
|               | E3 | 2           | 6        | 25 | C        | D            | 2        | $35 + C + D = 36$    |     |
|               | E4 | 1           | 3        | 2  | 14       | 1            | 4        | 25                   |     |
|               | E5 | G           | 5        | H  | I        | 30           | J        | $35 + G + H + I + J$ |     |
|               | E6 | 1           | 7        | 3  | 1        | 2            | 9        | 23                   |     |
|               | E7 | 4           | 16       | 30 | 5        | 5            | 41       | 101                  |     |
|               |    | Total       | $17 + G$ | 76 | $78 + H$ | $21 + C + I$ | $44 + D$ | $60 + J$             | 300 |

To this table if we add the information of clue 1, we get:

**Deduction 5:** From Clue 1's second part – ‘after the reshuffle, the number of students in E4 was 3 more than that in E1’ we can see that the only way this is feasible to do would be to use  $G = 1$  and  $C$  and  $I$  as 0 each. Hence, the remaining unknowns viz:  $H$ ,  $J$  and  $D$  would be 1 each. This deduction completes the table:

|               |    | To Elective |    |    |    |    |    | Total |     |
|---------------|----|-------------|----|----|----|----|----|-------|-----|
|               |    | E1          | E2 | E3 | E4 | E5 | E6 |       |     |
| FROM ELECTIVE | E1 | 9           | 5  | 10 | 1  | 4  | 2  | 31    |     |
|               | E2 | 0           | 34 | 8  | 0  | 2  | 2  | 46    |     |
|               | E3 | 2           | 6  | 25 | 0  | 1  | 2  | 36    |     |
|               | E4 | 1           | 3  | 2  | 14 | 1  | 4  | 25    |     |
|               | E5 | 2           | 5  | 1  | 0  | 30 | 1  | 38    |     |
|               | E6 | 1           | 7  | 3  | 1  | 2  | 9  | 23    |     |
|               | E7 | 4           | 16 | 30 | 5  | 5  | 41 | 101   |     |
|               |    | Total       | 18 | 76 | 79 | 21 | 45 | 61    | 300 |

The answers to the questions can now be read off the table:

5. It can be seen that E1 (31 to 18) and E4 (25 to 21) had a decrease. Hence, option (c) is correct.
6. Option (d) is correct and it can be checked from our final table above.
7. The largest percentage change can be seen to be for E6 (23 to 61 is a greater than 150% increase, which is not matched by any other value). Option (d) is correct.
8. Due to this condition imposed by the college, it's clear that students who had opted out of E1 would need to get back to E1. So E1 would have 31 students, and E2 would lose the 5 students it gained from E1 – leaving E2 with  $76 - 5 = 71$  students. Likewise,  $E3 = 79 - 10 = 69$ ;  $E4 = 21 - 1 = 20$ ;  $E5 = 45 - 4 = 41$  and  $E6 = 61 - 2 = 59$ . Thus, the correct decreasing order would be:

E2, E3, E6, E5, E1, E4. Option (a) is correct.

### Questions 9 to 12:

The first thing you should realise when you look at this question, is that the number of gold coins is not mentioned. It is best to make an inventory list of the items available for division:

| Bank Deposit | House   | Flat 1  | Flat 2  | Flat 3  | Gold Coins |
|--------------|---------|---------|---------|---------|------------|
| 70 Lacs      | 50 Lacs | 30 Lacs | 30 Lacs | 30 Lacs | N lacs     |

The total value of the assets is  $210 + N$  lacs. Based on this information, we can move to solve the individual questions on the basis of the specific distribution constraints mentioned in the question. Let us take a look at the questions one at a time.

9. Since, the gold coins are distributed equally, it means that the 210 lacs worth of assets must be divided equally. This can only be done as follows:

House 50 Lacs + 20 lacs bank deposit to one person; 2 flats worth 30 + 30 lacs + 10 lacs bank deposit to second person; one flat worth 30 lacs and bank deposits of 40 lacs to third person.

Based on Neeta receiving the least amount in bank deposits and Geeta receiving the largest amount in bank deposits, these distributions can be allocated to the three sisters as follows:

|       | House Value | Flat Value | Bank Deposit Value |
|-------|-------------|------------|--------------------|
| Geeta | 0           | 30 lacs    | 40 lacs            |
| Seeta | 50 lacs     | 0          | 20 lacs            |
| Neeta | 0           | 60 lacs    | 10 lacs            |

Based on this distribution, the answer to question 9 would be: 20 lacs. Option (c) is correct.

10. This question gives the same conditions as the previous one. Hence, Neeta received 2 flats. The correct answer is 2. (Note: This was a TITA question with no options).

For solving questions 11 and 12, we need to consider the change in the distribution structure.

**Deduction 1:** Since, the assets were distributed in the ratio 1:2:3,  $210 + N$

must be a multiple of 6. Since 210 is a multiple of 6, N must also be a multiple of 6.

**Deduction 2:** Since the gold coins were distributed in the ratio 2:3:4, the number of gold coins would be a multiple of 9. Thus, N would be a multiple of 9.

Based on this, we can see that the value of N could be 18, 36, 54, 72, 90 etc. (common multiples of 6 and 9). If you see the question 11, at this point, you realise that the question is indeed talking about values of N and the given possible values are 72, 90, 180 and 216. For these values, we can see that the value of  $210 + N$  could be 282, 300, 390, 416.

We can then draw the following possibility structure for each of these total values of assets to be distributed in the ratio 1:2:3.

|       |  | Possibility 1 | Possibility 2 | Possibility 3 | Possibility 4 |
|-------|--|---------------|---------------|---------------|---------------|
|       | All figures in lacs  | $N = 72$      | $N = 90$      | $N = 180$     | $N = 216$     |
|       | $210 + N$  | 282           | 300           | 390           | 416           |
|       | Distribution on the basis of 1:2:3 i.e $x$ , $2x$ and $3x$ |               |               |               |               |
| Neeta | $x$  | 47            | 50            | 65            | 71            |
| Seeta | $2x$   | 94            | 100           | 130           | 142           |
| Geeta | $3x$   | 141           | 150           | 195           | 213           |
|       | Distribution of coins amongst Neeta, Seeta, Geeta: 2:3:4   | 16, 24, 32    | 20, 30, 40    | 40, 60, 80    | 48, 72, 96    |

To this information, you have to fit in the additional numbers as follows: Someone gets 90 lacs from the three flats; someone else gets the house of 50 lacs and someone also gets 30 lacs of bank deposits.

The interpretation of the above table is that for possibility 1, Neeta has 16 gold coins and a total asset of 47 lacs. This can only occur with a bank deposit distribution of 31 lacs. Also, since someone other than Geeta received 30 lacs of bank deposits, we need to allocate 30 lacs bank deposits to Seeta. But with that, Seeta would get 24 lacs (gold coins) + 30 lacs (bank deposits) + 40 lacs assets. But we can clearly see that there is no asset block worth 40 lacs in the given situation. Hence, possibility 1 is rejected.

If you try to fit in these constraints into the various possibilities above, you can see that: 47, 94 and 141 cannot be created; 65, 130 and

If you were to look through the above table, the possibility of creating numbers like 47, 65 and 71 for  $x$  does not exist.

Under possibility 2: Neeta gets 20 lacs (coins) + 30 lacs (bank deposits);  
 Seeta gets: 30 lacs (coins) + 50 lacs house + 20 lacs (bank deposits)  
 Geeta gets: 40 lacs (coins) + 90 lacs (flats) + 20 lacs (bank deposits).

This fits the given conditions perfectly. A similar look at possibilities 3 and 4 would reject those possibilities (Task for the student: Can you work out how these would get rejected?)

Thus, Possibility 3 holds and in this possibility, the exact distribution is as shown above. We can now answer the questions asked:

11. The old woman had 90 gold coins.
12. Geeta received 20 lacs in bank deposits.

### Questions 13 to 16:

The following deductions can be made with the clues given in the question set:

In the following table ‘M’ stands for Moderate and ‘E’ stands for extensive while ‘L’ stands for Light repairs.

| Dorm Number                         | 1   | 2   | 3                 | 4   | 5     | 6                  | 7   | 8   | 9                 | 10  |
|-------------------------------------|-----|-----|-------------------|-----|-------|--------------------|-----|-----|-------------------|-----|
| Clue 1                              | M/E | L/E | M/E               | L/E | M/E   | L/E                | M/E | L/E | M/E               | L/E |
|                                     |     |     | Not E.<br>Hence M |     |       | Not E.<br>Hence L. |     |     | Not E.<br>Hence M |     |
| Clue 2<br>Repair costs<br>in crores |     |     |                   | 2/5 | 3/4/5 | 1/2                | 6   | 1   | 3/4               |     |

At this point if we think of dorms 4 to 9, we can see that dorm 6 must have a repair cost of 2 crore. Consequently, dorm 4 must have a repair cost of 5 crore. Based on these conclusions, the table becomes the following:

| Dorm Number                      | 1   | 2   | 3 | 4 | 5   | 6 | 7 | 8 | 9   | 10  |
|----------------------------------|-----|-----|---|---|-----|---|---|---|-----|-----|
| Clue 1                           | M/E | L/E | M | E | M   | L | E | L | M   | L/E |
| Clue 2<br>Repair costs in crores |     |     |   | 5 | 3/4 | 2 | 6 | 1 | 4/3 |     |

If we look at the frequency of the repair costs for the six values in the bar diagram, we can see that, there are only one 2 crore, one 4 crore and one 5 crore cost. Dorms 4 to 9 have used one value of each of these repair costs already. Thus, there are no more of these numbers to be allocated in our table.

This means we are left with one value of 1 crore, two values of 3 crores and one value of 6 crores to put in the table. Thus, dorms 1 and 3 must necessarily be 3 crores each (since they are the only two dorms where there

are moderate costs that are left to be allocated with their costs).

| Dorm Number            | 1 | 2   | 3 | 4 | 5   | 6 | 7 | 8 | 9   | 10  |
|------------------------|---|-----|---|---|-----|---|---|---|-----|-----|
| Clue 1                 | M | L/E | M | E | M   | L | E | L | M   | L/E |
| Clue 2                 | 3 | 1/6 | 3 | 5 | 3/4 | 2 | 6 | 1 | 4/3 | 6/1 |
| Repair costs in crores |   |     |   |   |     |   |   |   |     |     |

We can start to answer the questions based on this table:

13. Each of the first three options are necessarily true. Option (d) is not necessarily true, since dorm 10 can cost 1 crore or 6 crores. Hence, option (d) is the correct answer.
14. Dorms 13, 7 would cost  $3 + 3 + 6 = 12$  crores. Dorms 5 and 9 share a cost of 3 crore and 4 crore amongst them – a total of 7 crores. Thus, the total cost of repairs for the odd numbered dorms is  $12 + 7 = 19$  crores.
15. If four of the dorms are women's dorms and their cost of repair is 20 crores, their average cost of repair must be 5 crore. A total of 20 crores can only be done using Dorm 7 (6 crores) + Dorm 10 (6 crores) + Dorm 9 (3 crore) + Dorm 4 (5 crore). The cost of repairing dorm 9 is 3 crore.
16. From the above, we have that dorm 10 is definitely a women's dorm. Option (d) is correct.

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