04 October 2011
19:18

T.I.M.E.
Triumphant Institute of Management Education Pvt. Ltd.

AIM CAT
(All-India Mock CAT)

(Test Ref.: AIMCAT1204)

INSTRUCTIONS

1. Read the instructions given at the beginning/end of a section or group of questions very carefully.
2. The test has two sections, I and II. The time available for each section is 70 minutes. You cannot return to section I once you have started to answer section II.
3. **Pattern of the test and marking scheme**

Section	Number of questions	Marks per question	Negative marks
Quantitative Ability + Data Interpretation	30	3	1
Verbal Ability + Logical Reasoning	30	3	1
Total	60	–	–

4. You are expected to show your competence in both the sections.
5. Each wrong answer will attract a penalty of one mark.
6. There are no negative marks for unattempted questions.
7. You can navigate to any question of your choice within a section.
8. During the test, you can mark questions for review and return to them at a convenient time.
9. An answer once marked can be changed any number of times before submitting the test. However the last marked answer will be considered as the final answer.
10. Do not carry calculators, slide rules or any other calculating devices. Do not carry any other papers with you except your HALL TICKET. Rough papers for calculations will be provided.

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Ref: AIMCAT1204

INSTRUCTIONS

1. Read the instructions given at the beginning/end of each section or at the beginning of a group of questions very carefully.
2. This test has two sections with 60 questions – 30 questions in each section. The TOTAL TIME available for the paper is **140 minutes**. The time available for each section is 70 minutes and you cannot return to the first section once you have started the second section.
3. You are expected to show your competence in both the sections.
4. All questions carry three marks each. Each wrong answer will attract a penalty of one mark.

SECTION – I
Number of Questions = 30

DIRECTIONS *for questions 1 to 4:* Answer the questions independently of each other.

1. In a box there are 90 slips, numbered from 1 to 90. Ramu picks up four slips at random, one after the other, without replacement. What is the probability that the numbers on the slips, in the order he picks them up, are in ascending order?

(A) $\frac{1}{6}$ (B) $\frac{1}{12}$ (C) $\frac{1}{24}$ (D) $\frac{2}{45}$

2. Find the remainder when $23574^{(1^2+2^2+3^2+.....+77^2)}$ is divided by 5.

(A) 2 (B) 4 (C) 1 (D) 3

3. In a certain class, the number of students who do not study at home or do not attend classes is one-third more than that of those who either study at home or attend classes. Further, the number of students who do not study at home but attend classes is two fifths more than those who study at home but do not attend classes, while the number of students who study at home as well as attend classes is half that of those who neither study at home nor attend classes. If the total number of students in the class is 150, then find the number of students who study at home as well as attend classes.

(A) 35 (B) 30 (C) 25 (D) 45

4. In a rectangular grid of dimensions m cm × n cm, where m and n are both positive integers, a line is drawn from one corner to the diagonally opposite corner.

The grid is completely divided into unit squares, i.e, squares of size 1 cm × 1 cm, by drawing lines parallel to the edges of the grid. If m = 240 and n = 384, the number of unit squares that the line passes through is

(A) 575 (B) 623
(C) 624 (D) 576

DIRECTIONS *for questions 5 and 6:* Answer the questions on the basis of the information given below.

The island of Kya-Kya has only one telephone service provider, KyaTel Co. The monthly telephone bill for any subscriber of KyaTel Co., depends on the slab in which the number of calls made by him falls and is calculated as follows:

Slab	Number of calls (Range)	Bill Amount
Slab 1	0 to 100	Rs.125
Slab 2	101 to 200	Bill for first 100 calls + 50 paise per call for calls in excess of 100
Slab 3	201 to 300	Bill for first 200 calls + 75 paise per call for calls in excess of 200
Slab 4	301 to 400	Bill for first 300 calls + Rs.1.00 per call for calls in excess of 300
Slab 5	401 to 500	Bill for first 400 calls + Rs.1.25 per call for calls in excess of 400
Slab 6	501 or more	Rs.1000 + Rs.1.50 per call

5. In a month, if a subscriber has made 465 calls, his bill amount is

(A) Rs.706.25 (B) Rs.560.25
(C) Rs.465 (D) Rs.431.25

6. In a month, if a subscriber paid an average of exactly Rs.0.95 per call, then which of the following can be the number of calls that he made?

(A) 400 (B) 500
(C) 300 (D) 600

DIRECTIONS *for questions 7 to 12:* Answer the questions independently of each other.

7. Given two functions, $f(x)$ and $g(x)$, where $f(x) = |x| - 4$ and $g(x) = 4 - |x|$, $\forall x \in R$, what is the area of the largest circle that can be drawn in the region bounded by the two curves $f(x)$ and $g(x)$ on the co-ordinate plane?

(A) 10π sq.units (B) 4π sq.units
(C) 8π sq.units (D) 16π sq.units

8. Two classmates P and Q have a conversation as below.

P: $\frac{7}{11}^{th}$ of my classmates are females.

Q: That is interesting, because $\frac{12}{19}^{th}$ of my classmates are females.

Assuming that both P and Q speak the truth, which of the following statements are true?

I. Q is a female.
II. P is a female.
III. There are a total of 209 students in the class.

(A) Only II and III
(B) Only I
(C) Only I and III
(D) None of the statements are true.

9. The lines $4x + 5y = 134$ and $y = mx + 16$ intersect at points whose coordinates are integers. Find the number of positive integer values that m can assume.

(A) 1 (B) 2 (C) 3 (D) 4

10. Fourteen boys went to collect berries and returned with a total of 80 berries among themselves. If every boy collected at least one berry each, then what is the minimum number of pairs of boys that must have collected the same number of berries?

(A) 0 (B) 1 (C) 2 (D) 3

11. One morning, Govind Lal-the owner of the local petrol bunk, was adulterating petrol that he sells with kerosene. He had two identical tanks – the first being full of pure petrol while the second being empty. First he transferred an arbitrary amount of petrol from the first tank into the second and then replaced the petrol removed from the first tank with kerosene. He then repeated this process one more time but this time he ensured that by the end of the process the second tank was exactly full.

Which of the following statements is/are not true regarding the concentration of petrol in the second tank?

I. It cannot be more than 75%
II. It cannot be less than 75%
III. It is at most 50%

(A) Only I and III (B) Only I and II
(C) Only II (D) Only III

12. A solid sphere is put in a cylindrical container. How many of the following percentage values could possibly represent the ratio of the volume of the cylinder not occupied by the sphere and the volume of the sphere?

(a) $33^1/_3\%$ (b) $55^1/_5\%$ (c) 20%
(d) $44^1/_4\%$ (e) 50%

(A) 0 (B) 5 (C) 2 (D) 1

DIRECTIONS *for questions 13 and 14:* Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choose A if the question can be answered by one of the statements alone but not by the other.
Choose B if the question can be answered by using either statement alone.
Choose C if the question can be answered by using both the statements together, but cannot be answered by using either statement alone
Choose D if the question cannot be answered even by using both the statements together.

Information common to questions 13 and 14:

A treadmill manufacturing company sold x treadmills during each of the years 2001 through 2007. Exactly k% of the treadmills manufactured in any year were disposed off after exactly two years from their date of purchase, and the rest of the tread mills continue to be in operation for the next 20 years. The following two questions pertain to the treadmills sold by the company.

13. What is the value of k?

I. The ratio of the number of treadmills in operation at the end of 2003 and that in operation at the end of 2006 is 7 : 13.
II. The number of treadmills in operation at the end of the year 2006 is 1,04,000.

14. What is the value of x?

I. Five times the number of treadmills in operation at the end of the year 2004 is equal to thrice the number of treadmills in operation at the end of the year 2007.
II. The number of treadmills in operation at the end of the years 2003 and 2005 are 56,000 and 88,000 respectively.

DIRECTIONS *for questions 15 to 17:* Answer the questions on the basis of the information given below.

In a school, there are seven classrooms, one each for classes I through VII. These classrooms were built around a circular garden such that classes I to VII are accommodated in that order. The following table gives the sum of the number of students in any group of three consecutively situated classes.

Classes	Total students
I, II, III	300
II, III, IV	280
III, IV, V	240
IV, V, VI	195
V, VI, VII	215
VI, VII, I	235
VII, I, II	260

The percentage of girls in different classes are 30%, 40%, 44%, 45%, 50%, 55% and 60%, not necessarily in any order.

15. At least how many classes contain more than 30 girls?

(A) 1 (B) 2 (C) 3 (D) 4

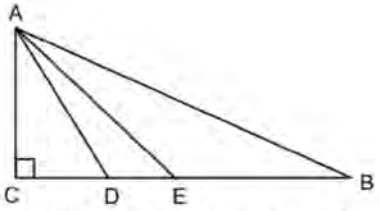
16. What is the maximum possible difference between the number of boys in one class and the number of girls in another class?
(A) 42 (B) 45 (C) 54 (D) 60

17. If it is known that x classes have an equal number of girls, then what is the maximum possible value of x?
(A) 2 (B) 3 (C) 4 (D) 5

DIRECTIONS *for questions 18 to 20:* Answer the questions independently of each other.

18. Bakul and Manohar start from two points P and Q respectively on a river and head towards each other. Had they been travelling in still water, they would have met at a point R, which is twice as distant from P as it is from Q. If Bakul had been travelling along the current and Manohar against it, then they would have met in 24 minutes. Find the time they would take to meet, if Bakul were to travel against the current and Manohar along the current.
(A) 12 minutes (B) 24 minutes
(C) 36 minutes (D) 48 minutes

19.



In the figure given above, triangle ABC is right-angled at C. AD is the angle bisector of ∠A and AE is the median to BC. If AC = 12 cm and BC = 16 cm, what is the ratio of the area of triangle AED to that of triangle AEB?
(A) 1 : 3 (B) 1 : 4
(C) 1 : 6 (D) 1 : 8

20. The number of ways of arranging $4n + 2$ ($n > 4$) students of a class around a circular table such that no two girls sit together and no two boys sit together is x. If the number of students is increased by 50%, then the number of ways becomes
(A) $\frac{3}{2}x$ (B) x^3
(C) $(2n + 1)!x$ (D) None of these

DIRECTIONS *for questions 21 and 22:* Answer the questions on the basis of the information given below.

Two curves are defined in the coordinate plane as $y = \frac{k_1}{x}$ and $y = \frac{x}{k_2}$, where k_1 and k_2 are constants.

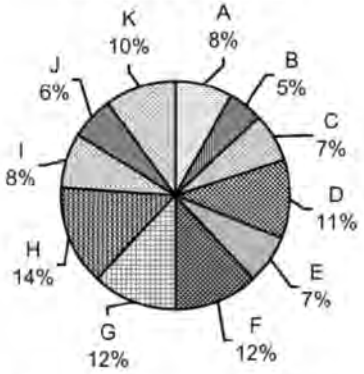
21. If $k_1 = 4$, the two curves intersect at a maximum of
(A) 4 points. (B) 3 points.
(C) 2 points. (D) 1 point.

22. If $k_1 = 6$, the two curves intersect at a minimum of
(A) 3 points. (B) 0 points.
(C) 1 point. (D) 2 points.

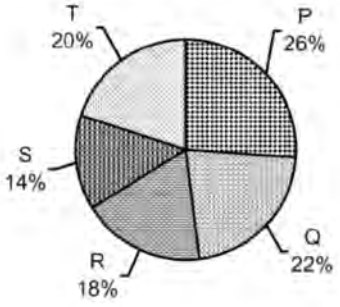
DIRECTIONS *for questions 23 to 25:* Answer the questions on the basis of the information given below.

The pie charts give the percentage market share (by sales value) of different soft drink brands available in the market and the percentage market share (by sales value) of different companies which make these soft drinks.

Market Share by brand



Market Share by company



23. If each company owned more than a single brand, then at most how many brands did company T own?
(A) 2 (B) 3 (C) 4 (D) 5

24. If companies R and S were taken over by company Q, than at least how many soft drink brands did the combined entity own?
(A) 5 (B) 6 (C) 7 (D) 8

25. If each company owned at least two brands and no two brands of a single company had the same market share (by sales value), then for how many of the given companies can the brands owned by them be uniquely determined?
(A) 3 (B) 2
(C) 1 (D) 0

DIRECTIONS *for questions 26 to 30:* Answer the questions independently of each other.

26. In a parallelogram ABCD, E is a point on AB, such that CE bisects ∠BCD. If ED = AE and BC = 4 cm, find BE.
(A) 2 cm
(B) 4 cm
(C) 8 cm
(D) Cannot be determined

27. If $2^y + 2(3^y) > 3(4^y)$ and $y = 3x^2 + 2x - 2$, which of the following is a possible value of x?
(A) –1.5 (B) 1.2
(C) –0.5 (D) 0.7

28. If a and c are positive, and the roots of the quadratic equation $(a^2 + b^2)x^2 + 2(ab + bc)x + (b^2 + c^2) = 0$ are real, find the minimum possible value of the quadratic expression $ax^2 + bx + c$.
(A) $\frac{-3c}{4}$ (B) $-\frac{c}{2}$ (C) $\frac{c}{2}$ (D) $\frac{3c}{4}$

29. If $S = \frac{1}{40} + \frac{1}{88} + \frac{1}{154} + \ldots\ldots + \frac{1}{59290}$. Which of the following best describes (49)S?
(A) 3.1 < (49)S < 3.3
(B) 3.5 < (49)S < 4
(C) 4 < (49)S < 4.5
(D) (49)S > 5

30. There are two flagpoles, A and B, of heights $15\sqrt{3}$ m and $30\sqrt{3}$ m respectively. If there is only one point on the ground from where both the flagpoles subtend an angle of 60° each, find the maximum possible distance between the tops of the two flagpoles.
(A) $30\sqrt{3}$ m (B) 15 m
(C) $15\sqrt{3}$ m (D) 45 m

SECTION – II
Number of Questions = 30

DIRECTIONS *for questions 1 to 4:* Read the following passage and answer the questions that follow it.

Scholars have always been people of the book, so it seems wrong that this faithful companion has been put on the defensive. Part of the problem is knowing what we mean exactly when we say "book." It's a slippery term for a format, a technology, a historical construct, and something else as well.

The book has a long story to tell, one that might be organized around four epochal events, at least in the West. In the beginning was the invention of writing and its appearance on various materials. The second was the development during the first years of the Christian era of the codex—the thing with pages and a cover—first as a supplement and eventually as a replacement for the older technology of the scroll. The third was the European deployment of movable type, in the 15th century. And the fourth is, of course, the digital revolution in the middle of which we find ourselves today.

When we say "book," we hear the name of a physical object, even if we're thinking outside the codex. The codex bound text in a particular way, organizing words into pages, and as a result literally reframed ideas. The static text image on my desktop is the electronic cousin of late antiquity's reading invention. When my screen is still, or when I arrange text into two or four pages, like so much visual real estate, I am replicating a medieval codex, unbinding its beautifully illuminated pages. Yet reading digitally is also a scroll-like engagement – the fact that we "scroll down" connects us to a reading practice that dates back several millennia. One of the things that book historians study is the change in, and persistence of, reading technologies over time, and what those historians have demonstrated is that good technologies don't eradicate earlier good technologies. They overlap with them – or morph, so that the old and the new may persist alongside yet another development. Think Post-its, printed books, PCs, and ipods, all in the same office cubicle.

The concept of the "history of the book" is a scholarly new discipline, that evolved as recently as the 1950s. Book history's objective was analysis of the function of the book in culture, and since the 1970s, it has continually expanded its scope, emerging as a trading zone among various disciplines, where the work of librarians, archivists, and scholarly publishers can intersect with the work of traditional scholars and theorists, all members of what is now called the "knowledge industry."

In the long night of culture, we knowledge workers are restless sleepers. We need dreamers – in technology and science as well as the arts. Right now we are walking through two great dreams that are shaping the future of scholarship, even the very idea of scholarship and the role "the book" should play within it.

1. Why does the author say that the codex 'literally reframed ideas'?
(A) Because it coincided with the emergence of new ideas in the literary field
(B) Because it changed the way written expression was presented, from a scroll to pages bound between covers
(C) Because it was the precursor to the e-book that has pages framed on the screen.
(D) Because it was a new, and significant, medium of written expression.

2. Which of the following best describes the concluding para?
   (A) The para uses analogy to represent the significant contribution, by science and art, to the development of the book.
   (B) The para depicts the author's visualisation of how the book will shape science and technology.
   (C) The para aptly concludes the discussion on the evolution of the book by giving a glimpse of its future shape.
   (D) The para is a metaphorical representation of the influence of art and technology on the future of the book and scholarship.

3. The author refers to the Post-its, printed books, PCs and iPods found in the office cubicle
   (A) to demonstrate that electronic gadgets have not been able to replace the printed word.
   (B) to suggest that the good old technologies are the ones that evolve into the new ones.
   (C) to show that good old technologies may evolve into changed forms but are not wiped out by newer technologies.
   (D) to exemplify how new technologies borrow ideas from older forms that have proven themselves.

4. The author calls the book 'a slippery term' because
   (A) it encompasses not just a form and technology but a lot of other things as well.
   (B) it has been changing its form in response to changes in technology, and is therefore difficult to define.
   (C) it has altered so drastically that it is difficult to think of a scroll and an e-book as essentially the same thing.
   (D) the changes over time have affected how it is perceived and received by the general public.

DIRECTIONS *for questions 5 and 6:* Each of these questions presents a paragraph which has 6 words/phrases that are underlined. Each such word/phrase is followed by (Y/N). Select (Y) if you find the word/phrase to be appropriate in its use (in all aspects: grammar, spelling, standard use and contextual relevance), or select (N) if it is not appropriate (in any aspect). From the choices that follow the paragraph, pick that which you consider represents the correct sequence for the paragraph.

5. Evolutionists had it put down (Y/N) pat. The universe, they had decided (Y/N), is about 20 billion years old, and Earth itself is 4.5 billion years old. Simple forms of life came into being more than three billion years ago, having formed spontaneously (Y/N) from nonliving matter. They had grown (Y/N) more complex through slow evolutionary processes and the first hominid ancestors of humanity appeared more than four million years ago. Homo Sapians (Y/N)—the present human species, people like you and me—has (Y/N) walked the earth for at least 50,000 years.
   (A) NNYNNN (B) NYYNNY
   (C) NYYYYY (D) YNYYNN

6. Children between the ages of three and thirteen who are infected with H. Pylori are 60% less prone (Y/N) to have asthma than the (Y/N) uninfected contemporaries. Researchers believe this is because H. Pylori makes the immune system more robust. The lack of it lowers the threshold for responding to a foreign protein that might come from a pathogen. As a result, things like pollen and mites trigger responses even though they are not, actually, dangerous. This idea is similar to the "hygiene hypothesis", that the super-clean environment of the modern world fails to challenge children's (Y/N) immune systems enough for their own good and thus opens (Y/N) the way to (Y/N) conditions such as asthma. It differs, however, in that these researchers think humanity has co-evolved with the bugs that prime the immune system rather than picked (Y/N) them up at random.
   (A) YNYYYN (B) YYYNYN
   (C) NNYYNY (D) NNYYYN

DIRECTIONS *for questions 7 to 10:* Read the following passage and answer the questions that follow it.

A mysterious bowel disease thought to be caused by an over-exuberant immune system may paradoxically be triggered by immune cells that don't do enough in the early stages of bacterial infection.

Since some treatments for Crohn's disease aim to suppress the immune system, it's possible these drugs could be making things worse. The discovery by Anthony Segal of University College London and his colleagues, is causing a stir among immunologists. Caetano Reis e Sousa at Cancer Research UK calls it "provocative", while Jean-Laurent Casanova at The Rockefeller University in New York says it is "a major breakthrough".

A similar mechanism may be at the root of a host of other "autoimmune" disorders, in which immune cells turn on the body's own tissue. Underactive immune cells could also explain why some of us are more prone to infectious diseases.

About 1 in 1000 people in the US and Europe have Crohn's. Symptoms include swollen, painful intestines and diarrhoea. Inflamed sections of gut often have to be surgically removed.

Segal and his colleagues got their first clue when they noticed a weaker immune response in people with Crohn's than in healthy people after both groups were injected with heat-killed Escherichia Coli. The team reasoned that this lukewarm response might allow an infection to build up and eventually trigger a debilitating secondary immune response, resulting in Crohn's.

If this is the case, though, why does Crohn's only manifest itself in the intestine? After further experiments it became clear that the immune weakness only revealed itself when large number of killed E. Coli were injected. As the bowel is

one of the few places in the body where bacteria exist in huge numbers Segal concluded that this is where the weakened immune response has its biggest impact. "It's only in the bowel that you routinely get massive loads of bacteria – and if these breach the intestinal wall it will cause an infection."

It still wasn't clear, however, what caused the weakened immunity in the first place. So Segal's team focused on cells called macrophages, the immune system's whistle-blowers. In people with Crohn's disease, they found that macrophages secrete lower levels of cytokines, the chemicals that rally other immune cells to infection sites.

The team concluded that ineffectual rallying of immune cells in people with defective macrophages is what allows intestinal bacteria to run amok in the early stages of an infection, setting in motion the series of events that leads to Crohn's disease.

7. As understood from the passage, in the light of the new discovery, Crohn's is caused
(a) when the immune system overreacts to a threat of infection.
(b) in the intestine because it houses a large number of bacteria that attack when the immune response is weak.
(c) when bacteria become unruly in the gut because of the absence of macrophages.
(d) by the weakened response of the immune system after bacterial infection has built up significantly.
(A) Only b (B) b and d
(C) Only a (D) a and c

8. The discovery by Anthony Segal regarding Crohn's is causing a stir among immunologists because
(a) it shows that the current line of treatment may be doing more harm than good.
(b) it unearths facets of autoimmune diseases not known hitherto.
(c) it may open the door to progress in other auto immune diseases also.
(d) it is controversial and not all immunologists subscribe to the findings.
(A) a and c (B) b and d
(C) a and b (D) c and d

9. The first para of the passage
(A) puts forth a hypothesis that is analysed in the passage and found wanting.
(B) sets out the objective of a scientific discovery the attainment of which forms the content of the rest of the passage.
(C) sets forth a discovery that is then elaborated on and explained in the rest of the passage.
(D) gives the gist of Anthony Segal's discovery and then elaborates on the hornet's nest it stirred.

10. Refer to the last para – 'The team concluded that ineffectual rallying of immune cells in people with defective macrophages is what allows intestinal bacteria to run amok in the early stages of an infection, setting in motion the series of events that leads to Crohn's disease'.

Which of the following is the best restatement of the above sentence?
(A) Crohn's disease is caused by a series of events set in motion by intestinal bacteria running amok with the defective macrophages, in the early stages of infection in a person, leading to the ineffectual rallying of immune cells – so the team concluded.
(B) The team inferred from the series of events set in motion in people with defective macrophages that ineffectual rallying of immune cells causes intestinal bacteria to run amok in the early stages of an infection.
(C) Crohn's disease is caused, the team concluded, by a series of events set in motion when intestinal bacteria run amok in the early stages of an infection, in those in whom the defectiveness of macrophages leads to ineffectual rallying of immune cells.
(D) In people with defective macrophages, the team concluded, the ineffectual rallying of immune cells in the early stages of an infection is caused by intestinal bacteria that lead to Crohn's disease.

DIRECTIONS *for questions 11 and 12:* Each of the following questions has a set of 4 independent sentences which may have errors in grammar, spelling, punctuation or structure. Identify the sentence that is free from errors.

11. (A) The purpose of McGuire's book is to sketch the environmental pickle in which we find ourselves, to suggest the likely consequences of personal, corporate and governmental inaction, and to offer a few crumbs of hope that its possible to avert the doomsday scenario that he portrays.
(B) We're living in a time, McGuire writes, when the atmospheric concentration of carbondioxide runs at 380 parts per million, and in which the UN Intergovernmental Panel on Climate Change has recently determined that unless we reduce emissions of greenhouse gases by between 50 and 80 percent by 2050, the game is up.
(C) It also makes for a thoroughly depressing read because it's difficult to ignore the troublesome environmental omens: that last year was, as he puts it, 'the year of the flood', and a year in which the Arctic ice field was so drastically reduced during the summer.
(D) The elusive dream of genuinely balmy English summers has finally been realized – temperatures routinely hit the mid-40s – but the ensuing droughts have led to vineyards being abandoned, and the sweltering members of the English parliament are obliged to decamp to Edinburgh between May and October.

12. (A) Today, hunger is the beast rampaging around the world and particularly in Africa, where shortage of food threatens to undo recent economic and political gains – there have been food riots in Egypt, Cameroon, Cote d'Ivoire, Senegal, Burkina Faso and Madagascar.

(B) To transform African agriculture is the goal of the Alliance for a Green Revolution in Africa, which hopes to engage all stakeholders – including the public and private sectors, civil society, farmer groups, donors, scientists and entrepreneurs – to the task.
(C) Systemic problems in distribution, infrastructure and trade also need to be addressed to strengthen local and regional markets – major roads all lead to the coast when what is needed is roads that connect countries, especially landlocked ones now burdened by outrageous transport costs.
(D) An African Green Revolution that doubles or triples productivity of smallholder farmers, preserves biodiversity, and creates rural income will be crucial in ending widespread poverty and hunger, and freeing Africa from its dependence on food imports and food aid.

DIRECTIONS *for questions 13 to 16:* Read the following passage and answer the questions that follow it.

It's a pity that so few of us have lived down our childhood struggles with grammar. We have been made to suffer so much from memorizing rules by rote and from approaching language in a mechanical, unimaginative way that we tend to think of grammar as the most inhuman of studies. Probably we have a kind of unconscious resentment against all patterns that are so set as to constitute a gratuitous insult to the principle of free will.

Yet nothing is more human than the speech of an individual or of a folk. Human speech, unlike the cry of an animal, does not occur as a mere element in a larger response. Only the human animal can communicate abstract ideas and converse about conditions that are contrary to fact. Indeed the purely conventional element in speech is so large that language can be regarded as pure culture. A Burmese weaver, moved to Mexico, would know at once what a fellow craftsman in Mexico was doing, but would not understand one word of the Nahuatl tongue. No clues are so helpful as those of language in pointing to ultimate, unconscious, psychological attitudes. Moreover, much of the friction between groups and between nations arises because in both the literal and the slangy senses they don't speak the same language.

We live in an environment which is largely verbal in the sense that we spend most of our waking hours uttering words or responding actively or passively to the words of others. As Edward Sapir says: Language completely interpenetrates direct experience. For most persons every experience, real or potential, is saturated with verbalism which, perhaps, explains why so many nature lovers do not feel that they are truly in touch with nature until they have mastered the names of a great many flowers and trees, as though the primary world of reality were a verbal one and as though one could not get close to nature unless one first mastered the terminology that somehow magically expresses it. It is this constant interplay between language and experience which removes language from the cold status of such purely and simply symbolic systems as mathematical symbolism or flag signalling."

The dictionaries still say that "language is a device for communicating ideas." The semanticists and the anthropologists agree that is a tiny, specialized function of speech. Mainly, language is an instrument for action. The meaning of a word or phrase is not its dictionary equivalent but the difference its utterance brings about in a situation. We use words to comfort and cajole ourselves in fantasy and daydream, to let off steam, to goad ourselves into one type of activity and to deny ourselves another. We use words to promote our own purpose in dealing with others. We build up verbal pictures of ourselves and our motives. We coax, wheedle, protest, invite, and threaten. Even the most intellectual of intellectuals employs only a minute fraction of his total utterance in symbolizing and communicating ideas that are divorced from emotion and action. The primary social value of speech lies in getting individuals to work more effectively together and in easing social tensions. Very often what is said matters much less than that something is said.

13. 'Very often what is said matters much less than that something is said', because
(A) language is an instrument of action as much as a channel for dispersal of information.
(B) we can use language to promote our own objectives by manipulating others.
(C) the purpose of speech is to communicate emotions far more than to communicate ideas.
(D) we can change a situation by communicating ideas that are not known.

14. What makes language superior to symbolic systems?
(A) Unlike other symbolic systems, language is closely interwined with our experiences.
(B) Language saturates our lives so completely that experiences seem meaningless without the ability to express them.
(C) Only languages have elaborate and distinct grammar and idioms.
(D) Language is not purely mechanical and objective but alive and changing.

15. Language can be regarded as pure culture because
(A) people belonging to different cultures barely understand each other.
(B) there is no one-to-one correspondence between expressions in two languages.
(C) it often points to unconscious psychological attitudes of a people.
(D) it is the underlying cause of much of the friction between people speaking different tongues.'

16. Refer to the second sentence of the third para, 'For most persons every experience, real or potential, is saturated with verbalism which, perhaps, explains why so many nature lovers do not feel that they are truly in touch with nature until they have mastered the names of a great many flowers and trees, as though the primary world of reality were a verbal one and as though one could not get close to nature unless one first mastered the terminology that somehow magically expresses it.'

Which of the following is the best restatement of the above sentence?

(A) Many nature lovers feel that unless they master the names of a great many flowers and trees, they are not in touch with nature because the primary world of reality is a verbal one and one can't get close to nature without mastering the terminology that magically expresses it; or so it seems for people whose experience is saturated with verbalism.
(B) Many nature lovers master the names of a great many flowers and trees because they think that the primary world of reality is a verbal one and so the only way to be close to nature is to master the terminology that magically expresses it.
(C) The reason why many people, including nature lovers, master the names of a great many flowers and trees is that their experience is so saturated with verbalism that they can't be in touch with nature without mastering the terminology that somehow magically expresses it.
(D) In feeling that their understanding of the primary world of reality and their closeness to nature would be complete only when they have the words to express their experiences, and in taking pains, therefore, to master the names of a considerable number of flowers and trees, many nature lovers demonstrate that they are among a majority who find their every experience saturated with verbalism.

DIRECTIONS *for questions 17 to 20:* Select the correct alternative from the given choices.

17. How harmful are the performance enhancing drugs used by today's athletes? Certainly, there have been heavily publicised cases suggesting that excessive use can sometimes have damaging consequences. But the balance of the medical evidence suggests that, used responsibly, today's more popular performance enhancers mostly have only temporary side effects, at worst. And any such harm pales beside that known to be done by, say, smoking tobacco and drinking alcohol, activities not unknown among athletes, but not likely to be banned anytime soon by the sporting authorities.

In the argument given, the two underlined portions play which of the following roles?

(A) The first states the position that the argument as a whole opposes, the second provides evidence to undermine the support for the position being opposed.
(B) The first states the position that the argument as a whole opposes, the second is evidence that has been used to support the position being opposed.
(C) The first states the position that the argument as a whole opposes, the second states the conclusion of the argument as a whole.
(D) The first is evidence that has been used to support a position that the argument as a whole opposes, the second provides information to undermine the force of that position.

18. Achou: France's cultural diplomacy in the European region has been vigorous and effective. Handsome French cultural centres ornament the capitals of the region.
Marion: But admiration for France's culture does not translate into widespread use of its language.

Marion responds to Achou by

(A) demonstrating that Achou's conclusion is based on evidence that is not relevant to the issue at hand.
(B) challenging the plausibility of the evidence that serves as the basis for Achou's argument.
(C) agreeing with the main conclusion of Achou's argument but construing that conclusion as grounds for pessimism rather than for optimism.
(D) reinforcing Achou's conclusion by supplying a complementary interpretation of the evidence Achou cites.

19. Industry standard No 23 stipulates that a worker who suffers injuries or death due to accident inside the factory within his working hours is to be adequately compensated by the company. A worker who stays for five minutes after his stipulated working hours to wind up his work, suffers an accident and is injured.

The answer to which of the following questions is most relevant in helping to determine whether or not the company is liable to pay compensation?

(A) Is winding up of work considered a part of the duty expected to be performed by the worker?
(B) Was the company following all safety measures to prevent accidents at work spots?
(C) Does the factory have a system of indicating to a worker that his day's work is over?
(D) Is the time of accident within the buffer time, if any, within which, if the accident occurs, the company is liable to compensate the victim?

20. European unemployment rates are usually substantially higher than the rate in the United States of America and the employed fraction of the population smaller.

Which of the following, if true, would show that the problem of unemployment in Europe is not as serious as suggested?

(A) Most of the Europeans are self employed whereas in the United States of America it is not the case.
(B) The density of population in Europe is comparatively higher than that in the United States of America.
(C) The disparity of income levels in Europe is not as pronounced as in the United States of America.
(D) The population profile of European countries shows that a much higher percentage is of people of unemployable age.

DIRECTIONS *for questions 21 to 23:* Answer the questions on the basis of the information given below.

Archana, Bhargavi, Chandrika, Divya, Eshwari and Fathima are six faculty members in a college. Each faculty member is a Professor in exactly one subject and

an Associate Professor in exactly one other subject. Bhargavi is a Professor in Physics, for which there are has three Associate Professors. Eshwari is a faculty member in Physics and Biology. Eshwari and Bhargavi are faculty members in the same subjects. Archana and Chandrika are faculty members in Chemistry. Archana is an Associate Professor in Mathematics, for which Divya and Chandrika are Professors. For Commerce, there is exactly one Professor.

21. Who is the Associate Professor in Commerce?
(A) Divya (B) Bhargavi
(C) Fathima (D) None of these

22. Fathima is a Professor in
(A) Mathematics (B) Biology
(C) Physics (D) Commerce

23. Who among the following is/are Associate Professor(s) in Biology?

(I) Bhargavi (II) Eswari
(III) Divya (IV) Chandrika
(A) Only II and III (B) Only I
(C) Only I and II (D) Only II, III and IV

DIRECTIONS *for question 24:* The question below is followed by two statements I and II. You have to decide whether the information provided in the statements is sufficient for answering the questions.

Choose A if the question can be answered by using one of the statements alone but cannot be answered by using the other statement alone.
Choose B if the question can be answered by using either statement alone.
Choose C if the question can be answered by using both statements together, but cannot be answered by using either statement alone.
Choose D if the question cannot be answered even by using both statements together.

24. Given that ABC is a triangle, whose sides, when measured in cm, are integer. Is ABC a right-angled triangle?
I. ABC is isosceles.
II. The sum of the sides of the triangle is 12 cm, and the three sides in cm, are in arithmetic progression, with no two sides being equal.

DIRECTIONS *for questions 25 to 27:* Answer the questions on the basis of the information given below.

Seeing the huge popularity of the Indian Premier League (IPL) tournament, the All India Football Federation started an Indian Football League (IFL) tournament, to give impetus to the sport in the country. Eight clubs representing eight cities of the country participate in the inaugural tournament, which comprises three stages. The first stage, called the group stage, is a double round-robin stage, i.e., a stage in which every team plays exactly two matches against each of the other teams. If any match in this stage ends as a draw, both the teams get one point each. Otherwise, the winning team gets three points and the losing team gets no points. If, at the end of the group stage, two or more teams end up with the same number of points, goal differences (goals scored – goals conceded) will be applied to determine their placings. Assume that no two teams end up with the same goal difference. At the end of this stage, the top four teams, in terms of the points scored, would advance to the second stage, i.e., the semifinals. The winners of the semifinals would advance to the third stage, i.e., the finals. The winner of the finals is the champion of the tournament. It is ensured that there are no draws in the second and the third stages.

25. It is known that 'Maratha Stallions', a Pune based club, made it to the semi-finals. The minimum possible points obtained by 'Maratha Stallions' at the end of the group stage are
(A) 8 (B) 10 (C) 11 (D) 12

26. The number of points scored by a team which does not advance to the semifinals can be at most
(A) 28 (B) 26 (C) 30 (D) 32

27. At least how many points should be scored by a team to finish sixth in the group stage?
(A) 4 (B) 5 (C) 6 (D) 7

DIRECTIONS *for question 28:* The question below is followed by two statements. You have to decide whether the information provided in the statements is sufficient for answering the questions.

Choose A if the question can be answered by using one of the statements alone but cannot be answered by using the other statement alone.
Choose B if the question can be answered by using either statement alone.
Choose C if the question can be answered by using both statements together, but cannot be answered by using either statement alone.
Choose D if the question cannot be answered even by using both statements together.

28. Five boys – L, M, N, O and P – are of distinct heights and are standing in a queue one behind the other with the shortest first and the tallest last. Who is the shortest among the five boys?
I. P is the second tallest boy among the five boys and only N is taller than him.
II. At least three of the five boys are taller than M and M is shorter than both O and L.

DIRECTIONS *for questions 29 and 30:* Answer the questions on the basis of the information given below.

(i) Six persons – A, B, C, D, E and F – are sitting in two rows of three persons each, such that each person in a row faces exactly one person in the other row.
(ii) F is sitting at the middle of a row.
(iii) A and B are sitting in the same row but not next to each other.
(iv) D is sitting at the extreme left of one of the rows and C is adjacent to him.
(v) E and B are not opposite each other.

29. Who is sitting opposite F?
(A) A (B) B (C) C (D) D

30. Which of the following pairs of persons are at the ends of two different rows but not opposite each other?
(A) A and B (B) B and D
(C) A and E (D) A and D

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T.I.M.E.
Triumphant Institute of Management Education Pvt. Ltd.

(Key and Solutions for AIMCAT1204)

Key

SECTION – I

1. C	6. B	11. A	16. D	21. C	26. B
2. B	7. C	12. C	17. B	22. B	27. C
3. B	8. B	13. A	18. B	23. B	28. D
4. D	9. B	14. A	19. B	24. A	29. A
5. D	10. D	15. C	20. D	25. D	30. A

SECTION – II

1. B	6. C	11. B	16. D	21. D	26. C
2. D	7. A	12. A	17. D	22. D	27. A
3. C	8. A	13. C	18. B	23. B	28. C
4. A	9. C	14. A	19. D	24. B	29. C
5. B	10. C	15. C	20. D	25. A	30. D

Solutions

SECTION – I

Solutions for questions 1 to 4:

1. Since the slips are picked up one after the other without replacement, they have distinct numbers on them and 4 distinct numbers can be arranged among themselves in 4! ways. (i.e., 24 ways). Of these 24 ways only one arrangement is in ascending order.
∴ The required probability = 1/24. Choice (C)

2. The remainder of $23574^{(1^2+2^2+3^2+\ldots+77^2)}$ divided by 5 is the same as the units digit of $23574^{(1^2+2^2+3^2+\ldots+77^2)}$ divided by 5.

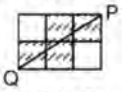
Units digit of $23574^{1^2+2^2+3^2+\ldots+77^2}$ is units digit of $4^{1^2+2^2+3^2+\ldots+77^2}$ = Units digit of $4^{\text{odd}} = 4$ Choice (B)

3.

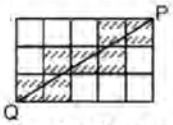
	No. who don't attend classes	No. who attend classes
No. who don't study at home	a	b
No. who study at home	d	c

Given $(a + b + d) = (1 + 1/3)(c + d + b)$
$\Rightarrow (a + b + d) = 4/3 (c + d + b)$ ---- (1)
Further $b = (1 + 2/5) d$ and $c = a/2$
$a = 2c$, $b = 7/5d$ ----- (B)
Substituting (B) in (1) gives
$2c + 7/5d + d = 4/3 (c + d + 7/5d)$
$\Rightarrow 2c + 12/5d = 4/3c + 16/5d$
$\Rightarrow 2/3c = 4/5d$ ----- (C)
$\Rightarrow d = 10/12c = 5/6c$
$\Rightarrow b = 7/5 (5/6c) = 7/6c$ and $a = 2c$
$a + b + c + d = 5c = 150$ (given)
$\Rightarrow c = 30$ Choice (B)

4. Consider a grid of dimensions 2×3, which is divided into squares, each of dimensions 1×1.



A diagonal drawn from P to Q passes through 4 squares.
Consider a grid of dimensions 3×5 as shown below.



A diagonal drawn from P to Q passes through 7 squares.
∴ When a grid of dimensions $m \times n$, where m and n are co-primes to each other, is divided into squares of dimensions 1×1, the number of squares that a diagonal passes through is $m + n - 1$.
In the above examples, $4 = 2 + 3 - 1$.
$7 = 3 + 5 - 1$.

The given grid is of dimensions 240×384, in which the given numbers are not co-primes to each other.
In a grid of dimensions 240×384, there are 48 smaller grids of dimensions 5×8 which lie on the diagonal. (i.e., 48 is the HCF of 240 and 384)
($\because 240 \times 384 = (48 \times 5) \times (48 \times 8)$)
Now, when a grid of dimensions 5×8 is divided into smaller squares of dimensions 1×1 and a diagonal is drawn, the diagonal passes through $5 + 8 - 1 = 12$ squares ($\because$ 5 and 8 are co-primes to each other)
Since there are 48 such grids of dimensions 5×8 along the diagonal of the larger grid the number of squares cut is $48 \times 12 = 576$. Choice (D)

Solutions for questions 5 and 6:

5. $125 + 100 \times 0.5 + 100 \times 0.75 + 100 \times 1 + 65 \times 1.25$
= Rs.431.25 Choice (D)

6. It cannot be less than 100 as the average is more than Re.1.
It cannot be between 200 and 400 as the average is less than Rs.0.90
If it is between 100 and 200, let it be $100 + x$.

$$\therefore \frac{125 + \frac{x}{2}}{100 + x} = 0.95$$

$$\Rightarrow 0.45x = 30$$

$$\Rightarrow x = \frac{3000}{45} = 66\frac{2}{3}$$

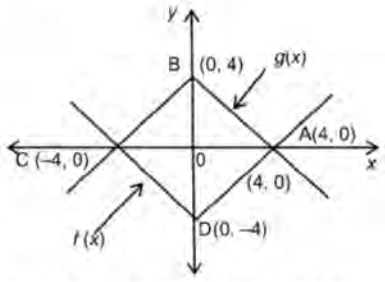
As x is an integer, it cannot be $66\frac{2}{3}$

So, check for 500 or 600.
For 500, bill is
$125 + 100 \times 0.5 + 100 \times 0.75 + 100 \times 1 + 100 \times 1.25 = 475$

Average per call = $\frac{475}{500} = 95$ paise Choice (B)

Solutions for questions 7 to 12:

7.



The graphs of $f(x)$ and $g(x)$ are shown above.
The area bounded by the curves is square ABCD with diagonals of length 8 units.

Side of square = $\frac{\text{diagonal}}{\sqrt{2}} = \frac{8}{\sqrt{2}} = 4\sqrt{2}$

Radius of largest circle inscribed in ABCD = side/2 = $2\sqrt{2}$

Area of circle = $\pi(\text{radius})^2 = \pi\left(2\sqrt{2}\right)^2 = 8\pi$ Choice (C)

8. Had both P and Q belonged to the same gender, they should have stated the same ratio of females in the class.

But $\frac{7}{11} \neq \frac{12}{19} \Rightarrow$ one of P and Q is a male and the other is a female. Clearly since $\frac{7}{11} > \frac{12}{19}$, P must be male and Q female. [Note that the basic reasoning is itself sufficient to eliminate both choices (A) and (D)]
Now, the 'number of classmates' is same for both P and Q, and equal to N – 1, where N is the total number of students in the class. For easy comparison we should try to convert $\frac{7}{11}$ and $\frac{12}{19}$ into ratios with the same denominator.

$$\therefore \frac{7}{11} = \frac{7 \times 19x}{11 \times 19x} = \frac{133x}{209x}$$

and $\frac{12}{19} = \frac{12 \times 11x}{19 \times 11x} = \frac{132x}{209x}$

The difference between the number of female classmates as stated by P and Q should be one (since P and Q belong to different genders)
$133x - 132x = 1 \Rightarrow x = 1$ and
No.of classmates = N – 1 = 209
$\Rightarrow$ N = 210
$\therefore$ No of students in the class is 210.
$\therefore$ Only statement I is true. Choice (B)

9. Given $4x + 5y = 134$

$$\Rightarrow y = \frac{134 - 4x}{5} \quad \text{---------- (A)}$$

$y = mx + 16$ ---------- (B)

From (A) and (B), $mx + 16 = \frac{134 - 4x}{5}$

$5mx + 80 = 134 - 4x \Rightarrow (5m + 4)x = 54$
Since $m \in N$, $x \in N$.
Now consider the factors of 54 i.e., 1, 2, 3, 6, 9, 18, 27 and 54. Out of these only 9 and 54 can be expressed as $5m + 4$ i.e., $m = 1$ and $m = 10$ are the two possible values.
Choice (B)

10. We have to distribute 80 berries among 14 boys, i.e., write 80 as the sum of 14 natural whole numbers, where as many as possible of the numbers are distinct.
$\Rightarrow$ We should consider $1 + 2 + \ldots\ldots 12 = 78$ (among 12 boys) and the other two berries have to be distributed among the remaining two boys. Each of the two boys must be given one berry. Hence, three boys will have one berry each.
$\Rightarrow {}^3C_2$ = three pairs of boys have the same number of berries each. Choice (D)

11. Let Govind Lal transfer x fraction of the petrol in the first operation and y fraction of the petrol in the second operation.
Then concentration of petrol in first tank = $(1 - x)$, $(1 - y)$ = C and concentration of petrol in second tank = 1 – C.
Now, also known that $x + y = 1$ (since second tank is full)

$\therefore$ Maximum possible value of $C = \left(1 - \frac{1}{2}\right)\left(1 - \frac{1}{2}\right) = \frac{1}{4}$

(i.e., when $x = y = ½$)
and similarly minimum possible value of $(1 - C)$

$= 1 - \frac{1}{4} = \frac{3}{4}$

Clearly only II is correct and I and III are incorrect.
Choice (A)

12. Let the radius of the sphere that has been put in a cylinder be R. The minimum dimensions of the cylinder can then be a radius of R and a height of 2R.

$\therefore$ Minimum Volume of the cylinder = $2\pi R^3$ and the volume of the sphere = $\frac{4\pi R^3}{3}$

$\therefore$ The minimum possible volume of the cylinder not occupied by the sphere = $2\pi R^3 - \frac{4\pi R^3}{3} = \frac{2\pi R^3}{3}$

$\therefore$ Remaining volume as percentage of the volume of the sphere is at least $\frac{\frac{\pi}{3}R^3}{\frac{2\pi}{3}R^3} \times 100 = 50\%$

Only 50% and $55\frac{1}{2}\%$ are possible. Choice (C)

Solutions for questions 13 and 14:

The following table gives the data regarding the number of treadmills in operation at the end of years 2001 through 2007.

2001	2002	2003	2004	2005	2006	2007
X	$2x$	$3x - \frac{kx}{100}$	$4x - \frac{2kx}{100}$	$5x - \frac{3kx}{100}$	$6x - \frac{4kx}{100}$	$7x - \frac{5kx}{100}$

13. From I, we have $\frac{\left(3x - \frac{kx}{100}\right)}{\left(6x - \frac{4kx}{100}\right)} = \frac{7}{13}$

$$\Rightarrow \frac{300 - k}{600 - 4k} = \frac{7}{13}$$

∴ We can find the value of k
∴ I alone is sufficient.

From II, we have $6x - \frac{4kx}{100} = 1,04,000$

As we don't know the value of x, we cannot find the value of k.
∴ II alone is not sufficient. Choice (A)

14. From I, we have $5\left(4x - \frac{2kx}{100}\right) = 3\left(7x - \frac{5kx}{100}\right)$

As x is present on both sides of the equation, we can only find the value of k but not x.
∴ I alone is not sufficient.

From II, $3x - \frac{kx}{100} = 56,000$

$5x - \frac{3kx}{100} = 86,000$

Solving the above two equations, we can find the values of x and k.
∴ II alone is sufficient. Choice (A)

Solutions for questions 15 to 17:

Total strength of the school
$= \frac{300 + 195 + 260 + 240 + 235 + 280 + 215}{3} = 575$
Strength of class I
= 575 – (II, III, IV, V, VI, VII) = 575 – (280 + 215) = 80
Similarly, the strengths of classes II, III, IV, V, VI and VII are 100, 120, 60, 60, 75 and 80 respectively.

15. For the cases in which the percentage of girls is 60 and 55, the number of girls will be more than 30(minimum possible is $\frac{55 \times 60}{100} = 33$)

Also for the class which has 44% of girls, the total number of students will be 75 or 100 (only then the number of girls is an integer)

∴ Minimum possible = $\frac{75 \times 44}{100} = 33$.

Hence, there are at least three such classes and the following is one of the possible cases:
I. 30% of 80 = 24
II. 44% of 100 = 44
III. 60% of 120 = 72
IV. 50% of 60 = 30
V. 45% of 60 = 27
VI. 40% of 75 = 30
VII. 55% of 80 = 44

Here only classes II, III and VII have more than 30 girls.
Choice (C)

16. Minimum possible number of girls in any class = 30% of 60 = 18.
The maximum possible number of boys in other class
= (100 – 40)% of 120 = 72
∴ Difference = 54
Similarly, Maximum possible number of boys
= (100 – 30)% of 120 = 84.
Then minimum possible girls = 40% of 60 = 24.
∴ difference = 60.
Also, maximum possible number of girls
= 60% of 120 = 72.
Then minimum boys = (100 – 55)% of 60 = 27
∴ difference = 45
Also, minimum possible number of boys
= (100 – 60)% of 60 = 24.
Then maximum girls = 55% of 120 = 66
∴ difference = 42
∴ Maximum possible difference is 60. Choice (D)

17. The possible number of girls for I, VII – 24, 32, 36, 40, 44, 48
II – 30, 40, 44, 45, 50, 55, 60
III – 36, 48, 54, 60, 66, 72
IV, V – 18, 24, 27, 30, 33, 36
VI – 30, 33, 45

Here, only 30 (or 36) can occur for 3 times.

(1) <u>for 30 girls</u>
II – 30% of 100 = 30
IV – 50% of 60 = 30
V – 40% of 75 = 30

But 44% cannot take any other class to get an integer.

(2) <u>For 36 girls</u>
I – 45% of 80 = 36
III – 30% of 120 = 36
IV – 60% of 60 = 36
∴ It is a possible case. Choice (B)

Solutions for questions 18 to 20:

18. In the calculation of relative speeds, the effect of the speed of current will be nullified. Hence, it will be similar to the situation of them travelling on the ground.
∴The time taken by them, even when they swap their directions, is 24 minutes only. Choice (B)

19. As AC = 12 and BC = 16, AB = 20, and CE = BE = 8.

Since AD is the angle bisector, $\frac{CD}{DB} = \frac{AC}{AB} = \frac{12}{20}$

$\frac{CD}{16 - CD} = \frac{3}{5} \Rightarrow$ CD = 6 and DE = CE – CD = 8 – 6 = 2

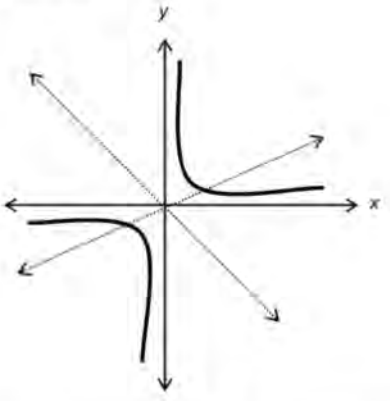
Area of triangle AED : Area of triangle AEB
$= \frac{1}{2}(2)(12) : \frac{1}{2}(8)(12) = 1 : 4$ Choice (B)

20. At first the number of students was even $(4n + 2)$.
When the number of students is increased by 50%, the number of students = $6n + 3$
i.e. odd.
∴ either the number of boys or girls is one more than the other.
In this case we cannot arrange them around a round table such that no two boys are together and no two girls are together.
∴ Number of ways = 0. Choice (D)

Solutions for questions 21 and 22:

$y = \frac{k_1}{x}$

$\Rightarrow xy = k_1$
If $k_1 = 4$(or 6 or any positive number) the curve looks as given below (in bold lines).



$y = \frac{x}{k_2}$ is a straight line, passing through the origin. As shown in the figure above (dotted lines), this straight line can cut the first curve at a minimum of zero points and a maximum of two points.

21. Choice (C)

22. Choice (B)

Solutions for questions 23 to 25:

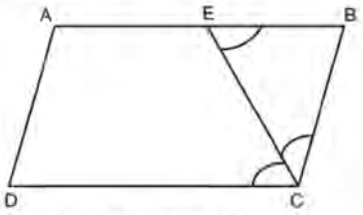
23. A company has a market share of only 14%, and as it owned more than a single brand, it must either own brands, I and J or brands C and E.
In either case, the maximum number of brands company T could own is three. The distribution of the companies and the brands they owned could be S – A and J, R – C and D, T – I, B and E, Q – G and K and P – F and H.
Choice (B)

24. The minimum number of brands, that could be owned by Q, R and S are 1, 2 and 2 respectively,
∴The combined entity owned at least five brands.
Choice (A)

25. If no two brands of a single company had the same market share, we cannot uniquely determine the brands owned by a single company.
Choice (D)

Solutions for questions 26 to 30:

26.



$\angle ECB = \angle ECD$ (ED bisects $\angle C$)
$\angle CEB =$ ($\because$ AB || CD)
$\therefore$ BE = BC = 4
Note: ED = AE is not needed Choice (B)

27. If $y > 0$, $2^y < 4^y$ and $3^y < 4^y$
$\therefore 2^y + 2(3^y) < 3(4^y)$
If $y < 0$, $2^y > 4^y$ and $3^y > 4^y$
$\therefore 2^y + 2(3^y) > 3(4^y)$
If $y = 0$
$2^y + 2(3^y) = 3(4^y)$
Conversely, if $2^y + 2(3^y) > 3(4^y)$, it follows that $y < 0$

$3x^2 + 2x - 2 < 0 \Rightarrow \frac{-\sqrt{7}-1}{3} < x < \frac{\sqrt{7}-1}{3}$

or (approximately), $\frac{-3.6}{3} < x < \frac{1.6}{3}$ or $-1.2 < x < 0.5$

$\therefore$ Among the options, –0.5 is the only possible value of x.
Choice (C)

28. Discriminant of the quadratic equation
$= [2(ba + bc)]^2 - 4(a^2 + b^2)(b^2 + c^2) = -4(b^2 - ac)^2$
As the roots are real the discriminant ≥ 0. Hence, $b^2 - ac$ must be equal to 0.
$\Rightarrow b^2 = ac$
∴The minimum value of the quadratic expression

$ax^2 + bx + c = \frac{4ac - b^2}{4a} = \frac{4ac - ac}{4a} = \frac{3c}{4}$

Alternative solution:
Rearranging the terms in the given expression, we can arrive at $(ax + b)^2 + (bx + c)^2 = 0$

$\Rightarrow x = \frac{-b}{a} = \frac{-c}{a} \Rightarrow b^2 = ac$.
Now, proceed as given above Choice (D)

29. Each term of the series is in the form of (1/ two factors). The first factors of the denominators form one AP and the second factors form another AP. Hence, the general forms of the factors are:

i) $5 + \overline{x-13} = (3x + 2)$ and
ii) $8 + \overline{x-13} = (3x + 5)$

$\Rightarrow t_x = \frac{1}{(3x+2)(3x+5)}$ when $x = 1, 2, 3, \text{---------} \rightarrow$ (A)

Given that $t_i = \frac{1}{242 \times 245} = \frac{1}{(3\times 80+2)(3\times 80+5)} \rightarrow (2)$

t_x can be written as:

$t_x = \frac{1}{(3x+2)(3x+5)} = \frac{1}{3}\left[\frac{(3x+5)-(3x+2)}{(3x+2)(3x+5)}\right]$

$= \frac{1}{3}\left[\frac{1}{3x+2} - \frac{1}{3x+5}\right] \rightarrow (C)$

∴Sum of the given series

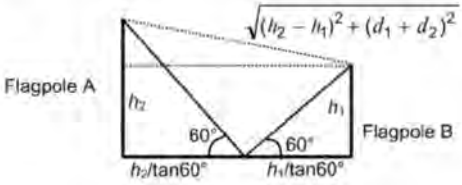
$S = \frac{1}{3}\left[\frac{1}{5} - \frac{1}{8} + \frac{1}{8} - \frac{1}{11} \text{.....} + \frac{1}{242} - \frac{1}{245}\right]$

$= \frac{1}{3}\left[\frac{1}{5} - \frac{1}{245}\right] = \frac{1}{3} \times \frac{1}{5}\left[1 - \frac{1}{49}\right]$

$= \frac{48}{15\times 49} = \frac{16}{245}$

$\Rightarrow (49)S = \frac{16}{5} = 3.2$ Choice (A)

30. If there is only point on the ground from which each flagpole subtends 60°, then the flagpoles must be exactly at a distance equal to the sum of the distances from which they respectively subtend 60° (i.e. when the condition is that the poles are as far away from each other as possible. The other case that is possible is that the poles are at a distance equal to the difference of the distances from which they respectively subtend 60°).



Hence $\frac{15\sqrt{3}}{\tan 60°} + \frac{30\sqrt{3}}{\tan 60°} = 45$ m

The distance between their tops
$= \sqrt{45^2 + (30\sqrt{3} - 15\sqrt{3})^2} = 30\sqrt{3}$ m Choice (A)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	–
Easy	2, 5, 6, 26
Medium	1, 7, 10, 12, 13, 18, 19, 20, 21, 22, 23, 24, 28, 29, 30
Difficult	3, 4, 8, 9, 11, 14, 15, 16, 17, 25, 27
Very Difficult	–

SECTION - II

Solutions for questions 1 to 4:

Number of words and Explanatory notes for RC:

Number of words : 471

1. Refer to para – 3 when the author says the codex 'literally reframed ideas', he means that the frame in which the ideas were presented changed – from the scroll to the pages bound between covers. Choice (B)

2. In the concluding para the author uses metaphors. The 2 dreams he speaks of are science and technology and the arts. He speaks of how these will affect scholarship and the role of the book. Choice (D)

3. Refer to the end of para 3 where the items listed are mentioned in the last sentence. This follows the authors belief that newer technologies (good ones) donot eradicate older good technologies (but modifies them). Choice (C)

4. Refer to the last sentence of the first para. The 'book' is a slippery term because it refers to the physical entity, the technologies used, the (historical) concept and something more. Choice (A)

Solutions for questions 5 and 6:

5. (i) The opening sentence uses the idiom 'had it down pat' – which means that something was understood clearly and very well. The 'it' here is the entire situation of human evolution that follows in the paragraph – what evolutionists had understood as established fact. The use of 'put' is erroneous (N).
   (ii) Since the situation of deciding would precede/lead to having the matter down pat, the past perfect tense in "had decided" is appropriate (Y).
   (iii) The context indicates, through the appropriate use of "spontaneously" (Y) that the first organisms were the first life forms and were not developed from previous life forms.
   (iv) The stages of evolution being presented similarly need the simple past tense ("came" into being, "grew" more complex, and "appeared"). The past perfect "had grown" is, therefore, inappropriate (N). Its use would imply that the hominids appeared after the complex development was complete. This is not the case; the appearance of himinids is a continuing part of complex development.
   (v) The human species is named "homo sapiens" not "sapians" (N).
   (vi) Since it is a single species that is being referred to, the use of the singular verb "has" is appropriate (Y).
   Thus - NYYNNY. Choice (B)

6. (i) The use of "prone" is inappropriate with 'to have' (N). (We would say "prone to asthma" or "likely to have asthma".)
   (ii) The contemporaries referred to are those of the children at the start of the sentence. Therefore the article "the" is inappropriate (N). We would need the possessive pronoun "their".
   (iii) "Children's" is the correct form of the possessive for "children" (Y).
   (iv) It is the "super-clean environment" (singular) that "thus opens" (singular) the way (Y).
   (v) However, it opens the way "for" and not "to" conditions such as asthma (N).
   (vi) The 2 compared ideas about humanity are it "has evolved with .... rather than picked them up...". The tense is 'present perfect' and the tense auxiliary "has" applies to both verbs "evolved" and "picked". This is appropriate (Y).
   Thus - NNYYNY. Choice (C)

Solutions for questions 7 to 10:

Number of words and Explanatory notes for RC:

Number of words : 409

7. Statement (b) is true - refer to sixth para of the passage.
   Statement (a) is the belief prior to Anthony Segal's discovery and is only part of the answer.
   Statement (c) is ruled out by the reference to the absence of macrophages not mentioned in the passage.
   Statement (d) is also only part of the answer – the weakened immune response does not cause Crohn's but leads to a chain of events that causes Crohn's.
   Choice (A)

8. Statement (a) is true – refer to the first sentence of para 2.
   Statement (c) is true – refer to the last para. Statements (b) and (d) are not reasons why it has caused a stir.
   Choice (A)

9. The first para gives the gist of Segal's findings which is then elaborated in the passage. Choice (C)

10. The idea expressed in the sentence is as follows: The team concluded:
    (1) There is ineffective rallying of immune cells in people with defective macrophages.
    (2) This leads to intestinal bacteria running amok in the early stages of an infection.
    (3) This sets in motion a series of events that leads to Crohn's disease.
    In short, what is stated in 1 leads to what is stated in 2 which leads to what is stated in 3 (that is to Crohn's disease).
    Only choice C has got the idea right.
    Choice A is incorrect because intestinal bacteria do not run amok with the defective macrophages.
    Choice B does not mention Crohn's disease which is what is being studied by the team. Choice D misses out 'setting in motion a series of events' that leads to Crohn's disease.
    Choice (C)

Solutions for questions 11 and 12:

11. Sentence A has a common but not easily noticed error of a missing apostrophe (it's not the possessive 'its') in the last part of the sentence. In sentence C the use of 'so' in the last para of the sentence (so drastically reduced) requires a 'that' (so ... that) or 'as to' (so ..... as to) to be grammatically right. In sentence 'D' the second half has two phrases linked by 'and' to 'have led'. They must have the same structure – 'vineyards being abandoned' must be followed by '... Parliament being obliged to .....'. Only sentence B is free of errors. Choice (B)

12. Sentence B has an error in the last phrase – it should be '..... engage all stake holder ..... in the task' not 'to the task'.
    Sentence C has an error in the placement of 'all' – it should be 'all major roads .....', and another error, of number, '..... what is needed are roads .....' (not is) since the idea is 'roads are needed'. Sentence D has an article missing – it should be '..... the productivity of smallholder farmers .....' since we are talking of the productivity of a definite group and not in general. Only sentence A is free of errors. Choice (A)

Solutions for questions 13 to 16:

Number of words and Explanatory notes for RC:

Number of words: 536

13. The words in quote form the concluding words of the passage. The para shows that choice C is the reason. Statement A also draws attention. However it is not an accurate statement. The first 3 sentences of the last paragraph clearly indicate that language is much more an instrument of action than it is a device for communicating ideas. Choice (C)

14. Refer to the penultimate para including the quote from Edward Sapir. Choice A can be inferred. Choice (A)

15. One of the meanings of 'culture' is – the behaviours and beliefs characteristic of a particular social, ethnic or age group. It is in this sense that the word is used, in para 2, as we see in the line – "No clues are so helpful as those of language in pointing to ultimate, unconscious, psychological attitudes." The connection is that behaviour is the display of unconscious psychological attitude. Since this is what language points to, it can be considered pure culture. Choice (C)

16. The idea contained in the sentence can be broken down as follows:
(1) For most people every experience is saturated with verbalism.
(2) This helps to explain why nature lovers donot feel they are in touch with nature until they have mastered the names of flowers and trees.
(3) This is as though the world of reality is a verbal one.
(4) This is as though you can't get close to nature without the terminology.
Only option D states the idea correctly changing the negative (donot feel ..... unless) to positive (feel ..... only when). Choice A is incorrect because it gives as fact (the primary world of reality is a verbal one) what people merely feel.
Choice B misses out the reason that what is stated is so because 'every experience is saturated with verbalism'. Choice C says 'many people' (not just nature lovers) master the names of flowers and trees, which is incorrect.
Choice (D)

Solutions for questions 17 to 20:

17. The argument as a whole opposes the position that "performance enhancing drugs" are harmful.
The first underlined portion presents evidence to support the said position. The author then argues that the said drugs are not necessarily harmful.
The second underlined portion goes on to introduce evidence that weakens the position the author opposes.
(A) The first underlined portion introduces evidence to support the position, it does not state the position itself.
(B) The second underlined portion introduces evidence to undermine, not support, the position being opposed.
(C) The second underlined portion introduces evidence, it does not state any conclusion.
(D) Correct. The first underlined portion presents evidence in support of the position, the second presents evidence to counter the strength of the position.
Choice (D)

18. Achou concludes that French culture has disseminated itself in Europe, based on the evidence of the presence of French cultural centres in the prominent capitals of Europe. Marion implies that genuine admiration for French culture translates into widespread use of the French language.
(A) There is nothing to suggest in the stimulus that the presence of a country's cultural centres in foreign capitals is irrelevant to the promotion of its culture.
(B) Correct. Marion points out that the presence of a country's cultural centres in foreign countries is not a sufficient indicator of the popularity of its culture.
(C) Marion does not agree with Achou's conclusion.
(D) Marion does not support Achou's conclusion.
Choice (B)

19. As the stipulation of the industry standard is about working hours, (D) is the most relevant answer.
(A) is not correct as the stipulation is not about performing work. (B) is not relevant. (C) is incorrect as the company's obligations are not of primary relevance. Choice (D)

20. The employed form a smaller fraction of the population. This will not be a serious problem, if the population consists of more people of unemployable age. Then it would mean that only a lower percentage of people in the employable age group are unemployed. (D) is the correct answer.
(A), (B) and (C) are not relevant to the argument.
Choice (D)

Solutions for questions 21 to 23:

As Archana is an Associate Professor in Mathematics, for which Divya and Chandrika are the Professors and Archana and Chandrika are faculty members in Chemistry, Archana, Chandrika and Divya are Professors in Chemistry, Mathematics and Mathematics respectively. Also, Archana and Chandrika are Associate Professors in Mathematics and Chemistry respectively.
Bhargavi is a Professor in Physics, for which there are three Associate Professors. From the above results, we can say that Divya, Eshwari and Fathima must be the Associate Professors in Physics.
As Eswari is a Professor in Physics and Biology, she is a Professor in Biology.
As, for commerce there is only one Professor, Fathima must be the Professor in Commerce.
As Bhargavi and Eswari are faculty members in the same subjects and Eswari is a faculty member in Physics and Biology, Bhargavi is an Associate Professor in Biology.

If we tabulate the results we get:

Name / Designation	A	B	C	D	E	F
Main	Ch	P	M	M	B	Co
Associate	M	B	Ch	P	P	P

21. None of them is an Associate Professor in Commerce.
Choice (D)

22. Fathima is the Professor in Commerce. Choice (D)

23. Only Bhargavi is an Associate Professor in Biology.
Choice (B)

Solution for question 24:

24. Given that triangle ABC has integral sides.
From statement I alone, given the triangle is isosceles.
If the triangle is right-angled, then the sides have to be in the ratio $1 : 1 : \sqrt{2}$, (since $\sqrt{2}$ is irrational).
∴ABC is not right-triangled.
From statement I alone,
Let the 3 sides be a – r, a, a + r.(since the three sides are in A.P.)
a – r + a + a + r = 12.
$\Rightarrow$ 3a = 12 $\Rightarrow$ a = 4.
If r = 1, (since all the sides are integral values) the possible sides are 3, 4, 5.
If r = 2, the sides will be 2, 4, 6.
but 2, 4, 6 will not form a triangle.
∴The only possibility is 3, 4, 5.
∴3, 4, 5 form a right-angled triangle.
∴The question can be answered from both (I) alone and (II) alone. Choice (B)

Solutions for questions 25 to 27:

25. For a team to advance to the semifinals with the least number of points, the top three teams should win the maximum number of matches, while the other five teams should draw all matches among themselves. One among these five teams would advance to the semifinals.
Minimum number of matches between the bottom five teams = 5 × 4.
Minimum number of total points of the bottom five teams = 20 × 2 = 40 points.

∴ Minimum points of 4th ranked team = 8 × 1 = 8 points.
Choice (A)

26. If five teams equally score the maximum points, one of these five would be eliminated. This can happen if the last three teams only score points in matches among themselves.
∴ Maximum points available for the top five teams
= (56 – 5) × 3 = 150
∴ Each of the five teams can score 30 points and one of them can be eliminated. Choice (C)

27. The team which finished sixth can have the least points when the last three teams only scored points in matches among themselves and all matches among these teams ended in draws.
∴ Each team can score four points and the team with the best goal difference would be placed sixth. Choice (A)

Solution for question 28:

28. From statement I alone, we can deduce

Shortest				Tallest
____	____	____	P	N

since N is tallest & P is second tallest. But I alone is not sufficient to find the shortest. From statement II alone, M is shorter than at least 3 people and O & L are among them i.e., M can be either the shortest or the 2nd shortest person. Combining I and II, we can say that M is the shortest, since N & P are taller than M and O & L are also taller than M.
Choice (C)

Solutions for questions 29 and 30:

From (i), six persons are in two rows of three persons each as shown below.
From (iv)
∴ D is at the extreme left of one of the rows X and C is at the middle of that row X.
From (ii), F must be sitting in the other row and A and B are sitting in the same row as F. Hence, E must be in the same row as C.
From (iv), A is sitting opposite E.
∴ D is sitting opposite B.
∴ Final arrangement is as follows :

E	C	D
A	F	B

29. C is opposite F. Choice (C)

30. A and D are at extreme ends of two different rows and also not opposite to each other. Choice (D)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	1, 15, 21, 22, 23, 29, 30
Medium	3, 4, 7, 9, 13, 14, 19, 20, 24, 28
Difficult	2, 5, 6, 8, 10, 11, 18, 25, 26, 27
Very Difficult	12, 16, 17