

CAT2003 Original Paper with Solutions

SECTION – I (RC & Verbal)

NUMBER OF QUESTIONS – 50

Directions for questions 1 to 5: The sentences given in each question, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

Solution:

From the choices it is clear that statement C opens the paragraph.

Now we have to decide between E and A to follow C. C speaks about People Soft's idea of buying a smaller rival.

A should follow C because A says, four days later Oracle announced its bid for People Soft and invited the board for a discussion.

Further B follows A. B says that People Soft's boss became furious that his own plans had been endangered. So 'AB' is the link.

Hence (1) is correct. Choice (1)

Solution:

From the choices it is clear that either A or D may open the paragraph.

A is a better statement to begin the paragraph as D talks about a continuation from something.

A says a few months ago I went to Princeton University to see what young people are like, therefore D follows A.

This sequence is found in (3) Choice (3)

3. A. I am much more intolerant of a human being's shortcomings than I am of an animal's, but in this respect I have been lucky, for most of the people I have come across have been charming.

B. Then you come across the unpleasant human animal—the District Officer who drawled, 'We chaps are here to help you chaps', and then proceeded to be as obstructive as possible.

C. In these cases, of course, the fact that you are an animal collector helps; people always seem delighted to meet someone with such an unusual occupation and go out of their way to assist you.

D. Fortunately, these types are rare, and the pleasant ones I have met more than compensated for them—but even so, I think I will stick to animals.

E. When you travel round the world collecting animals you also, of necessity, collect human beings.

Solution:

From the choices either E or A may open the paragraph. Statement 'A' cannot open the paragraph because the words "I have come across" say that some other statement should have preceded statement 'A'. Hence 'E' is the most appropriate statement to open the paragraph. i.e. 'E' says when you travel round the world collecting animals you also collect human beings. Further the idea finds a continuation in 'A'. i.e EA go together which is found in (1). Choice (1)

4. A. Surrendered, or captured, combatants cannot be incarcerated in razor wire cages; this 'war' has a dubious legality.

B. How then can one characterize a conflict to be waged against a phenomenon as war?

C. The phrase 'war against terror', which has passed into the common lexicon, is a huge misnomer.

D. Besides, war has a juridical meaning in international law, which has codified the laws of war, imbuing them with a humanitarian content.

E. Terror is a phenomenon, not an entity—either State or non-State.

(1) ECDBA (2) BECDA (3) EBCAD (4) CEBDA

Solution:

From the choices E, B or C may open the paragraph
B cannot open the paragraph because the word
'then' says that it should be preceded by some other
statement.

If we take statements E and C, individually both are meaningful and may open the paragraph. But C is a better statement to open the paragraph because C introduces the word "terror" and it also says that 'war on terror' is a huge misnomer, this finds a continuation in E. E explains why it is a misnomer (as stated in C). Hence CE is the appropriate combination. It is found in choice (4). Choice (4)

5. A. To avoid this, the QWERTY layout put the keys most likely to be hit in rapid succession on opposite sides. This made the keyboard slow, the story goes, but that was the idea.
 - B. A different layout, which had been patented by August Dvorak in 1936, was shown to be much faster.
 - C. The QWERTY design (patented by Christopher Sholes in 1868 and sold to Remington in 1873) aimed to solve a mechanical problem of early typewriters.
 - D. Yet the Dvorak layout has never been widely adopted, even though (with electric typewriters and then PC's) the anti-jamming rationale for QWERTY has been defunct for years.
 - E. When certain combinations of keys were struck quickly, the type bars often jammed.
- (1) BDACE (2) CEABD (3) BCDEA (4) CAEBD

Solution:

From the choices either C or B may open the paragraph.

The words 'A different layout' and 'much faster' in B tell that it should be preceded by some other statement.

Hence C is a better statement to open the paragraph. C says the QWERTY design aimed to solve the mechanical problem of typewriters.

E describes the 'mechanical problem' which has been stated in C.

Hence CE is a better combination. Further A says what QWERTY has done to avoid the problem. BD follow with the other layout. Choice (2)

Directions for questions 6 to 10: There are two blanks in each of the following sentences. From the pairs of words given below, choose the pair that fills the blanks most appropriately.

6. The British retailer, M & S, today formally ____ defeat in its attempt to ____ King's, its US subsidiary, since no potential purchasers were ready to cough up the necessary cash.
- (1) admitted, acquire (2) conceded, offload
(3) announced, dispose (4) ratified, auction

Solution:

Choice (2) is the appropriate choice.

Concede means to admit especially used with defeat.

According to the context the M & S retailer admitted defeat in its attempt to offload – (get rid of) its US subsidiary. 'Admitted defeat' is possible but 'acquire' does not fit in the second blank since the sentence goes on to talk of 'purchasers'.

Hence the pair conceded offload is the right choice. Choice (2)

7. Early ____ of maladjustment to college culture is ____ by the tendency to develop friendship networks outside college which mask signals of maladjustment.
- (1) treatment, compounded
(2) detection, facilitated
(3) identification, complicated
(4) prevention, helped

Solution:

Choice (3) is the most appropriate. Early identification (the action or process of identifying) of maladjustment to college culture is complicated (involving many different and confusing aspects) by the tendency to develop friendship outside college which masks signals of maladjustments. The words "which mask signals of maladjustments" suggest that the appropriate word in the second blank is "complicated".

8. The ____ regions of Spain all have unique cultures, but the ____ views within each region make the issue of an acceptable common language of instruction an even more contentious one.
- (1) different, discrete (2) distinct, disparate
(3) divergent, distinct (4) different, competing

Solution:

From the sentence it is understood that the separate regions or distinguished regions (distinct) of spain have unique culture but the disparate (different in kind, not able to be compared) ideas within each region make the issue of common language instruction even more contentions. Hence choice (2). The words in the remaining choices different – (not the same as another) divergent – (varying especially of thought) Hence these are not suitable to the context.

Choice (2)

9. A growing number of these expert professionals ____ having to train foreigners as the students end up ____ the teachers who have to then unhappily contend with no jobs at all or new jobs with drastically reduced pay packets.
- (1) resent, replacing (2) resist, challenging
(3) welcome, assisting (4) are, supplanting

Solution:

The statement says that increasing number of expert professionals resent (feel bitterness) or dislike to train foreigners as the students end up replacing (take the place of) the teachers which leads to unhappiness in them. Hence choice (1). The remaining choices are not suitable to the content.

Choice (1)

10. Companies that try to improve employees' performances by ____ rewards encourage negative kinds of behaviour instead of ____ a genuine interest in doing the work well.
- (1) giving, seeking
(2) bestowing, discouraging
(3) conferring, discrediting
(4) withholding, fostering

Solution:

Companies would like to discourage negative kinds of behaviour and foster genuine interest in doing the work well. So, if the companies withhold rewards thinking that it will encourage them, the fall out is to the contrary.

Choice (4)

Directions for questions 11 to 15: In each of the questions, four different ways of presenting an idea are given. Choose the one that conforms most closely to Standard English usage.

11. A. The running of large businesses consist of getting somebody to make something that somebody else sold to somebody else for more than its cost.
- B. The running of a large business consists of getting somebody to make something that somebody else will sell to somebody else for more than it costs.
- C. The running of a large business consists of getting somebody to sell something that somebody else made for more than it cost.
- D. The running of large businesses consist of getting somebody to make something else that somebody else will sell to somebody else for more than it costs.

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

Solution:

Choice (2) is correct. In statement 'A' the words "The running of large businesses consist of" is wrong because the subject is "running of a" which is singular hence it must be "consists of" further "somebody else sold to somebody else" is also wrong because it is in past tense. In statement 'C'. "The running ofgetting somebody to sell something...." changes the meaning completely. In statement 'D' also the same error as in 'A' is found. Only (2) is grammatically right.

Choice (2)

12. A. From the sixteenth century onwards, people started feeling disdainful and self-conscious about their body and its products that led to a heightened focus on emotional and bodily regulations.
- B. The heightened focus on controlling the body and emotions comes from disdain and self-consciousness about the body and its products, found in the sixteenth century.
- C. From the sixteenth century onwards, a growing disdain for and self-consciousness about the body and its products took hold, leading to a heightened focus on emotional and bodily regulation.
- D. The heightened focus on emotional and bodily regulations started from the sixteenth century onwards, when people felt disdain and self-consciousness about the body and its products.

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

Solution:

Choice is (3) is correct. In statement 'A'. "From thesixteenth century ,...about their body and its products...." is wrong. "the body and its products" is

correct, which is found in 'C'. In statement 'B'. "found in sixteenth century" at the end of the sentence is erroneous because the ordering of words is wrong which gives a wrong meaning to the sentence. In statement 'D'"..... when people felt disdain and self-consciousness...." Is erroneous because disdain means – the feeling that someone or something is unworthy of one's consideration or respect hence "felt disdain" is wrong. Even in statement 'A' "feeling disdainful" is wrong (disdain itself means feeling something unworthy). The usage of the word 'feel' becomes redundant.

Choice (3)

13. A. We are forced to fall back on fatalism as an explanation of irrational events.
- B. We are forced to falling back on the fatalism as an explanation of irrational events.
- C. We are forced to fall back on fatalism as explanation of irrational events.
- D. We are forced to fall back to fatalism as an explanation of irrational events.

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

Solution:

Statement (1) is correct. "Fall back on" means – (have recourse to when in difficulty "falling back on" as used in statement 'B' is not appropriate. "Fall back" as used in 'D' means retreat. In statement 'C' fall back on" is correct but "the article 'an' is missing before explanation. Hence 'C' can be ruled out.

Choice (1)

14. A. If precision of thought had facilitated precision of behaviour, and if reflection had preceded action, it would be ideal for humans.
- B. It would be ideal for humans if reflection preceded action and precision of thought facilitated precision of behaviour.
- C. It would be ideal for humans if precedence of reflection was followed by action and precision of thought, by precise behaviour.
- D. It would have been ideal for humans, if precise action and behaviour preceded precise reflection.

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

Solution:

Statement B is correct. In statement 'A'. "The precision of thought had...." is in past perfect so it should be followed by future perfect conditional i.e (would have) and not would. Hence statement A is wrong. In statement 'C' "precedence of reflection" does not convey the meaning appropriately. In statement 'D' when "would have been" is used the remaining part of the sentence should take "had". Hence 'D' is wrong.

Choice (2)

15. A. Creativity in any field is regarded not only as valuable for itself but also as a service to the nation.
- B. Creativity in any field is not regarded only as valuable on its own, but also as a service to the nation.
- C. Creativity, in any field, is not only regarded as valuable, but also as a service to the nation.

D. Creativity in any field is regarded not only as valuable in itself but also as a service to the nation.

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

Solution:

Statement 'D' is correct because the expression "not only" but also" should be placed immediately before the terms which are being compared.

Choice (4)

Directions for questions 16 to 20: In each question, the word at the top of the table is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

16. Bundle

1	The newborn baby was a bundle of joy for the family.
2	Mobile operators are offering a bundle of additional benefits.
3	He made a bundle in the share market.
4	It was sheer luck that brought a bundle of boy-scouts to where I was lying wounded.

Solution:

Statement (4) is wrong because "bundle of boy scouts" is an inappropriate usage.

Choice (4)

17. Distinct

1	He is distinct about what is right and what is wrong.
2	Mars became distinct on the horizon in the month of August.
3	The distinct strains of Ravi's violin could be heard above the general din.
4	Ghoshbabu's is a distinct case of water rising above its own level.

Solution:

Distinct is often followed by "from". "Distinct" is not used for persons one can have distinct ideas but "distinct about" is an inappropriate

Directions for questions 21 to 45: Each of the five passages given below is followed by five questions. Choose the best answer to each question.

PASSAGE – I
(Number of words: 726)

At the heart of the enormous boom in wine consumption that has taken place in the English-speaking world over the last two decades or so is a fascinating, happy paradox. In the days when wine was exclusively the preserve of a narrow cultural elite, bought either at auctions or from gentleman wine merchants in wing collars and bow-ties, to be stored in rambling cellars and decanted to order by one's butler, the ordinary drinker didn't get a look-in. Wine was considered a highly technical subject, in which anybody without the necessary ability could only fall flat on his or her face in embarrassment. It wasn't just that you needed a refined aesthetic sensibility for the stuff if it wasn't to be hopelessly wasted on you. It required an intimate knowledge of what came from where, and what it was supposed to taste like.

Those were times, however, when wine appreciation essentially meant a familiarity with the great French classics, with perhaps a smattering of other wines-like sherry and port. That was what the wine trade dealt in. These days, wine is bought daily in supermarkets and high-street chains to be consumed that evening, hardly anybody has a cellar to store it in and most don't even possess a decanter. Above all, the wines of literally dozens of countries are available on our market. When a supermarket offers its customers a couple of fruity little numbers from Brazil, we scarcely raise an eyebrow.

usage. Hence in statement (1) the word is inappropriately used.
Choice (1)

18. Implication

1	Everyone appreciated the headmaster's implication in raising flood relief in the village.
2	This letter will lead to the implication of several industrialists in the share market scam.
3	Several members of the audience missed the implication of the minister's promise.
4	Death, by implication, is the only solution the poem offers the reader.

Solution:

Implication means what is involved in or implied by something else i.e. what is implied or suggested. "Headmaster's implication" is an inappropriate usage.

Choice (1)

19. Host

1	If you host the party, who will foot the bill?
2	Kerala's forests are host to a range of snakes.
3	Ranchi will play the host to the next national film festival.
4	A virus has infected the host computer.

Solution:

19. 'Play the host to' is incorrect usage, it would be 'play host to'.
Choice (3)

20. Sort

1	What sort of cheese do you use in pizza?
2	Farmers of all sort attended the rally.
3	They serve tea of a sort on the these trains.
4	Let's sort these boys into four groups.

Solution:

Farmers of "all sorts" would be the appropriate statement. "Farmers of all sort" is an inappropriate usage.
Choice (2)

It seems, in other words, that the commercial jungle that wine has now become has not in the slightest deterred people from plunging adventurously into the thickets in order to taste and see. Consumers are no longer intimidated by the thought of needing to know their Pouilly-Fume from their Pouilly-Fuisse, just at the very moment when there is more to know than ever before.

The reason for this new mood of confidences is not hard to find. It is on every wine label from Australia, New Zealand, South Africa and the United States: the name of the grape from which the wine is made. At one time that might have sounded like a fairly technical approach in itself. Why should native English-speakers know what Cabernet Sauvignon or Chardonnay were? The answer lies in the popularity that wines made from those grape varieties now enjoy. Consumers effectively recognize them as brand names, and have acquired a basic lexicon of wine that can serve them even when confronted with those Brazilian upstarts.

In the wine heartland of France, they are scared to death of that trend—not because they think their wine isn't as good as the best from California or South Australia (what French winemaker will ever admit that?) but because they don't traditionally call their wines Cabernet Sauvignon or Chardonnay. They call them Chateau Durcru-Beaucailou or Corton-Charlemagne, and they aren't about to change. Some areas, in the middle of southern France, have now produced a generation of growers using the varietal names on their labels and are tempting consumers back to French wine. It will be an uphill struggle, but there is probably no other way if France is to avoid simply becoming a specialty source of old-fashioned wines for old-fashioned connoisseurs.

Wine consumption was also given a significant boost in the early 1990s by the work of Dr. Serge Renaud, who has spent many years investigating the reasons for the uncannily low incidence of coronary heart disease in the south of France. One of his major findings is that the fat-derived cholesterol that builds up in the arteries and can eventually lead to heart trouble, can be dispersed by the tannins in wine. Tannin is derived from the skins of grapes, and is therefore present in higher levels in red wines, because they have to be infused with their skins to attain the red colour. That news caused a huge upsurge in red wine consumption in the United States. It has not been accorded the prominence it deserves in the UK, largely because the medical profession still sees all alcohol as a menace to health, and is constantly calling for it to be made prohibitively expensive. Certainly, the manufacturers of anticoagulant drugs might have something to lose if we all got the message that we would do just as well by our hearts by taking half a bottle of red wine every day!

21. The tone that the author uses while asking "What French winemaker will ever admit that?" is best described as
(1) caustic. (2) satirical.
(3) critical. (4) hypocritical.

Solution:

The authors comment has a touch of humour. Hence we can say he is satirical (humorously critical) and not caustic (scathingly critical).

Choice (2)

22. Which one of the following CANNOT be reasonably attributed to the labelling strategy followed by wine producers in English-speaking countries?
(1) Consumers buy wines on the basis of their familiarity with a grape variety's name.
(2) Even ordinary customers now have more access to technical knowledge about wine.
(3) Consumers are able to appreciate better quality wines.
(4) Some non-English speaking countries like Brazil indicate grape variety names on their labels.

Solution:

Choice (3) is not said or implied in the passage.

Choice (3)

23. Which one of the following, if true, would provide must support for Dr. Renaud's findings about the effect of tannins?
(1) A survey showed that film celebrities based in France have a low incidence of coronary heart disease.
(2) Measurements carried out in Southern France showed red wine drinkers had significantly higher levels of coronary heart incidence than white wine drinkers did.

- (3) Data showed a positive association between sales of red wine and incidence of coronary heart disease.
(4) Long-term surveys in southern France showed that the incidence of coronary heart disease was significantly lower in red wine drinkers than in those who did not drink red wine.

Solution:

Red wine contains tannin and it is tannin that disperses cholesterol, according to Dr. Serge Renand. Hence choice 4 is the answer.

Choice (4)

24. The development which has created fear among winemakers in the wine heart lands of France is the
(1) tendency not to name wines after the grape varieties that are used in the wines.
(2) 'education' that consumers have derived from wine labels from English-speaking countries.
(3) new generation of local winegrowers who use labels that show names of grape varieties.
(4) ability of consumers to understand a wine's qualities when confronted with "Brazilian upstarts".

Solution:

Para 4 has the explanation for statement of the question in para 5.

Choice (2)

25. What according to the author should the French do to avoid becoming a producer of merely old-fashioned wines?
(1) Follow the labelling strategy of the English-speaking countries.
(2) Give their wines English names.
(3) Introduce fruity wines as Brazil has done.
(4) Produce the wines that have become popular in the English-speaking world.

Solution:

Para 5, lines 5-6.

Choice (1)

PASSAGE – II
(Number of words : 779)

Right through history, imperial powers have clung to their possessions to death. Why, then, did Britain in 1947 give up the jewel in its crown, India? For many reasons. The independence struggle exposed the hollowness of the white man's burden. Provincial self-rule since 1935 paved the way for full self-rule. Churchill resisted independence, but the Labour government of Atlee was anti-imperialist by ideology. Finally, the Royal Indian Navy mutiny in 1946 raised fears of a second Sepoy mutiny, and convinced British wavers that it was safer to withdraw gracefully. But politico-military explanations are not enough. The basis of empire was always money. The end of empire had much to do with the fact that British imperialism had ceased to be profitable. World War II left Britain victorious but deeply indebted, needing Marshall Aid and loans from the World Bank. This constituted a strong financial case for ending the no-longer-profitable empire.

Empire building is expensive. The US is spending one billion dollars a day in operations in Iraq that fall well short of full-scale imperialism. Through the centuries, empire building was costly, yet constantly undertaken because it promised high returns. The investment was in armies and conquest. The returns came through plunder and taxes from the conquered.

No immorality was attached to imperial loot and plunder. The biggest conquerors were typically revered (hence titles like Alexander the Great, Akbar the Great, and Peter the Great). The bigger and richer the empire, the more the plunderer was admired. This mindset gradually changed with the raise of new ideas about equality and governing for the public good, ideas that culminated in the French and American revolutions. Robert Clive was impeached for making a little money on the side, and so was Warren Hastings. The white man's burden came up as a new moral rationale for conquest. It was supposedly for the good of the conquered. This led to much muddled hypocrisy. On the one hand, the empire needed to be profitable. On the other hand, the white man's burden made brazen loot impossible.

An additional factor deterring loot was the 1857 Sepoy Mutiny. Though crushed, it reminded the British vividly that they were tiny ethnic group who could not rule a gigantic subcontinent without the support of important locals. After 1857, the British stopped annexing one princely state after another, and instead treated the princes as allies. Land revenue was fixed in absolute terms, partly to prevent local unrest and partly to promote the notion of the white man's burden. The empire proclaimed itself to be a protector of the Indian peasant against exploitation by Indian elites. This was denounced as hypocrisy by nationalists like Dadabhai Naoroji in the 19th century, who complained that land taxes led to an enormous drain from India to Britain. Objective calculations by historians like Angus Maddison suggest a drain of perhaps 1.6 percent of Indian Gross National Product in the 19th century. But land revenue was more or less fixed by the Raj in absolute terms, and so its real value diminished rapidly with inflation in the 20th century. By World War II, India had ceased to be a profit centre for the British Empire.

Historically, conquered nations paid taxes to finance fresh wars of the conqueror. India itself was asked to pay a large sum at the end of World War I to help repair Britain's finances. But, as shown by historian Indivar Kamtekar, the independence movement led by Gandhiji changed the political landscape, and made mass taxation of India increasingly difficult. By World War II, this had become politically impossible. Far from taxing India to pay for World War II, Britain actually began paying India for its contribution of men and goods. Troops from white dominions like Australia, Canada and New Zealand were paid for entirely by these countries, but Indian costs were shared by the British government. Britain paid in the form of non-convertible sterling balances, which mounted swiftly. The conqueror was paying the conquered, undercutting the profitability on which all empire is founded. Churchill opposed this, and wanted to tax India rather than owe it money. But he was overruled by Indian hands who said India would resist payment, and paralyze the war effort. Leo Amery, Secretary of state of India, said that when you are driving in a taxi to the station to catch a life-or-death train, you do not loudly announce that you have doubts whether to pay the fare. Thus World War II converted India from a debtor to a creditor with over one billion pounds in sterling balances. Britain, meanwhile, became the biggest debtor in the world. It's not worth ruling over people you are afraid to tax.

- 26.** Which one of the following best expresses the main purpose of the author?
- To present the various reasons that can lead to the collapse of an empire and the granting of independence to the subjects of an empire.
 - To point out the critical role played by the 'white man's burden' in making a colonizing power give up its claims to native possessions.
 - To highlight the contradictory impulse underpinning empire building which is a costly business but very attractive at the same time.
 - To illustrate how erosion of the financial basis of an empire supports the granting of independence to an empire's constituents.
- 27.** Which of the following was NOT a reason for the emergence of the 'white man's burden' as a new rationale for empire-building in India?
- The emergence of the idea of the public good as an element of governance.
 - The decreasing returns from imperial loot and increasing costs of conquest.
 - The weakening of the immorality attached to an emperor's looting behaviour.
 - A growing awareness of the idea of equality among peoples.

Solution:

Para 3 has all the choices 1, 2 and 4 as given reasons for 'white man burden'. Choice (3)

- 28.** Which of the following best captures the meaning of the 'white man's burden', as it is used by the author?
- The British claim to a civilizing mission directed at ensuring the good of the natives.

- (2) The inspiration for the French and American revolutions.
- (3) The resource drain that had to be borne by the home country's white population.
- (4) An imperative that made open looting of resources impossible.

Solution:

Para 3.

Choice (1)

- 29.** What was the main lesson the British learned from the Sepoy Mutiny of 1857?
- (1) That the local princes were allies, not foes.
 - (2) That the land revenue from India would decline dramatically.
 - (3) That the British were a small ethnic group.
 - (4) That India would be increasingly difficult to rule.

Solution:

Para 4. Clearly British have only been reminded that they were tiny ethnic group but the main reason was the increasing difficulty to rule. Choice (4)

- 30.** Why didn't Britain tax India to finance its World War II efforts?

- (1) Australia, Canada and New Zealand had offered to pay for Indian troops.
- (2) India had already paid a sufficiently large sum during World War I.
- (3) It was afraid that if India refused to pay, Britain's war efforts would be jeopardized.
- (4) The British empire was built on the premise that the conqueror pays the conquered.

Solution:

Para 5 the analogy of going in a taxi implies choice 3. Choice (3)

PASSAGE – III
(Number of words: 744)

The controversy over genetically-modified food continues unabated in the West. Genetic modification (GM) is the science by which the genetic material of a plant is altered, perhaps to make it more resistant to pests or killer weeds, or to enhance its nutritional value. Many food biotechnologists claim that GM will be a major contribution of science to mankind in the 21st century. On the other hand, large numbers of opponents, mainly in Europe, claim that the benefits of GM are a myth propagated by multinational corporations to increase their profits, that they pose a health hazard, and have therefore called for governments to ban the sale of genetically-modified food.

The anti-GM campaign has been quite effective in Europe, with several European Union member countries imposing a virtual ban for five years over genetically-modified food imports. Since the genetically-modified food industry is particularly strong in the United States of America, the controversy also constitutes another chapter in the US-Europe skirmishes which have become particularly acerbic after the US invasion of Iraq.

To large extent, the GM controversy has been ignored in the Indian media, although Indian biotechnologists have been quite active in GM research. Several groups of Indian biotechnologists have been quite active in GM research. Several groups of Indian biotechnologists have been working on various issues connected with crops grown in India. One concrete achievement which has recently figured in the news is that of a team led by the former vice-chancellor of Jawaharlal Nehru University, Asia Datta—it has successfully added an extra gene to potatoes to enhance the protein content of the tuber by at least 30 percent. Not surprisingly, the new potato has been called the protato. The protato is now in its third year of field trials. It is quite likely that the GM controversy will soon hit the headlines in India since a spokesperson of the Indian Central government has recently announced that the government may use the protato in its midday meal programme for schools as early as next year.

Why should "scientific progress", with huge potential benefits to the poor and malnourished, be so controversial? The anti-GM lobby contends that pernicious propaganda has vastly exaggerated the benefits of GM and completely evaded the costs which will have to be incurred if the genetically-modified food industry is allowed to grow unchecked. In particular, they allude to different types of costs.

This group contends that the most important potential cost is that the widespread distribution and growth of genetically-modified food will enable the corporate world (alias the multinational corporation-MNCs) to completely capture the food chain. A "small" group of biotech companies will patent the transferred genes as well as the technology associated with them. They will then buy up the competing seed merchants and seed breeding centres, thereby controlling the production of food at every possible level. Independent farmers, big and small, will be completely wiped out of the food industry. At best, they will be reduced to the status of being sub-contractors.

This line of argument goes on to claim that the control of the food chain will be disastrous for the poor since the MNCs, guided by the profit motive, will only focus on the high-value food items demanded by the affluent. Thus, in the long run, the production of basic staples which constitute the food basket of the poor will taper off.

However, this vastly overestimates power of the MNCs. Even if the research promoted by them does focus on the high-value food items, much of biotechnology research is also funded by governments in both developing and developed countries. Indeed, the protato is a by-product of this type of research. If the protato passes the field trials, there is no reason to believe that it cannot be marketed in the global potato market. And this type of success story can be repeated with other basic food items.

The second type of cost associated with the genetically-modified food industry is environmental damage. The most common type of "genetic engineering" involves gene modification in plants designed to make them resistant to applications of weed-killers. This then enables farmers to use massive dosages of weed-killers so as to destroy or wipe out all competing varieties of plants in their field. However, some weeds through genetically-modified pollen contamination may acquire resistance to a variety of weed-killers. The only way to destroy these weeds is through the use of ever-stronger herbicides which are poisonous and linger on in the environment.

31. Using the clues in the passage, which of the following countries would you expect to be in the forefront of the anti-GM campaign?

- (1) USA and Spain.
- (2) India and Iraq.
- (3) Germany and France.
- (4) Australia and New Zealand.

Solution:

Para 1 says the opponents to GM are mainly in Europe.
Choice (3)

32. The author doubts the anti-GM lobby's contentions that MNC control of the food chain will be disastrous for the poor because

- (1) MNCs will focus on high-value food items.
- (2) MNCs are driven by the motive of profit maximization.
- (3) MNCs are not the only group of actors in genetically-modified food research.
- (4) economic development will help the poor buy MNC-produced food.

Solution:

Para 6 says governments are also involved in biotechnology research.
Choice (3)

33. Which of the following about the Indian media's coverage of scientific research does the passage seem to suggest?

- (1) Indian media generally covers a subject of scientific importance when its mass application is likely.
- (2) Indian media's coverage of scientific research is generally dependent on MNCs interest.
- (3) Indian media, in partnership with the government, is actively involved in publicizing the results of scientific research.

- (4) Indian media only highlights scientific research which is funded by the government.

Solution:

Para 3 the example of the potato suggest choice 1.
Choice (1)

34. Genetic modification makes plants more resistant to killer weeds. However, this can lead to environmental damage by

- (1) wiping out competing varieties of plants which now fall prey to killer weeds.
- (2) forcing application of stronger herbicides to kill weeds which have become resistant to weak herbicides.
- (3) forcing application of stronger herbicides to keep the competing plants weed-free.
- (4) not allowing growth of any weeds, thus reducing soil fertility.

Solution:

The last line of the passage implies choice 2.
Choice (2)

35. According to the passage, biotechnology research.

- (1) is of utility only for high value food items.
- (2) is funded only by multinational corporations
- (3) allows multinational corporations to control the food basket of the poor.
- (4) addresses the concerns of rich and poor countries.

Solution:

Choices 1, 2 and 3 have been negated in the passage.
Choice (4)

PASSAGE – IV
(Number of words : 791)

Social life is an outflow and meeting of personality, which means that its end is the meeting of character, temperament, and sensibility, in which our thought and feelings, and sense perceptions are brought into play at their lightest and yet keenest.

This aspect, to my thinking, is realized as much in large parties composed of casual acquaintances or even strangers, as in intimate meetings of old friends. I am not one of those superior persons who hold cocktail parties in contempt, looking upon them as barren or at best as very tryingly kaleidoscopic places for gathering, because of the strangers one has to meet in them; which is no argument, for even our most intimate friends must at one time have been strangers to us. These large gathering will be only what we make of them—if not anything better, they can be as good places to collect new friends from as the slave-markets of Istanbul were for beautiful slaves or New Market for race horses.

But they do offer more immediate enjoyment. For one thing, in them one can see the external expression of social life in – appearance and behavior at its widest and most varied—where one can admire beauty of body or air, hear voices remarkable either for sweetness or refinement, look on elegance of clothes or deportment. What is more, these parties are schools for training in sociability, for in them we have to treat strangers as friends. So, in them we see social sympathy in widest commonality spread, or at least should. We show an atrophy of the natural human instinct of getting pleasure and happiness out of other human beings if we cannot treat strangers as friends for the moment. And I would go further and paraphrase Pater to say that not to be able to discriminate every moment some passionate attitude in those about us, even when we meet them casually, is on this short day of frost and sun which our life is, to sleep before evening.

So, it will be seen that my conception of social life is modest, for it makes no demands on what we have, though it does make some on what we are. Interest, wonder, sympathy, and love, the first two leading to the last two, are the psychological prerequisites for social life; and the need for the first two must not be underrated. We cannot make the most even our intimate social life unless we are able to make strangers of our oldest friends everyday by discovering unknown areas in their personality, and transform them into new friends. In sum, social life is a function of vitality.

It is tragic, however, to observe that it is these very natural springs of social life which are drying up among us. It is a becoming more and more difficult to come across fellow-feeling for human beings as such in our society—and in all its strata. In the poor middle class, in the course of all my life, I have hardly seen any social life properly so-called. Not only has the grinding routine of making a living killed all desire for it in them, it has also generated a standing mood of peevish hostility to other human beings. Increasing economic distress in recent years has infinitely worsened this state of affairs, and has also brought a sinister addition—class hatred. This has become the greatest collective emotional enjoyment of the poor middle class, and indeed they feel most social when they form a pack, and snarl or howl at people who are better off than they.

Their most innocent exhibition of sociability is seen when they spill out from their intolerable homes into the streets and bazaars. I was astonished to see the milling crowds in the poor suburbs of Calcutta. But ever there a group of flippant young loafers would put on a conspiratorial look if they saw a man in good clothes passing by them either on foot or in a car. I had borrowed a car from a relative to visit a friend in one of these suburbs, and he became very anxious when I had not returned before dusk. Acid and bombs, he said, were thrown at cars almost every evening in that area. I was amazed. But I also know as a fact that my brother was blackmailed to pay five rupees on a trumped up charge when passing in a car through one such locality.

The situation is differently inhuman, but not a whit more human, among the well-to-do. Kindliness for fellow human beings has been smothered in them, taken as a class, by the arrogance of worldly position, which among the Bengalis who show this snobbery is often only a third-class position.

36. In this passage the author is essentially

- (1) showing how shallow our social life is.
- (2) poking fun at the lower middle class people who howl at better off people.
- (3) lamenting the drying up of our real social life.
- (4) criticizing the upper class for lavish showy parties.

Solution:

The best choice is (3). Choices (2) and (4) are too narrow and cannot be the essence of the passage. Choice (1) cannot be deduced from the passage.

Choice (3)

37. The author's conception of 'social life' requires that

- (1) people attend larger gatherings.
- (2) people possess qualities like wonder and interest.
- (3) people do not spend too much time in the company of intimate friends.
- (4) larger parties consist of casual acceptances and intimate friends.

Solution:

The best choice is (2), in line 2, para 4, this is explicitly mentioned.

Choice (2)

38. The word 'they' in the first sentence of the third paragraph refers to

- (1) Large parties consisting of casual acquaintances and strangers.
- (2) Intimate meetings of old friends.
- (3) New friends.
- (4) Both (1) & (2).

Solution:

The word 'they' clearly refers to large parties. Line 5 in para 2 states this.

Choice (1)

39. What is the author trying to show through the two incidents in the paragraph beginning, "Their most innocent exhibition of sociability..." ?

- (1) The crowds in poor Calcutta suburbs can turn violent without any provocation.
- (2) Although poor, the people of poor Calcutta suburbs have a rich social life.
- (3) It is risky for rich people to move around in poor suburbs.
- (4) Achieving a high degree of sociability does not stop the poor from hating the rich.

Solution:

Choice (4) fits the bill perfectly here. Choice (1) and (3) are long drawn ones. Choice (2) has no logical base. The last 3 lines of para 5, clearly support choice (4).

Choice (4)

40. The word 'discriminate' in the last sentence of the third paragraph means

- | | |
|------------------|--------------|
| (1) recognize. | (2) count. |
| (3) distinguish. | (4) analyze. |

Solution:

The issue here is about 'recognising' rather than distinguishing or analysing. Count cannot be the answer.

Choice (1)

PASSAGE – V
(Number of words : 773)

Modern science, exclusive of geometry, is a comparatively recent creation and can be said to have originated with Galileo and Newton. Galileo was the first scientist to recognize clearly that the only way to further our understanding of the physical world was to resort to experiment. However obvious Galileo's contention may appear in the light of our present knowledge, it remains a fact that the Greeks, in spite of their proficiency in geometry, never seem to have realized the importance of experiment. To a certain extent this may be attributed to the crudeness of their instruments of

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measurement. Still, an excuse of this sort can scarcely be put forward when the elementary nature of Galileo's experiments and observations is recalled. Watching a lamp oscillate in the cathedral of Pisa, dropping bodies from the leaning tower of Pisa, rolling balls down inclined planes, noticing the magnifying effect of water in a spherical glass vase, such was the nature of Galileo's experiments and observations. As can be seen, they might just as well have been performed by the Greeks. At any rate, it was thanks to such experiments that Galileo discovered the fundamental laws of dynamics, according to which acceleration imparted to a body is proportional to the force acting upon it.

The next advance was due to Newton, the greatest scientist of all time if account be taken of his joint contributions to mathematics and physics. As a physicist, he was of course an ardent adherent of the empirical method, but his greatest title to fame lies in another direction. Prior to Newton, mathematics, chiefly in the form of geometry, had been studied as a fine art without any view to its physical applications other than in very trivial cases. But with Newton all the resources of mathematics were turned to advantage in the solution of physical problems. Thenceforth mathematics appeared as an instrument of discovery, the most powerful one known to man, multiplying the power of thought just as in the mechanical domain the lever multiplied our physical action. It is this application of mathematics to the solution of physical problems, their combination of two separate fields of investigation, which constitutes the essential characteristic of the Newtonian method. Thus problems of physics were metamorphosed into problems of mathematics.

But in Newton's day the mathematical instrument was still in a very backward state of development. In this field again Newton showed the mark of genius by inventing the integral calculus. As a result of this remarkable discovery, problems, which would have baffled Archimedes, were solved with ease. We know that in Newton's hands this new departure in scientific method led to the discovery of the law of gravitation. But here again the real significance of Newton's achievement lay not so much in the exact quantitative formation of the law of attraction, as in his having established the presence of law and order at least in one important realm of nature, namely, in the motions heavenly bodies. Nature thus exhibited rationality and was not mere blind chaos and uncertainty. To be sure, Newton's investigations had been concerned with but a small group of natural phenomena, but it appeared unlikely that this mathematical law and order should turn out to be restricted to certain special phenomena; and the feeling was general that all the physical processes of nature would prove to be unfolding themselves according to rigorous mathematical laws.

When Einstein, in 1905, published his celebrated paper on the electrodynamics of moving bodies, he remarked that the difficulties, which surrounded the equation of electrodynamics, together with the negative experiments of Michelson and others, would be obviated if we extended the validity of the Newtonian principle of the relativity of Galilean motion, which applied solely to mechanical phenomena, so as to include all manner of phenomena: electrodynamics, optics etc. When extended in this way the Newtonian principle of relativity became Einstein's special principle of relativity. Its signification lay in its assertion that absolute Galilean motion or absolute velocity must ever escape all experimental detection. Henceforth absolute velocity should be conceived of as physically meaningless, not only in the particular realm of mechanics, as in Newton's day, but in the entire realm of physical phenomena. Einstein's special principle, by adding increased emphasis to this relativity of velocity, making absolute velocity metaphysically meaningless, created a still more profound distinction between velocity and accelerated or rotational motion. This latter type of motion remained absolute and real as before. It is most important to understand this point and to realize that Einstein's special principle is merely an extension of the validity of the classical Newtonian principle to all classes of phenomena.

- 41.** According to the author, why did the Greeks NOT conduct experiments to understand the physical world?
- (1) Apparently they did not think necessary to experiment.
 - (2) They focused exclusively on geometry.
 - (3) Their instruments of measurement were very crude.
 - (4) The Greeks considered the application of geometry to the physical world more important.

Solution:

Choice (3) is the best one. Choices (2) and (4) are tangential. While choice (1) is tempting, the actual reason is clearly mentioned in (3) alone. Observe lines 5 and 10 of para 1.
Choice (1)

- 42.** Newton may be considered one of the greatest scientists of all time because he
- (1) discovered the law of gravitation.
 - (2) married physics with mathematics.
 - (3) invented integral calculus.
 - (4) started the use of the empirical method in science.

Solution:

The best choice is (2) Line 3 – 5 in para 2.
Choice (2)

- 43.** The statement "Nature thus exhibited rationality and was not mere blind chaos and uncertainty" suggests that

- (1) problems that had baffled scientists like Archimedes were not really problems.
- (2) only a small group of natural phenomena was chaotic.
- (3) physical phenomena conformed to mathematical laws.
- (4) natural phenomena were evolving towards a less chaotic future.

Solution:

The best choice is (3). The last 2 lines in para 3 bear evidence to this.
Choice (3)

- 44.** The significant implication of Einstein's special principle of relativity is that
- (1) absolute velocity was meaningless in the realm of mechanics.
 - (2) Newton's principle of relativity needs to be modified.
 - (3) there are limits to which experimentation can be used to understand some physical phenomena.
 - (4) it is meaningless to try to understand the distinction between velocity and accelerated or rotational motion.

Solution:

The best choice is (1). Observe the lines 6-10 of para 4. Choice (4) contradicts it.
Choice (3)

- 45.** Which of the following statements about modern science best captures the theme of the passage?
- (1) Modern science rests firmly on the platform built by the Greeks.
 - (2) We need to go back to the method of inquiry used by the Greeks to better understand the laws of dynamics.
 - (3) Disciplines like Mathematics and Physics function best when integrated into one.
 - (4) New knowledge about natural phenomena builds on existing knowledge.

Solution:

The best choice is (4). Read Lines 2 and 3 in para 1 and lines 1 and 2 in para 2.

Choice (4)

Directions for questions 46 to 50: The poem given below is followed by five questions. Choose the best answer to each question.

As you set out for Ithaka.
hope the journey is a long one,
full of adventure, full of discovery.
Laistrygonians and Cyclopes,
angry Poseidon – don't be afraid of them:
you'll never find things like that on your way
as long as you keep your thoughts raised high,
as long as a rare excitement
stirs your spirit and your body.
Laistrygonians and Cyclops,
wild Poseidon – you won't encounter them
unless you bring them along inside your soul,
unless your soul sets them up in front of you.

Hope the voyage is a long one,
may there be many a summer morning when,
with what pleasure, what joy,
you come into harbours seen for the first time;
may you stop at Phoenician trading stations
to buy fine things,
mother of pearl and coral, amber and ebony,
sensual perfume of every kind–
as many sensual perfumes as you can;
and may you visit many Egyptian cities
to gather stores of knowledge from their scholars.

Keep Ithaka always in your mind.
Arriving there is what you are destined for.
But do not hurry the journey at all.
Better if it lasts for years,
so you are old by the time you reach the island,
wealthy with all you have gained on the way,
not expecting Ithaka to make you rich.
Ithaka gave you the marvelous journey.
without her you would not have set out.
She has nothing left to give you now.

And if you find her poor, Ithaka won't have fooled you.
Wise as you will have become, so full of experience,
you will have understood by then what these Itakas mean.

- 46.** Which of the following best reflects the central theme of this poem?
- (1) If you don't have high expectations, you will not be disappointed.
 - (2) Don't rush to your goal; the journey is what enriches you.
 - (3) The longer the journey the greater the experiences you gather.
 - (4) You cannot reach Ithaka without visiting Egyptian ports.

Solution:

The best choice is (2). The last three lines of the poem make it clear. Further, line 3 in stanza 3 supports this.

- 47.** The poet recommends a long journey. Which of the following is the most comprehensive reason for it?
- (1) You can gain knowledge as well as sensual experience.
 - (2) You can visit new cities and harbors.
 - (3) You can experience the full range of sensuality.
 - (4) You can buy a variety of fine things.

Solution:

The best choice is (1). Others are too narrow in approach and serve as examples rather than essence.

- 48.** In the poem, Ithaka is a symbol of
- (1) the divine mother. (2) your inner self.
 - (3) the path to wisdom. (4) life's distant goal.

Solution:

The choice is (4) since others have no logical referents to support them. Moreover the poem speaks mostly of Ithaka the distinct goal.

Choice (4)

- 49.** What does the poet mean by 'Laistrygonians' and 'Cyclops'?
- (1) Creatures which, along with Poseidon, one finds during a journey.
 - (2) Mythological characters that one should not be afraid of.
 - (3) Intra-personal obstacles that hinder one's journey.
 - (4) Problems that one has to face to derive the most from one's journey.

Solution:

There is no clue for (1) and (2) to be the correct options. Choice (3) is what is talked about in the entire passage.

Choice (3)

- 50.** Which of the following best reflects the tone of the poem?

- | | |
|-----------------|---------------|
| (1) Prescribing | (2) Exhorting |
| (3) Pleading | (4) Consoling |

Solution:

The best choice is (2). The poem does not have the tone of pleading nor prescribing 'consoling' is a clear misnomer, as there is no sympathy or tragedy involved in the poem.

Choice (2)

SECTION – II (DI)**NUMBER OF QUESTIONS – 50**

Directions for questions 51 to 53: Answer the questions on the basis of the information given below.

One of the functions of the Reserve Bank of India is to mobilize funds for the Government of India by issuing securities. The following table shows the details of funds mobilized during the period of July 2002-July 2003. Notice that on each date there were two rounds of issues, each with a different maturity.

Date of issue	Notified amount	Maturity	Competitive bids received	Non-competitive bids received	Competitive bids accepted	Non-competitive bids accepted	Total amount mobilized	Coupon rate %	Implicit yield %	
	Rs. Crores	Years	No.	No.	No.	Value	No.	Value	Rs. Crore	
17-Jul-02	40	15	229	23	66	15.21	23	0.37	16	8.07
17-Jul-02	30	10	145	12	90	29.88	12	0.12	30	6.72
05-Aug-02	50	9	324	13	105	49.68	13	0.33	50	9.39
05-Aug-02	20	24	163	9	34	19.81	9	0.19	20	10.18
28-Aug-02	50	15	260	26	157	48.92	26	1.08	50	7.46
28-Aug-02	20	30	119	15	67	19.61	15	0.39	20	7.95
11-Sep-02	40	15	261	22	152	38.93	22	1.07	40	7.46
11-Sep-02	30	20	131	20	98	29.44	20	0.56	30	8.35
09-Oct-02	40	11	361	26	119	39.22	26	0.78	40	7.27
09-Oct-02	30	30	91	15	39	29.52	15	0.48	30	7.95
07-Nov-02	40	17	245	14	20	39.71	14	0.29	40	10.03
07-Nov-02	30	24	166	11	49	29.70	11	0.31	30	10.18
09-Apr-03	40	20	245	25	65	39.53	25	1.47	40	6.30
09-Apr-03	50	11	236	24	201	49.40	24	0.60	50	7.37
23-Apr-03	50	15	319	26	134	48.98	26	1.02	50	6.25
23-Apr-03	20	29	131	19	9	19.39	19	0.61	20	7.95
05-May-03	60	10	314	14	98	59.69	14	0.31	60	7.27
05-May-03	30	20	143	14	118	29.58	14	0.42	30	6.30
04-Jun-03	30	25	187	19	15	28.50	19	1.50	30	6.13
04-Jun-03	60	9	378	21	151	59.09	21	0.91	60	6.85
02-Jul-03	50	11	298	20	116	49.05	20	0.95	50	7.37
02-Jul-03	30	25	114	20	45	28.64	20	1.36	30	6.31
16-Jul-03	60	17	371	29	115	57.00	29	3.10	60	6.35
16-Jul-03	30	29	134	22	12	29.32	22	0.68	30	7.95
Total	930								906	

51. How many times was the issue of securities under-subscribed, i.e., how often did the total amount mobilized fall short of the amount notified?

(1) 0 (2) 1 (3) 2 (4) 3

Solution:

The "total amount mobilized is given under the 10th column from left.

The notified amount is given in the 3rd column from left, on 17 - July - 02 total amount mobilized is less than the notified amount ($16 < 40$)

This is the only case in the given data. Choice (2)

52. Which of the following is true?

- (1) The second round issues have a higher maturity than the first round for all dates.
- (2) The second round issue of any date has a lower maturity only when the first round's notified amount exceeds that of the second round.
- (3) On at least one occasion, the second round issue having lower maturity, received a higher number of competitive bids.
- (4) None of the above three statements is true.

Solution:

Choice (3) and choice (2) are contradicted on 17 - June - 02 and 04 June 03 respectively.

Consider option (3): -

Consider the date: -

04 - Jun - 03	-	25	15
04 - Jun - 03	-	9	15

Directions for questions 54 to 56: In each question there are two statements: A and B, either of which can be true or false on the basis of the information given below.

A research agency collected the following data regarding the admission process of a reputed management school in India.

Year	Gender	Number bought application forms	Number appeared for written test	Number called for interviews	Number selected for the course
2002	Male	61205	59981	684	171
	Female	19236	15389	138	48
2003	Male	63298	60133	637	115
	Female	45292	40763	399	84

Choose 1 if only A is true

Choose 2 if only B is true

Choose 3 if both A and B are true

Choose 4 if neither A nor B is true

54. Statement A: The success rate of moving from written test to interview stage for males was worse than for females in 2003.

Statement B: The success rate of moving from written test to interview stage for females was better in 2002 than in 2003

Solution:

Statement A: -

In 2003: -

Written Test : - Males = 60133
Females = 40763

Interview stage :- Males :- 637
Females: - 399

On 04 - June - 03

Maturity	No. of competitive bids
25	15
9	151

As $151 > 15$ so option (3) is true

Choice (3)

53. Which of the following statements is NOT true?

- (1) Competitive bids received always exceed non-competitive bids received.
- (2) The number of competitive bids accepted does not always exceed the number of non-competitive bids accepted.
- (3) The value of competitive bids accepted on any particular date is never higher for higher maturity.
- (4) The value of non-competitive bids accepted in the first round is always greater than that in the second round.

Solution:

Consider option (4)

On 07 - Nov 02, the value of non-competitive bids in the second round is greater than the value of non-competitive bids in first round. So option (4) is not true.

Choice (4)

Directions for questions 54 to 56: In each question there are two statements: A and B, either of which can be true or false on the basis of the information given below.

637 as a percentage of 60133 is ($>1\%$) more than 399 as percentage of 40763 ($<1\%$)
So statement A is wrong.

Statement B: -

In 2003: -

Written Test Females: - 40763

Interview stage (Females) – 399

$\therefore 399/40763$ is slightly less than 1%

In 2002: -

Written Test:- (Females:- 15389

Interview stage:- 138

Slightly less than 1% but as 399 is closer to 407 than 138 is to 153, so the statement is wrong.

Choice (4)

The conditions imposed required.
 $[(\text{The last 40}) \cap (\text{last 25})] \cap (\text{first 91})$
 $\therefore = [\text{child no. 76 to child no. 100}] \cap [\text{child no. 1 to child no. 91}]$
 $= \text{child no. 76 to child no. 91}$
i.e 16 children

Solution:

Children older than 6 years but not exceeding 12 years
 $= 77 - 22 = 55$
 $= (\text{child no. 23 to child no. 77})$
 Now, arranging the children by weight. The child who weighs more than 38 kg is the child number 34. Hence, $(\text{child no. 23 to child no. 77}) \cap (\text{child no. 34 to child no. 100})$.
 $= \text{child no. 34 to child no. 77} = 44 \text{ children.}$

Directions for questions 60 and 61: Answer the questions on the basis of the information given below.

An industry comprises four firms (A, B, C and D). Financial details of these firms and of the industry as a whole for a particular year are given below. Profitability of a firm is defined as profit as a percentage of sales.

Figures in Rs.	A	B	C	D	Total
Sales	24568	25468	23752	15782	89570
Operating costs	17198	19101	16151	10258	62708
Interest costs	2457	2292	2850	1578	9177
Profit	4914	4075	4750	3946	17684

- 60.** Which firm has the highest profitability?
(1) A (2) B (3) C (4) D

$$\text{Profitability of D} = \frac{3946}{15,782} > 20\% \quad \text{Choice (4)}$$

Solution:

Profitability is defined as = $\frac{\text{Profit}}{\text{Sales}} \times 100$

$$\text{Profitability of A} = \frac{4914}{24568} \approx 20\%$$

$$\text{Profitability of A} = \frac{4914}{24568} \approx 20\%$$

$$\text{Profitability of B} = \frac{4075}{25468} < 20\%$$

$$\text{Profitability of C} = \frac{4750}{23752} < 20\%$$

61. If Firm A acquires Firm B, approximately what percentage of the total market (total sales) will they corner together?

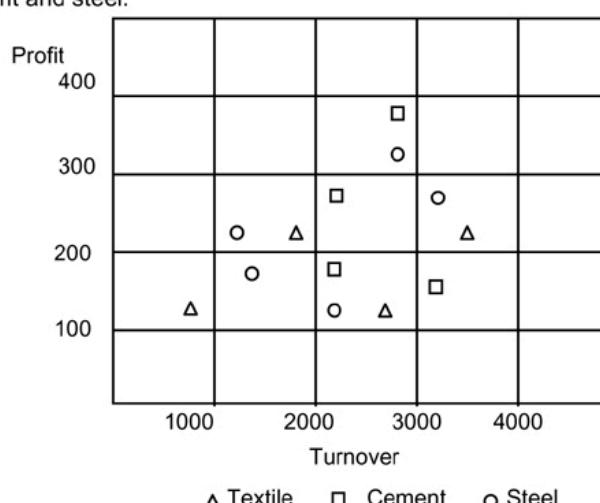
Solution:

If Firm A acquires Firm B, then its total sales will be
 $24568 + 25468 = 49936$

∴ Its share in total sales = $\frac{49936}{89570}$

Directions for questions 62 to 64: Answer the question 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: textiles, cement and steel.



Solution:

Since the scale of the profit axis is exactly 10% of the scale of the turnover axis, we only need to find companies that are above the 45° line drawn through the origin. There are seven companies which fall above this line and thus meet the criteria. Choice (2)

63. For how many steel companies with a turnover of more than 2000 is the profit less than 300?
 (1) 0 (2) 1 (3) 2 (4) 7

Solution:

Number of steel companies having turnover more than 2000 is 3. Of these one company has profit more 300 (row 4 counted from bottom, column 3)
 \therefore Number of steel companies satisfying the condition
 $= 3 - 1 = 2$ Choice (3)

64. 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?

(1) 4 (2) 5 (3) 6 (4) 7

Solution:

Number of steel companies having a turnover greater than 1000 and profit exceeding 10% of the turnover is

3 (2nd row, 2nd column); (3rd row, 2nd column);
 (4th row, 3rd column)

And number of such cement companies is 2
 (3rd row, 3rd column) (4th row, 3rd column)

Choice (2)

Directions for questions 65 to 67: Answer the questions on the basis of the information given below. Details of the top 20 MBA schools in the US as ranked by *US News and World Report*, 1997 are given below.

School	Overall ranking	Ranking by Academics	Ranking by recruits	Ranking by placement	Median starting salary	% employed	Annual tuition fee
Stanford University	1	1	3	1	\$82,000	98.9	\$23,100
Harvard University	2	1	2	4	\$80,000	96.4	\$23,840
University of Pennsylvania	3	1	4	2	\$79,000	100.0	\$24,956
Massachusetts Institute of Technology	4	1	4	3	\$78,000	98.8	\$23,900
University of Chicago	5	1	8	10	\$65,000	98.4	23,930
Northwestern University	6	1	1	11	\$70,000	93.6	\$23,025
Columbia University	7	9	10	5	\$83,000	96.2	\$23,830
Dartmouth College	8	12	11	6	\$70,000	98.3	\$23,700
Duke University	9	9	7	8	\$67,500	98.5	\$24,380
University of California-Berkeley	10	7	12	12	\$70,000	93.7	\$18,788
University of Virginia	11	12	9	9	\$66,000	98.1	\$19,627
University of Michigan-Ann Arbor	12	7	6	14	\$65,000	99.1	\$23,178
New York University	13	16	19	7	\$70,583	97.0	\$23,554
Carnegie Mellon University	14	12	18	13	\$67,200	96.6	\$22,200
Yale University	15	18	17	22	\$65,000	91.5	\$23,220
Univ. of North Carolina-Chapel Hill	16	16	16	16	\$60,000	96.8	\$14,333
University of California – Los Angeles	17	9	13	38	\$65,000	82.2	\$19,431
University of Texas –Austin	18	18	13	24	\$60,000	97.3	\$11,614
Indian University – Bloomington	19	18	20	17	\$61,500	95.2	\$15,613
Cornell University	20	12	15	36	\$64,000	85.1	\$23,151

- 65.** Madhu has received admission in all schools listed above. She wishes to select the highest overall ranked school whose a) annual tuition fee does not exceed \$ 23,000 and b) median starting salary is at least \$70,000. Which school will she select?
 (1) University of Virginia
 (2) University of Pennsylvania
 (3) North western University
 (4) University of California – Berkeley

Solution:

The best way to solve these question is to go through the choices. Of the given choices only University of California - Berkeley satisfies the twin conditions.
Choice (4)

- 66.** In terms of starting salary and tuition fee, how many schools are uniformly better (higher median starting salary AND lower annual tuition fee) than Dartmouth College?
 (1) 1 (2) 2 (3) 3 (4) 4

Solution:

By observation, we can find that Stanford and New York University have higher median starting salary and lower tuition fee than Dartmouth.

Choice (2)

- 67.** How many schools in the list above have single digit rankings on at least 3 of the 4 parameters (overall ranking, ranking by academics, ranking by recruiters and ranking by placement)?
 (1) 10 (2) 5 (3) 7 (4) 8

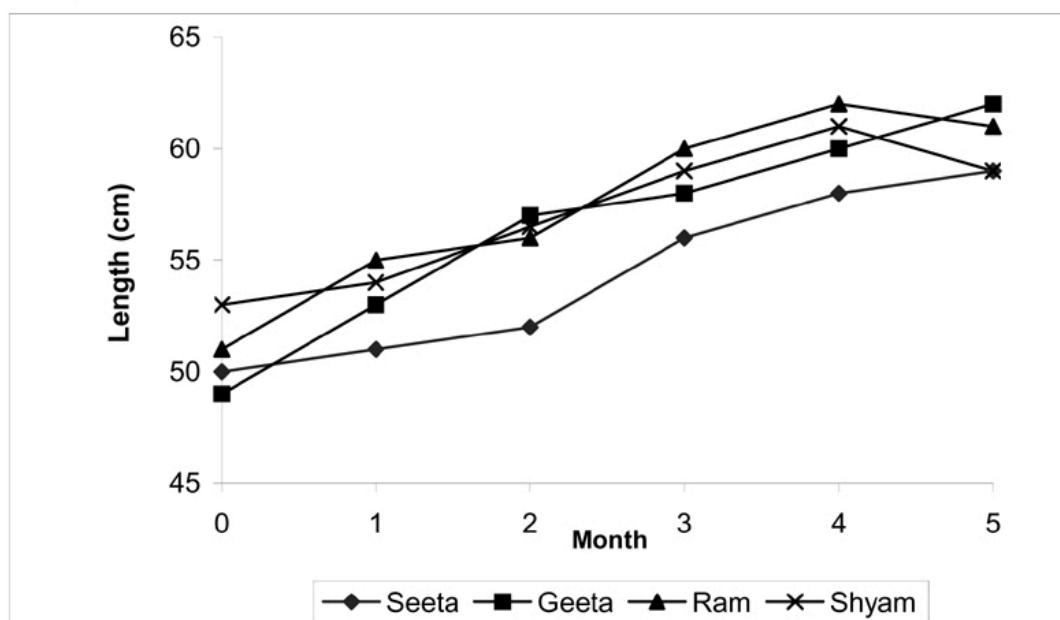
Solution:

Stanford, Harvard, Pennsylvania, Massachusetts, Chicago, Northwestern, Columbia and Duke University have single digit ranking on at least 3 of the 4 parameters i.e., 8 universities satisfy the given condition.

Choice (4)

Directions for questions 68 to 71: Answer the questions on the basis of the information given below.

The length of an infant is one of the measures of his / her development in the early stages of his / her life. The figure below shows the growth chart of four infants in the first five months of life.



- 68.** After which month did Seeta's rate of growth start to decline?
 (1) Second month (2) Third month
 (3) Fourth month (4) Never

Solution:

The slope of the line is the best indicator to solve this question. For Seeta the rate of growth has increased from the first month to the third but there is a decline thereafter.
Choice (2)

- 69.** Who grew at the fastest rate in the first two months of life?
 (1) Geeta (2) Seeta (3) Ram (4) Shyam

Solution:

By observing the slope of the lines we can conclude that Geeta has grown at the maximum rate in the first two months.
Choice (1)

- 70.** The rate of growth during the third month was the lowest for
 (1) Geeta. (2) Seeta.
 (3) Ram. (4) Shyam.

Solution:

From the observation of the slope of the lines we can conclude that Geeta has the least growth rate amongst all in the 3rd month.
Choice (1)

- 71.** Among the four infants, who grew the least in the first five months of life?
 (1) Geeta (2) Seeta (3) Ram (4) Shyam

Solution:

Though the final length is least for Seeta, Shyam has least overall growth (final length – initial length).
Choice (4)

77. In the financial category, the number of spam emails received in September 2002 as compared to March 2003
- was larger.
 - was smaller.
 - was equal.
 - Cannot be determined.

Solution:

September 2002 figure is 25%

March 2003 figure is 37%

i.e., the first percentage is less than the second percentage.

However, the total of September 2002 is greater than that of March 2003.

Hence, comparison cannot be made on the basis of the available data. Choice (4)

Directions for questions 78 to 81: In each question there are two statements A and B

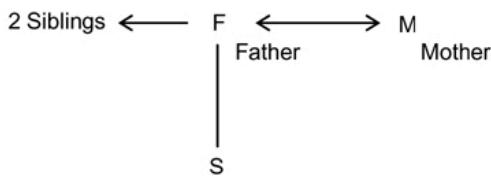
- Choice 1, if the question can be answered by one of the statements alone but not by the other.
- Choice 2, if the question can be answered by using either statement alone.
- Choice 3, if the question can be answered by using both the statements together but cannot be answered using either statement alone.
- Choice 4, if the question cannot be answered even by using both the statements A and B.

78. F and M are father and mother of S, respectively. S has four uncles and three aunts. F has two siblings. The siblings of F and M are unmarried. How many brothers does M have?

- F has two brothers.
- M has five siblings.

Solution:

Let us represent the given information in the form of a tree diagram.



It is given that F and M have 7 siblings (as S has 4 uncles and 3 Aunts). Further, since F has two siblings, M will have five siblings. We need to find out the number of brothers that M has.

Statement A → 'F has two brothers' would mean that M also has two brothers (as S has four uncles). The question can be answered with A alone.

Statement B → 'M has five siblings' does not give us any additional information apart from what is already known in the question statement. This statement is not sufficient. Choice (1)

79. A game consists of tossing a coin successively. There is an entry fee of Rs.10 and an additional fee of Re.1 for each toss of the coin. The game is considered to have ended normally when the coin turns heads on two consecutive throws. In this case the player is

paid Rs.100. Alternatively, the player can choose to terminate the game prematurely after any of the tosses. Ram has incurred a loss of Rs.50 by playing this game. How many times did he toss the coin?

- The game ended normally.
- The total number of tails obtained in the game was 138.

Solution:

Given entry fee = Rs.10 and additional for each toss = Re.1. According to the given information, game will be ending in two cases :

- Normally (ii) Prematurely.
- In the case of normal ending, Ram will be losing Rs.50 after playing 138 tosses, in all cases of which tail turns up and next two times heads turns up. This implies Ram paid $(10 + 138 + 2)$ i.e., Rs.150. As he got Rs.100, he incurs Rs.50 loss.

In case of premature ending, after tossing for 40 times in which no 2 times head turned up, the player will be loosing $Rs.(10 + 40)$ i.e., Rs.50.

As statements A and B independently talk about normal ending, we can find the number of times Ram has tossed the coin, from each of the statements. Choice (2)

80. Each packet of SOAP costs Rs.10. Inside each packet is a gift coupon labelled with one of the letters S, O, A and P. If a customer submits four such coupons that make up the word SOAP, the customer gets a free SOAP packet. Ms. X kept buying packet after packet of SOAP till she could get one set of coupons that formed the word SOAP. How many coupons with label P did she get in the above process?

- The last label obtained by her was S and the total amount spent was Rs.210
- The total number of vowels obtained was 18.

Solution:

We know that each pack of SOAP costs Rs.10 and contains a coupon having one letter from among S, O, A and P. Once a person collects four coupons having letters S, O, A and P then they can submit them to get a free SOAP packet. We need to find the number of coupons having letter P that the person collected, given that a person keeps on buying SOAP till he/she gets the requisite coupons.

Statement A → Last label is S and the amount spent is Rs.210.

From this we know that 21 coupons were obtained and the last label was S which had completed the sequence. However, the number of P's in these 21 coupons is not known. Hence, A alone is not enough.

Statement B → Number of vowels obtained is 18. We do not know the number of P's obtained. Hence, B alone is not sufficient.

When we combine A and B, we know that 18 coupons having A's or O's were collected; last coupon with S was collected which means 2 coupons with P were already collected (as a total of 21 coupons were collected in all). The question can be answered with both statements taken together. Choice (3)

81. If A and B run a race, then A wins by 60 seconds. If B and C run the same race, then B wins by 30 seconds. Assuming that C maintains a uniform speed what is the time taken by C to finish the race?
 A. A and C run the same race and A wins by 375 metres
 B. The length of the race is 1 km.

Solution:

A wins by 60 seconds and then B wins by 30 seconds; and the third participant is C.

$$\Rightarrow T_A = T_B - 60 \text{ and } T_B = T_C - 30$$

$$\Rightarrow T_A = T_C - 30 - 60 = T_C - 90, \text{ where } T_A, T_B, T_C \text{ are time taken by A, B and C respectively to cover the distance of the race.} \rightarrow (1)$$

Statement A gives data about the distance of winning, between A and C.

\Rightarrow C covers the distance of 375 metres in 90 seconds. Hence, speed of C can be determined. But this is not sufficient to answer the question.

Statement B specifies the length of the race. As the speed of C is not known, time cannot be calculated. When both statements are taken together

Statement A gives the speed and statement B gives the distance of race; and hence, time taken can be calculated.

Choice (3)

Directions for questions 82 and 83: Answer the questions on the basis of the information given below.

Some children were taking free throws at the basketball court in school during lunch break. Below are some facts about how many baskets these children shot.

- i. Ganesh shot 8 baskets less than Ashish
- ii. Dhanraj and Ramesh together shot 37 baskets
- iii. Jugraj shot 8 baskets more than Dhanraj
- iv. Ashish shot 5 baskets more than Dhanraj
- v. Ashish and Ganesh together shot 40 baskets.

82. Which of the following statements is true?

- (1) Ramesh shot 18 baskets and Dhanraj shot 19 baskets.
- (2) Ganesh shot 24 baskets and Ashish shot 16 baskets.
- (3) Jugraj shot 19 baskets and Dhanraj shot 27 baskets.
- (4) Dhanraj shot 11 baskets and Ashish shot 16 baskets.

83. Which of the following statements is true?

- (1) Dhanraj and Jugraj together shot 46 baskets.
- (2) Ganesh shot 18 baskets and Ramesh shot 21 baskets.
- (3) Dhanraj shot 3 more baskets than Ramesh.
- (4) Ramesh and Jugraj together shot 29 baskets.

Solutions for questions 82 and 83:

Let us assume that Dhanraj has shot 'X' baskets.

This means that:

- A. Ashish shot ' $X + 5'$ baskets (from ii)
- B. Ganesh shot ' $X - 3'$ baskets (from i and A above)
- C. Jugraj shot ' $X + 8'$ baskets (from iii)
- D. Ramesh shot ' $37 - X$ ' baskets (from ii)

We also know that Ashish and Ganesh together shot 40 baskets.

$$\therefore X + 5 + X - 3 = 40$$

$$\Rightarrow 2X + 2 = 40$$

$$\Rightarrow 2X = 38 \Rightarrow X = 19$$

\therefore We can now see that Ashish has shot 24 baskets, Ganesh has shot 16 baskets, Jugraj has shot 27 baskets, Ramesh has shot 18 baskets and Dhanraj has shot 19 baskets.

82. Ramesh shot 18 baskets and Dhanraj shot 19 baskets is true. Choice (1)

83. Dhanraj (19 baskets) and Jugraj (27 baskets) together shot 46 baskets is true. Choice (1)

Directions for questions 84 to 86: Answer the questions on the basis of the information given below.

Seven varsity basketball players (A, B, C, D, E, F and G) are to be honoured at a special luncheon. The players will be seated on the dais in a row. A and G have to leave the luncheon early and so must be seated at the extreme right. B will receive the most valuable player's trophy and so must be in the centre to facilitate presentation. C and D are bitter rivals and therefore must be seated as far apart as possible.

84. Which of the following cannot be seated at either end?

- (1) C
- (2) D
- (3) F
- (4) G

85. Which of the following pairs cannot be seated together?

- (1) B & D
- (2) C & F
- (3) D & G
- (4) E & A

86. Which of the following pairs cannot occupy the seats on either side of B?

- (1) F & D
- (2) D & E
- (3) E & G
- (4) C & F

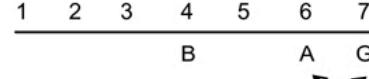
Solutions for questions 84 to 86:

Let us number the seats as 1 to 7 from left to right.

From the given data, we know the following.

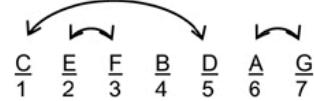
- (i) B is at 4.

- (ii) A and G are at 6 and 7, though not necessarily in that order.



Since C and D have to be as far apart as possible, they have to sit at 1 and 5, though not necessarily in that order. The remaining people, E and F, occupy the remaining places 2 and 3, in any order.

The final arrangement is as follows.



Here C and D can interchange and so can E and F and so can A and G.

84. C, D and G can be seated at the extreme ends but F cannot be seated at any of the extreme ends as the only possible places for F are 2 and 3. Choice (3)

85. B and D can be seated together at 4 and 5.

C and F can be seated together at 1 and 2.

D and G can be seated together at 5 and 6.

E and A can never be seated together. Choice (4)

86. As G can never be next to B, thus E and G can never be on either side of B. Choice (3)

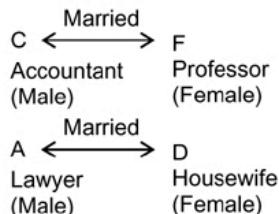
Directions for questions 87 to 89: Answer the questions on the basis of the information given below.

A, B, C, D, E and F are a group of friends. There are two housewives, one professor, one engineer, one accountant and one lawyer in the group. There are only two married couples in the group. The lawyer is married to D, who is a housewife. No woman in the group is either an engineer or an accountant. C, the accountant, is married to F, who is a professor. A is married to a housewife. E is not a housewife.

Solutions for questions 87 to 89:

The following information is given.

1. There are only two married couples in this group.
 2. D is a Housewife and is married to the Lawyer.
 3. The Engineer and the Accountant are males.
 4. C is an Accountant married to F, who is a Professor.
 5. A is married to the Housewife.
 6. E is not a Housewife.
 7. There are 2 Housewives, one Professor, one Engineer, one Accountant and one Lawyer in the group. One of the Couples is C - F (from 4) and the other is
D - A (from 2 and 5).



Since E is not the Housewife, it means that E is an Engineer and B is a Housewife. Since no Engineer is a female, as given in the data, it means E is a male.

The given deductions are represented in a table as shown below.

Name	Profession	Gender	Married to
A	Lawyer	Male	D
B	House wife	Female	-
C	Accountant	Male	F
D	House wife	Female	A
E	Engineer	Male	-
F	Professor	Female	C

The given questions can be solved by referring the above table.

87. The married couple among the given choices is
A - D. Choice (4)

88. E is an Engineer. Choice (1)

89. C, A and E are males whereas the rest are females.
A total of 3 males are there in this group. Choice (2)

Directions for questions 90 to 92: Answer the questions on the basis of the information given below.

Rang Barsey Paint Company (RBPC) is in the business of manufacturing paints. RBPC buys RED, YELLOW, WHITE, ORANGE, and PINK paints. ORANGE paint can also be produced by mixing RED and YELLOW paints in equal proportions. Similarly, PINK paint can also be produced by mixing equal amounts of RED and WHITE paints. Among other paints, RBPC sells CREAM paint, (formed by mixing WHITE and YELLOW in the ratio 70 : 30) AVOCADO paint (formed by mixing equal amounts of ORANGE and PINK paint) and WASHEDORANGE paint (formed by mixing equal amounts of ORANGE and WHITE paint). The following table provides the prices at which RBPC buys paints.

Color	Rs./litre
RED	20.00
YELLOW	25.00
WHITE	15.00
ORANGE	22.00
PINK	18.00

90. The cheapest way to manufacture AVOCADO paint would cost
(1) Rs.19.50 per litre. (2) Rs.19.75 per litre.
(3) Rs.20.00 per litre. (4) Rs.20.25 per litre.

91. WASHEDORANGE can be manufactured by mixing
(1) CREAM and RED in the ratio 14 : 10.
(2) CREAM and RED in the ratio 3 : 1.
(3) YELLOW and PINK in the ratio 1 : 1.
(4) RED, YELLOW, and WHITE in the ratio 1 : 1 : 2.

92. Assume the AVOCADO, CREAM, and WASHEDORANGE each sells for the same price. Which of the three is the most profitable to manufacture?
(1) AVOCADO.
(2) CREAM.
(3) WASHEDORANGE.
(4) Sufficient data is not available.

Solutions for questions 90 to 92:

Let us study the given data.

1. RBPC buys RED, YELLOW, WHITE, ORANGE and PINK paints.
 2. ORANGE → Mix RED and YELLOW in 1 : 1 ratio.
 3. PINK → Mix RED and WHITE in 1 : 1 ratio.
 4. CREAM → Mix WHITE and YELLOW in 7 : 3 ratio.
 5. AVOCADO → Mix ORANGE and PINK in 1 : 1 ratio.
 6. WASHEDORANGE → Mix ORANGE and WHITE in 1 : 1 ratio.

90. AVOCADO can be made by mixing ORANGE and PINK in the ratio of 1 : 1.

∴ cost of making AVOCADO from PINK and ORANGE is $(22 + 18)/2 = \text{Rs.}20$ Litre.

AVOCADO can also be made by mixing ORANGE (2 parts), RED (1 part) and WHITE (1 part) [since PINK can be made by mixing RED and WHITE in the ratio of 1 : 1].

$$\therefore \text{cost of AVOCADO} = \frac{22 \times 2 + 20 \times 1 + 15 \times 1}{4} = \frac{79}{4}$$

∴ cost of AVOCADO = Rs.19.75.

This is the cheapest way to manufacture AVOCADO.
Choice (2)

91. WASHEDORANGE can be prepared by mixing ORANGE and WHITE in the ratio of 1 : 1. However ORANGE can be manufactured by mixing equal proportions of RED and YELLOW.

∴ ORANGE (1 part) → 1/2 RED + 1/2 YELLOW

∴ WASHEDORANGE can be prepared by mixing 1/2 part RED, 1/2 part YELLOW and 1 part WHITE.

$$\therefore \text{RED : YELLOW : WHITE} = \frac{1}{2} : \frac{1}{2} : 1 \approx 1 : 1 : 2$$

Choice (4)

92. As seen in the first question of this set AVACADO can be manufactured at a cost of 19.75. Cream can be manufactured by mixing WHITE and YELLOW in the ratio of 7 : 3.

∴ Cost of CREAM paint

$$= \frac{15 \times 7 + 25 \times 3}{10} = \frac{180}{10} = \text{Rs.}18/-$$

WASHEDORANGE can be manufactured by mixing RED, YELLOW and WHITE in the ratio of 1 : 1 : 2.

∴ Cost of WASHEDORANGE paint

$$= \frac{20 + 25 + 15 \times 2}{4} = \frac{75}{4} = 18.75/-$$

Given that AVACODO, CREAM and WASHEDORANGE sell for the same price, it means that the one with least cost of manufacturing will be the most profitable, which in this case is CREAM.
Choice (2)

Directions for questions 93 and 94: Answer the questions on the basis of the information given below.

The Head of a newly formed government desires to appoint five of the six elected members A, B, C, D, E and F to portfolios of Home, Power, Defence, Telecom and Finance. F does not want any portfolio if D gets one of the five. C wants either Home or Finance or no portfolio. B says that if D gets either Power or Telecom then she must get the other one. E insists on a portfolio if A gets one.

93. Which is a valid assignment?

- (1) A-Home, B-Power, C-Defence, D-Telecom, E-Finance.
- (2) C-Home, D-Power, A-Defence, B-Telecom, E-Finance.
- (3) A-Home, B-Power, E-Defence, D-Telecom, F-Finance.
- (4) B-Home, F-Power, E-Defence, C-Telecom, A-Finance.

94. If A gets Home and C gets Finance, then which is NOT A valid assignment for Defence and Telecom?

- (1) D-Defence, B-Telecom.

(2) F-Defence, B-Telecom.

(3) B-Defence, E-Telecom.

(4) B-Defence, D-Telecom.

Solutions for questions 93 and 94:

The data given is as follows:

- (i) If D gets a portfolio, then F does not want a portfolio.
- (ii) C takes either Home or Finance or none of the portfolios.
- (iii) If D gets either Power or Telecom, then B should get the other one.
- (iv) If A gets a portfolio then E also should get a portfolio.

93. The best way to solve this problem is to check the choices with the above mentioned conditions.

Choice (1) is eliminated on account of (ii).

Choice (3) is ruled out on account of (i).

Choice (4) is eliminated on account of (ii).

∴ Choice (2) is the only correct assignment, which does not violate any given condition. Choice (2)

94. A → Home; C → Finance

The best way is to check through the choices.

From (iii), we know that B and D should get Power or Telecom, in any order, in case D is assigned Power or Telecom.

This is violated in choice (4) and this is our answer as we are looking for an invalid assignment.

Choice (4)

Directions for questions 95 to 97: Answer the questions on the basis of the information given below.

Five friends meet every morning at Sree Sagar restaurant for an idli-vada breakfast. Each consumes a different number of idlis and vadas. The number of idlis consumed are 1, 4, 5, 6 and 8, while the number of vadas consumed are 0, 1, 2, 4 and 6. Below are some more facts about who eats what and how much.

- i. The number of vadas eaten by Ignesh is three times the number of vadas consumed by the person who eats four idlis.
- ii. Three persons, including the one who eats four vadas, eat without chutney.
- iii. Sandeep does not take any chutney.
- iv. The one who eats one idli a day does not eat any vadas or chutney. Further, he is not Mukesh.
- v. Daljit eats idli with chutney and also eats vada.
- vi. Mukesh, who does not take chutney, eats half as many vadas as the person who eats twice as many idlis as he does.
- vii. Bimal eats two more idlis than Ignesh, but Ignesh eats two more vadas than Bimal.

95. Which one of the following statements is true?

- (1) Daljit eats 5 idlis.
- (2) Ignesh eats 8 idlis.
- (3) Bimal eats 1 idli.
- (4) Bimal eats 6 idlis.

96. Which of the following statements is true?

- (1) Sandeep eats 2 vadas.
- (2) Mukesh eats 4 vadas.
- (3) Ignesh eats 6 vadas.
- (4) Bimal eats 4 vadas.

- 97.** Which of the following statements is true?
- (1) Mukesh eats 8 idlis and 4 vadas but no chutney.
 - (2) The person who eats 5 idlis and 1 vada does not take chutney.
 - (3) The person who eats equal number of vadas and idlis also takes chutney.
 - (4) The person who eats 4 idlis and 2 vadas also takes chutney.

Solutions for questions 95 to 97:

From (i), we know that Ignesh has consumed three times the number of vadas consumed by a person eating four idlis. The only possible numbers here are 6 and 2. Thus Ignesh eats 6 vadas, as 6 is the only multiple of 3.

From (vii), we know that Ignesh ate two more vadas than Bimal which means that Bimal ate 4 vadas.

Using the above inference and combining this with (ii), (iii) and (vi), we know that Bimal, Sandeep and Mukesh do not have chutney. The persons consuming chutney are Ignesh and Daljit.

From (iv), (v), (i) and (vii), we find that Sandeep does not eat any vada and has exactly one idly.

Let us now construct a table with the information gleaned so far.

Person	Idlis	Vadas	Chutney
Ignesh		6	✓
Sandeep	1	0	✗
Mukesh			✗
Daljit			✓
Bimal		4	✗

From (vii), we know that Bimal has two more idlis than Ignesh which means it is either 8 or 6. When we try out Ignesh as 4, there is a contradiction of point (i). Hence, Ignesh has to eat 6 idlis, which means that Bimal consumes 8 idlis. Mukesh has half the number of idlis as one other person and the only possible number that satisfies this is 4, which means that he has half the number of vadas that Bimal eats.

∴ Mukesh has 2 vadas and that leaves Daljit with just one vada.

The complete information is given in the table given below.

Person	Idlis	Vadas	Chutney
Ignesh	6	6	✓
Sandeep	1	0	✗
Mukesh	4	2	✗
Daljit	5	1	✓
Bimal	8	4	✗

- 95.** Daljit eats 5 idlis is true.

Choice (1)

- 96.** Ignesh eats 6 vadas and Bimal eats 4 vadas is true.

∴ both the choices (3) and (4) are correct.

NOTE : This question has two possible answers.

- 97.** Ignesh eats 6 vadas, 6 idlis and also has chutney.

Choice (3)

Directions for questions 98 to 100: Answer the questions on the basis of the information given below.

Five women decided to go shopping to M.G. Road, Bangalore. They arrived at the designated meeting place in the following order: 1. Archana, 2. Chellamma, 3. Dhenuka, 4. Helen and 5. Shahnaz. Each woman spent at least Rs.1000. Below are some additional facts about how much they spent during their shopping spree.

- i. The woman who spent Rs.2234 arrived before the lady who spent Rs.1193.
- ii. One woman spent Rs.1340 and she was not Dhenuka.
- iii. One woman spent Rs.1378 more than Chellamma.
- iv. One woman spent Rs.2517 and she was not Archana.
- v. Helen spent more than Dhenuka.
- vi. Shahnaz spent the largest amount and Chellamma the smallest.

- 98.** What was the amount spent by Helen?

- (1) Rs.1193.
- (2) Rs.1340.
- (3) Rs.2234.
- (4) Rs.2517.

- 99.** Which of the following amounts was spent by one of them?

- (1) Rs.1139.
- (2) Rs.1378.
- (3) Rs.2571.
- (4) Rs.2718.

- 100.** The woman who spent Rs.1193 is

- (1) Archana.
- (2) Chellamma.
- (3) Dhenuka.
- (4) Helen

Solutions for questions 98 to 100:

Let us first identify the amounts being spent.

The amounts are Rs.2234, Rs.1340, Rs.2517 and Rs.1193. There is one person who spent Rs.1378 more than Chellamma, which means that it is at least Rs.2378 (since everybody spent more than Rs.1000/-).

Now we have to consider two cases:

Case (A): Chellamma spent Rs.1193

Case (B): The highest amount spent is Rs.2571

Case (A):

From (vi) we know that Chellamma spent Rs.1193. Rs.1378 more than Rs.1193 is Rs.2571 which is the amount spent by Shahnaz (from vi).

From (v) we know that Helen spent either Rs.2234 or Rs.2517. From (ii), we know Dhenuka did not spend Rs.1340 which means she spent either Rs.2234 or Rs.2517. But (v) says that Helen spent more than Dhenuka, which implies that Helen spent Rs.2517 and Dhenuka spent Rs.2234. That leaves us with Archana who spent Rs.1340. The final table is as follows.

Name	Amount spent
Archana	Rs.1340
Chellamma	Rs.1193
Dhenuka	Rs.2234
Helen	Rs.2517
Shahnaz	Rs.2571

But here, we find that this arrangement violates condition (ii) given in the data which says "The woman who spent Rs.2234 arrived before the lady who spent Rs.1193 (because the names in the above table are written in the order in which they arrived).

Hence, this case does not give us a feasible solution.

- 106.** How many even integers n , where $100 \leq n \leq 200$, are divisible neither by seven nor by nine?
 (1) 40 (2) 37 (3) 39 (4) 38

Solution:

Given n is an even integer and $100 \leq n \leq 200$.
 There are 51 even integers from 100 to 200 (both inclusive)
 The number of even integers (between 100 and 200) which are neither divisible by 7 nor by 9
 $= 51 - [\text{The number of integers between 100 and } 200 \text{ which are divisible by 14 or 18}]$

$$n(14) = \frac{196 - 112}{14} + 1 = 7$$

$$n(18) = \frac{198 - 108}{18} + 1 = 6$$

$$n(14 \text{ and } 18) = 1 \text{ (i.e. 126)}$$

$$\therefore n(\overline{14} \text{ or } \overline{18}) = 51 - 12 = 39 \quad \text{Choice (3)}$$

- 107.** Which one of the following conditions must p , q and r satisfy so that the following system of linear simultaneous equations has at least one solution, such that $p + q + r \neq 0$?

$$x + 2y - 3z = p$$

$$2x + 6y - 11z = q$$

$$x - 2y + 7z = r$$

$$(1) 5p - 2q - r = 0 \quad (2) 5p + 2q + r = 0$$

$$(3) 5p + 2q - r = 0 \quad (4) 5p - 2q + r = 0$$

Solution:

Given equations :

$$x + 2y - 3z = p \quad \text{-----(1)}$$

$$2x + 6y - 11z = q \quad \text{-----(2)}$$

$$x - 2y + 7z = r \quad \text{-----(3)}$$

Taking clue from the choices,

we can observe that

LHS of equation (3)

$$= 5x [\text{LHS of Eq (1)}] - 2x [\text{LHS of Eq (2)}]$$

To have atleast one solution the corresponding RHS must be related in the same way.
 i.e. RHS of Eq (3)

$$= 5x [\text{RHS of Eq (1)}] - 2x [\text{LHS of Eq (2)}]$$

$$\Rightarrow 5p - 2q = r \quad \text{Choice (1)}$$

- 108.** The function $f(x) = |x - 2| + |2.5 - x| + |3.6 - x|$, where x is a real number, attains a minimum at
 (1) $x = 2.3$ (2) $x = 2.5$
 (3) $x = 2.7$ (4) None of the above

Solution:

Given

$$f(x) = |x - 2| + |2.5 - x| + |3.6 - x| \quad (x \in \mathbb{R})$$

From the choices,

$$f(2.3) = 0.3 + 0.2 + 1.3 = 1.8$$

$$f(2.5) = 0.5 + 0 + 1.1 = 1.6$$

$$f(2.7) = 0.7 + 0.2 + 0.9 = 1.8$$

Among $f(2.3)$, $f(2.5)$ and $f(2.7)$, $f(2.5)$ is the least.

Consider $f(2.5 + k)$ where k is a very small positive quantity.

$$f(2.5 + k) = (0.5 + k) + (k) + (1.1 - k) = 1.6 + k \geq f(2.5)$$

Similarly consider

$$f(2.5 - k) = (0.5 - k) + (k) + (1.1 + k) = 1.6 + k > 1.6$$

$$\therefore f(2.5 - k) > f(2.5)$$

$\therefore f(2.5)$ is the minimum value of $f(x)$.

$$\therefore f(x) \text{ is minimum at } c = 2.5 \quad \text{Choice (2)}$$

- 109.** Let $g(x) = \max(5 - x, x + 2)$. The smallest possible value of $g(x)$ is

$$(1) 4.0 \quad (2) 4.5$$

$$(3) 1.5 \quad (4) \text{None of the above}$$

Solution:

$$g(x) = \max(5 - x, x + 2)$$

smallest value of $g(x)$ will occur when $5 - x = x + 2$
 i.e. at $x = 1.5$

$$g(1.5) = \max(3.5, 3.5) = 3.5 \quad \text{Choice (4)}$$

- 110.** A positive whole number M less than 100 is represented in base 2 notation, base 3 notation, base 3 notation, and base 5 notation. It is found that in all three cases the last digit is 1, while in exactly two out of three cases the leading digit is 1. Then M equals

$$(1) 31. \quad (2) 63. \quad (3) 75. \quad (4) 91.$$

Solution:

The number m should leave a remainder 1 when divided by 2, 3 or 5.

\therefore Choices (2) and (3) are eliminated.

From the choices,

$$31_{(10)} = 1111_{(2)}$$

$$= 1011_{(3)}$$

$$= 111_{(5)}$$

$$91_{(10)} = 1011011_{(2)}$$

$$= 10101_{(3)}$$

$$= 331_{(5)}$$

For $31_{(10)}$ and $91_{(10)}$ has the last digit in (base 2, base 3 and base 5 notation) and only 91 has 1 as the lead digit in base 2 and base 3 notation (exactly two cases).

Choice (4)

- 111.** A leather factory produces two kinds of bags, standard and deluxe. The profit margin is Rs.20 on a standard bag and Rs.30 on a deluxe bag. Every bag must be processed on machine A and on machine B. The processing times per bag on the two machines are as follows.

	Time required (Hour / bag)	
	Machine A	Machine B
Standard Bag	4	6
Deluxe Bag	5	10

The total time available on machine A is 700 hours and on machine B is 1250 hours. Among the following production plans, which one meets the machine's availability constraints and maximizes the profit?

$$(1) \text{ Standard 75 bags, Deluxe 80 bags}$$

$$(2) \text{ Standard 100 bags, Deluxe 60 bags}$$

$$(3) \text{ Standard 50 bags, Deluxe 100 bags}$$

$$(4) \text{ Standard 60 bags, Deluxe 90 bags}$$

Solution:

Let s and d be the number of standard bags and deluxe bags respectively to maximise the profit under the given constraints. To maximise the profit, maximum number of bags have to be produced for which all the available machine time must be utilized.

$$\begin{aligned} \text{Profit } P_{\max} &= 20s + 30d \quad \dots \dots (1) \\ \text{and} \\ 4s + 5d &= 700 \quad \dots \dots (2) \\ 6s + 10d &= 1250 \quad \dots \dots (3) \end{aligned}$$

Solving (2) and (3) we get

$$s = 75, d = 80$$

Alternate method:

The question can be done through back substitution.
Choice (1)

112. In a 4000 meter race around a circular stadium having a circumference of 1000 meters, the fastest runner and the slowest runner reach the same point at the end of the 5th minute, for the first time after the start of the race. All the runners have the same starting point and each runner maintains a uniform speed throughout the race. If the fastest runner runs at twice the speed of the slowest runner, what is the time taken by the fastest runner to finish the race?

$$\begin{array}{ll} (1) 20 \text{ min} & (2) 15 \text{ min} \\ (3) 10 \text{ min} & (4) 5 \text{ min} \end{array}$$

Solution:

$$\text{Given } F = 25$$

where F and S are the speeds of the fastest and the slowest runners respectively.

For the faster runner to meet the slower runner, the faster runner must run 1000 meters more than the slower runner (one track length). That means the faster runner must have run 2000 m and the slower runner must have run 1000 m (because their speeds are in the ratio of 2 : 1). The faster runner has taken 5 minutes. So, to complete the race of 4000 m he would require 10 minutes.

Choice (3)

113. At the end of the year 1998, Shepard bought nine dozen goats. Henceforth, every year he added p% of the goats at the beginning of the year and sold q% of the goats at the end of the year where p > 0 and q > 0. If Shepard had nine dozen goats at the end of year 2002, after making the sales for that year, which of the following is true?

$$\begin{array}{ll} (1) p = q & (2) p < q \\ (3) p > q & (4) p = q/2 \end{array}$$

Solution:

Given that Shepard has nine dozens of goats at the end of 1998. Also he sells q% of the goats at the end of the year and he adds p% of the goats at the beginning of the year.

∴ Number of goats at the end of the year

$$= 9 \text{ dozens} - q\% \text{ of } 9 \text{ dozens}$$

$$= 9 \text{ dozens} (1 - q\%)$$

Next year, he adds p% on this.

∴ Number of goats till the end of 1999

$$= 9 \text{ dozens} (1 - q\%) (1 + p\%)$$

As every year this process is repeated and at the end of 2002, Shepard has same nine dozens of goats, we can say that $(1 - q) (1 + p) = 1$

$$\Rightarrow p - q = pq$$

$$\Rightarrow p > q \text{ (since } pq > 0\text{)}$$

Choice (3)

Directions for questions 114 and 115: Answer the questions on the basis of the information given below.

New Age Consultants have three consultants Gyani, Medha and Buddhi. The sum of the number of projects handled by Gyani and Buddhi individually is equal to the number of projects in which Medha is involved. All three consultants are involved together in 6 projects. Gyani works with Medha in 14 projects. Buddhi has 2 projects with Medha but without Gyani, and 3 projects with Gyani but without Medha. The total number of projects for New Age Consultants is one less than twice the number of projects in which more than one consultant is involved.

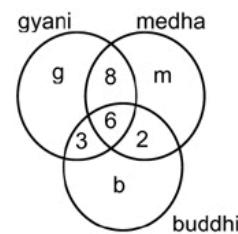
114. What is the number of projects in which Gyani alone is involved?

$$\begin{array}{l} (1) \text{ Uniquely equal to zero.} \\ (2) \text{ Uniquely equal to 1.} \\ (3) \text{ Uniquely equal to 4.} \\ (4) \text{ Cannot be determined uniquely.} \end{array}$$

115. What is the number of projects in which Medha alone is involved?

$$\begin{array}{l} (1) \text{ Uniquely equal to zero.} \\ (2) \text{ Uniquely equal to 1.} \\ (3) \text{ Uniquely equal to 4.} \\ (4) \text{ Cannot be determined uniquely.} \end{array}$$

Solutions for questions 114 and 115: Drawing the venn diagram for the given information.



Number of projects in which more than one consultant is involved = $8 + 6 + 3 + 2 = 19$

$$\therefore \text{Total number of projects} = 2 \times 19 - 1 = 37$$

$$g + m + b + 19 = 37$$

$$g + m + b = 18$$

$$\text{Also, } g + b = m + 16$$

$$\therefore 2m + 16 = 18$$

$$m = 1$$

- 114.

Choice (4)

- 115.

Choice (2)

Directions for questions 116 to 133: Answer the questions independently of each other.

116. Each side of a given polygon is parallel to either X or Y axis. A corner of such a polygon is said to be convex if the internal angle is 90° or concave if the internal angle is 270° . If the number of convex corners in such a polygon is 25, the number of concave corners must be

$$(1) 20 \quad (2) 0 \quad (3) 21 \quad (4) 22$$

Solution:

For a polygon the sum of all its interior angles must be a multiple of 180° .

∴ if $25 \times 90 + k \times 270$ has to be a multiple of 180° then only permissible value of k (from choices) = 21.

Choice (3)

117. Let p and q be the roots of the quadratic equation $x^2 - (\alpha - 2)x - \alpha - 1 = 0$. What is the minimum possible value of $p^2 + q^2$?
 (1) 0 (2) 3 (3) 4 (4) 5

Solution:

117. Given quadratic equation is
 $x^2 - (\alpha - 2)x - (\alpha + 1) = 0$ ----- (1)
 and p, q are the roots of (1)
 $p + q = \alpha - 2$ and $pq = -(\alpha + 1)$
 $p^2 + q^2 = (p + q)^2 - 2pq$
 $= (\alpha - 2)^2 + 2(\alpha + 1) = \alpha^2 - 2\alpha + 6$
 $= (\alpha - 1)^2 + 5$
 The minimum value is 5 (since $(\alpha - 1)^2 \geq 0$)
 Choice (4)

118. The 288th term of the series a, b, b, c, c, c, d, d, d, d, e, e, e, e, f, f, f, f, f, f, is
 (1) u (2) v (3) w (4) x

Solution:

Given series is
 a, b, b, c, c, c, d, d, d, d, e, e, e, e,
 Clearly it is of the form,
 1as, 2bs, 3cs, 4ds, 5es, 6fs,

Now $\frac{n(n+1)}{2} = 288$

From this we can observe that the number/alphabet lies between $\sum n$ and $\sum(n+1)$. And the corresponding alphabet is $(n+1)^{\text{th}}$ value.

For $n = 23$, we have $\frac{n(n+1)}{2} = 276$

and $n = 24$, we have $\frac{n(n+1)}{2} = 300$

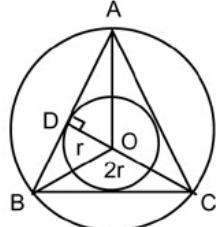
Clearly 288 lies between $\sum 23$ and $\sum 24$.

$\therefore 24^{\text{th}}$ letter i.e. x will be the 288th letter in the series.
 Choice (4)

119. There are two concentric circles such that the area of the outer circle is four times the area of the inner circle. Let A, B and C be three distinct points on the perimeter of the outer circle such that AB and AC are tangents to the inner circle. If the area of the outer circle is 12 square centimeters then the area (in square centimeters) of the triangle ABC would be

- (1) $\pi\sqrt{12}$ (2) $\frac{9}{\pi}$
 (3) $\frac{9\sqrt{3}}{\pi}$ (4) $\frac{6\sqrt{3}}{\pi}$

Solution:



As area of outer circle is 4 times area of inner circle, we have radius of outer circle = 2 (radius of the inner circle)

Let R and r be the radii of the outer circle and the inner circle respectively $\Rightarrow R:r = 2:1$

By symmetry, the $\triangle ABC$ is equilateral.

From $\triangle ODE$, $AD = \frac{1}{2}AB = \sqrt{(2r)^2 - r^2} = \sqrt{3}r$

\therefore Area of $\triangle ABC = \sqrt{3}/4a^2 = \frac{\sqrt{3}}{4} \times (2\sqrt{3}r)^2$

$\Rightarrow r^2 = 12/4\pi = \Delta ABC$

$\Rightarrow \frac{\sqrt{3}}{4} \times 12r^2 \times \frac{3}{\pi} = \frac{9\sqrt{3}}{\pi}$ units Choice (3)

120. Let a, b, c, d be four integers such that $a + b + c + d = 4m + 1$ where m is a positive integer. Given m, which one of the following is necessarily true?

- (1) The minimum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 - 2m + 1$
 (2) The minimum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 + 2m + 1$
 (3) The maximum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 - 2m + 1$
 (4) The maximum possible value of $a^2 + b^2 + c^2 + d^2$ is $4m^2 + 2m + 1$

Solution:

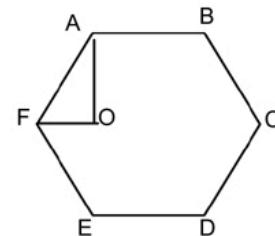
Given $a + b + c + d = 4m + 1$ where m is a positive integer. If the expression $(a^2 + b^2 + c^2 + d^2)$ is minimum, the numbers must be as close to each other as possible. Since the RHS is definitely not a multiple of 4, the possibility of a, b, c and d being equal is ruled out. Hence the numbers can be of the form m, m, m, and $(m+1)$.

\therefore minimum of $(a^2 + b^2 + c^2 + d^2)$
 $= m^2 + m^2 + m^2 + (m+1)^2$

$= 4m^2 + 2m + 1$ Choice (2)

Note: It can be verified that the expression takes the minimum by assuming a counter example say $m = 2$ and $(a, b, c, d) = (1, 2, 3, 3)$ vs $(a, b, c, d) = (2, 2, 2, 3)$ also if $(a, b, c, d) = (1, 8, n, -n)$ where $n \rightarrow \infty$ there is no maximum for the expression.

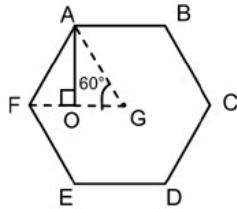
121. In the figure below, ABCDEF is a regular hexagon and $\angle AOF = 90^\circ$. FO is parallel to ED. What is the ratio of the area of the triangle AOF to that of the hexagon ABCDEF?



- (1) 1/12 (2) 1/6 (3) 1/24(4) 1/18

Solution:

In the given figure draw two lines as shown by the dotted lines AO and FO



Now AO is the altitude of equilateral triangle AGF, hence Area of AOF = $\frac{1}{2}$ area of AFG

$$= \frac{1}{2} \times \frac{1}{6} \text{ of area of hexagon} = \frac{1}{12} \text{ of area of hexagon}$$

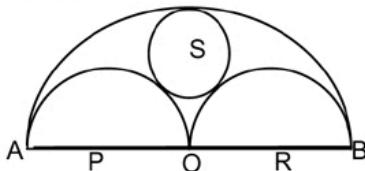
Choice (1)

122. The number of non-negative real roots of $2^x - x - 1 = 0$ equals
 (1) 0 (2) 1 (3) 2 (4) 3

Solution:

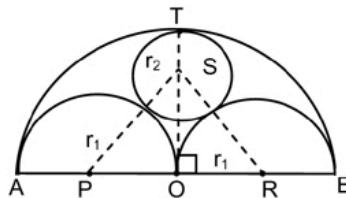
The given equation is satisfied for the values $x = 0$ as well as 1. Hence, there are 2 non-negative real roots.
 Choice (3)

123. Three horses are grazing within a semi-circular field. In the diagram given below, AB is the diameter of the semi-circular field with centre at O. Horses are tied up at P, R and S such that PO and RO are the radii of semi-circles with centres at P and R respectively, and S is the centre of the circle touching the two semi-circles with diameters AO and OB. The horses tied at P and R can graze within the respective semi-circles and the horse tied at S can graze within the circle centred at S. The percentage of the area of the semi-circle with diameter AB that cannot be grazed by the horses is nearest to



- (1) 20 (2) 28 (3) 36 (4) 40

Solution:



Lines PS and RS pass through respective points of contacts of the circles. $\triangle PSR$ is isosceles, because $PS = r_1 + r_2 = RS$; (r_1 is radius of semicircles with centers P and R; r_2 is radius of the small circle with center S); and O is midpoint of PR. Hence, a line perpendicular to AB, at O, becomes the perpendicular bisector of PR and hence passes through S. OS, when extended meets, the circle with centre S and the semicircle with centre O, at their point of contact. Let this point be T.

(\therefore the line joining the centers of two touching circles passes through the point of contact).

Hence, OT = Radius of semicircle with centre O

$$\Rightarrow OA = 2r_1 \rightarrow (1)$$

ST = radius of circle with centre S = $r_2 \rightarrow (2)$

$$\text{Hence, } OS = OT - ST = (2r_1 - r_2) \rightarrow (3)$$

$\triangle PSO$, which is right angled at O,

$$PS^2 = PO^2 + OS^2$$

$$\Rightarrow (r_1 + r_2)^2 = r_1^2 + (2r_1 - r_2)^2$$

$$\Rightarrow r_1^2 + r_2^2 + 2r_1r_2 = r_1^2 + 4r_1^2 + r_2^2 - 4r_1r_2$$

$$\Rightarrow 4r_1^2 - 6r_1r_2 = 0$$

$$\Rightarrow 2r_1(2r_1 - 3r_2) = 0$$

$$\Rightarrow r_1 = \frac{3}{2}r_2 \rightarrow (4)$$

Area that can be grazed

$$= \frac{1}{2}\pi r_1^2 + \frac{1}{2}\pi r_1^2 + \pi r_2^2 = \pi(r_1^2 + r_2^2)$$

$$= \pi \left(r_1^2 + \frac{4r_2^2}{9} \right) = \pi \frac{13r_1^2}{9} = \frac{13\pi}{9}r_1^2$$

Area of semicircle with centre O

$$= \frac{1}{2}\pi r_1^2 = 2\pi r_1^2 \rightarrow (5)$$

Hence, percentage of area that cannot be grazed

$$= \left(\frac{2\pi r_1^2 - \frac{13\pi}{9}r_1^2}{2\pi r_1^2} \right) \times 100 = \frac{5}{2 \times 9} \times 100$$

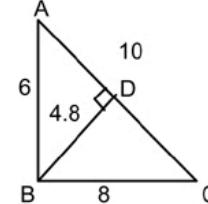
= 28% (approximately) Choice (2)

124. In a triangle ABC, AB = 6, BC = 8 and AC = 10. A perpendicular dropped from B, meets the side AC at D. A circle of radius BD (with centre B) is drawn. If the circle cuts AB and BC at P and Q respectively, then AP : QC is equal to

- (1) 1 : 1 (2) 3 : 2
 (3) 4 : 1 (4) 3 : 8

Solution:

Given data when translated become the following figure.



Since the sides are AB = 6 cm, BC = 8 cm, AC = 10 cm.

$$\text{Hence, } ABC \text{ is right angled at } B \quad - \quad (1)$$

$$\text{BD is the altitude to the hypotenuse} \quad - \quad (2)$$

$$\frac{1}{2}BD \cdot AC = \frac{1}{2}AB \cdot BC$$

$$\Rightarrow BD = 4.8$$

$$BD = \text{radius} = BP = BQ$$

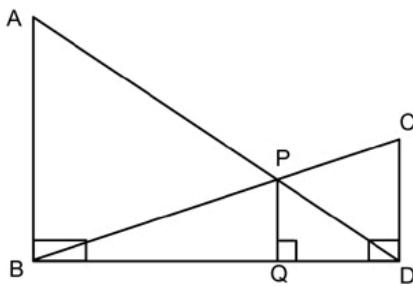
$$\text{Hence, } AP = AB - BP = 6 - 4.8 = 1.2 \quad - \quad (3)$$

$$\text{and } CQ = CB - BQ = 8 - 4.8 = 3.2 \quad - \quad (4)$$

$$AP : CQ = 1.2 : 3.2 = 3 : 8$$

Choice (4)

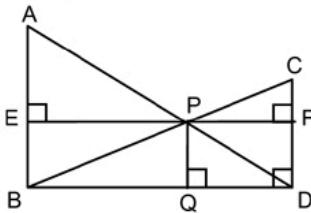
125. In the given figure, $\angle ABD = \angle CDB = \angle PQD = 90^\circ$.
If $AB : CD = 3 : 1$, the ratio of $CD : PQ$ is



- (1) 1 : 0.69 (2) 1 : 0.75
(3) 1 : 0.72 (4) None of the above

Solution:

Line CD , parallel to AB , cuts the sides (externally) AP and PB at points D and C .



$\triangle ABP$ is similar to $\triangle DCP$

Hence the altitudes (EP) : the altitude (FP)

$$= AB : CD = 1 : 3$$

But $EP = BQ$ and $FP = DQ$

\Rightarrow in triangles BPQ and BCD

$$PQ / CD = \frac{BQ}{BD} = \frac{BQ}{BQ + DQ} = \frac{3}{3+1} = 0.75$$

Choice (2)

126. If $\log_3 2, \log_3(2^x - 5), \log_3(2^x - 7/2)$ are in arithmetic progression, then the value of x is equal to
(1) 5 (2) 4 (3) 2 (4) 3

Solution:

By back substitution, it can be seen that the given quantities are $\log_3 2, \log_3(8 - 5), \log_3(8 - 7/2)$, when $x = 3$.

The quantities are \log_2, \log_3 and $\log \frac{9}{2}$

As these are in AP.

$$\log_3 - \log_2 \text{ shall be equal to } \log \frac{9}{2} - \log_3$$

Or

$$\log \left(\frac{3}{2} \right) \text{ shall be equal to } \log \left(\frac{9}{2} \times \frac{1}{3} \right) \text{ or } \log \left(\frac{3}{2} \right)$$

The two quantities are equal.

Alternate method:

$$\log_3(2^x - 5) - \log_3 2 = \log_3(2^x - 7/2) - \log_3(2^x - 5)$$

$$\Rightarrow (2^x - 5)^2 = 2(2^x) - 7$$

solving we get $2^x = 4$ or 8;

$$\text{but } 2^x = 4$$

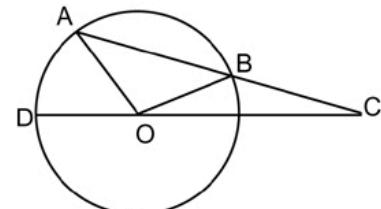
$\Rightarrow x = 2$ does not satisfy.

Hence $2^x = 8$

$$\Rightarrow x = 3$$

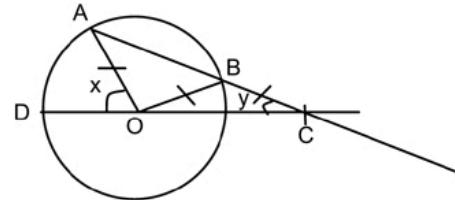
Choice (4)

127. In the figure given below, AB is the chord of a circle with centre O . AB is extended to C such that $BC = OB$. The straight line CO is produced to meet the circle at D . If $\angle ACD = y$ degrees and $\angle AOD = x$ degrees such that $x = ky$, then the value of k is



- (1) 3 (2) 2
(3) 1 (4) None of these

Solution:



$$\text{Given } OB = BC; \Rightarrow \angle BOC = \angle BCO = y \quad - \quad (1)$$

$\angle OBA$ is external angle to $\triangle OBC$; hence,

$$\angle OBA = \angle BOC + \angle BCO = y + y = 2y \quad - \quad (2)$$

But $\angle OBA = \angle OAB$ (since, OA and OB are the radii of the same circle) $\Rightarrow \angle OAB = 2y$

$\angle AOD + \angle AOB + \angle BOC = 180^\circ$ (angle on a straight line)

$$\Rightarrow x + (180 - 4y) + y = 180$$

$$\Rightarrow x = 3y \Rightarrow k = 3$$

Choice (1)

128. How many three digit positive integers, with digits x, y and z in the hundred's, ten's and unit's place respectively, exist such that $x < y, z < y$ and $x \neq 0$?
(1) 245 (2) 285 (3) 240 (4) 320

Solution:

y is greater than x as well as z - (1)

No restriction on repetition of digits is stated,

\Rightarrow repetition of digit is allowed. - (2)

0(zero) cannot occupy the hundred's place; but it can occupy the units place - (3)

Considering the above points, the conclusion is Y can take values from 2 to 9 - (4)

Correspondingly, x can take values from 1 to 8 - (5)

and Z can take values from 0 to 8 - (6)

The possibilities can be listed as follows:

Value of Y	Value of X	Value of Z	Number of ways
2	1 (only)	Either of 0 or 1	1 x 2
3	2 (1 or 2)	Either of 0, 1 or 2	2 x 3
4	3 (1, 2 or 3)	Either 0, 1, 2 or 3	3 x 4
.....
.....
9	1 to 8	0, 1, 2, ... 8	8 x 9

Hence total number of possible 3-digit number

$$= (1 \times 2) + (2 \times 3) + (3 \times 4), \dots (8 \times 9)$$

$$= \sum_{n=1}^8 n(n+1) = \sum_{n=1}^8 n^2 + \sum_{n=1}^8 n = \sum(8)^2 + \sum 8$$

$$= \frac{8 \times 9 \times 17}{6} + \frac{8 \times 9}{2} = 204 + 36 = 240$$

Choice (3)

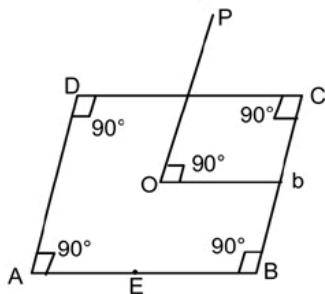
129. A vertical tower OP stands at the centre O of a square ABCD. Let h and b denote the length of OP and AB respectively. Suppose $\angle APB = 60^\circ$ then the relationship between h and b can be expressed as

(1) $2b^2 = 4^2$
(3) $3b^2 = 2h^2$

(2) $2h^2 = b^2$
(4) $3h^2 = 2b^2$

Solution:

129. This is a 3-dimensional problem. The relevant figures needs to be imagined.



OP is perpendicular to the plane ABCD.

$$\text{AO, half the diagonal} = \frac{1}{2} \cdot b\sqrt{2} = \frac{b}{\sqrt{2}}$$

Δ in AOP, (which is perpendicular to plane ABCD being a right angle, $AP^2 = AO^2 + OP^2$)

$$\Rightarrow AP^2 = \left(\frac{b}{\sqrt{2}}\right)^2 + h^2 = \frac{b^2}{2} + h^2 \quad \text{--- (1)}$$

$\Rightarrow \angle PAB = \angle PBA$ (since AP = BP)

In ΔAPB , $\angle APB = 60^\circ$,

$\angle PAB = \angle PBA$ (since AP = BP)

and $\angle PAB + \angle PBA = 180 - \angle APB = 120^\circ$

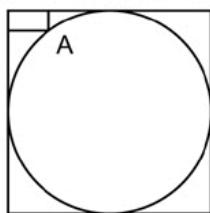
$\Rightarrow \angle PAB = \angle PBA = 60^\circ$

$\therefore \Delta APB$ is equilateral $\Rightarrow AP = b$ --- (2)

From (2) and (1)

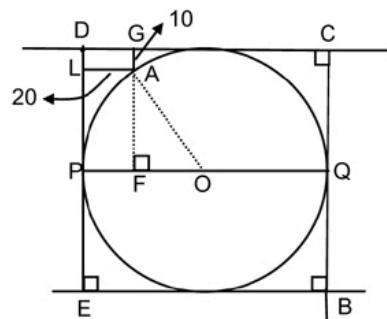
$$(b)^2 = \frac{b^2}{2} + h^2 \Rightarrow \frac{b^2}{2} = h^2 \Rightarrow b^2 = 2h^2 \quad \text{Choice (2)}$$

130. In the figure below, the rectangle at the corner measures $10 \text{ cm} \times 20 \text{ cm}$. The corner A of the rectangle is also a point on the circumference of the circle. What is the radius of the circle in cm?



- (1) 10 cm
(2) 40 cm
(3) 50 cm
(4) None of the above.

Solution:



Let PQ, the diameter be equal to $2R$ --- (1)

If GA is extended to cut PQ at F, it cuts it perpendicularly, (CD is parallel to QP).

Hence, PF = AL = DG = 20

$$\Rightarrow FO = OP - PF = R - 20 \quad \text{--- (2)}$$

$$\text{and } FA = FG - AG = (R - 10) \quad \text{--- (3)}$$

ΔAFO is right angled at F;

$$\text{hence } AO^2 = AF^2 + FO^2$$

$$\Rightarrow R^2 = (R - 10)^2 + (R - 20)^2$$

$$\Rightarrow R^2 = R^2 - 20R + 100 + R^2 - 40R + 400$$

$$\Rightarrow R^2 - 60R + 500 = 0$$

$$(R - 50)(R - 10) = 0; R = 50 \text{ or } 10.$$

As FA = R - 10, value R = 10 is ignored.

Hence R = 50 cm

Choice (3)

131. There are 8436 steel balls, each with a radius of 1 centimeter, stacked in a pile, with 1 ball on top, 3 balls in the second layer, 6 in the third layer, 10 in the fourth, and so on. The number of horizontal layers in the pile is

- (1) 34 (2) 38 (3) 36 (4) 32

Solution:

Let there be n layers of balls. Then the n^{th} layer has $\frac{n(n+1)}{2}$ balls.

$$\sum \left(\frac{n^2}{2} + \frac{n}{2} \right) = 8436$$

Given $1 + 3 + 6 + 10 + \dots + n$ terms = 8436

$$= \frac{1}{2} \left(\frac{n(n+1)(2n+1)}{6} + \frac{n(n+1)}{2} \right)$$

Substituting from the choices only for $n = 36$

$$\text{Then } \frac{1}{2} \left[\frac{36(37)(73)}{6} + \frac{36 \times 37}{2} \right] = 8436$$

Choice (3)

132. If the product of n positive real numbers is unity, then their sum is necessarily

- (1) a multiple of n .

- (2) equal to $n + \frac{1}{n}$

- (3) never less than n .

- (4) a positive integer

Solution:

Here we can give contradictory examples for each of the choices

Choice (1)

Say $2 \times \frac{1}{2} \times 3 \times \frac{1}{3} = 1$ then $2 + \frac{1}{2} + 3 + \frac{1}{3}$ is not a multiple of 4

Choice (2): $2 + \frac{1}{2} + 3 + \frac{1}{3} \neq 4 + \frac{1}{4}$

Choice (4) $\left(2 + \frac{1}{2} + 3 + \frac{1}{3}\right)$ is not a positive integer.

Choice (3) is correct. Also if we take four numbers a, b, c and d such that $abcd = 1$, the minimum value of $a + b + c + d = 4$. Choice (3)

133. Given that $-1 \leq v \leq 1$, $-2 \leq u \leq -0.5$ and $-2 \leq z \leq -0.5$ and $w = vz/u$, then which of the following is necessarily true?

- (1) $-0.5 \leq w \leq 2$ (2) $-4 \leq w \leq 4$
 (3) $-4 \leq w \leq 2$ (4) $-2 \leq w \leq -0.5$

Solution:

$$-1 \leq v \leq 1,$$

$$-2 \leq u \leq -0.5$$

$$-2 \leq z \leq -0.5$$

$$w = \frac{vz}{u}$$

$$\text{The most negative } w = \frac{-1(-2)}{-0.5} = -4$$

$$\text{The most positive } w = \frac{1(-2)}{-0.5} = 4$$

$$\therefore -4 \leq w \leq 4$$

Choice (2)

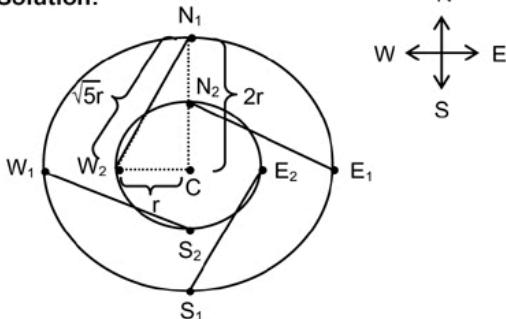
Directions for questions 134 to 136: Answer the questions on the basis of the information given below.

A city has two perfectly circular and concentric ring roads, the outer ring road (OR) being twice as long as the inner ring road (IR). There are also four (straight line) chord roads from E1, the east end point of OR to N2, the north end point of IR; from N1, the north end point of OR to W2, the west end point of IR; from W1, the west end point of OR, to S2, the south end point of IR; and from S1, the south end point of OR to E2, the east end point of IR. Traffic moves at a constant speed of 30π km/hr on the OR road, 20π km/hr on the IR road, and $15\sqrt{5}$ km/hr on all the chord roads.

134. The ratio of the sum of the lengths of all chord roads to the length of outer ring road is

- (1) $\sqrt{5} : 2$ (2) $\sqrt{5} : 2\pi$
 (3) $\sqrt{5} : \pi$ (4) None of the above

Solution:



$$OR = 2\pi(2r)$$

$$IR = 2\pi r$$

CW₂ = radius of inner ring = r (say)

$$CW_1 = 2r$$

$$\therefore \overline{W_2 N_1} = \sqrt{(2r)^2 + r^2} = \sqrt{5} r$$

\therefore sum of lengths of all chords = $4\sqrt{5} r$ and length of OR = $4\pi r$

$$\therefore \text{required ratio} = 4\sqrt{5} r : 4\pi r = \sqrt{5} : \pi$$

Choice (3)

135. Amit wants to reach N2 from S1. It would take him 90 minutes if he goes on minor arc S1 – E1 on OR, and then on the chord road E1 – N2. What is the radius of the outer ring road in kms?

- (1) 60 (2) 40 (3) 30 (4) 20

Solution:

$$\widehat{S_1 E_1} + \overline{E_1 N_2} = \frac{4\pi r}{4} + \sqrt{5} r$$

$$\text{Time taken} = \frac{\pi r}{30\pi} + \frac{\sqrt{5} r}{15\sqrt{5}}$$

$$\Rightarrow \frac{r}{30} + \frac{r}{15} = 1\frac{1}{2} \text{ (} \because 90 \text{ minutes} = 1\frac{1}{2} \text{ hour)}$$

$$\therefore 3r = 30 \times \frac{3}{2} \Rightarrow r = 15$$

$$\Rightarrow 2r = 30$$

Choice (3)

136. Amit wants to reach E2 and N1 using first the chord N1 – W2 and then the inner ring road. What will be his travel time in minutes on the basis of the information given in the above question?

- (1) 60 (2) 45 (3) 90 (4) 105

Solution:

$$\text{Time required} = \frac{\sqrt{5} \times 15}{15\sqrt{5}} + \frac{\pi(15)}{20\pi}$$

$$= 1 + \frac{3}{4} = 105 \text{ minutes}$$

Choice (4)

Directions for questions 137 to 143: Answer the questions independently of each other.

137. There are 6 boxes numbered 1, 2, ..., 6. Each box is to be filled up either with a red or a green ball in such a way that at least 1 box contains a green ball and the boxes containing green balls are consecutively numbered. The total number of ways in which this can be done is

- (1) 5 (2) 21 (3) 33 (4) 60

Solution:

The number of ways in which 1 green ball can be put = 6 ways (any of the six places)

Number of ways in which 2 green balls can be put = 5 ways. Similarly, 3 green balls 4, 4 green balls = 3 and so on.

$$\therefore \text{the number of ways of doing this} \\ = 6 + 5 + 4 + 3 + 2 + 1 = 21$$

Choice (2)

138. A graph may be defined as a set of points connected by lines called edges. Every edge connects a pair of points. Thus, a triangle is a graph with 3 edges and 3 points. The degree of a point is the number of edges connect to it. For example, a triangle is a graph with three points of degree 2 each. Consider a graph with 12 points. It is possible to reach any point from any other point through a sequence of edges. The number of edges, e, in the graph must satisfy the condition

- (1) $11 \leq e \leq 66$ (2) $10 \leq e \leq 66$
 (3) $11 \leq e \leq 65$ (4) $0 \leq e \leq 11$

Solution:

12 points have to be joined using e lines (edges) such that every point can be accessed from every other point through one or more lines (edges).

∴ we can have 11 concurrent edges diverging from a single point or we can have all possible lines through 12 given points i.e., ${}^{12}C_2 = 66$
 $\therefore 11 \leq e \leq 66$

Choice (1)

139. Let T be the set of integers {3, 11, 19, 27, ..., 451, 459, 467} and S be a subset of T such that the sum of no two elements of S is 470. The maximum possible number of elements in S is

- (1) 32. (2) 28.
 (3) 29. (4) 30.

Solution:

470 can be written as the sum of two numbers from the given set as follows,
 (since the given sequence of numbers are in arithmetic progression)

$$3 + 467 = 470$$

$$11 + 456 = \dots$$

.....

.....

so on

There are 59 numbers in the set.

So, there are 29 pairs and a middle number which give 470.

So, number of numbers such that the sum of no two elements of this set = $29 + 1 = 30$.

Choice (4)

140. Consider the following two curves in the x-y plane:
 $y = x^3 + x^2 + 5$
 $y = x^2 + x + 6$

Which of the following statements is true for $-2 \leq x \leq 2$?

- (1) The two curves intersect once.
 (2) The two curves intersect twice.
 (3) The two curves do not intersect.
 (4) The two curves intersect thrice.

Solution:

$$y = x^3 + x^2 + 5 \quad \text{--- (1)}$$

$$y = x^2 + x + 6 \quad \text{--- (2)}$$

The point of intersection of the curves can be obtained $x^3 + x^2 + 5 = x^2 + x + 6 \Rightarrow x^3 = x$
 $y_2 = (x^2 + 5) + x$

therefore $x = -1, 0, 1$

∴ the curves intersect at three points.

Choice (4)

141. In a certain examination paper, there are n question. For $j = 1, 2, \dots, n$, there are $2n-j$ students who answered j or more questions wrongly. If the total number of wrong answers is 4095, then the value of n is

- (1) 12. (2) 11.
 (3) 10. (4) 9.

Solution:

Given that the number of students doing j or more than j wrongs is 2^{n-j} , where $j = 1, 2, \dots, n$

∴ The total number of wrong answers is obtained form series $2^{n-1} - 2^{n-2} + \dots + 2^1 + 2^0$, where every term includes the students involved in all the later terms. Hence the students getting exactly j questions wrong are counted exactly j times, which is equivalent to counting the total number of wrong answers.

$$\text{Therefore } 2^{n-1} + 2^{n-2} + \dots + 2^1 + 2^0 = 4095$$

$$\Rightarrow 2^n - 1 = 4095$$

$$\Rightarrow 2^n = 4096 = 2^{12}$$

Choice (1)

142. If x, y, z are the distinct positive real numbers then

$$\frac{x^2(y+z) + y^2(x+z) + z^2(x+y)}{xyz}$$

- (1) greater than 4. (2) greater than 5.
 (3) greater than 6. (4) None of the above

Solution:

Let the given expression be E and E simplifies to $\left(\frac{x}{y} + \frac{y}{x}\right) + \left(\frac{y}{z} + \frac{z}{y}\right) + \left(\frac{z}{x} + \frac{x}{z}\right)$, where x, y, z are distinct each bracket is greater than 2.

$$\therefore E > 6. \quad \text{Choice (3)}$$

143. The number of positive integers n in the range $12 \leq n \leq 40$ such that the product $(n-1)(n-2)\dots(3.2.1)$ is not divisible by n is

- (1) 5 (2) 7 (3) 13 (4) 14

Solution:

If $(n-1)(n-2) \dots 3.2.1$ is not a multiple of n then n has no factors (apart from 1 and itself)

⇒ n is prime.

∴ if $12 \leq n \leq 40$ and n is prime then

$n \in \{13, 17, 19, 23, 29, 31, 37\}$ i.e. n can assume 7 values.

Choice (2)

Directions for questions 144 to 148: 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 one of the statements alone but not by the other.

Choose 2, if the question can be answered by using either statement alone.

Choose 3, if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

Choose 4, if the question cannot be answered even by using both the statements together.

144. Is $a^{44} < b^{11}$, given that a = 2 and b is an integer?

- A. b is even
 B. b is greater than 16

Solution:

Given $a = 2$

From statement A, we have b is even. Let $b = 2k$.

Now $a^{44} = 2^{44}$ and $b^{11} = (2k)^{11}$

For $k = 1$, $b^{11} = 2^{11}$

$\Rightarrow a^{44} > b^{11}$

But for $k = 4$, $b^{11} = 2^{44}$

$\Rightarrow a^{44} = b^{11}$.

\therefore Statement I alone is not sufficient.

From statement B, we have $b > 16$. Already for $b = 16$, we have seen $a^{44} = b^{11}$. As $b > 16$, it will be greater than a^{44} .

\therefore Statement B alone is sufficient to say that $a^{44} < b^{11}$. Choice (1)

145. What are the unique values of b and c in the equation $4x^2 + bx + c = 0$ if one of the roots of the equation is $(-1/2)$?

- A. The second root is $1/2$
B. The ratio of c and b is 1

Solution:

Given equation is $4x^2 + bx + c = 0$ and one of the roots is $-1/2$. Substituting $x = -1/2$, we have

$$4\left(\frac{1}{4}\right) + b\left(-\frac{1}{2}\right) + c = 0 \Rightarrow \frac{-b}{2} + c = -1 \rightarrow (1)$$

From statement A, we have second roots as $1/2$.

Substituting $x = 1/2$, we get $b/2 + c = -1 \rightarrow (2)$

Solving (1) and (2), we can get unique values of b and c .

\therefore Statement A alone is sufficient.

From statement B, we have $c : b = 1 \Rightarrow c = b$

As we know $-b/2 + c = 1$

Substituting $b = c$, we can find b value and c value

\therefore Statement B alone is sufficient. Choice (2)

146. AB is a chord of a circle AB 5 cm. A tangent parallel to AB touches the minor arc AB at E. What is the radius of the circle

- A. AB is not a diameter of the circle.
B. The distance between AB and the tangent at E is 5 cm.

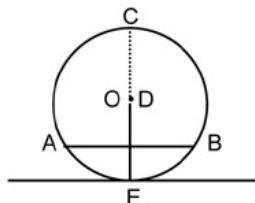
Solution:

Given AB = 5 cm and is a chord of a circle. Also a tangent parallel to AB touches the minor arc AB at E.

From statement A, we have AB is not the diameter of the circle. If it is diameter, we can say that radius of the circle is $1/2(AB)$, but as it is not diameter and no other information is given, we can't find the radius.

\therefore Statement A alone is not sufficient.

From statement B, we have distance between AB and E is 5 cm. Let O be the centre of the circle.



As radius is perpendicular to the tangent at point of contact and as AB is parallel to the tangent, $OD \perp AB$. Also as the perpendicular dropped from the centre to a chord, bisects it we have $AD = DB = 2.5$ cm. Also as AB and CE are chords of the circle, intersecting at D, we have $AD \times DB = CD \times DE$

$$\Rightarrow (2.5) \times (2.5) = CD \times 5$$

$\Rightarrow CD$ can be found.

As we know CD and DE, we can find the diameter, hence the radius.

\therefore Statement B alone is sufficient.

Choice (1)

147. Is $\left(\frac{1}{a^2} + \frac{1}{a^4} + \frac{1}{a^6} + \dots\right) > \left(\frac{1}{a} + \frac{1}{a^3} + \frac{1}{a^5} + \dots\right)$?

A. $-3 \leq a \leq 3$

B. One of the roots of the equation $4x^2 - 4x + 1 = 0$ is a

Solution:

From statement A, we have $-3 \leq a \leq 3$.

For $a = -2$, we have

$$\left(\frac{1}{a^2} + \frac{1}{a^4} + \frac{1}{a^6} + \dots\right) > \left(\frac{1}{a} + \frac{1}{a^3} + \frac{1}{a^5} + \dots\right)$$

But for $a = 1$, we have

$$\left(\frac{1}{a^2} + \frac{1}{a^4} + \frac{1}{a^6} + \dots\right) = \left(\frac{1}{a} + \frac{1}{a^3} + \frac{1}{a^5} + \dots\right)$$

\therefore Statement A alone is not sufficient.

From statement B, we have one of the roots of the equation $4x^2 - 4x + 1 = 0$ is a

$$\Rightarrow 4x^2 - 4x + 1 = 0$$

$$(2x - 1)^2 = 0$$

$$\Rightarrow x = \frac{1}{2}$$

$$\Rightarrow a = \frac{1}{2}$$

Let $\frac{1}{a^2} + \frac{1}{a^4} + \frac{1}{a^6} + \dots$ as L.H.S. (> 0) and

$\frac{1}{a} + \frac{1}{a^3} + \frac{1}{a^5} + \dots$ as R.H.S (> 0)

$$\text{Now } \frac{1}{a} \times \text{R.H.S} = \text{L.H.S}$$

$$\Rightarrow \frac{1}{a} = \frac{\text{L.H.S.}}{\text{R.H.S.}}$$

$$\Rightarrow \frac{\text{L.H.S.}}{\text{R.H.S.}} = 2$$

$$\Rightarrow \text{L.H.S.} = 2(\text{R.H.S.})$$

\therefore We can say that L.H.S $>$ R.H.S

\therefore Statement II alone is sufficient.

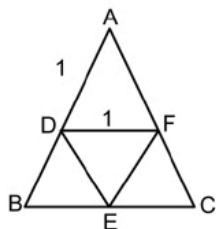
Choice (1)

148. D, E, F are the mid points of the points of the sides AB, BC and CA of a triangle ABC respectively. What is the area of DEF in square centimeters?

- A. AD = 1 cm, DF = 1 cm and perimeter of DEF = 3 cm
B. Perimeter of ABC = 6 cm, AB = 2 cm and AC = 2 cm

Solution:

Given D, E and F are the mid-points of AB, BC and CA respectively. From statement A, we have AD = 1 cm and perimeter of DEF = 3 cm



Using basic proportionality theorem, we have DF // BC and BC = 2DF
=> BC = 2 cm.

As D is mid-point of AB and as AD = 1 cm
AB = 2 cm and EF = 1 cm.

Since perimeter = 3 cm we can find DE
(= 3 - 1 - 1)

Hence the area of triangle DEF can be found.

∴ Statement A alone is sufficient.

From statement B, we have perimeter of ABC = 6 cm,

AB = 2 cm, AC = 2 cm

=> BC = 2 cm

∴ ABC is an equilateral triangle and as D, E, F are mid-points of AB, BC and AC respectively, we can find area of \triangle DEF which will be $1/4^{\text{th}}$ of that \triangle ABC.

∴ statement B alone is sufficient.

Choice (2)

Directions for questions 149 and 150: Answer the questions on the basis of the information given below.

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 520 Bahts per bottle. After one bottle is purchased, subsequent bottles are available at a discount of 30%. Three friends S, R and M together purchase three bottles of the perfume, agreeing to share the cost equally. R pays 2 Euros. M pays 4 Euros and 27 Thai Bahts and S pays the remaining amount in US Dollars.

149. How much does R owe to S in Thai Baht?
(1) 428 (2) 416 (3) 334 (4) 324

150. How much does M owe to S in US Dollars?
(1) 1.3 (2) 4 (3) 5 (4) 6

Solutions for questions 149 and 150:

Price of each bottle = 520 bahts

Price of 3 bottles = $520 + 70\% (1040)$

$$= 520 + 728 = 1248 \text{ bahts}$$

R pays 2 Euros = 92 bahts

M pays + 27 thai = $184 + 27 = 211 \text{ bahts}$

As the total is 1248 bahts

So Each person has to pay $\frac{1248}{3} = 416 \text{ bahts}$

149. So R pays S, $416 - 92 = 324 \text{ bahts}$.

Choice (4)

150. Out of the share of 416 bahts M paid only 211 bahts (and the remaining is paid by S). So he has to pay S = $416 - 211 = 205 \text{ bahts}$

$\Rightarrow \frac{205}{41} \text{ US dollars} = 5 \text{ dollars}$ Choice (3)

