

Ref: AIMCAT1110-Form-5

INSTRUCTIONS

1. Read the instructions given at the beginning/end of each section or at the beginning of a group of questions very carefully.
 2. This test has three sections with 60 questions – 20, 20, and 20 respectively in the first, second and third sections. The **TOTAL TIME** available for the paper is **135 minutes**. The student may apportion this time among various sections as he/she wishes. However, the student is expected to show his/her competence in all the three sections.
 3. All questions carry three marks each. Each wrong answer will attract a penalty of one mark.

SECTION – I

DIRECTIONS for questions 1 to 20: Answer the questions independently of each other.

11. Three dogs D_1 , D_2 and D_3 undergo a training programme to walk. After the training, the dogs had the following pattern of walking: the distances covered by 3 steps of D_1 , 4 steps of D_2 and 5 steps of D_3 are all equal. Further, in the time taken by D_1 to take 5 steps, D_2 takes 4 steps and D_3 takes 6 steps. What is the ratio of the speeds of walking of D_1 , D_2 and D_3 respectively?

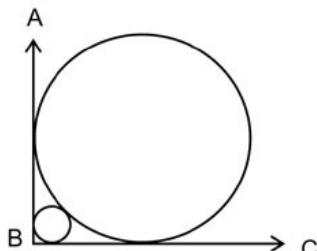
- (1) 25 : 15 : 18 (2) 15 : 18 : 25
 (3) 25 : 18 : 25 (4) 18 : 25 : 15

12. If $f(x) = \frac{16^{2x}}{16^{2x} + 16}$, then the value of

$$f\left(\frac{1}{2}\right) + f\left(\frac{1}{4}\right) + f\left(\frac{1}{8}\right) + f\left(\frac{1}{16}\right) + f\left(\frac{3}{4}\right) + f\left(\frac{7}{8}\right) + f\left(\frac{15}{16}\right) =$$

(1) 4 (2) 3 (3) $\frac{5}{2}$ (4) $\frac{7}{2}$

13. In the figure below, R is the radius of the bigger circle and r is the radius of the smaller circle. Find $r : R$ if $\angle ABC = 90^\circ$.



- (1) $4 - 2\sqrt{2}$ (2) $3 - 2\sqrt{2}$
 (3) $5 - 3\sqrt{2}$ (4) $6 - 3\sqrt{2}$

14. The set P is defined as the set of the first ten odd natural numbers. How many distinct pairs of numbers can be selected from the set P such that their sum is not less than 20?

- (1) 25 (2) 20 (3) 10 (4) 45

15. A, B, C and D are four integers having a sum of 4. Find the minimum possible value of the sum of their reciprocals.

- (1) 4 (2) 0 (3) $-2\frac{6}{7}$ (4) $-3\frac{1}{3}$

16. R is a recurring decimal of the form $p_1.p_2p_3\overline{p_3}$, where p_1 , p_2 and p_3 are single digits. If not more than one of p_1 , p_2 and p_3 can be zero, then which of the following always assumes an integer value?

- (1) 54R (2) 396R (3) 324R (4) 144R

17. Let T_1 be an equilateral triangle of side a . Another equilateral triangle T_2 is formed by joining the midpoints of T_1 . Another equilateral triangle T_3 is formed by joining the midpoints of T_2 and so on. Let X denote the sum of the perimeters of all the triangles and let Y denote the sum of the areas of all the triangles. The ratio $Y/X = \underline{\hspace{2cm}}$.

- (1) $\frac{\sqrt{3}a}{12}$ (2) $\frac{\sqrt{3}a}{24}$ (3) $\frac{\sqrt{3}a}{36}$ (4) $\frac{\sqrt{3}a}{18}$

18. At how many distinct points do the two curves given below intersect above the x-axis?

$$y = 2x^4 + x^3 + x$$

$$y = x^4 + x^3 + 5x^2 + x - 4$$

- (1) One (2) Two (3) Three (4) Four

19. If $E = |x| + |x - 1| + |x - 2| + |x - 3| + |x - 4|$, for how many integral values of x is E less than 54?

- (1) 13 (2) 20 (3) 5 (4) 21

20. A building has a height of 30 m. An observer stands on the ground at a point, A, and observes that the angle of elevation of a point, P, on the second floor, which is 10 m above the ground, is the same as the angle subtended by the rest of the building above the point P. Ignoring the height of the observer, find the approximate distance (in m) between the observer and the foot of the building.

- (1) 17.32 (2) 14.14 (3) 20 (4) 21.21

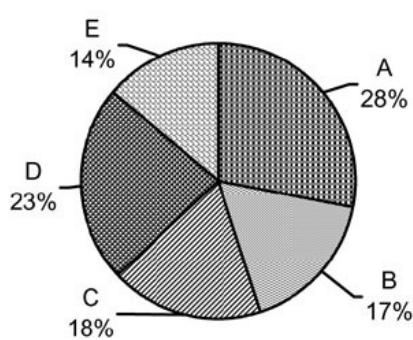
SECTION – II

Number of Questions = 20

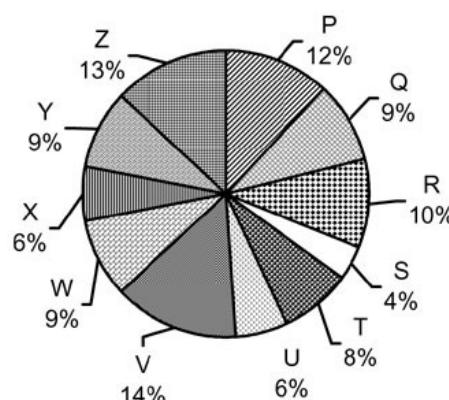
DIRECTIONS for questions 21 to 23: Answer the questions on the basis of the information given below.

Pie chart – 1 gives the percentage shares of all the five cement companies – A, B, C, D and E – in the total quantity of cement sold in country XYZ. Pie chart – 2 gives the percentage shares of all the eleven states – P through Z – in the total quantity of cement sold in the country.

Pie chart - 1



Pie chart - 2



The *market share* of any company in a state is the total quantity of cement sold by the company in that state as a percentage of the total quantity of cement sold in that state.

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21. In any state, if no company had more than 50% *market share*, then in at least how many states did company A sell cement?
 (1) 4 (2) 5 (3) 6 (4) 3
22. If in all the states in which company E was present, it had a *market share* of at least 25%, in at most how many states did company E sell cement?
 (1) 9 (2) 8 (3) 7 (4) 6
23. The number of companies which had sales in more than two states, is at least
 (1) 1 (2) 2 (3) 3 (4) 4

DIRECTIONS for questions 24 to 27: Answer the questions on the basis of the information given below.

Harish and Sachin are playing a game of matchsticks. There are N matchsticks on the table to start with. Each player, in his turn, picks up at least one matchstick and at most eight matchsticks. The two players take turns alternately. The player who clears the table loses. Assume that each player plays intelligently with an objective of winning. The first move is made by Harish. No player is allowed to pass his turn without picking up any matchsticks.

24. If, for some N, it is known that the number of matchsticks picked up by Harish in his first four moves were 6, 4, 3 and 6 respectively, then how many matchsticks would Sachin have picked up in his third move, given that Harish won the game?
 (1) 3 (2) 5
 (3) 6 (4) Insufficient data

25. If it is known that the game was completed in 8 moves (by each of the two players), what is the maximum possible value for N?
 (1) 63 (2) 71 (3) 72 (4) 81

Additional information for questions 26 and 27:

Instead of a minimum of one matchstick, each player has to pick up at least two matchsticks in his turn. The only instance that a player is allowed to pick up one

matchstick is when there is only one matchstick left on the table.

26. If it is known that N is greater than 6 but less than 44, for how many values of N will Harish certainly lose the game, irrespective of how he plays?
 (1) 4 (2) 5 (3) 6 (4) 8
27. If it is known that N is greater than 128 but less than 138 and that Harish picked up 6 matchsticks in his first move and eventually won the game, then what is the value of N?
 (1) 137 (2) 133
 (3) 134 (4) Cannot be determined

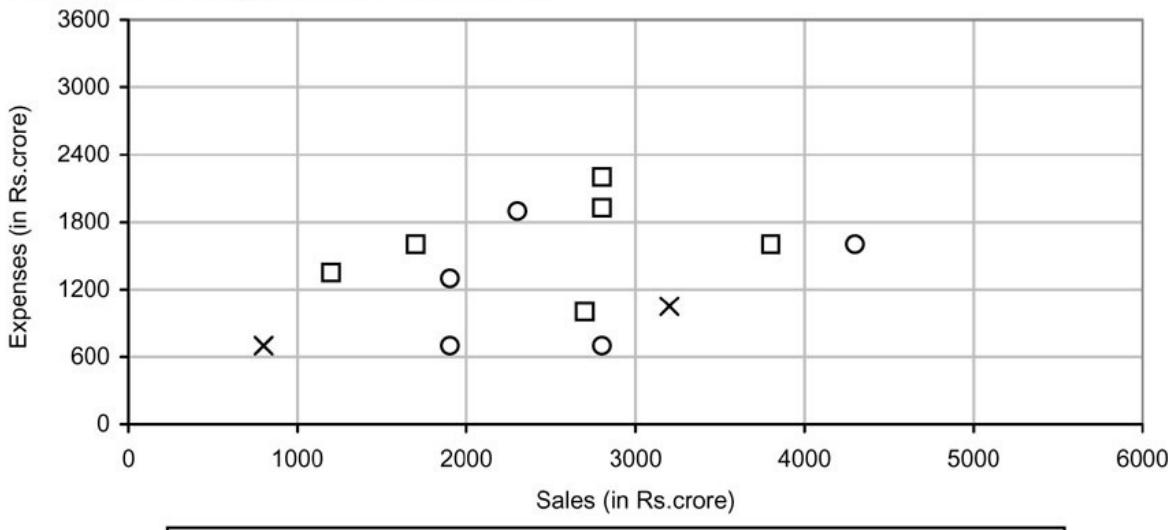
DIRECTIONS for questions 28 and 29: Each question is followed by two statements, I and II. Answer each question using the following instructions:

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

28. Ram is standing in a row of boys arranged from left to right. Are there more boys on Ram's left than on his right?
 I. Ram is 16th from the left and there are at least 12 boys to his right.
 II. Ram is 13th from the right and there are at least 14 boys to his left.
29. What percentage of the questions were attempted by Ramya in the exam?
 I. 30% of the questions are attempted by both Ramya and Swathi.
 II. The number of questions attempted by Ramya but not by Swathi is $(5/8)$ th of the total number of questions attempted by Ramya.

DIRECTIONS for questions 30 and 31: Answer the questions on the basis of the information given below.

Each point in the graph below shows the sales and expenses of a company. Each company belongs to one of the three sectors among manufacturing, automobiles and software.

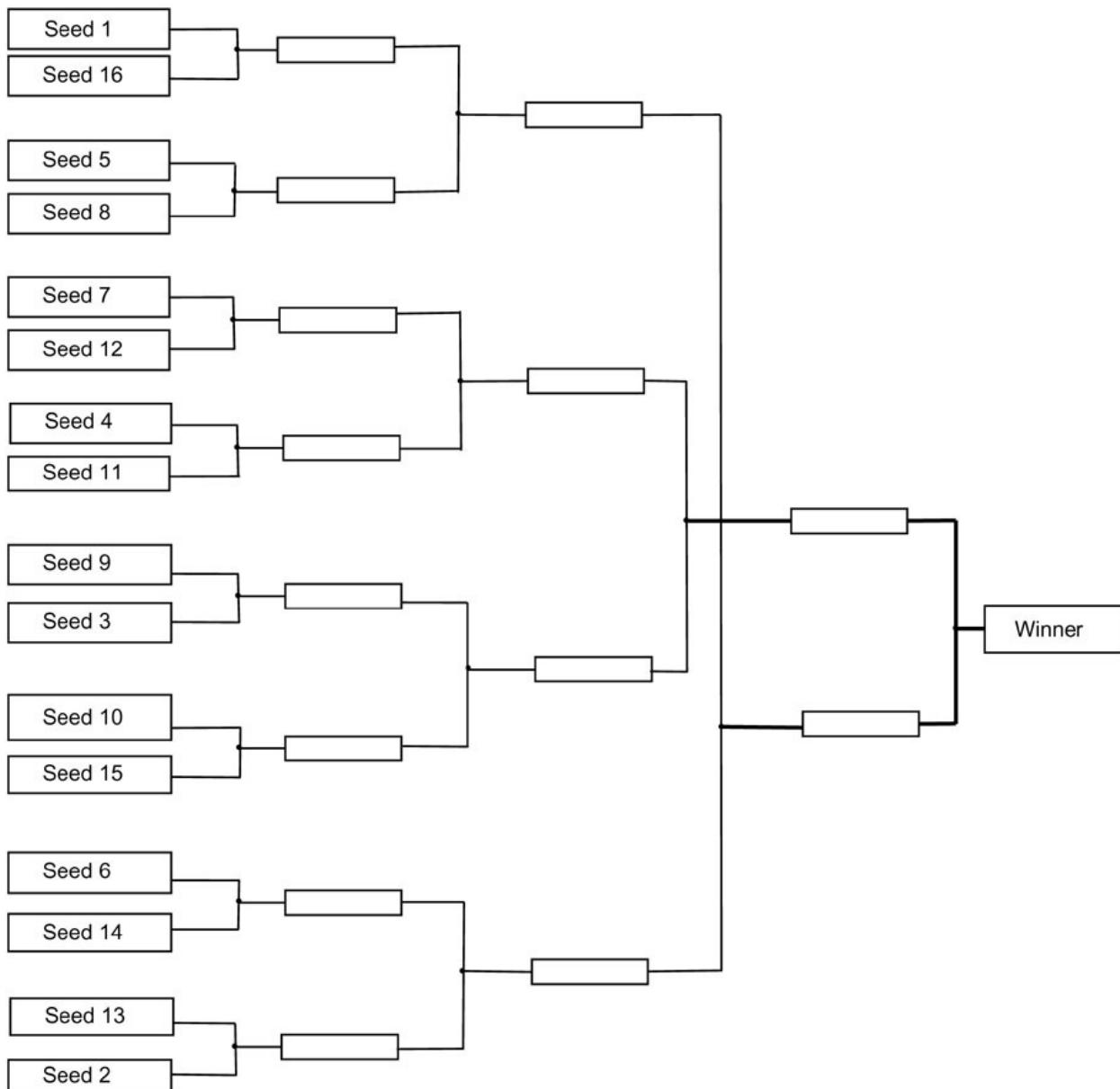


30. For how many of the companies, is the profit more than 40% of the sales (Profit = Sales – Expenses)?
 (1) 4 (2) 5 (3) 6 (4) 7

31. For how many software companies are the sales more than Rs.2500 crore but the expenses less than Rs.2100 crore?
 (1) 2 (2) 3 (3) 4 (4) 6

DIRECTIONS for questions 32 to 35: Answer the questions on the basis of the information given below.

Sixteen players participated in a tennis tournament. The players were seeded from 1 to 16, with seed 1 being the highest seed and seed 16 being the lowest seed. The following figure gives the draw of matches for the tournament, comprising four rounds – First Round, Quarter-Finals, Semi-Finals and Finals. In each round, the winners of the matches advanced to the next round, while the losers were eliminated. In any match, if a lower seeded player defeats a higher seeded player, the match is termed as an *upset*.



First Round

32. If the player seeded 11 reached the finals, what is the minimum number of *upssets* that happened in the tournament?
 (1) 2 (2) 3 (3) 4 (4) 5
33. The lowest seeded player who can win the tournament without himself causing an *upset* is
 (1) Seed 6 (2) Seed 7
 (3) Seed 2 (4) None of these

Quarter-Finals

Semi-Finals

Finals

34. If the player seeded 3 is one of the persons who reached the finals, who among the following can be the other player who reached the finals?
 (1) Seed 10 (2) Seed 7
 (3) Seed 14 (4) Seed 15
35. If it was known that the player seeded 6 was the winner of one of the semi-finals, who among the

following was definitely not the winner of the tournament?

DIRECTIONS for question 36: Each question is followed by two statements, I and II. Answer each question using the following instructions.

- Choose 1 if the question can be answered by using statement I alone but not by using II alone.

Choose 2 if the question can be answered by using statement II alone but not by using I alone.

Choose 3 if the question can be answered by using either statement alone.

Choose 4 if the question can be answered by using both the statements together but not by either statement alone.

36. The students of a class contributed equally to pay Rs.10000 for a tour. How much did each one pay?

- I. If there had been ten fewer students, each would have paid an additional Rs.50.
 - II. There were at least 40 students in the class, and each one paid no more than Rs.250.

DIRECTIONS for question 37: Each question is followed by two statements, I and II, giving certain data. You have to decide whether the information provided in the statements is sufficient for answering the question.

- Choose 1** if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.

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

Choose 3 if the question can be answered by using both 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.

37. Triangle ABC is right angled at B. What is the value of $AB + BC$?

- I. Diameter of the circle inscribed in the triangle ABC is 10 cm.
 - II. Diameter of the circle circumscribing the triangle ABC is 27 cm.

DIRECTIONS for questions 38 to 40: Answer the questions on the basis of the information given below.

After facing yet another World Cup debacle, the Board of Cricket Control in India (BCCI) is in search of a new coach for the team. It shortlisted five persons – Anshuman, Buchanen, John, Whatmore and Chappel. Each of them is from a different country among Australia, India, Japan, Pakistan and Canada, not necessarily in that order. At present, each of them is coaching the team of a different country among Australia, Bangladesh, China, Wales and Bermuda, not necessarily in that order. The following details were also observed about their particulars:

SECTION – III
Number of Questions = 20

DIRECTIONS for questions 41 to 44: Read the following passage and answer the questions that follow it.

Organic food is a two-billion pound industry grown fat on the back of celebrity endorsement and a well-heeled middle class seduced by claims that it is good for health. Prince Charles is one of its most enthusiastic and pro-active promoters. Not content with simply consuming it, he has his own lucrative line in overpriced organic products including biscuits which taste more like chalk.

But now questions are being raised about some of the basic assumptions that have contributed to the popularity of organic food and the phenomenal growth of this sector in the past decade. People are asking: is organic food really worth the price which is often three times more than that of normal food?

This follows new research by a group of British scientists who found that organic food offered no extra benefit over the ordinary cheaper foodstuff. In a controversial report, experts from the London School of Hygiene and Tropical Medicine say there is no evidence that organic food is more nutritional or healthier than food produced using fertilizers. For example, the expensive free-range chicken (sold as a "premium" product) has the same nutritional value as the factory-farmed chicken; and similarly, there is no difference between organic and non-organic vegetables or dairy produce.

The research, based on data published over the past 50 years and said to be the most comprehensive review ever of the relative benefits of organic food, strikes at the very heart of what has been portrayed by campaigners as its USP – that it is healthier than conventional food and therefore worth paying a “bit” extra.

Dr. Alan Dangour, who led the study, was unambiguous in rejecting claims made for organic food. “Looking at all of the studies published in the last 50 years, we have concluded that there’s no good evidence that consumption of organic food is beneficial to health based on the nutrient content,” he said.

The report, commissioned by the government’s Food Standards Agency and published in the *American Journal of Clinical Nutrition*, concluded that “organically and conventionally produced crops and livestock products are broadly comparable in their nutrient content.” A “small number of differences” were noted but these were “unlikely to be of any public health relevance.”

In a pointed reference to the hype over the supposed benefits of organic food, the FSA said the research was aimed at helping people make “informed choices” about what they ate. In other words, it was concerned that the high-profile campaign for organic food, dressed up as an ethical issue, was preventing people from making “informed choices” and they were being sold things on false premises.

“Ensuring people have accurate information is absolutely essential in allowing us all to more informed choices about the food we eat. This study does not mean that people should not eat organic food. What it shows is that there is little, if any, nutritional difference between organic and conventionally produced food and that there is no evidence of additional health benefits from eating organic food,” said Gill Fine, FSA’s Director of Consumer Choice and Dietary Health.

In the organic food circles, the report has caused fury with campaigners alleging that it is all part of a “cancerous conspiracy” to defame the organic food movement. Newspapers have been full of angry letters denouncing the report as “selective,” “misleading” and “limited.”

The Soil Association, which campaigns for “planet-friendly organic food and farming,” is furious that the research crucially ignored the presence of higher pesticide residues in conventional food. Some have defended organic food arguing that it is not about health alone but also involves wider environmental and social issues.

However, even those who agree that the report may be “flawed” in some respects believe that it is an important contribution to the debate on organic food.

“Yet the report - for all its alleged flaws – is an important one. For a start, it is certainly not the work of dogmatic and intractably hostile opponents of the cause... In fact, it raises key global issues... After all, if organic food is no more beneficial in terms of nutrition than other, standard foodstuffs, why should we pay excessive price to eat the stuff? Why devote more land to its production,” asked Robin McKie, Science Editor of *The Observer*.

There is also a view that the fad for organic food is a bit of a class thing – something to do with the idea that if something is expensive it is also good. So, a Marks & Spencer cheese sandwich is supposed to taste better than a similar sandwich at Subway next door; *everything* at Harrods is out of this world; and similarly you don’t know what you are missing if organic food is not your preferred choice. There is said to be a whiff of snobbery about buying into an expensive lifestyle choice. Will science bring them down to earth?

41. Which of the following factors/aspects, related to organic food, has the result of the FSA study primarily called into question?
(1) The nutritional value
(2) The health benefits
(3) The celebrity endorsement
(4) The presence of pesticides
42. According to the passage, defenders of organic food are of the opinion that the FSA study
(1) is not representative and scientific.
(2) has been promoted by those who have vested interest in conventional food.
(3) is flawed and has been projected as an ethical issue.
(4) is not balanced and has not taken a comprehensive view of the issue.
43. In this passage, the author essentially
(1) analyses the pros and cons of promoting organic food.
(2) debunks the findings of a study on organic food.
44. What, according to the FSA, was the objective of conducting the research on organic food?
(1) To spread awareness on the growth of this sector.
(2) To help consumers in making the right choices with regard to their food.
(3) To expose the false promises made by the promoters of organic food.
(4) To prove that there is no big difference between conventional food and organic food.

DIRECTIONS for questions 45 and 46: In each question, four different ways of presenting an idea are given. Choose the one that conforms most closely to standard English usage.

45. (A) Man is uniquely beyond the bounds of physical explanation; the beast on the other hand, is merely an ingenious machine, commanded by

- natural law and man's freedom and his consciousness of his freedom distinguishes him from the beast-machine
- (B) Man is uniquely beyond the bounds of physical explanation; the beast, on the other hand, merely is an ingenious machine, commanded by natural law and man's freedom and his consciousness of his freedom distinguishes him from the beast-machine.
- (C) Man is uniquely beyond the bounds of physical explanation; on the other hand the beast merely is an ingenious machine, commanded by natural law and man's freedom and his consciousness of his freedom distinguishes him from the beast-machine.
- (D) Man is uniquely beyond the bounds of physical explanation; the beast, on the other hand, is merely an ingenious machine, commanded by natural law and man's freedom and his consciousness of his freedom distinguishes him from the beast-machine
- (1) A (2) B (3) C (4) D

46. (A) Free market capitalism has emerged from the battle of ideas as the most effective means for maximizing material well-being but it had also been periodically derailed by asset-price bubbles and rare but devastating economic collapse that engenders widespread misery.
- (B) Free market capitalism has emerged from the battle of ideas as the most effective means to maximize material well-being but it has also been periodically derailed by asset-price bubbles and rare but devastating economic collapse that engenders widespread misery.
- (C) Free market capitalism has emerged from the battle of ideas as the most effective means to maximize material well-being and it had also

been periodically derailed by asset-price bubbles and rare but devastating economic collapse that engenders widespread misery.

(D) Free market capitalism emerged from the battle of ideas as the most effective means for maximizing material well-being and it has also been periodically derailed by asset-price bubbles and rare but devastating economic collapse that engenders widespread misery.

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

DIRECTIONS for questions 47 and 48: In each of the following questions, the word at the top is used in four different ways, numbered 1 to 4. Choose the option in which the usage of the word is INCORRECT or INAPPROPRIATE.

47. MARK

- (1) The signing of the peace pact will mark a new phase in international relations.
- (2) Ensure that you are punctual to class otherwise I shall mark you absent.
- (3) The traumatic experience has left a mark on the child's mind.
- (4) Low sales has forced the company to mark off the price of a wide range of goods.

48. NEAR

- (1) With the exams drawing near most students are seen poring over their books.
- (2) A near neighbour of mine was very helpful to me when I was confined to bed with a bout of fever.
- (3) It is not likely that Vivek will return to India in the near future.
- (4) I had a near encounter with death when I met with an accident a couple of months ago.

DIRECTIONS for questions 49 to 51: Read the following passage and answer the questions that follow it.

Just when the world was heaving a collective sigh of relief that the 2008 crisis was finally ending, another major crisis has emerged. Late last year, analysts were debating whether we would see a sharp V-shaped recovery from the Great Recession or a more gradual U-shaped recovery. Some prescient analysts spoke of a W-shaped or double-dip path to recovery. They were right but for the wrong reason. The recovery path is indeed facing a double-dip. However, this is not being triggered by the discovery of hitherto hidden toxic assets in the US as had been feared. Instead, it is being driven by the threat of sovereign debt default in Greece.

The global financial system seems remarkably fragile. Greece accounts for less than 2 per cent of the combined GDP of the European Union. Yet, it has set that entire region in turmoil and this in turn has spooked investors across the globe. During the past month stock markets have declined not only in Europe but also in the US and throughout Asia. The decline is now beginning to spill over into commodities like copper and oil.

Greece is in a tight spot. A public debt stock amounting to 115 per cent of GDP is likely to rise to 150 per cent by 2014. This is partly because its large fiscal deficit is adding nearly 14 per cent of GDP to the debt stock annually, and partly because Greek GDP is declining by 4 per cent to 5 per cent per year. Getting back to a sustainable fiscal path will require cutting the deficit by 10 per cent of GDP by 2014, after allowing for an interest burden amounting to 7.5 per cent of GDP.

Such harsh fiscal compression is not politically feasible. Even the much milder austerity programme announced earlier this month had Greeks rioting in the streets to defend their entitlements and jobs. Nor does Greece have the option to moderate the fiscal compression, combining it with aggregate expenditure switching from imports to exports through devaluation. It is locked into the euro and no longer has its own currency.

Investors are aware of all this. They are also aware of similar debt crises potentially looming in Spain, Portugal, Ireland, Italy and even the UK. Hence, the risk of contagion in case Greece defaults on its debt. It was to stem the fears that European leaders announced a \$1 trillion bailout package on May 10, worked out in collaboration with the IMF. This is partly money on the table but mostly guarantees of assistance. Moreover, the 'independent' European Central Bank

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(ECB) was persuaded to announce that it would buy Greek government bonds three days after its head, Jean-Claude Trichet, announced that the ECB would do no such thing. Initial market reaction was positive. But sentiments turned bearish when investors realized that even this large package would only postpone the date of final reckoning for sovereign Greek debt.

What is the outlook going forward? Three possible scenarios can be envisaged. Greece could withdraw from the EU, revive its own currency and devalue the drachma to stimulate growth and ease the fiscal burden. However, this is quite unlikely since no European country is prepared to see the EU's unravelling at present. Alternatively, Greece can remain in the EU and impose harsh fiscal compression to meet its debt obligations. However, the markets are already discounting this option as being politically infeasible. The third and most likely outcome is that Greece will remain in the EU, and combine politically feasible austerity measures with some debt restructuring, that is, a managed and partial haircut for investors exposed to Greek and derivative debt. The markets are probably factoring in this outcome right now, hence the decline.

How will all this affect India? Finance minister Pranab Mukherjee and RBI governor D. Subbarao have both indicated that the impact on India will be limited. They are probably right. Though bigger than the Dubai debt hiccup a few months ago, the Greek debt crisis is nowhere near the scale of the great recession that hit the world two years ago. Even then the impact on India was quite muted. Hence, it is reasonable to expect that the fallout of the present crisis will be relatively benign.

Nobody knows how soon the Greek markets will settle. If market volatility is sustained, economic recovery in Europe and other advanced countries will be disrupted. Oil prices will remain soft. There will be an initial capital flight from Europe to the US and other 'safe' advanced country markets. Then fear will give way to a search for better returns, and we should see a significant increase in capital flows to relatively safe emerging markets like India. However, there will be an adverse negative impact on the incipient recovery of India's exports. On balance, a modest negative net impact.

If the markets settle soon, Europe and advanced countries elsewhere will resume their recovery. This will drive up oil prices, but it will also help sustain the recovery of Indian exports. Finally, the setting of markets in Europe notwithstanding, we will probably still see enhanced capital flows to India. On balance, a modest net positive impact.

49. The optimism that Greece's debt crisis may not seriously impact India is based on the fact that
- India's trade with Greece is on a very moderate scale.
 - India had been able to survive the Dubai debt crisis.
 - India had remained immune to the consequences of the great recession that hit the world.
 - India had weathered both the Dubai debt crisis and the great global recession.
50. From the passage, it could be inferred that the author views Greek's debt crisis as causing
- the world economy to decline from a robust condition.
 - the world economy's recovery from a gradual decline.
 - the world economy's recovery from a sharp decline.
 - the world economy's decline after an initial recovery from an earlier decline.
51. Stringent fiscal measures to combat the debt crisis in Greece cannot be envisaged because
- they will thwart development.
 - they will be politically unwise.
 - they will prove ineffective without an increase in GDP.
 - the crisis has been long drawn.

DIRECTIONS for questions 52 and 53: In each question, there are five sentences/paragraphs. The sentence/paragraph labelled A is in its correct place. The four that follow are labelled B, C, D and E, and need to be arranged in the logical order to form a coherent paragraph/ passage. From the given options, choose the most appropriate option.

52. (A) Just seven species make up the known diversity of the world's sea turtles today, but these evolutionary marvels are encountering a growing number of threats.
- With each passing year, nesting habitat is degraded or lost, feeding grounds are polluted, more turtles die in mechanised fisheries, and the threat of mindless port development looms large.
 - If a healthy population of turtles must survive into the future, there is a need for a new conservation paradigm.
 - Two environmental crises in the past few weeks highlight the dangers. The large oil spill in the Gulf of Mexico has turned the major feeding grounds of the rare Kemp's Ridley turtle into a veritable death zone. In South Asia, which hosts five species, thousands of Olive Ridleys making their annual journey to Orissa's Rushikulya rockery for nesting had to suffer the effects of a massive oil leak from a ship in the Ganjam port.
 - The marine reptiles, all of them endangered have persisted for millions of years, moving from the sea to land for nesting, and traversing the great tropical and subtropical oceans as part of their life cycles. Yet, as the 30th Annual Symposium on sea turtle biology and conservation held recently in Goa has highlighted, the modern human dominated era poses grave challenges for their survival.
- (1) BCED (2) EBDC (3) BCDE (4) EDBC
53. (A) The driving force of the 'nuclear renaissance' is a claim that nuclear power, once up and running, is a carbon-free energy source. The assertion is that a functioning nuclear reactor creates no greenhouse gases and thus contributes nothing to global warming or chaotic weather.

- (B) The frequently repeated notion that nuclear power is a carbon-free energy source is simply untrue.
- (C) At every stage of the cycle greenhouse gases are released into the atmosphere from burning diesel, manufacturing steel and cement and, in the circumpolar regions of the planet, by disturbance of the tundra which releases large amounts of methane, a particularly potent greenhouse gas.
- (D) That part is almost true, but the claim ignores the total environmental impact of nuclear energy, which includes a long and complicated chain of events known in the industry as the 'nuclear cycle' which begins with finding, mining, milling and enriching uranium, then spans through plant construction and power generation to the reprocessing and eventual storage of nuclear waste, all of which creates tons of CO₂.
- (E) Even the claim that a functioning nuclear power facility is CO₂-free is challenged by the fact that operating plant requires an external power source to run, and that electricity is almost certain to come from a fossil-fuelled plant.
- (1) DCEB (2) EBCD (3) DEBC (4) EDCB

DIRECTIONS for questions 54 and 55: In each question, there are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of

sentence(s) that is/are correct in terms of grammar and usage. Then, choose the **most appropriate** option.

- 54.** (A) Israel's imprudent commando raid of an aid flotilla headed towards the besieged Gaza strip
 (B) has generated an international wave of righteous anger
 (C) which promises to shake off West Asia's oppressive political order.
 (D) Pre-dawn images of gun-toting commandos slithering from helicopters on to the deck of the Turkish humanitarian aid ship,
 (E) Mavi Marmara, and the bloodbath that followed, has left the world aghast.
- (1) A, B and D (2) B and D
 (3) A and E (4) B, C and D
- 55.** (A) The blanket green and the empty spaces on the maps of the Peruvian Amazon hide a cacophony of life because,
 (B) aside from the rustle of its paper edges, a map can never sing as raucously as the jungle.
 (C) It does not resound with inhabitants voices as they travel along those blue lines that mark the river
 (D) and its myriad tributaries pedalling their canoes to the villages and hunting grounds,
 (E) or the more ominous sound of oil tankers-ominous because two-thirds of the Peruvian Amazon now falls under the shadow of potential oil drilling.
- (1) A, D and E (2) B, C and D
 (3) A, C and D (4) A and E

DIRECTIONS for questions 56 to 58: Read the following passage and answer the questions that follow it.

Nobody wants to be thought of as materialistic. Back in the late 1970s, academics Mihaly Csikzentmihalyi and Eugene Rochberg-Halton conducted lengthy interviews with several dozen families about their possessions, asking them a battery of detailed questions about which were most important to them and why. A number of their subjects insisted that the researchers had their priorities out of whack—material objects aren't important, people and human relationships are. But one of the themes that eventually emerged from their work, described in their book, *The Meaning of Things: Domestic Symbols and the Self*, is that some objects matter a great deal. It's worth lingering a moment over what it was that made some things mean more than others—and why not all materialism is the same. Csikzentmihalyi and Eugene Rochberg-Halton interviewed members of three generations of 82 families, asking their subjects: "What are the things in your home which are special to you?" Their interviewees mentioned a total of 1,694 objects, divided into 41 categories. Objects in the top 10 categories accounted for around half of the total mentioned: Visual art, photographs, books, stereos, musical instruments, TVs, sculptures, plants and plates. The subjects gave 7,875 reasons why their chosen things were special, and these were divided into 11 broad "meaning classes," such as "memories."

Part of what the authors found was that the most meaningful objects were rarely chosen on the basis of some intrinsic, rational property, like marketplace value, cutting-edge quality, simple aesthetic pleasure or anything that an economist might describe as "use-value" or "utility." They were chosen instead for connections to something else: family or social ties, a particular episode in the narrative of the subject's life, perhaps religious faith or some other belief system affiliation. That is to say, their "meaning" tended to be a function of what the thing represented.

Csikzentmihalyi has continued to address materialism in some of his work, extending ideas from that earlier study, in particular by way of what he calls "psychic energy." This essentially means attention, or simply what we choose to think about. "Objects are generally tools," he wrote in his contribution to a book Psychology and Consumer Culture: *The Struggle for a Good Life in a Materialistic World*.

Devoting "psychic energy" to objects can make sense, he argued, if it is part of an effort to "transcend self-interest" and "reach outside (our) own needs and goals and invest in another system, thus becoming a stakeholder in an entity larger than (our) previous selves". Problems arise when people use "material goals and experiences" not to reflect, but to construct who they are. *The Meaning of Things* drew a distinction between "instrumental" materialism and "increasingly expensive symbolic demonstrations of our autonomy and power," which the authors gave the label "terminal materialism." If you are a terminal materialist, you surround yourself with what you wish you were.

Those two versions of materialism seem vastly different, but in practice they are easily confused, especially in contemporary, ad-soaked consumer culture. We are thirsty for meaning, for connection, for individuality, for ways to tell

stories about ourselves that make sense. Meanwhile, all brand-makers generally have to sell is a product that may have use-value, but is hardly equipped to fulfil those needs. We know customized sneakers or a new car or deodorant can't really make us more of an individual; we know that mutual admiration for the same T-Shirt brands or electronic devices aren't really forms of community. But as one contemporary ad agency executive has put it: "Few stronger emotions exist than the need to belong and make meaning. And brands are poised to exploit that need."

There's no point, of course, in demonizing branding professionals, simply doing their jobs as effectively as they can. But there's also no point in decrying "materialism" in general, either. Chances are there are objects in your life that do mean something to you. The crucifix, the wedding ring, the diploma and the trophy are some obvious examples of things that exist purely to join us to-to symbolize—something else (a belief system, a union, an achievement, a memory). It's up to us to make sure we're being the right kind of materialist.

56. In the sentence 'A number of their subjects insisted that the researchers had their priorities out of whack', the expression "out of whack" most probably means:
- Out of ignorance.
 - Skewed and awry.
 - Out of place.
 - Jumbled and muddled.
57. Which of the following ideas have been suggested in the passage?
- Materialism is a product of the consumer age.
 - Materialism and consumerism cannot be differentiated.
 - People do not like to be viewed as materialistic and possessive.
 - Treating objects as valuable is not reprehensible.
58. Based on the passage, which of the following statements can be understood regarding a terminal materialist?
- He has utilitarian leanings.
 - He appreciates the aesthetic value of objects.
 - He acquires objects to build his identity.
 - He attaches importance to the symbolic value of objects.
 - He admires the brand culture.
- Only A and B
 - Only B and C
 - Only C and D
 - Only C, D and E

DIRECTIONS for questions 59 and 60: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

59. The years of conflict cannot just be written off, as if the various outbreaks of internal and inter-state violence were just local observations or the product of bad luck, or as if they had no bearing on the region's further prospects. It is not just that, if you add all the bloodletting together, up to a million

citizens of the Arab world may have perished violently since 1990, and killing on this scale cannot but leave deep scars. The disturbing point for the future is that none of the underlying causes of conflict has disappeared.

- On the contrary, in most Arab countries the glue of nationhood is still weak.
- On the contrary, in almost any Arab country, at almost any time, political and social discontent is in danger of tipping into violence.
- On the contrary, each appears to be taking on the characteristic of a chronic condition.
- On the contrary, peace looked more achievable during the negotiations initiated by Yitzhak Rabin and Yasser Arafat in the 1990s than it does now.

60. Jawaharlal Nehru seemed an unlikely candidate to lead India towards its vision. Under the cotton Khadi he wore in deference to the dictates of Congress, he remained the quintessential English gentleman. In a land of mysteries, he was a cool rationalist. The mind that had exulted in the discovery of science at Cambridge never ceased to be appalled by his fellow Indians who refused to stir from their homes on days proclaimed inauspicious by their favourite astrologers. He was a publicly declared agnostic in the most intensely spiritual area in the world, and he never ceased to proclaim the horror the word 'religion' inspired in him. Nehru despised Indian priests, her sadhus, her chanting monks and pious 'skerkhs'.
- And yet, the India of those sadhus and the superstition-haunted masses had accepted Nehru.
 - They had only served, he felt, to impede her progress.
 - The Mahatma had made it clear that it was on his shoulders that he wished his mantle to fall.
 - Nehru's heart told him to follow the Mahatma and his heart, he would later admit, had been right.

(Key and Solutions for AIMCAT1110-Form-5)

Key

1. 3	7. 3	13. 2	19. 4	25. 3	31. 2	37. 3	43. 4	49. 4	55. 4
2. 1	8. 2	14. 1	20. 1	26. 4	32. 2	38. 4	44. 2	50. 4	56. 2
3. 1	9. 3	15. 3	21. 2	27. 1	33. 2	39. 1	45. 4	51. 2	57. 4
4. 1	10. 4	16. 2	22. 3	28. 1	34. 3	40. 2	46. 2	52. 2	58. 3
5. 3	11. 1	17. 4	23. 1	29. 3	35. 3	41. 2	47. 4	53. 1	59. 3
6. 2	12. 4	18. 3	24. 1	30. 3	36. 1	42. 4	48. 4	54. 2	60. 2

Solutions

SECTION – I

Solutions for questions 1 to 20:

1. Sum of the roots = $\alpha - 2$

Product of the roots = $\alpha - 5$

Let the roots be x_1 and x_2 . Then we have

$$x_1 + x_2 = \alpha - 2 \text{ and } x_1 x_2 = \alpha - 5$$

$$x_1^2 + x_2^2 = (x_1 + x_2)^2 - 2x_1 x_2$$

$$= (\alpha - 2)^2 - 2(\alpha - 5) = \alpha^2 - 4\alpha + 4 - 2\alpha + 10$$

$$= \alpha^2 - 6\alpha + 9 + 5$$

$x_1^2 + x_2^2 = (\alpha - 3)^2 + 5$. The minimum value of $x_1^2 + x_2^2$ is 5, since $(\alpha - 3)^2$ is always a non-negative quantity.

Choice (3)

2. Let us visualise the soldiers in the following matrix.

1, 2 8, 9, 10, 17

18, 19 25, 26, 27, 34

256, 257 263, 264, 265, 272

273, 274 280, 281, 282, ... 289

Let us denote the i^{th} soldier as S_i and the number of bullets with him as x_i .

Now, $x_4 = 831$, $x_{14} = 861 \Rightarrow$ middle term = $x_9 = 846$ (i.e., the average of the fourth term from the left and the fourth term from the right)

Similarly, $x_{257} = 60$, $x_{271} = 102 \Rightarrow x_{264} = 81$

Now, the numbers $x_9, x_{26}, \dots, x_{264}, x_{281}$ are in AP (an AP with 17 terms)

The 1st term is 846.

The 16th term is 81.

$\therefore 15d = 765$ or $d = -51$. Hence, the average, i.e., the middle term (or 9th term of 17)

$$= 846 - 51(8) = 438$$

This is the average number of bullets with the soldiers.

Choice (1)

3. Let time of oscillation = T. now $T_1 = \frac{2\pi}{\sqrt{10}}$, $\ell_1 = 1$ m, $g_1 = 10$ m/sec²,

$$\ell_2 = \frac{3}{2} \text{ m and } g_2 = 18 \text{ m/sec}^2 \text{ given } T \propto \frac{\sqrt{\ell}}{\sqrt{g}}$$

$$\Rightarrow T_2 = T_1 \cdot \frac{\sqrt{\ell_2}}{\sqrt{\ell_1}} \cdot \frac{\sqrt{g_1}}{\sqrt{g_2}}$$

$$\Rightarrow T_2 = \frac{2\pi}{\sqrt{10}} \times \sqrt{\frac{3}{2}} \times \sqrt{\frac{10}{18}} = \frac{\pi}{\sqrt{3}} \text{ seconds} \quad \text{Choice (1)}$$

4. Let the numbers in the i^{th} row be P_i, Q_i, R_i, S_i and T_i

It is given that $P_i > Q_i > R_i > S_i > T_i$.

Given : $P_1 - T_1 = 41$ and $Q_2 - S_2 = 4.1$

Row	P_1	Q_1	R_1
II nd :	$\frac{P_1+Q_1+R_1+S_1}{4}$	$\frac{P_1+Q_1+R_1+T_1}{4}$	$\frac{P_1+Q_1+S_1+T_1}{4}$

I st :	S_1	T_1
II nd :	$\frac{P_1+R_1+S_1+T_1}{4}$	$\frac{Q_1+R_1+S_1+T_1}{4}$

Difference between the first and the last numbers in the second row = $P_2 - T_2$

$$= \frac{P_1 - T_1}{4} = \frac{1}{4} \times (\text{Difference for the previous row})$$

$$\therefore P_n - T_n = \frac{P_{n-1} - T_{n-1}}{4} = \frac{P_1 - T_1}{4^{n-1}}$$

$$P_7 - T_7 = \frac{P_1 - T_1}{4^6} = \frac{41}{4096} \approx 0.01 \quad \text{Choice (1)}$$

5. Let the efficiencies (rate of work) of A, B and C be a, b and c respectively.

Given, $(b + c) = 2a$ ---- (1)

and $(a + c) = 3b$ ---- (2)

Solving (1) and (2) we get $a = \frac{4}{5} c$ and $b = \frac{3}{5} c$

$\Rightarrow a : b : c = 4 : 3 : 5$

$\Rightarrow c$ does $\frac{5}{(4+3+5)} = \frac{5}{12}$ th of any work that all three of them complete together. Choice (3)

6. Let the present time be t . Then, it is given that the angle between the minute hand and the hour hand was the same at $(t - 30)$ minutes and $(t + 10)$ minutes. Hence exactly midway between these two times, i.e., at $(t - 10)$ minutes, the two hands of the clock must have either coincided or must have been at 180° to each other.

Hence, angle between the hands of the clock now, i.e., 10 minutes after $(t - 10)$ minutes, would be either $(0^\circ + 5\frac{1}{2}^\circ \text{ per min} \times 10 \text{ min}) = 55^\circ$ (in case the hands coincide at $(t - 10 \text{ min})$) OR $(180^\circ - 5\frac{1}{2}^\circ \text{ per min} \times 10 \text{ min}) = 125^\circ$ (in case the two hands were at 180° to each other at $(t - 10 \text{ min})$). Choice (2)

7. If Bunny receives exactly 5 mangoes, then $12 - 5 = 7$ mangoes need to be distributed among Honey, Sunny and Moni. The possible ways of dividing 7 mangoes in 3 parts and the corresponding number of ways of distributing the parts among the children are given below.

$$7 = 1 + 1 + 5 \rightarrow 3 \text{ ways}$$

$$7 = 1 + 2 + 4 \rightarrow 6 \text{ ways}$$

$7 = 1 + 3 + 3 \rightarrow 3$ ways
 $7 = 2 + 2 + 3 \rightarrow 3$ ways
 Hence a total of $3 + 6 + 3 + 3 = 15$ ways are possible.
 Choice (3)

8. Given $2 < \frac{nx+2}{n} \leq \frac{5n+1}{n}$
- $$\Rightarrow 2 < x + \frac{2}{n} \leq 5 + \frac{1}{n}$$
- Subtracting $\frac{2}{n}$ throughout, we get
- $$\Rightarrow 2 - \frac{2}{n} < x \leq 5 - \frac{1}{n}$$
- \therefore If $n = 1$, $0 < x \leq 4$
 if $n = 2$, $1 < x \leq 4 \frac{1}{2}$
 if $n = 3$, $1 \frac{1}{3} < x \leq 4 \frac{2}{3}$
- As $n \rightarrow \infty$, $2 < x < 5$.
 $\therefore 0 < x < 5$ is the best description of x . Choice (2)

9. When a number is divided by 100, the remainder is the last two digits of that number.

\therefore We can try to find $\text{Rem}\left(\frac{2^{999}}{100}\right)$

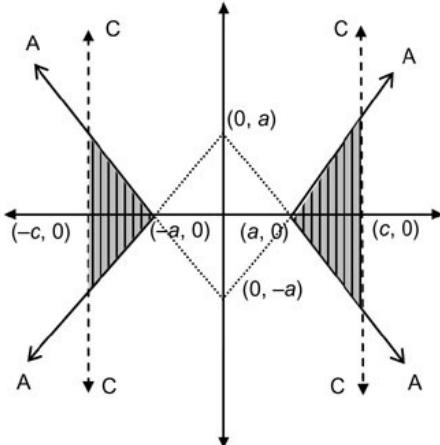
$$\text{Rem}\left(\frac{2^{999}}{25}\right) = \text{Rem}\left(\frac{(2^{10})^{99} \times (2^9)}{25}\right)$$

$$\Rightarrow \text{Rem}\left(\frac{(-1)(512)}{25}\right) = 13$$

Since 25 is a factor of 100, the remainder when 2^{999} is divided by 100 will be of the form $25K + 13$.
 i.e., 13, 38, 63, 88 are the possible remainders
 But since 2^{999} is exactly divisible by 4, the last two digits of 2^{999} must be divisible by 4.
 Hence 88 is the remainder when divided by 100.
 So '8' is the tens digit. Choice (3)

(Choices (2) and (4) can be eliminated since, it can easily be found that the units digit of 2^{999} is 8, and the last two digits must be divisible by 4).

10. The lines represented by A and C are shown in figure given below, (where $a > 0$).



The region enclosed by A and C comprises of two separate congruent triangles. The area of each triangle is $\frac{1}{2}(c-a)$
 $2(c-a) = (c-a)^2$
 Therefore the total area is $2(c-a)^2 = 2(5-2)^2 = 18$. Choice (4)

11. Let ℓ be the length covered by D_1 in 3 steps

$$\Rightarrow \text{step length of } D_1 = \frac{\ell}{3}.$$

By the same logic, step lengths of D_2 and D_3 are respectively $\frac{\ell}{4}$ and $\frac{\ell}{5}$. Distances covered by D_1 , D_2 and D_3

in 5 steps, 4 steps and 6 steps are $5\left(\frac{\ell}{3}\right)$, $4\left(\frac{\ell}{4}\right)$ and $6\left(\frac{\ell}{5}\right)$

respectively.

As these distances are covered in the same time interval, the ratio of speed of $D_1 : D_2 : D_3 = \left(\frac{5}{3}\right) : (1) : \left(\frac{6}{5}\right) = 25 : 15 : 18$

\therefore Required ratio ($D_1 : D_2 : D_3$) = 25 : 15 : 18

Choice (1)

12. Given

$$f(x) = \frac{16^{2x}}{16^{2x} + 16}$$

$$f(x) = \frac{256^x}{256^x + 16}$$

$$f(1-x) = \frac{256^{1-x}}{256^{1-x} + 16} = \frac{256}{256 + 16 \times 256^x} = \frac{16}{16 + 256^x}$$

$$f(x) + f(1-x) = \frac{256^x}{256^x + 16} + \frac{16}{16 + 256^x} = 1$$

$$\text{Put } x = \frac{1}{2} \Rightarrow f\left(\frac{1}{2}\right) + f\left(\frac{1}{2}\right) = 1 \Rightarrow f\left(\frac{1}{2}\right) = \frac{1}{2}$$

$$f\left(\frac{1}{2}\right) + f\left(\frac{1}{4}\right) + f\left(\frac{1}{8}\right) + f\left(\frac{1}{16}\right) + f\left(\frac{3}{4}\right) + f\left(\frac{7}{8}\right) + f\left(\frac{15}{16}\right)$$

$$= f\left(\frac{1}{2}\right) + \left[f\left(\frac{1}{4}\right) + f\left(\frac{3}{4}\right) \right] + \left[f\left(\frac{1}{8}\right) + f\left(\frac{7}{8}\right) \right] +$$

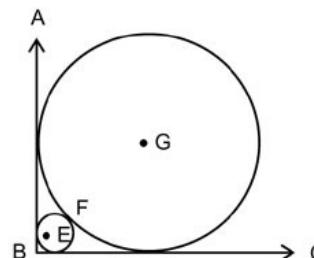
$$\left[f\left(\frac{1}{16}\right) + f\left(\frac{15}{16}\right) \right]$$

$$= f\left(\frac{1}{2}\right) + \left[f\left(\frac{1}{4}\right) + f\left(1 - \frac{1}{4}\right) \right] +$$

$$\left[f\left(\frac{1}{8}\right) + f\left(1 - \frac{1}{8}\right) \right] + \left[f\left(\frac{1}{16}\right) + f\left(1 - \frac{1}{16}\right) \right]$$

$$= f\left(\frac{1}{2}\right) + 1 + 1 + 1 = \frac{1}{2} + 3 = 3\frac{1}{2} = \frac{7}{2} \quad \text{Choice (4)}$$

- 13.



Let the centres of the bigger and smaller circles be denoted by G and E respectively.

Let F be the point of contact of the two circles.

$$BE = \sqrt{2}r$$

$$BG = \sqrt{2}R$$

$$BE + EF + FG = \sqrt{2}R$$

$$\sqrt{2}r + r + R = \sqrt{2}R$$

$$r = \frac{\sqrt{2}-1}{\sqrt{2}+1}R = (3-2\sqrt{2})R$$

$$\therefore r : R = 3 - 2\sqrt{2}$$

Alternative solution:

Clearly ($r : R < 1$). Choices (1) and (4) can be eliminated since they are greater than 1. Also, choice (3) evaluates to approximately 0.76, which can be rejected intuitively, since, from observing the figure, we can conclude that $r : R$ is definitely less than 0.5. Hence, choice (2).

Choice (2)

14. If the smaller of two numbers is a and the greater is b , the possible values of a and the corresponding values of b (such that $a + b \geq 20$) and the number of ordered pairs (a, b) are given below.

If $a = 1, 3, 5, 7, 9$, there are respectively 1, 2, 3, 4, 5 values of b such that $a + b \geq 20$, i.e. a total of 15 pairs (a, b) .

If $a \geq 11$, there are 5C_2 is i.e. 10 values of (a, b) . Thus, in all, there are 25 pairs (a, b) such that $a + b \geq 20$.

Choice (1)

15. $A + B + C + D = 4$

$\frac{1}{A} + \frac{1}{B} + \frac{1}{C} + \frac{1}{D}$ must be minimum. This would be minimum, if its magnitude is maximum and sign is negative. These conditions would be satisfied if three of A, B, C and D are -1 each. The fourth would be 7.

$\frac{1}{A} + \frac{1}{B} + \frac{1}{C} + \frac{1}{D}$ would then be $-2\frac{6}{7}$. Choice (3)

16. $R = P_1 \cdot \bar{P}_2 \bar{P}_3$ ----- (1)

$$100R = P_1 P_2 P_3 \cdot \bar{P}_2 \bar{P}_3 \rightarrow (2)$$

Subtracting (1) from (2), $99R = P_1 P_2 P_3 - P_1$

$$R = \frac{P_1 P_2 P_3 - P_1}{99}$$

As $99R$ is an integer, any multiple of $99R$ is always an integer. Hence of the options, only $396R$ is a multiple of $99R$. Choice (2)

17. Perimeter of $T_1 = 3a$

$$\text{Perimeter of } T_2 = \frac{3}{2}a$$

$$\text{Perimeter of } T_3 = \frac{3a}{4} \text{ and so on.}$$

$$\text{Area of } T_1 = \frac{\sqrt{3}}{4}a^2$$

$$\text{Area of } T_2 = \frac{\sqrt{3}}{16}a^2$$

$$\text{Area of } T_3 = \frac{\sqrt{3}}{64}a^2 \text{ and so on.}$$

$$x = \frac{3a}{1 - \frac{1}{2}} = 6a$$

$$y = \frac{\frac{\sqrt{3}}{4}a^2}{1 - \frac{1}{4}} = \frac{\sqrt{3}}{3}a^2$$

$$\therefore \frac{y}{x} = \frac{\sqrt{3}}{18}a.$$

Choice (4)

18. Solving

$$2x^4 + x^3 + x = x^4 + x^3 + 5x^2 + x - 4$$

$$x^4 - 5x^2 + 4 = 0$$

$$\Rightarrow (x^2 - 1)(x^2 - 4) = 0 \Rightarrow x = \pm 1, \pm 2$$

But for $x = -1, y = 0$. For $x = 1, 2, -2, y > 0$.

\therefore The curves intersect above the x-axis at three distinct points. Choice (3)

19. Consider $|x - a|$. On the number line $|x - a|$ is the distance (or difference) of the number x from a . So, $|x|$ i.e. $|x - 0|$ can be considered as the distance of x from the origin.

Given $E = |x| + |x - 1| + |x - 2| + |x - 3| + |x - 4|$

For $x = 2$, $E = 6$ and for $x = 1$ (or 3), $E = 7$

Since the numbers considered, i.e., 0, 1, 2, 3, 4 are in A.P. for the values of x equidistant from 2, E has same value.

For $x = 2 \pm 2$, i.e., 0 or 4, $E = 10$

From $x = 4$, as x moves to the right by a certain quantity E increases by 5 times that quantity. Same is the case as x moves to left from $x = 0$.

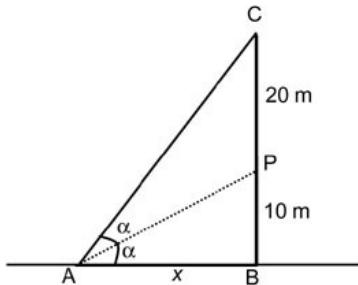
\Rightarrow If $x = 0 - k$ or $x = 4 + k$ where $k \geq 0$, $E = 10 + 5k$

Here, as x is an integer, k is also an integer. Since $E < 54$ $\Rightarrow 10 + 5k < 54$

$\Rightarrow k < 8.8$ i.e. k can take integer values from 0 to 8, i.e., 9 integers. So there are $3 + 2(9)$ i.e. 21 integral values of x , that satisfy $E < 54$.

Choice (4)

20. Let the observer be at point A on the ground and let BC be the building. Let the distance AB = x m.



$$\tan \alpha = \frac{10}{x}$$

$$\tan 2\alpha = \frac{30}{x}$$

$$\text{But since } \tan 2\alpha = \frac{2 \tan \alpha}{1 - \tan^2 \alpha}$$

$$\frac{2 \tan \alpha}{1 - \tan^2 \alpha} = \frac{30}{x}$$

$$\frac{2 \left(\frac{10}{x} \right)}{1 - \left(\frac{10}{x} \right)^2} = \frac{30}{x}$$

$$20x^2 = 30x^2 - 3000$$

$$x = \sqrt{300} = 10\sqrt{3} \approx 17.32$$

Alternative solution:

Using angle bisector theorem, AP bisects $\angle CAB$

$$\Rightarrow \frac{AC}{AB} = \frac{CP}{PB} = \frac{2}{1}$$

$$\text{Also } AC^2 = AB^2 + BC^2 = x^2 + (20 + 10)^2 = x^2 + 900$$

$$\Rightarrow \frac{\sqrt{x^2 + 900}}{x} = \frac{2}{1} \Rightarrow \frac{x^2 + 900}{x^2} = \frac{4}{1}$$

$$\Rightarrow x^2 = 300, \text{ i.e., } x = 10\sqrt{3} \approx 17.32 \text{ m}$$

Choice (1)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	-
Easy	3
Medium	1, 2, 5, 7, 11, 13, 14, 16, 17, 18, 19, 20
Difficult	4, 6, 8, 9, 10, 12, 15
Very Difficult	-

SECTION – II

Solutions for questions 21 to 23:

21. To find the least number of states in which company A sold cement, we have to assume that company A had its sales in states in which the total sales were the maximum. Even if we assume company A had 50% market share in the states with maximum sales, there must be at least 5 states where company A sold cement.
Choice (2)

22. To find the maximum number of states where company E was present, we have to assume it had sales in the states where the total sales are minimum and it had a share of only 25% in the states.
 \therefore Company E had its sales in at most 7 states (S, U, X, T, Q, W and Y). It cannot include R also as 25% of sales in R is 2.5% of total and already at least 25% of 51% = 12.75% is accounted by the seven states.
Choice (3)

23. For the minimum number of companies with sales in more than two states, the sales of the companies can be as follows:
 B(17%) – W(9%) + T(8%)
 C(18%) – Y(9%) + Q(9%)
 D(23%) – Z(13%) + R(10%)
 E(14%) – V(14%)
 Only company A has sales in more than two states.
Choice (1)

Solutions for questions 24 to 27:

Let us say that A and B are playing the game and the first move is A's. A's target is to leave exactly one matchstick on the table, finally, such that B would have to take it and lose the game.

Let us assume a case, where the number of matchsticks on the table is more than one and less than 10. Then A picks up all the matchsticks except one and B picks up the last matchstick. A finds this kind of situation only when B is left with exactly 10 matchsticks on the table in his move. (Because if B has 11 matchsticks, he picks up exactly one and leaves 10. Then, whatever be the number of matchsticks that A picks, B would pick up the remaining matchsticks minus one and thus ensure that A loses the game. Also because, if B has 9 matchsticks, he picks up 8 and A loses the game). In other words, if there are 10 matchsticks when B has to move, A sees to it that the total number of matchsticks picked up by him and B put together would be 9, so that B is left with exactly one matchstick. Before these two moves A has to leave 9 more matchsticks for B (i.e. 19 matchsticks). In this case no matter whatever number of matchsticks B picks up, A can pick up some matchsticks and leave 10 matchsticks on the table for B's move.

\Rightarrow A has to leave $9n + 1$ matchsticks on the table before each of B's moves. ($n = 0, 1, 2, \dots$).

24. Harish always sees to it that the sum of the number of matchsticks picked up by him and Sachin consecutively is always 9. (Except the first move). i.e., if Sachin picks up n matchsticks, Harish picks up $(9 - n)$ matchsticks. In his first move Harish picks up 6 matchsticks then Sachin picks up 5 matchsticks and Harish picks 4 ($5 + 4 = 9$). Then Sachin picks up 6 matchsticks and Harish picks 3 ($6 + 3 = 9$). Then Sachin picks up 3 matchsticks and Harish picks 6 ($3 + 6 = 9$).
Choice (1)

25. In the last move, the loser always picks up exactly one matchstick. In the first move, the beginner always picks up 8 or less matchsticks. In between these two moves in every pair of consecutive moves both of them would pick up 9 matchsticks in total.

$$\Rightarrow 9x7 + 1 + n \text{ (Where } n \leq 8)$$

$$\Rightarrow 63 + 1 + n = 64 + n$$

The maximum value of $n = 8$

$$\Rightarrow 64 + 8 = 72$$

Choice (3)

Solutions for questions 26 and 27:

In this case, Harish should manage to play in such a way that Sachin and himself should take 10 matchsticks in two consecutive moves (First move in the pair being Sachin's) And the target of Harish is to leave $10n + (1 \text{ or } 2)$ matchsticks on the table before each of Sachin's moves.

26. Harish loses the game if he has $10n + 1$ matchsticks or $10n + 2$ matchsticks before he picks up.
 Numbers satisfying this rule are 11, 12, 21, 22, 31, 32, 41 and 42.
Choice (4)
27. The objective is to leave 121 or 122 or 131 or 132 matchsticks for the opponent to pick up from. This can be done only when there are 137 matchsticks. ($137 - 6 = 131$).
Choice (1)

Solutions for questions 28 and 29:

28. From statement I we know that Ram has 15 boys to his left and 12 or more boys on his right. Since the number of boys on the right is not exactly known hence the given question cannot be answered with statement I alone.
 From statement II we know Ram has 12 boys to his right and 14 or more boys on his left, therefore we know that Ram has more boys on his left than on his right.
Choice (1)

29. From statement I, we cannot determine the total percentage of questions attempted by Ramya as we do not know the % of questions attempted by Ramya but not by Swathi.
 From statement II, the number of questions attempted by both Ramya and Swathi together is not known.
 But by combining both the statements, If x is the percentage of questions attempted by Ramya $\frac{3}{8} \times x = 30$
 $\Rightarrow x = 80$
 \therefore 80% of the questions are attempted by Ramya.
Choice (3)

Solutions for questions 30 and 31:

30. Companies for which the expenses are less than 60% of the sales, will have a profit more than 40% of the sales.
 There are six such companies.
Choice (3)
31. Only for three software companies the sales, are over Rs.2500 crore and expenses are less than Rs.2100 crore.
Choice (2)

Solutions for questions 32 to 35:

32. If the player seeded 11 reached to finals, the minimum number of *upsets* are as follows;
 (1) First round – seed 11 beats seed 4,
 (2) Quarter finals – seed 11 beats seed 7 and
 (3) Semi-finals – seed 11 beats seed 3. Choice (2)
33. To find the lowest seeded player, check from player seeded 16th. It can be seen that seeds 16, 15, 14, 13, 12 and 11 cannot advance to the next round without causing an *upset*. Seed 10 will face either seed 9 or seed 3 in the next round and so will need an *upset* to advance seed 9 and seed 8 will need *upsets* in the first round itself to advance. Seed 7 is the lowest seeded player who can win the tournament without himself causing an *upset*.
Choice (2)
34. If the player seeded 3 reached the finals all players in his half of the draw, i.e. seed, 7, 12, 4, 11, 9, 10 or 15 could not have reached the finals.
Choice (3)
35. If player seeded 6 was the winner of one of the semi-finals, i.e., reached the final, none of the players in his half of the draw i.e., seeds – 1, 16, 5, 8, 14, 13 or 2 wouldn't have reached the finals.
Choice (3)

Solution for question 36:

36. Let the number of students be x and let the amount contributed by each be Rs. y .
 $\therefore xy = 10,000$ _____(1)
From I,
 $(X - 10)(Y + 50) = 10,000$ _____(2)
By solving (1) & (2), we get the value of x
I alone is sufficient
From II, $x \geq 40$, $y \leq 250$.
There are more than one values which satisfy this.
II alone is not sufficient. Choice (1)

Solution for question 37:

37. Either statement alone will not give the answer. Combining both the statements we can find $AB + BC$.
Let c and a be AB and BC , then $\left(\frac{a+b+c}{2}\right)$ in radius
 $= \frac{1}{2}ac$
And $a^2 + c^2 = b^2$
Given inradius $= \frac{10}{2}$, and $a = 2x$ circumradius, $(b+c)$ can be solved for. Choice (3)

Solutions for questions 38 to 40:

Let the countries to which the persons belong i.e. Australia, Canada, Pakistan, India and Japan be represented by A, C, P, I and J respectively. Let the countries that they are coaching i.e. Australia, Wales, Bangladesh, Bermuda and China be represented by Au, Wa, Ba, Be and Ch respectively.

Name	Anshuman		Buchanan		John		Whatmore		Chappel	
	x	✓	x	✓	x	✓	x	✓	x	✓
Country of origin	A	I or J	-	A	J	A	C	A	J or I	C
	C				A	P				P
Country he is coaching	Au		Ba		Au				Ch	
	Wa	Ch	Be	Wa	Wa	Be	Wa	Au	Au	
	Ba		Au		Ba				Wa	
	Be		Ch		Ch				Be	Ba

38. Whatmore can be from India or Japan. Choice (4)
39. Buchanan is from Australia. Choice (1)
40. Wales had Buchanan, who is from Australia, as their coach. Choice (2)

Solutions for questions 45 and 46:

45. Statement A and C are incorrect due to the incorrect positioning and the absence of commas respectively. The phrase 'on the other hand, should be separated from 'the beast' and 'is merely an...'. The main idea is 'the beast is merely an ingenious...'. Further, in B and C, the position of the adverb, 'merely', is incorrect. It should be positioned after the auxiliary verb 'is' i.e., 'the beast, on the other hand, is merely ...' is the correction. Hence, only D is free of errors. Choice (4)

46. Statement A has a prepositional and a tense error. The use of 'means for maximizing' makes the choice incorrect. It should be 'means for maximization' or 'means to maximize' i.e., 'for' should be followed by the noun form. Further, the use of past perfect tense 'had also been' is incorrect in the context because the first part of the sentence is in present perfect and the reference is not to an incident of the past. The prepositional error 'means for maximizing' is found even in statement D and hence it is ruled out. Further in C and D the use of 'and' (well-being and it had also) makes the statements incorrect. Since the sentence presents two contrasting ideas the conjunction 'but' should be used but not 'and'. Hence C and D are ruled out. Besides the above mentioned errors, in D the first part of the sentence is in the past tense and the rest of the sentence is in the present perfect tense. Hence, there is a tense inconsistency. Only statement B is free of errors. Choice (2)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	30, 31
Easy	28, 29
Medium	21, 22, 23, 32, 33, 34, 35, 36, 37, 38, 39, 40
Difficult	24, 25, 26, 27
Very Difficult	-

SECTION – III

Solutions for questions 41 to 44:

Number of words and Explanatory notes for RC:

Number of words : 807

41. Paras (5) and (6) point to choice (2) as the answer. Although other aspects have been called into question, the health benefits that organic food supposedly provides has been questioned by the study. Choice (2)
42. Refer to paras 9, 10 and 11. Choice (1) can't be supported. There is no mention of the study not being scientific. Choice (2) has not been suggested. Choice (3) the second half is inapt. Choice (4) is correct. Choice (4)
43. In this passage, the author reports the findings of a study and discusses the debate that it (the study report) has raised. So, choice (4) is the best answer. The reason for and against promoting organic food has not been discussed. Choice (1) is incorrect. Choices (2) and (3) are easy eliminations. Choice (4)
44. Refer to the seventh para, which provides the objective of the study. Choice (2) is the answer. The study did not aim to show or prove anything. Choice (2)

Solutions for questions 47 and 48:

47. The error lies in choice 4.. Here, the expression '... mark off' is incorrect. The correction is 'Low sales has ... mark down the price of a range of goods'. To mark down the price is to reduce the price. Choice (4)
48. Choice (4) is incorrect because near does not collocate with encounter. The correction is '... close encounter with death'. Choice (4)

Solutions for questions 49 to 51:**Number of words and Explanatory notes for RC:**

Number of words : 860

49. Refer to the seventh para, which provides the reason for the optimism in India. Option (1) is an easy elimination. Option (2) includes only the Dubai crisis and misses the reference to the world recession. The phrase "immune to the consequences" in option (3) is a distortion. Muted impact does not imply remaining immune. Since the author mentions both Dubai and the world recession in the same para, while discussing the idea, option (4) is the best pick.
Choice (4)

50. Choice (4) is the answer. The introductory para where the author discusses the 'W-shaped' or 'double-dip' path provides the key.
Choice (4)

51. Refer to para 3, (such harsh feasible) and sentences 5 and 6 of para 6 (Alternatively infeasible). Choice (2) is the obvious answer.
Choice (2)

Solutions for questions 52 and 53:

52. Statement A opens the paragraph by speaking about the sea turtles of which only seven species one now existing. Statement E is a continuation of A as it further elaborates on the sea turtles. The 'marine reptiles' in E refers to the sea turtles in A. B follows E by mentioning the causes for the depletion of the species. D elaborates on B by citing examples. C is conclusive in nature. Hence EBDC.
Choice (2)

53. The opening sentences tell us about 'nuclear renaissance' and the claim that nuclear energy would encourage a green and carbon-free environment. This claim is only partly true, as stated in D. Hence D follows A. The word 'claim' in D refers to the 'assertion' in A. D explains how the 'nuclear cycle; can be hazardous to the environment. 'At every stage of the cycle' is a continuation of this idea, the 'cycle' referring to the 'nuclear cycle' mentioned in D. Hence C follows D. C tells us about the 'stages' and E tells us about what happens once the power plant starts functioning and B concludes stating that the assertion made in A is 'untrue'. Thus the proper sequence of the sentences would be DCEB.
Choice (1)

Solutions for questions 54 and 55:

54. A is erroneous because 'raid of' should be 'raid on' C is incorrect because the phrasal verb shake off is inapt here. The correct phrasal verb to be used is shake up which means to cause large changes in something, usually in order to make improvements. E is incorrect because the verb has does not agree with the plural subject images, the correction is 'pre dawn images have left the world aghast. B and D are free of errors.
Choice (2)
55. B is incorrect because the expression '... as raucously as the jungle should be followed by does in order to make the sentence grammatically correct. C is erroneous because the 's' in the word inhabitants should be followed by the

apostrophe in order to denote the possessive case as the reference is to the voices of the inhabitants. Therefore the correction is '....inhabitants' voices'. D is incorrect because the word 'pedalling' is used incorrectly. Canoes are not pedalled but paddled. Only A and E are grammatically consistent.
Choice (4)

Solutions for questions 56 to 58:**Number of words and Explanatory notes for RC:**

Number of words : 698

56. The idiomatic phrase "out of whack" is used in para (1) and option (2) is the correct pick in the given context. Other options do not suit the context.
Choice (2)

57. Choice (1) is not suggested. Choice (2) is categorical (can't be differentiated). The word possessive renders choice (3) wrong. Choice (4) is supported by the last para.
Choice (4)

58. Refer to para (4), where the term "terminal materialist" is introduced. Statements (C) and (D) can be surmised. The sentence "problems arise who they are" and the phrase "symbolic demonstrations of autonomy and power" support statements (C) and (D) and hence option (3) is the answer. While statements (A) and (B) can be eliminated easily, statement (E) seems right. But, the idea "admires the brand culture" does not suggest "acquisition and possession" of branded goods. So, (E) is invalid.
Choice (3)

Solutions for questions 59 and 60:

59. The paragraph talks of death and violence in the Arab world, which have left deep marks. The penultimate line bemoans the fact that the under-lying causes of the conflict has not been removed. So the concluding sentence begins with 'on the contrary' and thus must present the opposite. Only choice 3 is the opposite of what is said in the penultimate sentence. Choice 1 talks of nationhood-not mentioned in the para. Choice 4 compares the past and the present scenario in terms of achieving peace-not relevant. Only choice 3 continues the context of "underlying causes".
Choice (3)

60. The given para is about Jawaharlal Nehru – what he was and now he was different from his country men – a rationalist in the midst of spiritualists. choices 3 and 4 can be ruled out since they talk of Gandhi not mentioned in the para. Choices 1 and 2 appear close of the two. Choice 2 is better since it continues telling us about Nehru and how he felt. Choice 1 changes stand to what the people thought of Nehru.
Choice (2)

Difficulty level wise summary - Section III	
Level of Difficulty	Questions
Very Easy	-
Easy	44, 51
Medium	41, 42, 43, 52, 56, 57, 60
Difficult	45, 46, 47, 48, 49, 50, 53, 54, 55, 58, 59
Very Difficult	-