

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 70 questions – 20, 30, 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
Number of Questions = 20

DIRECTIONS for questions 1 and 2: Answer the questions independently of each other.

1. Find the remainder when 81^{82} is divided by 17.
(1) 1 (2) 4 (3) 13 (4) 16
2. If x and y are positive numbers and $\sqrt{x^2 + 16y} + \sqrt{y^2 + 16x} = 45$ and $x - y = 9$, then find the value of $x + y$.
(1) 15 (2) 21 (3) 31 (4) 36

DIRECTIONS for question 3: The question is followed by two statements, I and II. Answer the 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.

3. Three taps A, B and C can together fill a cistern in 10 hours, where A and B are filling taps and C is an emptying tap. If B and C together take thrice the time taken by A and C together to fill the cistern, then find the time taken by C alone to empty the cistern.
 - I. If the rate of discharge from A is decreased by 40% and that from B is increased by $66\frac{2}{3}\%$, then the time taken by A and B together to fill the cistern remains unchanged.
 - II. A, B and C together take $33\frac{1}{3}\%$ more time than that taken by A and B together to fill the cistern.

DIRECTIONS for questions 4 to 9: Answer the questions independently of each other.

4. A man rowing upstream in a river accidentally dropped his hat into the river. After travelling a distance of $3x$, he noticed his loss and immediately turned back to retrieve his hat. He caught up with his

hat after it had covered a distance of $2x$. The speed of the stream was what percent of the speed at which he rows in still water?

- | | |
|-----------------------|-------------------|
| (1) 25% | (2) 50% |
| (3) $66\frac{2}{3}\%$ | (4) None of these |
5. In the equation $(x - m)(x - n) - 4 = 0$, if m is greater than n , which of the following is true about the roots of the equation?
 - I. Both the roots lie in $[n, m]$.
 - II. One root is in $(-\infty, n)$ and the other root is in (m, ∞) .
 - III. Both the roots are non-real.
 - IV. Both the roots lie in $(n + 4, m + 4)$.
 6. The ratio of the sum of the first p terms to the sum of the first q terms of an arithmetic progression is $\frac{p^2}{q^2}$. Find the ratio of the twelfth term to the fifteenth term of the same AP.

(1) $\frac{4}{5}$	(2) $\frac{23}{29}$
(3) $\frac{25}{31}$	(4) Cannot be determined
 7. Pradip was preparing for CAT and enrolled for the Mock Cat series of a tutorial which offered 23 Mock cats for practice, to be conducted across the country. On account of his hectic work schedule, he decided to skip a few papers and appear for exactly 9 out of the 23 papers. Again, in order to have his preparation evenly spaced, he decided against writing any two consecutive papers but did not want to miss the last Mock Cat which would be held two weeks before CAT. Find the total number of ways in which Pradip can write the Mock Cats.

(1) 3003	(2) 1716
(3) 5005	(4) None of these
 8. Two distinct numbers when written in a certain base, end in 3. When one-third the sum of the two numbers is written in the same base, it ends in 2 or 5 or 8. What is the base in which the numbers are written?

(1) 12	(2) 9
(3) 15	(4) 18

DIRECTIONS for questions 10 & 11: Answer the questions on the basis of the information given below.

There are five boxes with each box having a distinct integral weight (in kg). All possible combinations of three boxes, out of the five boxes, are taken and weighed. The weights (in kg) so obtained are distinct integers in the range [33, 43]. Further, the weights (in kg) of all the boxes except one are composite numbers.

10. Which of the following cannot be the weight of any combination of 3 boxes from the five boxes?
(1) 33 kg (2) 37 kg (3) 40 kg (4) 41 kg

11. What is the weight of the box having the least weight?
(1) 8 kg (2) 10 kg
(3) 11 kg (4) Cannot be determined

DIRECTIONS for questions 12 to 20: Answer the questions independently of each other.

12. If $\cos\theta_1 + x\cos\theta_2 + x^2\cos\theta_3 + x^3\cos\theta_4 + x^4\cos\theta_5 = 3$
 and $\theta_i \in \left[\frac{\pi}{3}, \frac{\pi}{2}\right]$ for $i = 1$ to 5 , and a is the least value
 of x for which the equation is satisfied, then
 (1) $0.8 < a \leq 0.9$ (2) $0.9 < a \leq 1$
 (3) $1 < x \leq 1.1$ (4) $1.1 < a \leq 1.2$

13. On a 8×8 chessboard, in how many ways can
 two squares be chosen such that they have only one
 corner in common?
 (1) 196 (2) 49 (3) 104 (4) 98

14. In $\triangle ABC$, the points B, C, the orthocenter O and the
 incentre I are concyclic. If the four points are all
 distinct, find the measure of $\angle A$.
 (1) 30° (2) 45°
 (3) 60° (4) Cannot be determined

SECTION – II

DIRECTIONS for questions 21 to 23: The sentences given in each of the following questions, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. From among the choices given below each question, choose the most logical order of sentences that constructs a coherent paragraph.

21. (A) People have always faced change as they age but no generation has been thrown so much change, so fast, as today's seniors.

(B) Today they are in the midst of a monumental transition.

(C) Those who have adjusted feel confident, those who have resisted feel vulnerable, oblivious to how critical the computer will be to help them stay in touch with friends, order food, or buy prescription drugs as they become more housebound.

16. If $x = 8 + 8^{1/3} + 8^{2/3}$, then the value of $x^3 - 24x^2 + 168x - 381$ is
 (1) 0 (2) 2 (3) 11 (4) 121

17. In rectangle ABCD, the line through C parallel to BD intersects AD produced at E. If P is a variable point in the rectangle such that the area of quadrilateral EPBC exceeds the area of $\triangle PAB$ by half the area of the rectangle, then P lies on

 - BD or a line parallel to BD.
 - AC or a line parallel to AC.
 - BC or a line parallel to BC.
 - None of these.

18. There is a 100 sided regular polygon. How many different types of regular polygons (other than the given one) can be formed by joining the vertices of the regular polygon?
(1) 5 (2) 6 (3) 8 (4) 12

19. A nationwide online examination was held over a five day window period. There were two slots on each day. In each slot there were a total of 60 questions spread across three sections with each section consisting of 20 questions. All the questions asked were taken from a question bank consisting of 360 questions. If no question was used in more than 5 slots and all the 360 questions were used at least once, then the number of questions that were used exactly 5 times was at most

(1) 40 (2) 45 (3) 60 (4) 120

20. The magnitude of profit is one third of the discount offered. If the discount is 37.5%, find the profit percent.
(1) 20% (2) 12.5% (3) 40% (4) 25%

22. (A) That is, formal criminal law defines a minimal set of social rules by which people in a society agree to abide.

(B) There is an intimate relationship between social capital and crime.

(C) That is why, in criminal law, the state rather than an individual steps in to apprehend and punish violators.

DIRECTIONS: For questions 81-140, Read the following passage and answer the questions that follow it.

Enough for the average American Jew the word "Jewish" conjures up images from "Fiddler on the Roof": real Jews in a Jewish locality, practising real Jewish traditions for the real Jewish God. There persists in the American Jewish imagination a myth of authenticity and an anxiety of inauthenticity – that someone, somewhere, is the real Jew, but I'm not.

The myth, however, has got to go. It is historically inaccurate – the notion did not even exist, until the advent of modernity, that if you were "really" religious, you would dress or behave anachronistically. Modest, distinctive dress, yes – but never the idea that to be "real" was to be radically different from one's own place and time. More importantly, the entire notion of authenticity is a false projection of particular historical quirks – onto an imagined ideal of "realness" that artificially freezes culture, and thus spells its demise.

The truth is that there is no single authentic Jewishness. Like any living culture, Jewish culture (and religion) has evolved over time in order to remain vibrant. Of course, there are certain core values, myths and cultural traits that remain relatively constant. But bagels, bookishness and bar mitzvahs all evolved historically; none is more "really Jewish" than sushi, sports or birthday celebrations. Orthodox fidelity to the law, anxieties of dislocation, reformist rationalization – all arose along the way. Even the ultra-orthodox maxim that "innovation is forbidden by Torah" is, of course, a 19th-century innovation.

To imagine that cultural forms must remain static to be authentic is to doom a culture to obsolescence. It is also, of course, to privilege some cultural forms over others. Anytime we claim that one cultural form is more authentic than another, we are replicating privilege and marginalization. And, worst of all, by ossifying and reifying a fake authenticity as "the real thing," we actually undermine the attempt to create true authenticity on the part of progressive Jews.

Meaningful authenticity isn't about an old religious form. It's when a religious, literary or cultural form – old or new – speaks to the depths of what it is to be human. If a meditating female rabbi resonated more with the souls of her followers than did a prayer-reciting male one, she would be the more authentic spiritual leader. If ecstatic prayer spoke to and from the spirit more than a supposedly consistent rationalism, then it, too, would be more authentic, secularism notwithstanding. Authenticity isn't about form, it's about getting to what matters.

Those who prefer traditional forms sometimes deride innovations as "compromises". Yet, which is the more objectionable compromise: bending the rules to eat hot food on non-kosher plates, or clinging to a ritual form that may no longer hold any meaning, is historical in its origin and may actively impede other ethical values (such as connecting with people of other faiths)? Likewise, sometimes traditional forms are derided as intellectual compromises by those who insist on a more rigorous secularism. But which is the real compromise: admitting the irrational desire to pray, or maintaining some pseudo-intellectual purity that cuts off the heart despite the soul?

Progressive Jews don't do what they do to compromise the authenticity of Judaism; they do it to maintain it. Yes, there are lazy Jews who simply indulge their laziness, whether as ritual wafflers, ethical slobs or intellectual weaklings. But for those who care about living an authentic life, values shift because of consideration, not spinelessness. To say "This works for me" can, indeed, be a summary denial of responsibility. But to say so meaningfully, based on discernment and introspection, is a mark of integrity.

The myth of authenticity, in contrast, is an abdication of introspection and personal responsibility. It's a lot easier to say "Thanks, but I'm not religious; Thanks, but I'm Orthodox; Thanks, but I don't need to think any further", than to look closely at what form might work to do the important stuff (afflict the comfortable, comfort the afflicted) for you.

Newer Jewish forms are not intrinsically superior to older ones; the ancient texts of the Bible continue to speak to so many people even today, despite the gulf in history and culture – in great part because of their ancientness: they bind us to history in a way that newer books cannot. Yet, Biblical Israelites are not the real Jews. Neither are Hasidim, 20th-century modernists, neurotic New York psychoanalysts, Moroccan saints, angst-ridden intellectuals, High Reformers or anyone else.

Real Jews are all of the above - and the rest who take Jewishness seriously, in one form or another. Real Jews speak with Southern accents, observe one day in the week as a holiday, hike in the wilderness, eat shrimp, intermarry, do karate, are bisexual. There are Jewish boxing champions, pop stars, farmers, pro wrestlers, yoga teachers, even Jewish Sufis – all of whom are as much Jews as any traditional Jew is.

Jewish culture is distinctive in the way it has amalgamated so many contradictions, oblique angles and diverse perspectives on how it is to be human. (Granted, that pattern also leads to Jewish mobsters, crooks and arms merchants, but they aren't bad because they're inauthentic; they're bad because they're bad). The basic principles of change, growth and evolution are what has kept Jews going these thousands of years, as much as the basic bedrock values that remain more or less constant. For them, change is authenticity.

24. Which of the following lines comes closest to encompassing the author's views on authenticity in relation to the Jewish faith?
- There persists in the American Jewish imagination a myth of authenticity.... (paragraph 1)
 - Meaningful authenticity isn't about an old religious form. (paragraph 5)
 - Authenticity isn't about form, it's about getting to what matters. (paragraph 5)
 - Progressive Jews don't do what they do to compromise the authenticity of Judaism..... (paragraph 7)
25. In what manner do paragraphs 3 (The truth is that there is no.....) and 10 (Real Jews are all of the.....) relate to each other?
- The former explains the evolution of present-day Jewishness; the latter presents examples of the manner of such evolution.
 - Both, in their own way, present the idea that relevance to life and living is real Jewishness.
 - The former explains that orthodoxy was not always part of Jewish culture; the latter demonstrates this through example.
 - Both, in their own way, present the thought that traditional forms of culture are no longer of value.
26. The word "compromise" is used in both, paragraphs 6 and 7. The word is used to indicate
- betrayal of the Jewish faith.
 - concessions in the former paragraph and harm in the latter.
 - accommodation in the former paragraph, and dilution in the latter.
 - agreement in the former paragraph, and reduction in the latter.
27. We can infer, from the use of the phrase 'afflict the comfortable, comfort the afflicted' (in paragraph 8) that the author believes that the right form of faith, for an individual, would be one which
- would keep his beliefs from sliding into obsolescence and would help him cope with the impact of changes around him.
- (2) would arouse him from the laziness he wallows in and guide him to a state of considered awareness.
(3) would help him understand the changes around him and enable him to cope with them.
(4) would keep the comfort of established tradition at arms length while empowering him to cope with the travails of modern life.
- DIRECTIONS for questions 28 to 30:** 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.
28. LINE
- Soldiers defending the country's borders put their lives on line of duty every day.
 - There is a move to bring the salaries of contract employees in line with those of the permanent staff.
 - The leading fashion house has started a new line in men's wear.
 - He comes from a long line of patriots.
29. SHOULDER
- She slung her bag over her shoulder and left the room in a huff.
 - I had to shoulder my way through the crowd in order to catch the train.
 - Unless you put your shoulder on the wheel, you cannot complete the work before the deadline.
 - After the death of his parents, the responsibility of looking after his younger siblings fell on his shoulders.
30. OPEN
- I was so tired and sleepy that I could barely keep my eyes open.
 - Exercising in the open air has a salubrious effect on one's body and mind.
 - Your comments open a whole new train of thought.
 - The competition is open to children of classes VIII to X.

DIRECTIONS for questions 31 to 34: Read the following passage and answer the questions that follow it.

The reception of *Democracy in America* was all that an author could have desired. 'I see you have written a masterpiece,' said Tocqueville's publisher upon the publication of Volume I, and readers generally concurred. The second volume was less universally admired, but the two together were agreed by most critics to represent a stunning

achievement in explaining to Europeans what the new civilization the other side of the Atlantic was like; critics were also struck by Tocqueville's insistence that what was happening in America was part of the same process that was making European societies more egalitarian.

The enthusiasm of John Stuart Mill was one of the major reasons for the book's success with English-speaking readers. It struck a chord in Mill that it could hardly have done in anyone else. For Mill read the *Democracy* at a point in his life where he had broken with the radicalism of his father and Jeremy Bentham, and was looking for a new social and political vision. Mill, in essence, had come to reject the utilitarians' belief that all social ills could be cured by a Parliament elected by popular vote, together with a rational, disinterested, uncorrupt administration to implement the policies that such a Parliament would vote. Under the impulse of such writers as Thomas Carlyle, Samuel Taylor Coleridge, and William Wordsworth, and reflecting on his own experiences as a young man, Mill had come to think that the limitations of democracy were greater than his father and Bentham had realized. He had accepted even before he read Tocqueville, that in the modern world, public opinion was increasingly powerful, and that even governments that were not democratic in form would increasingly become so in substance. Unlike many of his contemporaries, Mill was not particularly anxious that pressures for an expansion of the suffrage or for making government more answerable to the middle and lower middle classes would result in mob rule or mere chaos. What he feared was that it would result in a dreary, barren, narrowly businesslike society. It was, so to speak, the cultural consequences of universal egalitarianism that he feared. His one complaint against Tocqueville when he read the first volume of *Democracy in America* was that Tocqueville talked of the effects of 'democracy' when he meant only the effects of equality. Democracy considered as a form of government had merits that were detachable from the dangers of generalized egalitarianism.

The surprising thing is less that Mill should have so admired the book than that its continued vitality in the Anglo-American world should have been so great. A few American critics in the nineteenth century complained over the next two decades that Tocqueville made a great show of discovering things that all Americans knew already; others complained that he had ignored the American's own reflections on their political system. For the most part, however, they were quick to recognize that Tocqueville's English critics, other than Mill, had frequently used him as a weapon against the extension of the franchise to the large majority of the British population that was still unenfranchised, and they therefore applauded the friendliness of his analysis. Where British conservatives used his criticisms of America as reasons for not extending the reach of democratic institutions in Britain, Americans used his relatively cheerful assessment of their condition as a prop to national pride and self-confidence.

Of course, later writers expressed the perfectly sensible view that as time went on, the United States had changed rather dramatically – the whole continent had been occupied, there had been a Civil War, and the country's culture had been transformed by vast waves of immigration from Ireland, Germany, Eastern and Southern Europe, and then from Asia and Spanish America. The Anglophone culture of Puritan New England was not just one element in a more kaleidoscopic picture, it was a rather small element. Tocqueville was not unaware of the existing influx of immigrants from the heart of Europe, but it was certainly easier to see the United States as a branch of the English project in 1831 than it was seventy-five years after. Odder, however, was the way the *Democracy* became once more a text for our times, both in the aftermath of World War II and again some twenty-five years later.

31. All of the following statements regarding 'Democracy in America' are true EXCEPT:

- (1) The book was hailed as a masterpiece by both the critics and the general public.
- (2) The book was used by conservatives in Britain to give enfranchisement to a vast majority.
- (3) The book boosted the self-confidence of Americans and pride in their country.
- (4) American critics complained that the book did not reflect their analysis of the prevailing political system.

32. According to the author, the dramatic change in America over time was/were largely due to

- (A) the influx of migrants from various parts of the world.
 - (B) the spread of habitation over the entire continent.
 - (C) the effect of the conflict over slavery.
 - (D) the influence of the Puritanic culture of New England.
- (1) Only A
 - (2) Only A and B
 - (3) Only A, B and C
 - (4) A, B, C and D

33. Which of the following is NOT the author's opinion, as seen from the passage?

- (1) 'Democracy in America' owes its success in England largely to John Stuart Mill.
- (2) 'Democracy in America' presents a positive picture of the new civilization in America.
- (3) J.S.Mill's personal circumstances were one reason why 'Democracy in America' so appealed to him.
- (4) It is not surprising that 'Democracy in America' continues to be relevant a century after it was written.

34. Which of the following statements regarding Mill or his views is NOT true?

- (1) Benefits of democracy come largely from the spread of egalitarianism.
- (2) Representative democracy even with a corruption free administration cannot solve all the social problems.
- (3) Like some of his contemporaries, Mill believed that democracy has its own limitations.
- (4) Egalitarianism, Mill believed, would make the society dull and monotonous.

DIRECTIONS for questions 35 to 38: Each of the following questions has a paragraph with one italicised word that does not make sense. Choose the most appropriate replacement for that word, from the options given below the paragraph.

DIRECTIONS for questions 39 to 42: Read the following passage and answer the questions that follow it.

As an architect before erecting a large edifice examines and tests the soil in order to see whether it can support the weight, so a wise law-giver does not begin by drawing up laws that are good in themselves, but considers first whether the people for whom he designs them are fit to endure them. It is on this account that Plato refused to legislate for the Arcadians and Cyrenians, knowing that these two peoples were rich and could not tolerate equality; and it is on this account that good laws and worthless men were to be found in Crete, for Minos had only disciplined a people steeped in vice.

A thousand nations that have flourished on the earth could never have borne good laws; and even those that might have done so could have succeeded for only a very short period of their whole duration. The majority of nations, as well as men, are tractable only in their youth; they become incorrigible as they grow old. When once customs are established and prejudices have taken root, it is a perilous and futile enterprise to try and reform them; for the people cannot even endure that their evils should be touched with a view to their removal, like those stupid and cowardly patients that shudder at the sight of a physician.

But just as some diseases unhinge men's minds and deprive them of all remembrance of the past, so we sometimes find, during the existence of states, epochs of violence, in which revolutions produce an influence upon nations such as certain crises produce upon individuals, in which horror of the past supplies the place of forgetfulness, and in which the state, inflamed by civil wars, springs forth so to speak from its ashes, and regains the vigour of youth in issuing from the arms of death. Such was Sparta in the time of Lycurgus, such was Rome after the Tarquins, and such among us moderns were Holland and Switzerland after the expulsion of their tyrants.

But these events are rare; they are exceptions, the explanation of which is always found in the particular constitution of the excepted state. They could not even happen twice with the same nation; for it may render itself free so long as it is merely barbarous, but can no longer do so when the resources of the state are exhausted. Then commotions may destroy it without revolutions being able to restore it, and as soon as its chains are broken, it falls in pieces and ceases to exist; henceforward it requires a master and not a deliverer. Free nations, remember this maxim: 'Liberty may be acquired but never recovered'.

Youth is not infancy. There is for nations as for men a period of youth, or, if you will of maturity, which they must await before they are subjected to always; but it is not always easy to discern when a people is mature, and if the time is anticipated, the labour is abortive. One nation is governable from its origin, another is not so at the end of ten centuries. The Russians will never be really civilized, because they have been civilized too early. Peter had an imitative genius; he had not the true genius that creates and produces something from nothing. Some of his measures were beneficial, but the majority were ill-timed. He saw that his people were barbarous, but he did not see that they were unripe for civilization; he wished to civilize them, when it was necessary only to discipline them. He wished to produce at once Germans or Englishmen, when he should have begun by making Russians; he prevented his subjects from ever becoming what they might have been, by persuading them that they were what they were not. It is in this way that a French tutor trains his pupil to shine for a moment in childhood, and then to be forever a nonentity. The Russian Empire will desire to subjugate Europe, and will itself be subjugated. The Tartars, its subjects or neighbours, will become its masters and ours. This revolution appears to me inevitable. All the kings of Europe are working in concert to accelerate it.

it is considered a *rempshel* only admissible in so far as one can exploit it to one's own advantage.

- (1) white elephant (2) milch cow
 (3) whirlpool (4) juggernaut

37. Creating value in an age of affluence is much more sophisticated than just disaggregating production and assembling products where wages are the lowest. Rising affluence means a demand for *strapping* of goods and services to suit individual needs which change and evolve quickly.

(1) customisation (2) sophistication
(3) modification (4) innovation

38. Repudiating the traditional view that the spinal cord was an extension of the brain, *aptunists* averred that the brain was an extension of the spinal cord and an individual's character and attitudes were determined by the structure of the brain.

(1) anthropologists (2) psychologists
(3) phrenologists (4) scientists

39. To which of the following questions does the passage provide an answer?
- Why are laws necessary for nations?
 - Why do laws fail to work in some nations?
 - When are nations mature for laws?
 - Why are people more important than laws in nations?
40. What is the advice that the author gives free nations?
- They should protect the liberty that has been obtained after much sacrifice.
 - They should not let revolutions and crisis overwhelm and overpower them.
 - They should first discipline their citizens before they attempt to civilize them.
 - They should beware of chaos and civil unrest which could lead to their collapse.
41. Which of the actions is analogous to the one cited at the beginning of the passage?
- Charting the course on a map before setting forth on a journey.
 - Checking the depth of a river before plunging into it.
 - Inspecting the conditions of a cricket pitch before drawing the strategy of the game.
 - Administering a test dose of a vaccine on a patient before giving him a shot.
42. Which of the following does the author seem to highlight through the observation, 'Crete had good laws and worthless men'?
- Its people were steeped in vices that no laws could redeem.
 - Its people were not worthy of the laws that were made.
 - The misjudgment on the part of the law-givers.
 - The intractable nature of the people that was not amenable to change.

DIRECTIONS for questions 43 to 46: 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.

43. All over the commonwealth, we see the devastation of downturn. Nearly 750 million commonwealth citizens live in dollar-a-day poverty. And the neediest areas of national life – health and education – have borne the brunt. We are quite aware of the solutions to this confluence of crises.
- But recovery and prosperity will not come from one country, one economy or one continent alone.
 - The challenge now is to secure the shared will and the shared funds to implement them.
 - Nevertheless, the world in all its diversity needs to act together.
 - The commonwealth, however, has a record of working together to achieve positive results.
44. Microsoft Research has developed a system called JamBayes that continuously analyses current and past traffic trends to make inferences about the future conditions on roads. It not only predicts future journey times and plots congestion-free routes but

- also warns drivers to leave earlier in order to avoid impending gridlocks.
- Such information on traffic densities can help avoid traffic jams.
 - It gives real-time advice on journey times and is thus very helpful.
 - It can help predict a person's time of arrival more accurately.
 - This can radically change the way we plan and set out on our journeys.
45. Recently, animal behaviourists have unleashed a pack of ingenious experiments to test the capabilities and cognition of the cat and the dog to find which of the pets is superior. They discovered that at 64 grams, the average dog brain is far bigger than its feline equivalent, which weights a mere 2 grams.
- But if you measure brain mass as a percentage of body mass, cats win by a whisker.
 - But then animals smaller in size will have smaller brains.
 - But then the average dog is much bigger than the average cat.
 - However, neuroanatomy is not the right way to assess their smartness.
46. He had been dubbed a failure in school and college, but he is determined to make his life a success. He wants to become an ace salesman simply because he has the power of persuasion, negotiation and conversation. It doesn't take long before he realizes the corporate world is truly cut-throat, cruel and completely devoid of ethics.
- But he knows that life is either a daring adventure or nothing.
 - But an ambitious horse will never return to its old stable.
 - Well, to win some things in life, you've got to lose some.
 - But to give it up now would be to be branded a failure twice.
- DIRECTIONS** for questions 47 to 50: In each of the following questions there are 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 (including spelling, punctuation and logical consistency). Then, choose the **most appropriate** option.
47. (A) It is better to err on the side of doing than the side of caution, noted a futurologist,
 (B) anticipating scenarios and events.
 (C) That was then; in economically more predictable, lesser uncertain times globally.
 (D) Fast forward to the here and now, the post-financial crisis world,
 (E) and it's clear that panoply of risks do need to be factored into policy design.
- A, D and E
 - B and D
 - A and C
 - B and E
48. (A) It was wisely said that impatience can be a virtue if practiced on oneself.
 (B) Right though this statement is, it is also incomplete and inconclusive.
 (C) In fact, all disturbing, harmful and retarding emotions

SECTION – III

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

The tables below provide information regarding the exports of goods and services and the GDP of nine nations, for the period 2004-08. The questions that follow pertain only to these nine nations.

Table – I
Exports of Goods and Services

Nation	2004	2005	2006	2007	2008
Afghanistan	30.3	25.2	22.9	17.3	17.2
Bangladesh	15.5	16.6	19.0	19.8	20.3
Bhutan	28.6	35.1	45.2	52.6	55.9
India	18.1	19.9	22.2	21.2	22.7
Indonesia	32.2	34.1	31.0	29.4	29.8
Malaysia	115.4	117.5	116.7	110.2	112.3
Nepal	16.7	14.6	13.4	13.0	12.1
Pakistan	15.7	15.7	15.2	14.2	12.8
Sri Lanka	35.3	32.3	30.1	29.1	24.9

Table – II
Gross Domestic Product (GDP)

Nation	2004	2005	2006	2007	2008
Afghanistan	5704	6814	8166	10153	10624
Bangladesh	56560	60277	61901	68415	79554
Bhutan	691	768	883	956	1283
India	700921	81051	914892	1176890	1159170
Indonesia	185914	265869	364571	431933	510730
Malaysia	124749	137954	156408	186721	221773
Nepal	7273	8130	9074	10282	12614
Pakistan	92977	109600	127500	143203	164539
Sri Lanka	20662	24405	28281	32363	40564

51. If any nation for which the value of the GDP grew by 10% or more in each of the years (when compared to the previous year) from 2005 to 2008 is called a fast growing nation, then what is the least value of

the exports (in Mn.US \$) in the year 2008 of any such fast growing nation?

52. The export steadiness of any nation is defined as the reciprocal of the range (i.e., the difference in the maximum value and the minimum value) of its statistic given in Table - I. For example, the export steadiness of India = $\frac{1}{22.7 - 18.1}$.

If any nation which has seen a consistent, year on year, increase in its exports is called an export oriented nation, what is the value of the exports (in Mn.US \$) in the year 2008 of the export oriented nation whose export steadiness is the maximum?
 (1) 1526 (2) 21061 (3) 263131 (4) 152197

53. Considering the period 2004-08, what is the compounded annual growth rate of the GDP of the nation which saw the highest average annual growth in the value of its exports? (approximately)

(1) 8.3% (2) 10.2% (3) 13.5% (4) 16.5%

DIRECTIONS for question 54: Answer the question on the basis of the information given below.

54. Eight persons – A through H – who are from eight cities – Cochin, Hyderabad, Bangalore, Chennai, Pune, Mumbai, Kolkata and Delhi – are sitting around a circular table. The following information is known about the order in which they are seated:

 - A is sitting next to the person from Kolkata.
 - The person from Mumbai is sitting opposite H who is from Cochin.
 - F, who is neither from Bangalore nor Mumbai, is sitting to the immediate right of E.
 - G, who is from Hyderabad, is sitting opposite the person from Bangalore, who, in turn, is not adjacent to either A or E.
 - E, who is from Chennai, is sitting opposite A.

Who is sitting opposite the person from Kolkata?

- (1) B (2) F
 (3) D (4) Cannot be determined

DIRECTIONS for questions 55 to 58: Answer the questions on the basis of the information given below.

The company XYZ Ltd. recruited 80 trainees, of which it was observed that every trainee had

- (i) exactly one qualification among (a) B.E. (b) M.Sc.
- (ii) at least one feature among the following two:
 - (a) He is from a reputed college.
 - (b) He had good academic record.
- (iii) experience in exactly one of the following two domains:
 - (a) Programming
 - (b) Testing

Further it is also known that,

- (a) 20 trainees who are B.E.s had a good academic record as well as experience in Testing. These trainees form 50% of those with experience in Testing.
- (b) No trainee with experience in Programming had both the features mentioned in (ii), i.e., being from a good college and having a good academic record.
- (c) 30 trainees were M.Sc.s, of which 15 had experience in Programming.
- (d) Of the trainees with experience in Testing, 15 were from a reputed college and they had good academic record.

- (e) In total, 45 trainees had a good academic record, of which two-thirds were B.E.s and one-third had experience in Programming.

55. How many of the trainees are B.E.s with experience in Programming and a good academic record?

- (1) 8
- (2) 10
- (3) 12
- (4) Cannot be determined

56. How many trainees who are B.E.s with experience in Testing had a good academic record and also are from a reputed college?

- (1) 5
- (2) 7
- (3) 12
- (4) Cannot be determined

57. How many trainees who are M.Sc.s are from a reputed college but had neither a good academic record nor any experience in Programming?

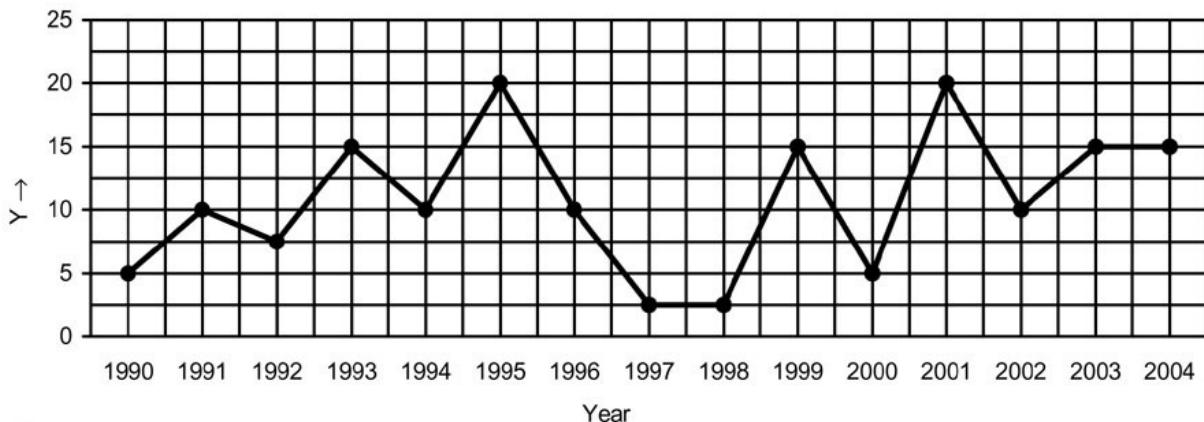
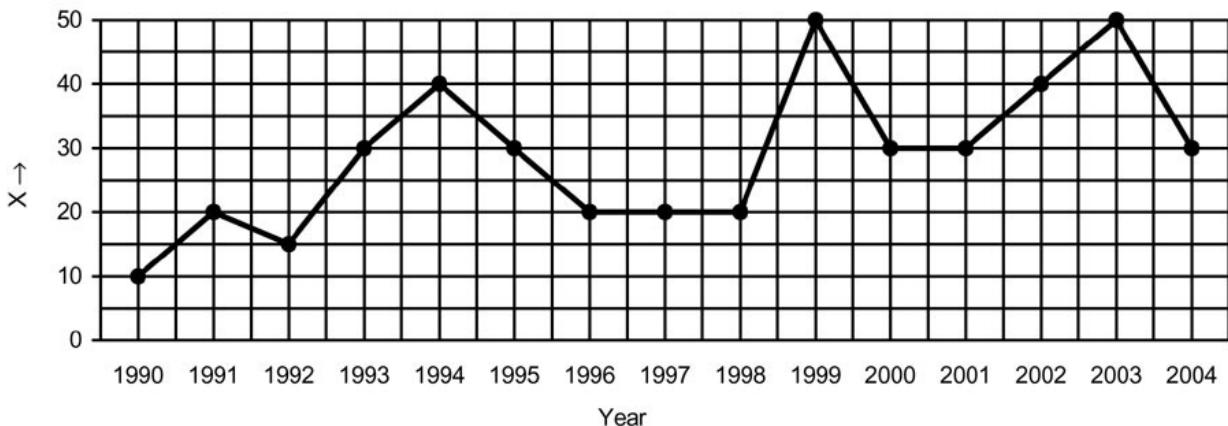
- (1) 5
- (2) 6
- (3) 7
- (4) Cannot be determined

58. If 18 B.E.s had a good academic record but are not from a reputed college, how many M.Sc.s are from a reputed college and with a good academic record?

- (1) 3
- (2) 4
- (3) 5
- (4) Cannot be determined

DIRECTIONS for questions 59 to 62: Answer the questions on the basis of the information given below.

The Finance manager of the company ABC Ltd, was analysing two charts, both of which are given below. One chart pertained to the annual performance of the company on the parameter X, and the other pertained to the annual performance of the company on the parameter Y, for the 15 year period 1990-2004.



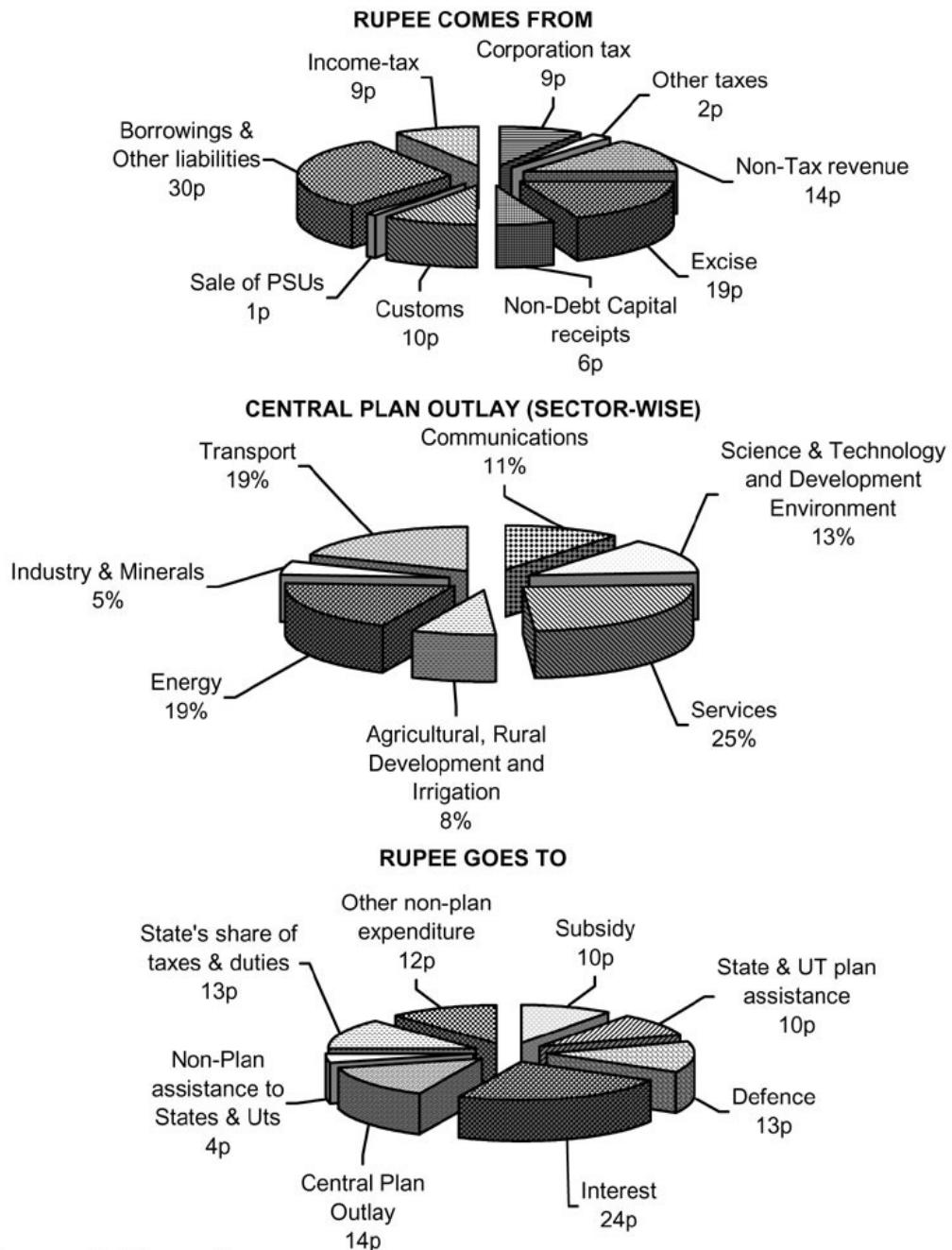
$$\text{Profit} = \text{Revenue} - \text{Expenses}$$

$$\text{Profitability (in \%)} = \frac{\text{Profit}}{\text{Expenses}} \times 100$$

However, the manager was confused over the exact nature of the individual charts and the only aspect he was certain about was that X and Y represented exactly two of the following three parameters.

DIRECTIONS for questions 63 to 65: Answer the questions on the basis of the information given below.

The pie charts below show the sources of income and the different heads of expenditure of the central government and the sector-wise central plan outlay.



Note: Total income = Total expenditure

- 63.** If the revenue from Toll Gate Tax is Rs.316 crore, which constitutes 5% of the revenue from Customs, then what is the Central Plan Outlay for the Energy sector? (approximately)
 (1) Rs.1,410 crore (2) Rs.2,910 crore
 (3) Rs.1,680 crore (4) Cannot be determined
- 64.** The expenditure incurred by the government on Subsidies and Interest payments is what percent of the revenue earned by the government from Other taxes, Non-Tax Revenue, Income tax and Corporation tax put together?
 (1) 100% (2) 200%
 (3) 50% (4) Cannot be determined
- 65.** By approximately what percent is the Central Plan Outlay on Service, Communications and Industry and Minerals more than what the government spends on Non-Plan assistance to states and UT's?
 (1) 10% (2) 40%
 (3) 44% (4) Data Inadequate

DIRECTIONS for questions 66 to 68: Answer the questions on the basis of the information given below.

A children's park had the following types of traffic signals for children driving the toy cars.

Red light (R) = stop

Red and Yellow lights (RY) = turn left

Red, Green and Yellow lights (RGY) = turn right

Green and Yellow lights (GY) = go at 20 kmph speed

Green and Red lights (GR) = go at 8 kmph speed

Green light (G) = go at 4 kmph speed

All children driving the cars starts at a point on the road and should compulsorily follow the traffic signals. For one of the children, Arun, who is heading North, the following were the signals encountered. (the time mentioned in each case below is applicable after crossing the previous signal)

Starting point – G

After half an hour, 1st signal – RY and GR;

After 15 minutes, 2nd signal – RGY;

After half an hour – 3rd signal – RGY and GY;

After 24 minutes, 4th signal – RY and GR;

After 15 minutes, 5th signal – R.

- 66.** The total distance that Arun travelled from the starting point till the 5th signal is
 (1) 18 km (2) 20 km
 (3) 24 km (4) None of these

- 67.** After the starting point, if the first signal was RGY and GR, instead of RY and GR, what would be the final position of Arun from the starting point?
 (1) 6 kms to the West and 4 kms to the South
 (2) 6 kms to the West and 8 kms to the North
 (3) 10 kms to the East and 8 kms to the North
 (4) 6 kms to the East
- 68.** If at the starting point, Arun was heading towards South, what would be his final position from the starting point?
 (1) 6 kms to the East and 8 kms to the South
 (2) 10 kms to the East and 8 kms to the South
 (3) 6 kms to the West and 8 kms to the South
 (4) 10 kms to the West and 4 kms to the North

DIRECTIONS for questions 69 and 70: Answer the questions independently of each other.

- 69.** Manoj and Manohar go on a long drive of a certain predetermined length. As they drive they play a game according to which they drive alternately and each of them can, in one chance, drive any whole number of kilometres between 2 km to 10 km (both values inclusive). The one who gets to drive the last kilometre is the winner. (Assume that both of them play intelligently and to win)

Which of the following statement(s) is/are true?

- (1) If Manoj starts the drive, then he will definitely win if the drive is 1008 km long.
- (2) If Manohar lost, then the drive could not have been 994 km long.
- (3) If the drive is 1001 km long, then the person starting will always win.
- (4) Both (1) and (2)

- 70.** Some children are standing in a row. All the children are facing North. There are twice as many girls in the row as there are boys. From the West end of the row, Ajay is 8th among the boys and 17th among all the children. From the East end of the row he is 20th among all the children. How many boys are there to the right of Ajay?

- (1) 9 (2) 4
- (3) 16 (4) Cannot be determined

(Key and Solutions for AIMCAT1116)

Key

1. 4	8. 2	15. 1	22. 2	29. 3	36. 4	43. 2	50. 3	57. 1	64. 1
2. 3	9. 1	16. 3	23. 2	30. 3	37. 1	44. 4	51. 4	58. 1	65. 3
3. 2	10. 3	17. 1	24. 3	31. 2	38. 3	45. 3	52. 2	59. 2	66. 1
4. 1	11. 1	18. 2	25. 2	32. 3	39. 2	46. 4	53. 3	60. 4	67. 1
5. 2	12. 3	19. 3	26. 3	33. 4	40. 4	47. 2	54. 2	61. 1	68. 3
6. 2	13. 4	20. 4	27. 1	34. 1	41. 4	48. 4	55. 2	62. 4	69. 3
7. 1	14. 3	21. 1	28. 1	35. 2	42. 3	49. 3	56. 4	63. 3	70. 2

Solutions

SECTION – I

Solutions for questions 1 and 2:

1. $\text{Rem}\left(\frac{81^{82}}{17}\right) = \text{Rem}\left(\frac{-4^{82}}{17}\right)$, since $\text{Rem}\left(\frac{81}{17}\right) = -4$
 $= \text{Rem}\left(\frac{(-4^2)^{41}}{17}\right) = \text{Rem}\left(\frac{16^{41}}{17}\right) = -1$

Hence, required remainder = 16

Alternative solution:

$$\begin{aligned} \text{Rem}\left(\frac{81^{82}}{17}\right) &= \text{Rem}\left(\frac{81^2 \cdot 81^{80}}{17}\right) \\ &= \text{Rem}\left(\frac{81^2}{17}\right) \times \text{Rem}\left(\frac{81^{80}}{17}\right) = 16 \times 1 \quad [\because \text{Rem}\left(\frac{81^{80}}{17}\right) = 1] \\ \text{By Fermat's theorem } \text{Rem}\left(\frac{a^{(p-1)k}}{p}\right) &= 1 \end{aligned}$$

where p is a prime number and a is not a multiple of p .
So the required remainder is 16. Choice (4)

2. In this case, we have been given $x - y = 9$, and need to find $x + y$. Since solving $x - y = 9$ and $x + y = k$ (say) is very simple, we can easily crack this question by plugging in values of k from the options.
Choice (1) : $x + y = 15$ and $x - y = 9 \Rightarrow x = 12, y = 3$. This does not satisfy $\sqrt{x^2 + 16y} + \sqrt{y^2 + 16x} = 45$
Choice (2) : $x + y = 21$ and $x - y = 9 \Rightarrow x = 15$ and $y = 6$. This also does not satisfy.
Choice (3) : $x + y = 31$ and $x - y = 9 \Rightarrow x = 20$ and $y = 11$. This satisfies ($\because \sqrt{400+176} + \sqrt{121+320} = 45$)

Alternative solution:

It is given that $\sqrt{x^2 + 16y} + \sqrt{y^2 + 16x} = 45$ --- (1)
and $x - y = 9$ ---- (2)

Let $\sqrt{x^2 + 16y} - \sqrt{y^2 + 16x} = k$ ---- (3)

Multiplying equations (1) and (3), we get

$$\left(\sqrt{x^2 + 16y}\right)^2 - \left(\sqrt{y^2 + 16x}\right)^2 = 45k$$

$$\Rightarrow x^2 + 16y - y^2 - 16x = 45k$$

$$\Rightarrow (x - y)(x + y) - 16(x - y) = 45k$$

$$\Rightarrow 9(x + y) - 16 = 45k \Rightarrow (x + y) - 16 = 5k$$

$$\Rightarrow x + y = 16 + 5k$$

For $k = 1, x + y = 21$. Solving $x = 15$ and $y = 6$.
But these values of x and y do not satisfy equation 1.
For $k = 3$, we get $x + y = 31$. Solving, we get $x = 20$ and $y = 11$.
These values for x and y satisfy equation (1).
Choice (3)

Solution for question 3:

3. Let the quantity filled by A and B and that emptied by C per hour be a, b and c respectively.
Let the volume of the cistern n be v .
It is given that,

$$\frac{v}{a+b-c} = 10 \quad \text{--- (1)}$$

$$\frac{v}{b-c} = 3 \cdot \frac{v}{a-c} \quad \text{--- (2)}$$

From equation (2), we get, $a - c = 3b - 3c$
 $a = 3b - 2c$ ----- (3)

$$\text{From statement (1), we get } \frac{v}{\frac{3}{5}a + \frac{5}{3}b} = \frac{v}{a+b}$$

$$\Rightarrow a + b = \frac{3}{5}a + \frac{5}{3}b \Rightarrow \frac{2}{5}a = \frac{2}{3}b \Rightarrow \frac{a}{b} = \frac{5}{3}$$

Let $a = 5k$ and $b = 3k$

Substituting the values of a and b in equation (3), we get $C = 2k$

$$\text{Now } \frac{v}{a+b-c} = \frac{v}{5k+3k-2k} = \frac{v}{6k}$$

$$\frac{v}{6k} = 10 \Rightarrow v = 60k$$

Therefore the time taken by C alone to empty the cistern

$$= \frac{v}{C} = \frac{60k}{2k} = 30 \text{ hours}$$

Thus statement I alone is sufficient.

From statement II, we get

$$\frac{v}{a+b-c} = \frac{4}{3} \frac{v}{a+b}$$

$$\Rightarrow 3a + 3b = 4a + 4b - 4c \Rightarrow a + b = 4c$$

$$\text{Now, } \frac{v}{a+b-c} = \frac{v}{4c-c} = \frac{v}{3c}$$

$$\text{It is given that } \frac{v}{3c} = 10 \text{ hours}$$

$$\therefore \frac{v}{c} = 30 \text{ hours}$$

Therefore the time taken by C alone to empty the tank is 30 hours.

Thus statement II alone is sufficient.

Therefore either statement alone is sufficient to answer the question.
Choice (2)

Solutions for questions 4 to 9:

4. This question is best solved using the concept of relative speeds. The speed of the boat in still water is its speed relative to the water. This relative speed remains the same, whether the boat is travelling upstream or downstream. Also, when the hat floats along with the water, its speed with respect to the water will be zero. Hence, the situation can be thought of as the boat moving away from the stationary hat at a certain speed (i.e., the speed of the boat relative to the water) for some time and then returning to the hat at the same speed, and hence taking the same amount of time. Hence, the boat have turned back when the hat had drifted a distance of exactly $\frac{2x}{2} = x$ (with respect to the ground). Therefore the hat drifted a distance x downstream in the same time that the man rowed the boat a distance of $3x$ upstream (both with respect to the ground). Hence $\frac{u-v}{v} = \frac{3}{1}$, where u and v are the speeds of the boat with respect to water and the speed of the water respectively. Hence $\frac{v}{u} = \frac{1}{4}$ i.e., v is 25% of u .

Alternative solution:

Let the distance travelled upstream after dropping the hat be m and the distance the hat travels downstream till he retrieves it be n (i.e., $m = 3x$ and $n = 2x$).

Considering his rowing speed and the speed of the stream to be u and v respectively, we get

$$\begin{aligned}\frac{m}{u-v} + \frac{m+n}{u+v} &= \frac{n}{v} \\ \Rightarrow (mu + mv + mu - mv + mu - nv)v &= n(u^2 - v^2) \\ \Rightarrow uv(2m + n) &= nu^2 \\ \because u \neq 0 & \\ \therefore nu - v(2m + n) &= 0 \\ \Rightarrow nu &= v(2m + n) \\ \Rightarrow \frac{u}{v} &= \frac{2m + n}{n}\end{aligned}$$

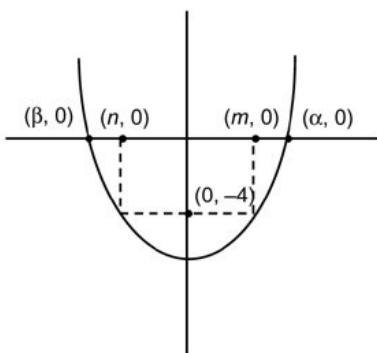
It is given that $n = \frac{2}{3} m \Rightarrow m = \frac{3}{2} n$

$$\begin{aligned}\therefore \frac{u}{v} &= \frac{2\left(\frac{3}{2}n\right)}{n} \\ \Rightarrow \frac{u}{v} &= 4 \text{ i.e., } v = \frac{1}{4}u \\ \therefore \frac{u}{v} \times 100\% &= \frac{1}{4} \times 100\% = 25\%\end{aligned}$$

Thus, the speed of the stream was 25% of the speed at which he was rowing the boat.

Choice (1)

5. Consider the diagram shown below:



Let $y = (x - m)(x - n) - 4$ ----- (1)

In the above equation, for $x = m$ and $x = n$, we get $y = -4$.

Again $(x - m)(x - n) - 4 = x^2 - (m + n)x + mn - 4$

The discriminant for the quadratic equation $y = 0$ is

$$\begin{aligned}\{-(m + n)\}^2 - 4(1)(mn - 4) \\ = m^2 + n^2 - 2mn + 16 = (m - n)^2 + 16\end{aligned}$$

Since the discriminant is greater than 0, the roots are real and distinct.

Let the roots be α and β , where $\alpha > \beta$.

Now, the co-efficient of x^2 is 1, (i.e., positive). The graph is a parabola that opens upwards as shown in the figure above.

We can see that the roots lie in $(-\infty, n)$ and (m, ∞) .

Alternative solution:

With some basic understanding of graphs, this question can be solved very easily by first imagining the graph of $(x - m)(x - n) = 0$, which will intersect the x-axis at $x = m$ and $x = n$, i.e., $(m, 0)$ and $(n, 0)$. Now the graph of $(x - m)(x - n) - 4 = 0$ is simply the original graph being pulled downwards by 4 units. In the process, clearly the new points of intersection of the curve with the x-axis will now move away from each other in opposite directions. Thus one of the roots of $(x - m)(x - n) - 4 = 0$ will lie between $-\infty$ and n and the other root will lie between m and $+\infty$ (given that $m > n$). Choice (2)

6. This question is solvable in a single step if one remembers the basic result that the sum of the first ' n ' odd numbers exactly equals n^2 .

Thus the sequence of odd numbers (1, 3, 5,) perfectly satisfies the conditions given. Hence, the ratio of the 12th and 15th terms will be the ratio of the 12th and the 15th odd numbers. The n^{th} odd number is $2n - 1$. Hence required ratio = $\frac{2.12 - 1}{2.15 - 1} = \frac{23}{29}$

Alternative solution 1:

Let the first term and the common difference of the given AP be a and d respectively.

$$S_p = \frac{p}{2}[2a + (p-1)d]$$

$$S_q = \frac{q}{2}[2a + (q-1)d]$$

$$\text{It is given that } \frac{S_p}{S_q} = \frac{p^2}{q^2}$$

$$\text{Now } \frac{T_p}{T_q} = \frac{S_p - S_{p-1}}{S_q - S_{q-1}} = \frac{p^2 - (p-1)^2}{q^2 - (q-1)^2} = \frac{2p-1}{2q-1}$$

$$\therefore \frac{T_{12}}{T_{15}} = \frac{2(12)-1}{2(15)-1} = \frac{23}{29}$$

Alternative solution 2:

Since, it is given that $\frac{S_p}{S_q} = \frac{p^2}{q^2}$

$$\therefore \frac{S_{12}}{S_{15}} = \frac{12^2}{15^2}$$

$$\frac{\frac{12}{2}[2a+11d]}{\frac{15}{2}[2a+14d]} = \frac{12^2}{15^2}$$

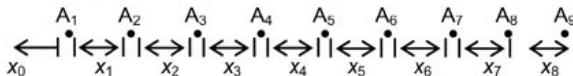
$$\Rightarrow \frac{2a+11d}{2a+14d} = \frac{12}{15}$$

$$\Rightarrow 6a = 3d \text{ or } d = 2a$$

$$\therefore \frac{T_{12}}{T_{15}} = \frac{a+11d}{a+14d} = \frac{a+22a}{a+28a} = \frac{23}{29}$$

Choice (2)

7. Let us denote the Mock cats to be attempted by Pradip by A_i where $i = 1$ to 9.



Let us denote the number of Mock cats not attempted by Pradip before A_1 , those between A_1 and A_2 , those between A_2 and A_3 , and so on upto those between A_8 and A_9 as $x_0, x_1, x_2, \dots, x_8$ respectively.

Now $x_0 + x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 = 23 - 9 = 14$ where $x_0 \geq 0$ and $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8 \geq 1$.

Let $x_0 + 1 = x_0 \therefore x_1 + x_2 + \dots + x_8 = 14 + 1 = 15$

The number of positive integral solutions of the above equation $= {}^{15-1}C_{9-1} = {}^{14}C_8 = 3003$ Choice (1)

8. This question can be solved by approaching from the options.

Choice (1) :

If base = 12, consider $(03)_{12}$ and $(13)_{12}$. One-third their sum will become $(6)_{12}$. This does not end in 2 OR 5 OR 8.

Choice (2) :

If base = 9, consider $\frac{(03)_9 + (13)_9}{3} = (05)_9$. Now

$$\frac{(13)_9 + (23)_9}{3} = (12)_9 \text{ and } \frac{(23)_9 + (33)_9}{3} = (18)_9.$$

Hence, choice (2) satisfies the condition.

Alternative solution:

Let the two numbers be x and y .

x in base n ends in 3.

\therefore We can express x as $na + 3$

Similarly y in base n ends is 3, so y can be expressed as $nb + 3$.

Now $\frac{1}{3}(x + y)$ expressed in base n ends in 3.

$$\therefore \frac{n(a) + 3 + n(b) + 3}{3} = \frac{n(a+b)}{3} + 2$$

This ends in 2 or 5 or 8.

Now $(a + b)$ when divided by 3 can leave a remainder of 0 or 1 or 2.

When the remainder is 0, we get $\frac{n(a+b)}{3} + 2 = nk + 2$

When the remainder is 1, i.e., $a + b - 1$ is divisible by 3, we get

$$\frac{n(a+b)}{3} + 2 = \frac{n(a+b-1)}{3} + \frac{n}{3} + 2 = nk_1 + \frac{n}{3} + 2$$

$$\text{Now } \frac{n}{3} + 2 = 5 \Rightarrow n = 9$$

Again when $a + b$ when divided by 3 leaves remainder 2, i.e., $a + b - 2$ is divisible by 3, we get

$$\frac{n(a+b)}{3} + 2 = \frac{n(a+b-2)}{3} + \frac{2n}{3} + 2 = nk_2 + \frac{2n}{3} + 2$$

$$\text{Now, } \frac{2n}{3} + 2 = 8 \Rightarrow n = 9$$

Therefore the base in which the numbers are written is 9.
Choice (2)

9. $f(x) = (x - 3)(x - 5)(x - 7) + k^2(x - 4)(x - 6)(x - 8)$

$$f(3) = 0 + k^2(-1)(-3)(-5) = -ve$$

$$f(4) = 1(-1)(-3) + 0 = +ve$$

$$f(5) = 0 + k^2(1)(-1)(-3) = +ve$$

$$f(6) = (3) \times (1) \times (-1) + 0 = -ve$$

$$f(7) = 0 + k^2(3)(1)(-1) = -ve$$

$$f(8) = 3 \times 3 \times 1 + 0(0) = +ve$$

\therefore There are 3 real roots, each one between (3, 4), (5, 6), and (7, 8).
Choice (1)

Solutions for questions 10 and 11:

Let the weights of the five boxes be w_1, w_2, w_3, w_4 and w_5 where $w_1 < w_2 < w_3 < w_4 < w_5$.

When weighed in combinations of 3, we will get 10 weights (${}^5C_3 = 10$)

It is given that the weights are in the range [33, 43]

$$\text{Now } 33 + 34 + 35 + \dots + 43 = \frac{11}{2}(33 + 43) = 418$$

The weights will be as follows

- | | |
|-----------------------|------------------------|
| (1) $w_1 + w_2 + w_3$ | (2) $w_1 + w_2 + w_4$ |
| (3) $w_1 + w_2 + w_5$ | (4) $w_1 + w_3 + w_4$ |
| (5) $w_1 + w_3 + w_5$ | (6) $w_1 + w_3 + w_5$ |
| (7) $w_2 + w_3 + w_4$ | (8) $w_2 + w_3 + w_5$ |
| (9) $w_2 + w_4 + w_5$ | (10) $w_3 + w_4 + w_5$ |

With some reasoning it can be figured out that the lightest two triplets and the heaviest two triplets can be identified from among the 10 triplets.

The lightest two will be:

$$w_1 + w_2 + w_3 < w_1 + w_2 + w_4$$

The heaviest two will be:

$$w_5 + w_4 + w_3 > w_5 + w_4 + w_2$$

Also, when we add all the weights, we get $6(w_1 + w_2 + w_3 + w_4 + w_5)$ i.e., each weight will be present 4C_2 or 6 times.

From 33 to 43, there are 11 values, out of which one value must be excluded such that the sum is a multiple of 6. The only possibilities are

Case I : $418 - 34 = 384$ and

Case II : $418 - 40 = 378$

With a little presence of mind, we can observe that out of 34 and 40, only 40 appears among the choices for Q.10. Hence, we can immediately conclude that case II is valid and case I is not valid. This can help us to directly answer Q.10, right away. Also, we can avoid a lot of calculations before figuring out which of the two cases is correct, and proceeding to answer Q.11. The complete calculations are given below.

As per case II

$$6(w_1 + w_2 + w_3 + w_4 + w_5) = 378$$

$$\therefore w_1 + w_2 + w_3 + w_4 + w_5 = 63 \quad \dots (1)$$

$$\text{Also, } w_1 + w_2 + w_3 = 33 \quad \dots (2) \text{ and } w_3 + w_4 + w_5 = 43 \quad \dots (3)$$

$$\text{and } w_1 + w_2 + w_4 = 34 \quad \dots (4) \text{ and } w_2 + w_4 + w_5 = 42 \quad \dots (5)$$

From (1), (2) and (3)

we get $w_4 + w_5 = 30$ and $w_1 + w_2 = 20$

$$\therefore w_3 = (w_1 + w_2 + w_3 + w_4 + w_5) - (w_1 + w_2) - (w_4 + w_5) \\ = 63 - (20) - (30) = 13$$

Now, using (4) and (5)

$$\text{we get } w_3 + w_5 = 29 \text{ and } w_1 + w_3 = 21$$

$$w_5 = 29 - 13 = 16 \text{ and } w_1 = 21 - 13 = 8$$

$$\therefore w_4 = 14 \text{ and } w_2 = 12$$

Thus the weights of the boxes were 8 kg, 12 kg, 13 kg, 14 kg and 16 kg.

As per case I

$$6(w_1 + w_2 + w_3 + w_4 + w_5) = 418 - 34$$

$$\therefore w_1 + w_2 + w_3 + w_4 + w_5 = 64 \quad \dots (1)$$

$$\text{Also, } w_1 + w_2 + w_3 = 33 \quad \dots (2) \text{ and } w_3 + w_4 + w_5 = 43 \quad \dots (3)$$

$$\text{and } w_1 + w_2 + w_4 = 35 \quad \dots (4) \text{ and } w_2 + w_4 + w_5 = 42 \quad \dots (5)$$

From (1), (2) and (3)

we get $w_4 + w_5 = 31$ and $w_1 + w_2 = 21$

$$\therefore w_3 = (w_1 + w_2 + w_3 + w_4 + w_5) - (w_1 + w_2) - (w_4 + w_5) \\ = 64 - (21) - (31) = 12$$

Now, using (4) and (5)

$$\text{We get } w_3 + w_5 = 29 \text{ and } w_1 + w_3 = 22$$

$$\therefore w_5 = 29 - 12 = 17 \quad \therefore w_1 = 22 - 12 = 10$$

$$\therefore w_4 = 14 \text{ and } w_2 = 11$$

Thus the weights of the boxes are 10 kg, 11 kg, 12 kg, 14 kg and 17 kg.

Now, as it is given that all the weights except one were composite numbers, case I is not admissible.

10. 40 kg cannot be the weight of a lot of 3 boxes from the 5 boxes.
Choice (3)

11. The weight of the box having the least weight was 8 kg.
Choice (1)

Solutions for questions 12 to 20:

12. The maximum value of $\cos\theta_i = \frac{1}{2}$ (for $i = 1$ to 5)
 $\Rightarrow \frac{1}{2} + \frac{1}{2}x + \frac{1}{2}x^2 + \frac{1}{2}x^3 + \frac{1}{2}x^4 = 3$
 $\Rightarrow x + x^2 + x^3 + x^4$ (say $f(x) = 5$)
 $f(1) = 4$
 $f(1.1) = 1.1 + 1.21 + 1.331 + 1.4641 = 5.1051$
 \therefore The least value of x (i.e., a) for which the equation is satisfied lies between 1 and 1.1.
Choice (3)

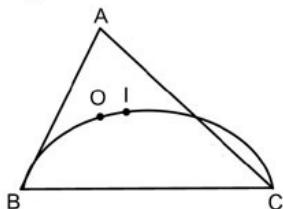
13. Consider the 2 squares that can be chosen from the first 2 columns.

When the first square is chosen either from the top row or the bottom row in the first column, only one square can be chosen from the 2nd column such that they have only one corner in common. If any other square is chosen from the first column, 2 squares can be chosen for each square. Thus from the first two columns, $2 \times 1 + 6 \times 2$ or 14 pairs of squares can be chosen.

In a 8×8 chessboard, 7 pairs of adjacent columns can be chosen.

\therefore The total number of ways of choosing the squares
 $= 7 \times 14 = 98$.
Choice (4)

14. Consider the figure shown below:



O is the orthocentre

$\therefore \angle BOC = 180^\circ - \angle A$

I is the incentre.

$\therefore \angle BIC = 90^\circ + \frac{\angle A}{2}$

B, O, I, C are concyclic

$\therefore \angle BOC = \angle BIC$ i.e., $180^\circ - \angle A = 90^\circ + \frac{\angle A}{2}$

$\Rightarrow \angle A = 60^\circ$
Choice (3)

15. $\frac{\log_b a + \log_b c}{2} \geq (\log_b a \times \log_b c)^{1/2}$ ($: AM \geq GM$)
 $\Rightarrow \frac{\log_b b^2}{2} \geq (\log_b a \times \log_b c)^{1/2} \Rightarrow (\log_b a \times \log_b c) \leq 1$.
Choice (1)

16. $x = 8 + 8^{1/3} + 8^{2/3}$

$$\Rightarrow x = 8 + 2 + 4 \Rightarrow x = 14$$

Now substituting $x = 14$ in the given equation we get
 $(14)^3 - 24(14)^2 + 168(14) - 381 = 2744 - 4704 + 2352 - 381 = 5096 - 5085 = 11$

Alternative solution:

$$x = 8 + 8^{1/3} + 8^{2/3}$$

$$\therefore (x - 8) = (8^{1/3} + 8^{2/3})$$

Cubing both sides, we get

$$x^3 - 24x^2 + 192x - 512 = 8 + 64 + 3.8^{1/3} \cdot 8^{2/3} (x - 8)$$

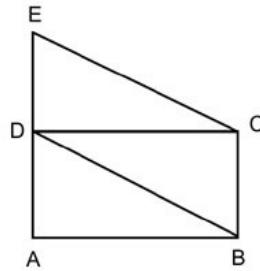
$$x^3 - 24x^2 + 168x - 392 = 0$$
 or

$$x^3 - 24x^2 + 168x - 381 - 11 = 0$$
 or

$$x^3 - 24x^2 + 168x - 381 = 11$$

Choice (3)

- 17.



Area of EPBC – Area of $\triangle PAB = \frac{ab}{2}$ where $a = AB, b = BC$

\therefore Area EPC + Area CPB – Area PAB = $\frac{ab}{2}$

\therefore Area EPC = $\frac{ab}{2}$

\therefore One possible position for P is D.

If P is any point on BD, Area EPC = Area DEC

\therefore The locus of P is the line BD.
Choice (1)

18. $100 = 4 \times 25$

$$= 5 \times 20$$

$$10 \times 10$$

$$20 \times 5$$

$$25 \times 4$$

$$50 \times 2$$

Only 6 different types of regular polygons can be formed (regular polygon with 4, 5, 10, 20, 25, 50 sides).

Choice (2)

19. The number of questions asked 5 times would be the greatest when the number of questions in the other categories was the least, i.e., questions were used either only once or 5 times.

Let the number of questions used exactly once and exactly 5 times be x and y respectively.

$$\therefore x + y = 360 \quad \dots (1)$$

$$x + 5y = 600 \quad \dots (2)$$

Solving, we get $y = 60$

Therefore the number of questions that were used exactly 5 times was at most 60.
Choice (3)

- 20.

Marked Price (MP)	Discount	Selling Price (SP)	Cost Price (SP)	Profit	Profit Amount
8K	3K	5K	4K	K	25%

Since the discount is 37.5% which is $3/8$, let us assume the marked price as 8K.

$$\therefore \text{Discount} = 37.5\% \text{ of } (8K) = 3K$$

$$\therefore \text{Selling Price} = M.P - \text{Discount} = 8K - 3K = 5K$$

Since the profit is $1/3^{\text{rd}}$ of the discount, the profit is K.

So, the Cost Price = SP – Profit = 5K – K = 4K

$$\text{Profit Percent} = \frac{\text{Profit}}{\text{C.P.}} \times 100 = \frac{K}{4K} \times 100 = 25\%$$

Choice (4)

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

SECTION – II

Solutions for questions 21 to 23:

21. Statement A states the main idea on which the paragraph is based. It begins on a general note stating that people have always faced changes as they age but no generation has been exposed to so much changes as today's seniors. D follows A harking back to the past, saying how they grew up. 'They' in D refers to the seniors mentioned in A. B follows D by presenting the contrast. E complements B stating that some seniors are handling the changes well, for others it has prompted terror. C which is a continuation of the same idea expressed in E is ideally the concluding statement. Hence, ADBEC is the best sequence. Between statements A and E the former is better as the opening statement as it flows logically from the general to the specific and directly states the subject on which the para is based whereas statement E is rather abrupt as the introductory statement.
Choice (1)

22. Statement B begins the paragraph by starting the topic – an intimate relationship between social capital and crime. D follows B by explaining what that relationship is. A carries forward the idea expressed in D and is therefore a continuation of D, 'Such a law' in E refers to the 'criminal law' mentioned in A. It is stated in A that formal criminal law defines a set of social rules by which people in a society agree to abide. E states that is the reason why breaking such a law represents an offence against the society. Hence E follows A. C is conclusive in nature. Hence BDAEC.
Choice (2)

23. Statement D sets the stage for what is to follow. A and E, respectively, go on to explain how Israel is responsible for the transgression. 'These sites' in E refer to the sites mentioned in A, hence E follows A. B is a continuation of what is stated in E. 'This attempt' in B refers to the designating of the sites as Jewish heritage sites by Israel. Also B states "this cannot pass as a benign attempt". In such a case what else could the perception be? And this comes through sentence C that concludes.... the para by saying that organised Judaisation of ancient sites is a plan to deny Palestinians their share of the past. DAEBC is the correct sequence.
Choice (2)

Solutions for questions 24 to 27:

Number of words and Explanatory notes for RC:

Number of words : 889

24. The various ideas that the author presents contribute to a central idea that 'real Jewishness' or true authenticity is about how relevant the faith and its culture are to individuals in their lives and living, that being what truly matters. Choice (3) comes closest to presenting this central idea.
Choice (3)

25. In para 3 the author explains that 'real Jewishness' is that which has evolved keeping pace with changing times while holding on to basic values, and that even what is now considered tradition also became part of the faith as it evolved in changing times in the past. Thus real Jewishness is that which is relevant to life and living, through the times. In para 10 he starts by saying that real Jews are not only those who are popularly recognised as being Jewish. Real Jews are also those who come from all walks of life, and adapt to modern times and modern life (intermarry, do karate, are bisexual; are pop stars, yoga teachers, Sufis) in the very same way that others do. Thus both paragraphs present the idea that relevance to life and living is real Jewishness (choice 2). Choice (1) is inappropriate – while its first part is relevant, the second part is not; the examples are not of the manner of evolution but of what has evolved. Choice (3) is inappropriate – while its second part is relevant, the first part is not; para 3

indicates that some part of orthodoxy (core values, myths, cultural traits) remain relevant. Choice (4) is wrong, for the same reason.
Choice (2)

26. In paragraph 6 the author explains how 'traditionalists' view those who take into account the changes in circumstances around them, and how 'secularists' view those who take into account the desires of the heart and not the mind. Thus, in this para, the word 'compromise' is used in the sense of 'accommodate'. In paragraph 7 he indicates that the intention of progressive Jews is to maintain the 'authenticity' of their faith, not to reduce it. Thus, in this para, the word 'compromise' is used in the sense of 'dilute'.
Choice (3)

27. The phrase itself appears at the end of paragraph 8. It refers to the ideas presented in paras 7 and 8, and we understand that 'afflict the comfortable' would mean 'shaking one out of unconsidered and easy acceptance of the myth of authenticity' and 'comfort the afflicted' would mean 'enabling one who is so shaken to consider and cope with change'. The question statement asks what we can infer from this, i.e., why would the author want the American Jew to consider and cope with change? We understand why when we look back at paras 2, 3 and 4, where he says '...the entire notion of authenticity is a false projection of particular historical quirks – onto an imagined ideal of "realness" that artificially freezes culture, and thus spells its demise'; goes on to say 'like any living culture, Jewish culture (and religion) has evolved over time in order to remain vibrant'; and further 'to imagine that cultural forms must remain static to be authentic is to doom a culture to obsolescence'. From this we can infer that keeping pace with change would keep the faith vibrant and guard it against obsolescence.
Choice (1)

Solutions for questions 28 to 30:

28. The usage of line is incorrect in choice 1. '..... put lives on line' is an incorrect expression. The correction is '..... put their lives in the line of duty'.
Choice (1)

29. The error lies in choice 3. The correct expression is 'put your shoulders to the wheel' which means to start working very hard at a particular task.
Choice (3)

30. The usage of 'open' is incorrect in choice 3. The correction is '..... open up a whole.'
Choice (3)

Solutions for questions 31 to 34:

Number of words and Explanatory notes for RC:

Number of words : 710

31. Choice 2 is not true – refer to penultimate para, penultimate sentence beginning 'For the most part'.
Choice (2)

32. Refer to the last para – statements A, B and C are true. D is not true because the Puritanic culture became a small element in the Kaleidoscopic picture.
Choice (3)

33. Choice 4 is not the author's opinion. In the last sentence of the passage he says that it is odd that Democracy in America is relevant in the aftermath of the II World War.
Choice (4)

34. Refer to para 2, the last sentence of para 2. Mill clearly sees democracy as being distinct from equality.
Choice (1)

Solutions for questions 35 to 38:

35. The first part of the para states that nihilism considered rationalism and materialism as the only source of knowledge and individual freedom.

The second sentence of the para supports the first by stating that the nihilists rejected man's from spiritual essence in favour of a materialistic one, from this, we can infer that the nihilists denounced (criticized) God and religious authority as antithetical to freedom. Hence, choice 2 suits the context perfectly. The words heckled (interrupt and harass a public speaker) and venerated (worshipped) are clearly inappropriate. The word mocked (ridicule, scoff at) is inapt when compared to the word denounced which suits the context perfectly.

Choice (2)

36. The first sentence states that the globalising economy is criticized in America for outsourcing jobs, unfair competition, etc. The second sentence states that this view persists not only in the US but in almost all countries of the world. The last sentence concludes saying that the globalising economy is like a juggernaut (an overwhelming force), which is admissible only if one can use to one's advantage. Hence, the word juggernaut most aptly describes the globalising economy. It cannot be called a milch cow (a source of easy profit) because the negative aspects of the globalising economy are overwhelming. The words whirlpool (a powerful circular eddy in the sea, often, causing suction at the centre) and white elephant (an item or property that is difficult to maintain or dispose of) are inapt in this context.

Choice (4)

37. The word customisation suits the description (to suit individual needs) the last part of the para perfectly. The word customisation itself means made to order or modify according to individual requirements. The words sophistication (urbanity, refinement) modification (alteration), and innovation are inapt in comparison.

Choice (1)

38. The word phrenologists (one who studies the shape and size of the cranium as a supposed indication of a character and mental faculties) is the most apt in the given context because the passage is about the positioning of the brain and its role in determining an individual character. The remaining option are inappropriate in comparison.

Choice (3)

Solutions for questions 39 to 42:

Number of words and Explanatory notes for RC:

Number of words : 697

39. Choice (2) is the answer. Refer to the first para, where the author suggests that wise lawgivers consider the state of the society before they draw up laws (applicability or suitability to a society). In the last para also, he suggests that nations should be subjected to laws only when they reach a certain maturity. So, it is implied that laws fail to work in societies which are not ready for them. Choices (1) and (4) can be eliminated because the passage does not deal with these issues. Choice (3) seems correct, but is not acceptable because the author merely says that nations have to attain a certain level of maturity before they are subjected to laws but does not specify in clear terms what that stage is or when it happens. When are nations mature in option (3) is not answered. Because there is no clarity on what the author considers to be mature.

Choice (2)

40. Refer to para (4), which ends with the maxim "liberty may be acquired but never recovered". In the preceding lines, the author explains when free nations run the risk of destroying themselves. (commotions may destroy) So, choice (4) is the best answer.

Choice (4)

41. Choice (4) is the best pick. The analogy in the first para drives home the point that it is important to check the condition or state of a society before subjecting it to laws. An architect tests the soil to check its endurance before he builds an edifice (Will it withstand the structure that will stand on it?). Similarly, before giving a vaccination, a doctor checks whether it is suitable for that patient by giving him a test dose. A vaccination is prescriptive, used for the purpose of preventing or guarding against a disorder. Note laws are also meant for regulating society (Correcting disorders). Choice (1) focuses on finding a direction, which is not suitable. In choices (2) and (3) aspect of regulation or course correction is not brought out. Plunging into a river and planning a strategy only involve studying conditions. While the first half seems suitable in all the options (that is studying or examining the state of a thing or person) the second half fails to capture the idea suggested in the passage.

Choice (4)

42. Refer to the first para, where the observation has been made. The author states that wise lawgivers consider the nature or state of the society before they make laws. Plato refusing to legislate for the Arcadians and Cyrenians is cited as an instance of lawgiver understating the nature of that society before making laws. (concept of equality will not be accepted by rich societies). The case of Crete has been provided to show that the laws per se may have been good, but were not suitable to that society. So, there was a misjudgment on the part of the lawgiver. (Framed Laws which were inapplicable to the times). So, choice (3) seems to be the author's focus. Other options do not point to the author's focus.

Choice (3)

Solutions for questions 43 to 46:

43. The passage talks about the 'downturn' in commonwealth nations which includes poverty, lack of good health and education. The last sentence says that 'we are aware of the solutions'. When we already know what the solutions are, the next stage is to implement them. Hence logically 2 concludes the paragraph. Option 1 tells us what 'commonwealth' means. Option 3 talks about the world whereas the passage is about the commonwealth nations in particular. There is a shift in the idea in option 4. The passage does not suggest anything about the integrity of the commonwealth nations. It is far-fetched.

Choice (2)

44. Microsoft Research has developed a system which should help plot traffic congestion and thus avoid impending traffic gridlocks. This can radically change the way we plan our journey. Hence option 4 can be the logical conclusion. The idea given in option 1 is redundant as it is part of what is given in the last sentence of the passage. Option 2 is too general. Option 3 is inaccurate as it talks about predicting the time of arrival which cannot follow the last sentence.

Choice (4)

45. It is a dispute on pets, whether the dog is superior or the cat. The last sentence tells us about an experiment and the discovery that an average dog's brain is bigger than that of an average cat. In line with this we can say that an average dog is bigger than an average cat. Hence 3 obviously follows and also concludes. The tone of option 1 does not gel with the previous sentence. It moves on to the second person narration saying 'if you measure' which doesn't gel with the previous sentence which is in terms of the third person 'they', referring to animal behaviourists. Option 2 is too generalized and not as specific to the context as 3 is. Option 4 is too categorical. It may not be right to assess it this way.

Choice (3)

46. Option 1 cannot conclude as it talks about a 'daring adventure'. He is not adventurous. He is determined. Option 2 is general and vague. He is ambitious. He wants to become successful in life. But the idea of returning to the old stable is not relevant in 2. Option 4 is a better conclusion as it relates to the particular topic mentioned. The paragraph begins saying that he was dubbed a failure and ends saying that he would be a failure again if he gives it up. Hence 4 is most appropriate. Option 3 comes more as an advice given by a third person and hence does not gel with the tone of the passage.
Choice (4)

Solutions for questions 47 to 50:

47. Part A is erroneous because 'than' should be followed by 'on' in order to maintain parallelism in the sentence. The correction is 'it is better to err on the side of daring than on the side....'. Part C is incorrect because the usage of 'lesser' is erroneous here. The correction is '... more predictable, less uncertain times....'. In part E the word 'panoply' should be preceded by the article 'a'. The correction here is '.... a panoply of risks....'. Only B and D are grammatically consistent.
Choice (2)

48. Part A is erroneous due to the word 'practiced'. Since it is a verb, the word should be written as 'practised'. Part B is erroneous because the use of the word 'also' is incorrect here as the structure of the sentence does not warrant the use of also. Therefore, the sentence should read 'Right though this statement is, it is incomplete and inconclusive'. In statement D 'transformed' should be followed by 'into' and not 'to'. Only C and E are grammatically correct.
Choice (4)

49. Part B is incorrect because the word 'arcacheology' is wrongly spelt. The correct spelling is 'archaeology'. The use of the word misuse is incorrect in part C. The word misuse which means to use wrongly or apply to the wrong purpose is inappropriate here. The word 'disuse' meaning lack of use is more apt here. Part D is erroneous because while 'buried in the silt' is incorrect, here the idea is that the route was not used and silt collected over it. So logically it was 'buried under the silt'. ('Buried under' suggests being in a layer under the silt; 'buried in' would be in the same layer as the silt, caught up in the silt). Only statements A and E are grammatically correct.
Choice (3)

50. B is erroneous because the word 'alarming' should be preceded by the article 'an', since gradient is a countable noun. Therefore the correction is '.... an alarming social gradient'. C is erroneous because the adjective 'unlucky' should be followed by the word enough which is an adverb of degree. The word 'further' in D conveys that it should be preceded by another adverb which conveys degree. The sentence means that having a disabled child is by itself unlucky and they are further pushed into poverty. Therefore the sentence is incomplete if the adverb 'enough' does not follow the adjective 'unlucky'. In statement E, 'prevailence' is wrongly spelt. The correction is 'prevalence' (occurrence). Statements A and D are correct.
Choice (3)

Difficulty level wise summary - Section II		
Level of Difficulty	Questions	
Very Easy	—	
Easy		
Medium	29, 30, 31, 35, 37, 38, 40, 42, 43, 44, 47	
Difficult	21, 22, 23, 24, 26, 28, 32, 33, 34, 36, 39, 41, 45, 46, 48, 50	
Very Difficult	25, 27, 49	

SECTION – III

Solutions for questions 51 to 53:

51. In such a question, it is better to solve for the answer by first focusing on the nation/s with very low values of exports (i.e., $GDP \times \text{exports} \text{ as \% of GDP}$). By observation we can zero in on Bhutan, Afghanistan and Nepal.
Now, we only need to check for the condition that the GDP should have increased by 10% every year. Here, Bhutan is eliminated, and of the two nations remaining, Nepal has lesser value for exports, i.e., $12\% \text{ of } 12614 = 1526$
Choice (4)

52. Since export steadiness= $\frac{1}{\text{range}}$, the range of statistic in Table - I
country with least range will have maximum export steadiness.
Between the two conditions, i.e., consistent increase in exports and the maximum export steadiness, (i.e., the least range of the statistic given in table - I), it is the second which is easier to check.

$$\text{Range (India)} = 22.7 - 18.1 = 4.6$$

Range	2.9	4.6	4.6	4.7	4.8
Nation	Pakistan	India	Nepal	Indonesia	Bangladesh

Hence, Pakistan would be the nation with the maximum export steadiness.

Let us now check if Pakistan is also an export oriented nation, i.e., if it also satisfies the condition of continuous increase in exports during 2004-08. From table - I, the "Exports as a percentage of GDP" figures are decreasing, but at a rate less than or equal to 10%. However, the GDP values for Pakistan are increasing at a rate more than 10%. Hence, we can conclude that the value of exports increased consistently in each of the years 2004-08 for Pakistan.
The value of its exports in 2008 is 21061. Choice (2)

53. We are looking for the Nation for which the average annual 'growth' in the 'value' of exports is highest. Only India, Indonesia, Malaysia and Pakistan registered six-digit GDP values (or more). However, Pakistan can be eliminated as it has both seen least growth in GDP and also has the least value of the statistic in table - I. Now checking for the other three nations:

Year	India	Indonesia	Malaysia
2008	22.7% of 11, 59, 170	29.8% of 510,730	112.3% of 221,773
2004	18.1% of 700,921	32.2% of 185,914	115.4% of 124,749

India ≈ 135000

Indonesia ≈ 92000

Malaysia ≈ 105000

Hence, the average annual growth in 'value' of exports will be highest for India.

Now the GDP of India became $\frac{1159}{700} = 1.66$ times in the four years. This growth is the equivalent of a CAGR of 13.4% (approximately) [i.e., slightly less than $\frac{(1.66 - 1)}{4}$].
Choice (3)

55. $j = 10$ Choice (2)
 56. $e = x$ cannot be determined. Choice (4)
 57. $a = 5$ Choice (1)
 58. As $10 + 20 - x = 18$
 $x = 12 \Rightarrow 15 - x = 3$ Choice (1)

Solutions for questions 59 to 62:

59. (i) Assume X as expenses, Y as profit,
 Minimum Revenue (1990) (in Rs.lakh) = $10 + 5 = 15$
 (ii) Assume X as expenses, Y as profitability (%)
 $\text{Profitability (\%)} = \left(\frac{R}{E} - 1 \right) (100)$
 Minimum Revenue (in 1990) (in Rs.lakh)
 $= (1.05)(10) = 10.5$
 (iii) Assume X as profit and Y as profitability (%)
 $\text{Expenses (1990)} = \frac{10}{5} \times 100 = 200$
 Minimum Revenue > 10.5
 (iv) Assume X as profitability and Y as profit
 $\text{Expenses (1990)} = \frac{5}{10} \times 100 = 50 > 10.5$
 (v) If X is profitability and Y is expenses
 $\text{Then Profit (1990)} = \frac{(X)(Y)}{100} = \frac{50}{100} = 0.5$
 Revenue (1990) = 5.5
 Revenue (1997) = $2.5 + 0.50 = 3$
 Hence, Minimum possible revenue = Rs.3 lakh
 Choice (2)

60. If one of the two parameters X and Y was the profitability, then by observation we can see the maximum possible years for which it could have been the same.
 If X \rightarrow profitability, then profitability was the same in at most five years, i.e., 1993, 1995, 2000, 2001 and 2004.
 If Y \rightarrow profitability, then profitability was the same in at most four years, i.e., say 1991, 1994, 1996 and 2002 (OR 1993, 1999, 2003 and 2004).
 Now, let X and Y be profit and expenses respectively.
 Then profitability was same in the years 1990, 1991, 1992, 1993, 1996 and 2004 i.e., 6 years. Choice (4)

61. Expenses are maximum possible when X and Y belong to profit and profitability respectively.

1997
 $\text{Expenses} = \frac{20}{2.5} \times 100 = \text{Rs.800 lakh}$

1998
 $\text{Expenses} = \frac{20}{2.5} \times 100 = \text{Rs.800 lakh}$ Choice (1)

62. If profitability itself is either of X or Y, then it will be at most 50% for any year (i.e., the maximum reading on either scale). Hence X and Y must be either of Profit and Expenses, and obviously profitability is highest when X is profit and Y is Expenses. Maximum percentage points is between 1996-97.

$\left| \left(\frac{20}{10} - \frac{20}{2.5} \right) (100) \right| = 600$ Choice (4)

Solutions for questions 63 to 65:

63. Toll Gate Tax revenue = 316 crores
 5% of Customs Revenue = 316 cr
 $\Rightarrow \text{Customs Revenue} = \frac{316 \times 100}{5} = 6,320 \text{ crore}$

$\therefore \text{Total Revenue} \times \frac{10}{100} = \text{Customs Revenue}$
 $\Rightarrow \text{Total Revenue} = \frac{6,320 \times 100}{10} = 6,32,00 \text{ crore}$

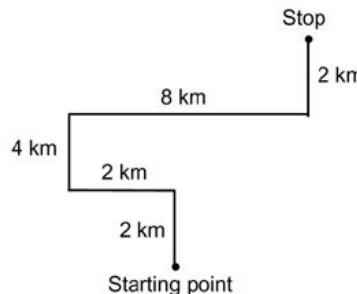
\therefore Energy sector is 19% of the Central Plan Outlay, which in turn is 14% of the total revenue
 $= 6,320 \times \frac{14}{100} \times \frac{19}{100} \approx \text{Rs.1,680 crore}$
 Choice (3)

64. Expenditure on Interest payments and subsidies
 $= 10p + 24p = 34p$
 Revenue from the given sources = $2 + 14 + 9 + 9 = 34p$
 $\therefore \frac{34p}{34p} \times 100 = 100\%$ Choice (1)

65. Central Plan Outlay on service, Communication, Industry and Minerals is 41% of the allocated amount to Central Plan and it is equal to 41% of 14% $\cong 5.75\%$ (A) of total revenue.
 Non-plan Assistance to states and UT's is 4% ---- (B)
 (A) is 1.75% more than (B)
 $\therefore \text{Percentage by which A is more} = \frac{1.75}{4} \times 100$
 $\cong 43.5\% \Rightarrow \text{approximately } 44\%$ Choice (3)

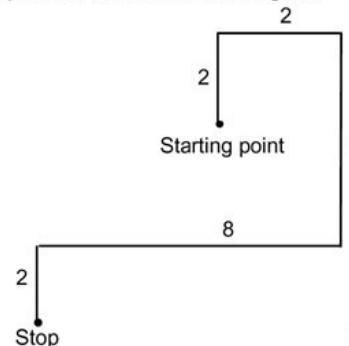
Solutions for questions 66 to 68:

- 66.



Total distance $2 + 2 + 4 + 8 + 2 = 18 \text{ km.}$ Choice (1)

67. Had the 1st signal been RGY and GR he would have been at a point 6 km to the west and 4 km to the South of the starting point as illustrated in the diagram.



Choice (1)

68. If Arun was heading South, he would have reached a position which is an inversion of the current one, i.e., 6 km to the West and 8 km to the South of his starting point.
 Choice (3)

Solutions for questions 69 and 70:

69. The person who starts, if he leaves exactly 12 km ($10 + 2$) for the other person at the end then he will always win, since the second person has to drive at least 2 and at most 10 in his turn and the first person can drive the rest and win.

Choice (1) : 1008 is itself a multiple of 12 hence Manoj cannot win.

Choice (2) : since we do not know who starts the game, this cannot be the answer.

Choice (3) : since 1001 is not a multiple of 12 the person starting the game will win the game.
i.e. the closest multiple of 12, to 1001 is 996.
So if Manoj starts the drive he will drive 1001 – 996 = 5 km at first and then make sure that they both together drive 12 kms from then which ensures his win. Choice (3)

70. Ajay is 17th from left and 20th from right. Hence, there are $(20 + 17 - 1)$ i.e., 36 children in the row.
∴ Number of girls and boys, respectively, are $(2 : 1)$ 24 and 12. Ajay is 8th among the boys and 17th among all children in the row from left i.e., there are nine girls to the left of Ajay and 15 on his right. There are 19 children in all to Ajay's right among whom $19 - 15 = 4$ are four boys.

Choice (2)

Difficulty level wise summary - Section III	
Level of Difficulty	Questions
<i>Very Easy</i>	–
<i>Easy</i>	63, 64, 65, 66, 67, 68, 70
<i>Medium</i>	51, 52, 53, 54, 69
<i>Difficult</i>	55, 56, 57, 58, 61, 62
<i>Very Difficult</i>	59, 60