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

(Key and Solutions for AIMCAT1603N)

Key

SECTION – I

1. 2	8. B	15. B	22. D	29. C
2. 1	9. 13452	16. C	23. B	30. A
3. 3	10. 13524	17. C	24. A	31. C
4. 4	11. C	18. D	25. C	32. B
5. A	12. B	19. A	26. B	33. A
6. D	13. D	20. D	27. A	34. D
7. C	14. A	21. C	28. B	

SECTION – II

35. B	42. C	49. D	56. C	63. 15
36. 2700	43. 8800	50. B	57. CE	64. 50
37. B	44. 8400	51. C	58. C	65. A
38. D	45. 117600	52. C	59. D	66. 20
39. B	46. 8400	53. 1	60. A	
40. A	47. B	54. A	61. D	
41. C	48. D	55. D	62. B	

SECTION – III

67. C	74. A	81. 15	88. D	95. AB
68. 3600	75. A	82. A	89. 5	96. 70
69. C	76. D	83. D	90. B	97. 360
70. 19	77. C	84. C	91. C	98. 45
71. C	78. B	85. 18	92. C	99. 3
72. A	79. –2	86. D	93. C	100. D
73. A	80. A	87. 1	94. D	

Solutions

Section – I

Solutions for questions 1 to 4:

1. Sentence 3 lays the foundation for the paragraph and introduces the same. "involves more than simply balancing" in sentence 3 links with "We must also correctly judge the probability" in sentence 1. Also, "these will or will not occur" in sentence 1 links with "relative importance of various factors and outcomes" in sentence 3. So sentence (1) follows sentence (3). Sentence 5, which is an observation, continues after sentence 1. "decision" and "understand" in sentence 5 links with "correctly judge" in sentence 1. Sentence 4 specifically concludes the paragraph. "understand the odds generally make the best bets" in sentence 5 is further explained in sentence 4. So, 3154. Sentence 2 which refers to the unlucky gambler needs a precedent and more substantiation. It leaves the thoughflow incomplete and also changes the tense of the paragraph.
Ans: (2)

2. Sentence 2 lays the foundation for the paragraph and introduces the same. Sentence 4 continues the thoughtflow. "Without it" in sentence 4 refers to "clarity" in sentence 2. Sentence 3 continues after sentence 4. "confusion" in sentence 4 is linked with "unclear thoughts" in sentence 3. Sentence 5 summarizes and concludes the paragraph. So, 2435. Sentence 1 can belong to another paragraph as it refers specifically to Socrates' methodology.
Ans: (1)

3. Sentence 4 is a general sentence that can begin the paragraph. It introduces the name of the island and the location. Sentence 1 continues the discussion. The pronoun 'it' refers to the island "Little Bokeelia". Sentence 2 provides a contrasting point with the word 'Despite'. "such enticing features" in sentence 2 refers to "cascading waterfalls, tennis courts, pools ....." given in sentence 1. Sentence 5 concludes the paragraph. So, 4125. Sentence 3 can be the introduction sentence of another paragraph as it generalizes the problem and needs further clarification. The remaining sentences are specific to the island of Little Bokeelia.
Ans: (3)

4. Sentence 2 is a general sentence that begins the paragraph. "wholesale gravitational collapse" in sentence 2 links with "resulting gravitational pull" in sentence 1. So sentence 2 is followed by sentence 1. The point mentioned in sentence 1 along with "the story goes" is referred to as "that simple formulation" in sentence 3. Sentences 3 and 5 form a mandatory pair. "possible solution to the paradox" in sentence 5 links with "paradoxical wrinkle" in sentence 3. So sentence 3 concludes the paragraph. Sentence 4 carries a discussion about 'information' and overall it needs a precedent and more substantiation.
Ans: (4)

Solutions for questions 5 and 6:

5. Choice (B) does not mention the cognitive framework. The second sentence in choice (B) is wrong because it is you who needs to make an impression, not everyone. Choice

(C) is wrong because impressions are not formed by gauging others. Choice D does not fully explain that the information is grouped. Choice (A) gives the complete summary. Choice (A)

6. Choices A and B are incomplete. They more or less focus on the last sentence of the paragraph. They neglect to mention that human beings' primal urges have not changed. Choice (C) distorts the meaning of the passage slightly. But choice (D) is a complete summary. Choice (D)

Solutions for questions 7 and 8:

7. The conclusion of the paragraph is more or less stated in the last sentence of the paragraph (....catch the viewer's imagination by making a more unusual advertisement). So only choice C can be inferred from the paragraph. "Celebrity endorsements are a thing of the past" as mentioned in Choice A is far-fetched. The word 'only' in Choice B makes it extreme. It also negates the information given in the paragraph (The Indian television viewer is becoming indifferent to the presence of celebrities in a commercial. Celebrity attributes do not necessarily impact the purchase intention of the consumer). The comparison in choice A is unwarranted. Choice (C)

8. Choice B is an assumption since it fills a blank, Consumption is the link between 'food supplies' and 'overweight'. Controlling fat consumption is important ..... Torpid or inactive refers to sedentary. The word 'only' in Choice C makes it extreme. Choice D is almost a repetition of the last two sentences of the paragraph. Restatements cannot be inferences. The comparison in Choice A is out of scope. Choice (B)

Solutions for questions 9 and 10:

9. Sentence (1) introduces the paragraph. It sets the background "Women in the U.S. feel accountable to the ideology of intensive mothering." Sentence (3) follows. "they" in sentence (3) refers to all US women. "feel accountable to the ideology of intensive mothering" in sentence (1) links with "construct a sense of self and a good mother identity " in sentence (3). Also, "whether they resist or embrace it" in sentence (1) links with "how useful or constraining they find it" in sentence (C). Sentence (4) and (5) then go on to explain how the relationship of middle-class women to this discourse is complicated. On the one hand motherhood negatively affects ..... At the same time, however, the discourse of good motherhood is useful ..... So, 1345. Sentences (5) and (2) form a mandatory pair. "valuation of their intensive mothering work" in sentence (5) links with "disavow an association with irresponsible and dependent mothering" in sentence (2). Sentence (2) concludes the paragraph. So, 13452 is the correct sequence. Sentence (3) refers to all US women, before the discussion covers middle-class and then low-income women. Ans: (13452)

10. Sentence (1) introduces the paragraph. It defines the term 'squatter' and provides a historical context. Sentence (1) and (3) form a mandatory pair. "condition that he worked for the European owner" in sentence (1) links with "In return for his services, the African was entitled....." in sentence (3). It can be noticed that both sentences (1) and (3) are general in nature and do not refer to the Kikuyu tribes like the other sentences. Sentence (3) is followed by sentence (5). Sentence (5) is the first sentence to introduce "Kikuyu tribes" in particular. "this meant that" in sentence (5) expands on the points highlighted earlier in sentence (1) (..... African permitted to reside on a European farmer's land and work for him) and sentence (3) (..... entitled to use some of the settler's land for cultivation and grazing). Sentence (2) talks about the first few limitations of the attempt to create a potential African labour force. Sentence (4) highlights other reasons that the Kikuyu could not be turned into farm owners successfully. So, 13524. Ans: (13524)

Solutions for questions 11 to 34:

Number of words and Explanatory notes for RC:

Number of words : Passage – I: 618
Passage – II: 694
Passage – III: 747
Passage – IV: 730
Passage – V: 677

11. The question phrase occurs in para 4. War is not an alternative to any sensible operation but a dismaying comparison to any solution. Even politics, economics, religions cannot escape the criticism that what they offer cannot be considered as solutions to problems. So how can war history and arms be spared from such criticism? So choice C is correct.
Choice A is incorrect. "wellfounded but poorly supported comparisons and solutions to war" would indicate that the weaknesses are not because of inherent logical flaws but they are poorly supported. i.e. The weakness is not because of inherent logical flaws but because the external circumstances do not permit the solution or there are no adequate circumstances to allow the solution to be practical. But this is not the case as there seems to be no solutions to problems.
Choice D is incorrect. The word 'plausible' means likely or seemingly (or apparently) valid and 'poorly substantiated' means 'not explained logically' which is not the situation in this case. Choice (C)

12. Refer to the critical words in the third paragraph. "does not appear to be rational", "war is romanticized", "(unconvincing) attempts have been made to present war as a solution to 'the' problem". Choice B can complete the fourth paragraph of the passage as it connects with the penultimate sentence: Women are often taken as the subject of war study or theory. All the other choices are out of scope of the discussion in the third paragraph. They do not connect with the first sentence of the fourth paragraph. For example, "oral histories" and "collective identity of women" in choice C needs precedents and more substantiation. Choice (B)

13. The term 'convenient victims' appears in the first sentence of the second paragraph. Usually the word 'convenient' is used to describe anyone who can effectively convince someone into believing something. The expression has been used in the second para, where the author highlights how the proponents of war used the 'oppressed condition' or the sad plight of women to justify their action of waging war. Nowhere does the passage suggest that either men or women are trying hard to convince anyone. So, choices A, B and C are ruled out. 'Unwitting' in choice A is a distortion. Since the "oppressed condition' of women is evident (convenient) and is being exploited by proponents of war, we can use the term 'convenient victims'. Choice (D)

14. Refer to para 3. The second half of the para clearly says that the way the American system works contradicts the very foundation of American civilization. Further, the phrase 'state actions and ideologies' refers to the 'role' played by the state.
For the same reason Choice B is incorrect as it contradicts what Chomsky says. Choice D is also incorrect. Even if other people utter the truth, they are blinded by indoctrination and are not ready to believe what is all too obvious to see. Choice C is a part of information or a detail for Chomsky's analysis (Realities were carefully sanitized on the evening news to make them acceptable to the powers that be, as given in para 3) but is not the understanding or conclusion from that analysis. Choice A succinctly states the conclusion from Chomsky's analysis of America's role in wars overseas and is the answer to the question. Choice (A)

15. The first few sentences of para 2 seem to suggest that a lot of people revealed radical stance or dissent ..... but few people could sustain. So choice A is wrong.
In para 2, Chomsky is distinguished from other writers like Mark Twain and Henry Adams. (No one has exposed more forcefully the self-righteous beliefs on which America's imperial role is based..... No one has focussed more compellingly on the violence of the world .....) Chomsky did not despair even as he expressed the shocking truths, and this is the distinction. Even in the middle of the last paragraph, it has been mentioned that "his is not the counsel of despair". Hence choice B is correct.
Choice C is incorrect. Not once does the passage says that Chomsky was apathetic or not shocked. Choice D is besides the point. It is not a distinguishing criterion.
Choice (B)

16. Refer to para 1 which validates all choices except choice C which is negated in the last sentence.
Statement A is true from the first sentence of the last paragraph.
Statements B and D are true from the words "unsettling" and "liberating" as given in the first sentence of para 1.
Statement B is also elaborated later in the passage. "indoctrination ..... people are blinded or become immune". (para 3)
Statement E is true from the third and fourth sentences of para 1. "However troubling reality may be, human dignity is not affirmed in fleeing it. Rather, dignity lies in see reality for what it is – and acting responsibly in the face of it."
Ans: (C)

17. The examples of the countries mentioned in the question are given in the fourth paragraph. (..... urging them to use their minds and not just their bodies to oppose the war; to not have illusions about America's aggression in Vietnam, or the long-term character of the struggle to end it; to not seek easy alternative faiths in other countries: not in Castro's Cuba, or Ho Chi Minh's Vietnam, or Mao's China).
In the third paragraph, the author mentions that Chomsky marshalled the evidence and described the brutal realities of the war – American aggression, genocide, war crimes, mass murder.
At the end of the third paragraph, the author mentions that in Vietnam, Central America, and the Middle East, Chomsky makes us confront the way in which the very foundations of American civilization and its economic life are at war with the prospects for human dignity and freedom.
America would have definitely gone to Vietnam for another agenda than just to end the struggle there. Choice C hints at this point. The remaining choices are out of scope.
Choice (C)

18. Refer to para 4 which validates statement D. "tenacity", "undiminished ardour", "determination", "urging them". While it can be understood from the passage that Chomsky is 'antiwar', there isn't enough in the passage to support the idea that he is of the view that war should not ever be engaged in. He is against the brutal realities of war such as American genocides. So choice C is incorrect.
Choices A and B do not answer the question.
Choice (D)

19. Only choice A comes close to the analogy given in the last sentence of the passage (which tells us that, subconsciously, we know the truth but we refuse to acknowledge it.) The other choices do not apply.
Choice (A)

20. Refer to the second paragraph. In the first boldface part of the text, the author compares sorrow to 'dusky cloud' and 'falling rain'. He likens joy to the sun which brightens up the face of sorrow. The whole circle of nature is a person's whole life which includes joys and sorrows.

Human sentiments and social virtues brighten up our sorrowful lives. In the third para, the author says that social virtues cannot be overcome by sorrow or sensual pleasure. So choice B would support the author's line of reasoning. Refer to the fourth paragraph. In the second boldface part of the text, the author says that social passions should associate themselves with the sentiments of virtue, and prompt us to worthy actions. Choice C would support the author's line of reasoning. "our ultimate goal, the human good" can be confirmed from the last two paras of the text. So choice A is not the answer to the question.

Choice D would least support the author's line of reasoning in the boldface parts of the text. In fact, paragraph 5 contradicts choice D. Choice D would be a misreading of the last sentence of the fifth paragraph. Choice (D)

21. The intent of the passage is to proclaim that man attains greatest pleasure in helping others. In the fourth paragraph, he mentions: **As harmonious colours mutually give and receive a lustre by their friendly union; so do these ennobling sentiments of the human mind**..... Parental affection ..... flies to their succour, through the most threatening and tremendous dangers?
The fifth paragraph also summarizes the theme. "What satisfaction in relieving the distressed, in **comforting** the afflicted, in **raising** the fallen, and in stopping the career of cruel fortune, or of cruel man, in their insults over the virtuous. By **virtuous example** or **exhortation**, our fellow-creatures are taught to govern their passions, reform their vices, and subdue their worst enemies". So statement C is correct.
Statement B may be limited to individual happiness and may not include outreach to fellow human beings. So statement B is incorrect.
Statement D is not true. It is not that a man is **known** by the company he keeps, it is that he is rendered complete by the company he keeps.
The idea "social animal" is about living together in community. The theme of the passage revolves around helping others. So statement E ("Man is a social animal") is insufficient to describe the theme. Statement A is also insufficient to describe the theme. Ans: (C)

22. The last line in the passage means "A person who has actually widened the opportunity to lay down his life for a noble cause is happy because anyway his life would be snatched away and it is better to gift the life for a noble cause." So choice D corresponds to the phrase in the question.
Choice C is wrong. The sage does not lament. Refer to the first sentence of para 2 (But does the sage rest contented with lamenting the miseries of mankind?..... No). Humans lament. Refer to the last sentence of para 1 (Some lament .....). Choice B is out of scope. Choice A is a proverb but does not address the question. Choice (D)

23. Refer to the lines in the third paragraph. 'Behold this ..... entertaining'. These line show that a person given to enjoying the pleasures of wine and jolity loses interest in them when he is separated from his companions. **Separate him from his companions**, like a spark from a fire, where before it contributed to the general blaze: His **alacrity** suddenly **extinguishes**; and though surrounded with every other means of delight, he **loathes** the sumptuous banquet, and prefers even the most abstracted study and speculation, as more agreeable and entertaining. So choice (B) is correct.
The author does not talk about the nature or bad effects of wine and jollity. He talks more about companionship. "The joys of love, however tumultuous, banish not the tender sentiments of sympathy and affection. They even derive their chief influence from that generous passion; and when **presented alone**, afford nothing to the unhappy mind but **lassitude** and **disgust**." So choice A is incorrect.

Choice (D) is besides the point. An addict to wine and jollity will enjoy a sumptuous banquet if his companions are there.

Choice (C) is a repetition of the first sentence of the fourth para but is out of context. Choice (B)

24. The author says that social passions give great pleasures. Refer to the first sentence of para 4: 'when they are associated with the sentiments of virtue and they prompt man to laudable and worthy actions.' Refer to the last sentence of para 5: But what supreme joy in the victories over vice as well as misery, when, by **virtuous example** or wise exhortation, our fellow-creatures are taught to govern their passions, reform their vices, and subdue their worst enemies, which inhabit within their own bosoms? Finally, refer to the sentences in the last paragraph: "It views liberty and laws as the source of human happiness, and devotes itself, with the utmost alacrity, to their guardianship and protection. Toils, dangers, death itself carry their charms, when we brave them for the **public good**, and ennoble that being, which we generously **sacrifice for the interests of our country**." These sentences make choice (B) irrelevant. Only choice (A) is the correct answer.
According to the passage, the sage does not remain apathetic to the sufferings of fellow beings. Instead he not only shows compassion but also empathizes with their lot as he feels too strongly the charm of the social affection. The first two sentences of para 2 (But does the sage preserve himself in ..... and of society? No.) negate choices (C) and (D). On seeing the miseries of mankind, the sage empathizes with the lot of his fellow beings. Choice (A)

25. The word 'alacrity' appears in the third paragraph and the last paragraph of the passage. The closest contextual meanings of the word 'alacrity' in the order that it appears in the passage are (i) sprightliness, and (ii) objective. This is because, in the first instance, the author is only talking about the personal brightness of the hedonist, whereas in the second instance, he's talking of the eagerness of the samaritan. So choice (C) is correct. Since the meaning of the word is not the same in both instances, choice (D) is wrong. Even though 'fervour' and 'zeal' are the literal or dictionary meanings of the word 'alacrity', these do not apply in the given context. So choices (A) and (B) are incorrect. Choice (C)

26. Choices (A) and (C) are categorical and hence are ruled out. By reading the second paragraph, we can arrive at choice (B) as the best pick. "Poverty is still very grave" and "a third of the population is still illiterate" in para 2 and the phrase "We need to progress further" in the last sentence of para 2 support choice (B). Choice (B)

27. Refer to the third paragraph especially the last three sentences - "Unlike democratic India, communist China has shown exemplary historical commitment in the social sector. From a well developed system of elementary education, (China has only a sixth of our university graduates but it is much closer to universal literacy), to land reforms and health care. These "inclusionary" arrangements have facilitated widespread economic participation, laying the basis for long-term growth." - China's inclusionary arrangements have brought more people under the umbrella of social benefits The term "universal economic participation" in the sentence "Universal votes do not guarantee universal economic participation" (as mentioned in the middle of the third paragraph) is another indicator. So choice (A) is correct. There isn't enough in the passage to move to choices (B), (C) and (D). Choice (A)

28. According to the fourth paragraph, choice C is something that Francis Fukuyama believes about democracy, which the author disagrees with. According to the penultimate paragraph, democracy does result in stability (The resulting social stability has obvious advantages....). According to the fourth paragraph, a point contended by the author about democracy may, at first, appear counterintuitive; this does not mean that democracy itself is counterintuitive; it's not a bad system, but it has many shortcomings, and a better system can be found. Democracy also leads to majority dissatisfaction. So choice A is incorrect and choice B is the answer. Though the author clearly finds democracy problematic, his views regarding it are not as negative as suggested by D. The idiom "the lesser of two evils" means "the somewhat less unpleasant of two poor choices." There are no "two evils" discussed clearly in the passage.
Choice (B)

29. The author's main premise in the passage is that he finds democracy problematic. In the second paragraph, he states that democracy is lacking in a number of aspects. In the third paragraph, he contrasts "totalitarian China" with "democratic India" and states that there is more social and economic participation in China. From the fourth paragraph onwards, the author harps on the point that the spread of democracy may actually make it harder to discover alternative forms of political organization. Democracy tends to anchor society in the political middle ground.

Statement A is incorrect. On reading through the piece, we realise that "tribute" is not being used in its usual sense (pay regard to), but in its (original) feudal meaning of payment in gold or kind to demonstrate fealty. In the passage, the 'tribute' is the payment in the form of dissatisfaction incurred or satisfaction sacrificed.

The author's tone is not extreme i.e. it is not one of contempt and sarcasm. So statement B is incorrect.

From the last four paragraphs of the passage, one can infer that statement C is true. "Democracy doesn't give most people what they want; in fact, it leads to majority dissatisfaction." The author indicates that democracy does not deserve as much praise as it is given. So the extent of the praise for democracy is questionable.

Statement D is incorrect. The viewpoint discussed is that democracy may not deserve the praise it gets, not its success or failure.

Statement E is not the reason. The viewpoint discussed is not of the extent of the prevalence of democracy.
Ans: (C)

30. From the passage, we can infer that the author would probably agree with the statement. It is parallel to the introductory sentence of the passage "Many people worry that there is not enough democracy in the world; I worry that we might never go beyond democracy". So choice (A) is correct. "Whole heartedly and without reserve" in choice (B) cannot be inferred. Choice (C) is wrong because the author does not disagree with the statement.
From the explanations above, we understand that the author would have views on the statement in the question, so, choice (D) is wrong. Choice (A)

31. While totalitarianism and one-party rule are mentioned in the passage, the author has referred to them to indicate what they make possible. There isn't, however, enough to indicate that he thinks it a better system, especially because he acknowledges that democracy delivers social stability. So we cannot infer whether the author prefers it to democracy or viceversa. So choice (A) is wrong. In any case, the statement isn't about whether autocracy would be a suitable alternative to democracy, but rather, whether currently autocratic regimes could come up with a new system that would serve as an alternative to democracy.

Refer to the last paragraph. In the first sentence, 'voting mechanism' does not necessarily mean the entire system of elections. In the last sentence, 'today's elected politicians' would indicate that there could have been / could be elected representatives who were / would be more capable of bringing about appropriate reforms. So, it would not be appropriate to infer that the author would favour the

dumping of the election system, and therefore democracy, entirely. For instance, he might see merit in a system of weighted votes, where certain meaningful circumstances could be used as multiplication factors. So choice (B) is not correct.

For the same reasons as above, and since the author uses 'supposed cause' when discussing China's totalitarianism, choice (C) would be possible, and the only one possible.
From the explanations above, we understand that the author would have views on the statement in the question, so, choice (D) is wrong. Choice (C)

32. Refer to the second sentence of para 5. This approach led to the belief that matter is the sole ultimate reality and life is purely a chance occurrence caused by fortuitous combination of atoms. When the author says 'life' in this sentence, he means the difference between lifeless matter and living beings. This is contradicted by choice (B). The scientific method enunciated by Francis Bacon is not contradicted by statement (C), which is not about 'life' but the 'experiences in life'. It is not even contradicted by choice (A), to which the author's definition of life serves as a corollary. Choice (B)

33. Refer to paragraph 3 (First sentence). The main arguments of both the environmentalists and the establishment lobbies revolve around economic issues. Also refer to the 4th, 5th and 6th sentences of para 3. (This is because both the planners ..... not on economic grounds). So choice (A) is correct. Choice (A)

34. "There has to be a paradigm shift from economic development to human development" in paragraph 2 shows that choice A is true. "What, however, has become evident over the decades is that although modern technology has contributed to increased productivity, lower costs, and much else, it has simultaneously brought humankind to the brink of disaster through environmental pollution ....." in the last paragraph shows that choice B is true. "We are privileged to live through one of the greatest scientific and technological revolutions in human history" in the fourth paragraph shows that choice C is true. "Fighting the establishment with their own weaponry" would imply adopting a materialistic stance which the author frowns upon. Choice (D)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	1, 2, 3, 20
Easy	4, 5, 19
Medium	11, 12, 15, 16, 17, 23, 24, 25, 26, 27, 28, 30, 34
Difficult	7, 9, 13, 14, 18, 21, 22, 29, 31, 32, 33
Very Difficult	6, 10

Section – II

Solutions for questions 35 to 38:

Let the total sales value be 100*x* and sales volume be 100*y*. From the given data, the selling price of different versions and the possible models are as follows.

	Music	Flip	FM	WLAN	CAM	Colour
Sales value	30%	14%	9%	28%	10%	9%
Sales value	20%	21%	16%	21%	10%	12%
Selling price	$\frac{3}{2}\left(\frac{x}{y}\right)$	$\frac{2}{3}\left(\frac{x}{y}\right)$	$\frac{9}{16}\left(\frac{x}{y}\right)$	$\frac{4}{3}\left(\frac{x}{y}\right)$	$\left(\frac{x}{y}\right)$	$\frac{3}{4}\left(\frac{x}{y}\right)$
Case (i)	Z620	M2080	A912i	R31b	V2n	K52
Case (ii)	R31b	V2*n*	A912i	K52	Z620	M2080

35. Case (ii) is possible. The required ratio is $\frac{3}{4} : \frac{9}{16} = 4 : 3$
Choice (B)

36. Case (i) is possible.

$$\frac{x}{y} - \frac{3}{4}\left(\frac{x}{y}\right) = 1200$$

$$\frac{1}{4}\left(\frac{x}{y}\right) = 1200$$

$$\left(\frac{x}{y}\right) = 4800 \Rightarrow \frac{9}{16}\left(\frac{x}{y}\right) = 2700$$ Ans: (2700)

37. Given,

$$\frac{3}{2}\left(\frac{x}{y}\right) = 18000 \Rightarrow \frac{x}{y} = 12000$$

$$\frac{4}{3}\left(\frac{x}{y}\right) - \frac{x}{y} = \frac{1}{3}\left(\frac{x}{y}\right) = 4000$$ Choice (B)

38. Among the given statements only (D) is true.
Choice (D)

Solutions for questions 39 to 42:

39. Second highest number of men is in country A, as it has the second highest population and the number of women per 1000 men is nearly the same in all the countries.

Number of women in A = $\frac{970}{1970}$ x 1321

$\frac{970}{1970} \cong \frac{1}{2}$ but less than $\frac{1}{2}$

$\therefore$ Number of women < $\frac{1}{2}$ x 1321 < 660.5

$\therefore$ Slightly less than 660. Choice (B)

40. Even if all the women in country D are literate, there will only be around 341 × 1/2 = 170 lakh illiterate women in D (as the number of men and women are nearly the same).
Even if all the men in any other country (say C) are literate, out of a total of 540 × 0.85 = 460 lakh literates, only about 270 lakh (half the total population) can be men (since male-female ratio is approx. 1) and the remaining 190 lakh will have to be literate women which is DEFINITELY higher than the number of literate women in D; thus D has the least number of literate women. Choice (A)

41. The percentage of women in the different countries are 49.2, 48.7, 50.5, 49.8, 49.7, i.e., approximately 49%.
Choice (C)

42. 55% of 1321 – 58% of 832
Treating 55% as (50% + 5%) and 58% as (60% – 2%)
{660.5 + 66.05} – {499.2 – 16.64}
726.5 – 482.6 = 243.9. Choice (C)

Solutions for questions 43 to 46:

It is given that A started with 100 grams of gold and ₹50000 while B started with 50 grams of gold and ₹100000.

43. Given that both A and B sold gold on the same day of the week. This can only happen when the price of gold is ₹9000.
$\therefore$ The only possible price movement of gold, at the end of each day from Day 1 to Day 5 is ₹8800, ₹9000, ₹8800, ₹8600 and ₹8400.
$\therefore$ The closing price of gold on Day 3 was ₹8800.
Ans: (8800)

44. If both A and B bought gold on the same day and only A sold on the next day, the only possibility is that the price of gold was ₹8200 on the day they bought, ₹8400 on the day

before it and ₹8400 on the day after it, i.e. on the day A alone sold. This is possible in the following ways when the closing prices from Day 1 to Day 5, are given.

Case I : 8800, 8600, 8400, 8200, 8400
Case II : 8400, 8200, 8400, 8200. 8400
Case III : 8400, 8200, 8400, 8600, 8400
Case IV : 8400, 8600, 8400, 8200, 8400

In all the cases the closing price of Day 3 or the price on the morning of Day 4 is ₹8400. Ans: (8400)

45. The minimum possible total amount with A and B happens when they have bought the maximum amount of gold. As the price at the beginning of Day 1 and that at the end of Day 5 is given it is clear that A would have bought three times and sold two times.
∴ We have to find the maximum number of time B would have bought gold. B would have bought atmost three times when the closing price at the end of each day from Day 1 to Day 5 was 8400, 8200, 8000, 8200, 8400.
∴ Change in amount with A
= (–8400) + (–8200) + (–8000) + 8200 + 8400
= ₹8000 decrease
Change in amount with B
= (–8200) + (–8000) + (–8200) = ₹24400 decrease
∴ Change in total amount = ₹32400 decrease
∴ Total final amount = 150000 – 32400 = ₹117600.
Ans:(117600)

46. If A had 40 grams of gold more than B, it means that B bought gold exactly twice during the week. This can happen only if the closing prices of gold from Day 1 to Day 5 are ₹8400, ₹8200, ₹8400, ₹8200 and ₹8400 respectively.
∴ Price of gold at the end of Day 3 was ₹8400.
Ans: (8400)

Solutions for questions 47 to 50:

47. The projected per capita rice consumption in the different countries in 2009 is

P - $110(1.06)^2 = 123.6$
Q - $140(1.04)^2 = 151.4$
R - $120(1.05)^2 = 132.3$
S - $100(1.08)^2 = 116.6$
T - $130(1.05)^2 = 143.3$
U - $160(1.02)^2 = 166.5$

Average = $\frac{834}{6} = 139$

Instead of performing exact calculations, one can approximate as shown below.
$(1.06)^2 = (1 + 0.06)^2 \approx 1 + 2 \times 0.06 = 1.12$
Similarly, $(1.04)^2 \approx 1.08$ and so on. Choice (B)

48. The approximate population of each country in 2008 would be

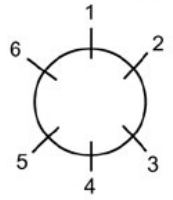
P - 120(1.03) = 123.6
Q - 300(1.05) = 315.0
R - 450(1.02) = 459.0
S - 600(1.01) = 606.0
T - 180(1.02) = 183.6
U - 360(1.01) = 363.6
Total = 2050.8 Choice (D)

49. The projected population of country P in 2009
= 127.3 million
The projected per capita consumption in 2009
= 123.6 kg
∴ Consumption in 2009 would be = 127×123.6
= 15.7 billion kg Choice (D)

50. By observation of solution 97, we need to compare the production and consumptions of only R and S.
Consumption of R = $54 \times 1.02 \times 1.05 = 57.834$
Consumption of S = $60 \times 1.01 \times 1.08 = 65.448$
Production R = $38 \times 1.1 = 41.8$
Production of S = $40 \times 1.1 = 44$
∴S has to import the maximum quantity of rice in 2008.
Choice (B)

Solutions for questions 51 to 54:

Let the seats be numbered from 1 to 6, as shown below

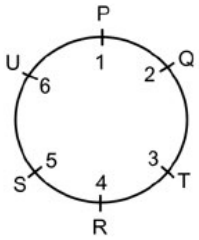


The child who sat in seat 1 on an evening cannot sit in 1, 2, 4 or 6 on the next evening.
⇒ the child can sit in 3 or 5
Similarly the child in 3 can sit in 1 or 5
and the child in 5 can sit in 1 or 3
∴The children in seats 1, 3 and 5 can interchange among themselves, i.e., no two of them can be adjacent to each other.
Similarly the children in seats 2, 4 and 6 can interchange among themselves.

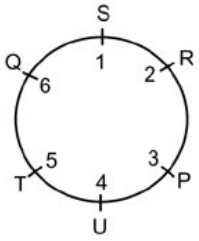
51. Given order is Q, T, R, U, P, S
∴No two among T, U and S will be adjacent to each other and no two among Q, R and P will be adjacent to each other.
The only possible order that satisfies is in choice (C).
Choice (C)

52. P has exactly three places to sit. Hence, if he sat an equal number of times in each seat, then it would give the required least possible value.
⇒ 16 = 5 + 5 + 6
P sat in the same place at least 6 times Choice (C)

53. On day 1:

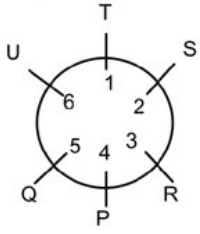


On day 2, P could have sat on seat 3, U on seat 4, S on seat 1, R on seat 2, T on seat 5, and Q on seat 6.
∴ On day 2:



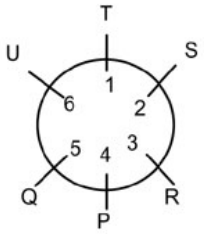
The order in which the children sat (reading from seat 5) is T, Q, S, R, P, U. Hence, minimum number of days required is 1. Ans: (1)

54. On day 9, the arrangement is as follows:

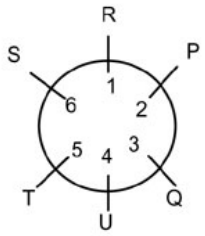


Given S cannot sit in 4. Hence, he sits in 2 and 6 alternately. When S sits in 6, U sits in 4 and P sits in 2.

Similarly Q cannot sit in 1. Hence he sits in 3 and 5 alternately. When Q sits in 3, R sits in 1 and T sits in 5. The following are the only two possible arrangements.



Days 9, 7, 5, 3 and 1



Days 8, 6, 4 and 2

On day 3, R is in seat 3 Choice (A)

Solutions for questions 55 to 58:

Let us draw a table to indicate the information given in the passage.

Name of the person	Ranks				Teachers Confirmation		
	1	2	3	4	C	I	F
R	Y	O	B	R	1	2	1
B	Y	B	R	G	1	1	2
G	W	O	B	G	2	1	1

In the first column of the above table, names of the persons who gave the information are given. Names of persons who got ranks from 1 to 4 are given against them. Teacher's confirmation of the information given by each of them is given against each of them respectively.
"C" gives the number of persons, who got the same ranks as said by R, B and G.
"F" gives the number of persons who failed out of the persons listed by R, B and G.
"I" gives the number of persons who have passed but not attained the same ranks as said by R, B or G and this automatically equals to 4 – (C + F).
According to R and B, Y, B and R got ranks. If two of Y, B and R failed, then it will contradict teacher's confirmation about R's statement.
∴Exactly one of Y, B and R is failed.
⇒ G is the other person who failed [Teacher's confirmation about B's statement]
From the last row, and the above results, we can say that W, O and B passed.
Here, we have three possibilities, i.e., one of W, O and B got the fourth rank and the other two got the same rank as stated by G.
If O and B got the 2nd and the 3rd ranks respectively, then the teacher's confirmation about R's statement will be contradicted.
If W and B got the 1st and the 3rd ranks respectively, then the teacher's confirmation about B's statement will be contradicted.
∴W and O got the 1st and the 2nd ranks respectively.
⇒ B got the 4th rank.
From the teacher's confirmation about B's statement, we can say that the ranks of one of Y, B, R and G must be correct.
∴R's rank must be 3.
⇒ Y is the other person who failed.

55. B got the fourth rank. Choice (D)

56. R got the third rank. Choice (C)

57. G and Y are the students who failed. Ans: (CE)

58. B got 4th rank and W got 1st rank. Only two students mentioned by W got the same rank. Choice (C)

Solutions for questions 59 to 62:

59. From the Choices,
(a) is not possible, as two subjects are taught between Physics and English.
(b) is not possible, as biology is taught after Physics.
(c) is not possible, as Maths is taught fourth.
(d) is a possible arrangement. Choice (D)

60. Given History is taught third.

__ G H __ __ __ __

Given that one subject is taught after Physics but before English.

Case (i)

__ G H P __ E __

Also Maths is taught either fifth or sixth and Chemistry is taught before Maths.

⇒ C G H P M E __

But Biology should be taught before Physics, which is not possible.

Case (ii)

_ G H __ P __ E

Hence, English is taught seventh is true (from choices).
Choice (A)

61. Given, Maths is taught fifth

__ G __ __ M __ __

One subject is taught after Physics but before English and Biology is taught before Physics.

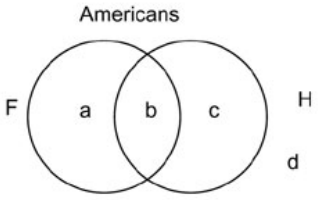
⇒ Physics cannot be taught first

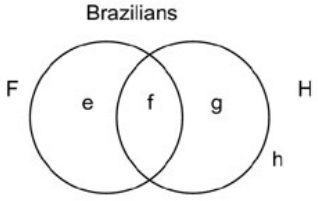
⇒ __ G __ P M E ___

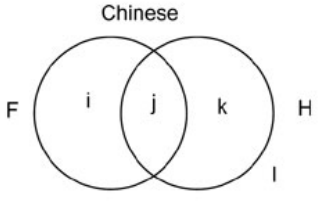
Now, Biology is taught before Physics and Chemistry is taught before Maths.
⇒ Biology and Chemistry are taught first and third, in any order.
⇒ History is taught Seventh. Choice (D)

62. From the choices,
(a) can have BGCPMEH (or) BGCHPME.
(b) can have only one possible order – BGPCEMH.
(c) can have BGCPMEH (or) CGBPMEH.
(d) can have BGCHPME (or) BGHCPME. Choice (B)

Solutions for questions 63 to 66:







Let the letters presented in the adjacent diagrams represent the number of people who play each sport in each group.
From (i), h = j. From (ii), a = 2l.
From (iv), i + k = 95.
Hence, j + l = 120 - 95 = 25
But j = h. ∴ h + l = 25
From (iii), d + h + l = 40 ⇒**d = 15**
From (v), b + c = 65. Since a + b + c + d = 120, a + 65 + 15 = 120
⇒**a = 40**
From (ii), **l = 20⇒h = 5 = j.**
From (v), e + f = 65.
Since e + f + g + h = 120, **g = 120 – 65 – 5 = 50**
From (iv), a + c = 70 ⇒**c = 70 – 40 = 30**.
Since b + c = 65 ⇒**b = 35**
From (iii), b + f + j = 60 ⇒ 35 + f + 5 = 60 ⇒**f = 20**
Since e + f = 65, **e = 45.**

63. The number of Americans who do not play either of the two sports (d) is 15. Ans: (15)

64. The number of Brazilians who play only Hockey (g) is 50. Ans: (50)

65. The number of Brazilians who play both the sports (f = 20) is the same as the number of Chinese who do not play either of the two sports (l = 20). Choice (A)

66. The maximum number of people in a single group who do not play either of the two sports is 20 (for Chinese). Ans: (20)

Difficulty level wise summary - Section II	
Level of Difficulty	Questions
Very Easy	–
Easy	39, 42, 49, 50, 59, 63
Medium	35, 36, 37, 38, 40, 41, 43, 46, 47, 48, 51, 52, 53, 54, 57, 58, 60, 61, 62, 64, 65, 66
Difficult	44, 45, 55, 56
Very Difficult	–

Section – III

Solutions for questions 67 to 100:

67. Let the roots of $py^2 + qy + r = 0$ be α and β.

We require the quadratic equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

By replacing y in $py^2 + qy + r = 0$ by $\frac{1}{y}$, we will obtain the required equation.

Required equation is $p\left(\frac{1}{y}\right)^2 + q\left(\frac{1}{y}\right) + r = 0$

i.e. $ry^2 + qy + p = 0$. Choice (C)

68. $\frac{P(15/12)5}{100} - \frac{P(8/12)4}{100} = 129$

$\frac{P}{1200}(75-32) = 129$

$P = \frac{129(1{,}200)}{43} = 3{,}600$ Ans: (3600)

69. Let a = 6p + 12q – 18r, b = 12p – 18q + 6r, c = –18p + 6q + 12r.
Here, a + b + c =0.
∴ $Xa^3 + b^3 + c^3 - 3abc = 0$
Both I and II are true. Choice (C)

70. Each leaf is two pages.
Let the number of leaves which are torn from the book be N.
Number of pages which are torn from the book is 2N.
As consecutive leaves are torn, the page numbers on the leaves torn form an AP whose common difference is 1.
Sum of the page numbers on the remaining pages is 6215.
Sum of the page numbers on the leaves torn

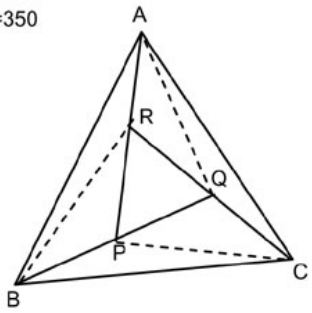
$= \frac{120(121)}{2} - 6215 = 1045.$

Let a be the first page number on the torn leaves.

$1045 = \frac{2N}{2}[2a + (2N - 1)(1)]$

$1045 = N[2a + 2N - 1]$ .... (1)
$a \geq 1$. □ $2a + 2N - 1 \geq N$
We can rewrite (1) as follows
N(2a + 2N – 1) = 1045 = 5(209) = 5(11)(19)
= 1(1045)
= 5(209)
= 11(95)
= 19(55)
The maximum value of N is 19. Ans: (19)

71. We denote the area of ΔXYZ as [XYZ]
[ABC] = 350
Join AQ, BR and CP. Let Area of ΔPQR = Δ
[RPB] = [ARB] = [ARQ] = [AQC]
= [CQP] = [CPB] = Δ
[The median divides a triangle into two triangles of equal area]
Now, 7Δ =350
⇒ Δ = 50



Choice (C)

72. The father would obviously start with the Sasio range of watches, as they are cheaper.
He can buy all the Sasio range of watches for ₹(300 + 400 + 500 + 600 + ... + 1900 + 2000)
= ₹20, 700.
And with remaining 12,300 he can buy a maximum of 5 Limen watches (starting with ₹2100 up to ₹2500).
However, if the man does not purchase any <u>one</u> of the Sasio watches priced at ₹1800, ₹1900 or ₹2000, he can then by one more Limen watch price ₹2600.
Hence, for the same total number of watches, the man can buy five OR six Limen watches. Choice (A)

73. Given expression is
$x^2y^3 = 256 \Rightarrow x^2y^3 = (16)^2(1)^3$ or $(2^2)(4^3)$
As x and y are positive and x > y, x = 16 and y = 1.
∴3x – 2y = 3 (16) – 2 = 46 Choice (A)

74. The number can have all three odd digits (type 1)
or 1 odd digit and 2 even digits (type 2)
odd - 1, 3, 5, 7, 9, even - 0, 2, 4, 6, 8. There are 5(5) (5) = 125 numbers of type 1.
In the second type,
Any odd digit can be in any of the 3 places.
Numbers with 1 in the units place is 5(5) = 25
Numbers with 1 in any place is 3(25) = 75
Numbers with an odd digit in any place is 5 (75) = 375
Numbers starting with 0 (zero)
2 (5) (5) = 25 (2) = 50
y = (375 – 50) = 325
Total = 125 + 325 = 450

Let o denote any odd digit and e any even digit. The types and number of number of each type are tabulated below

Type	Number of numbers
o o o	5(5)(5) = 125
o e e	5(5)(5) = 125
e o e	4(5)(5) = 100
e e o	4(5)(5) = 100
	450

Choice (A)

75. $x + y + z = 13$ ----(1) and $x(y + z) = 42$.-----(2)
(1), (2) $\Rightarrow x(13 - x) = 42 \Rightarrow x^2 - 13x + 42 = 0$
$\Rightarrow (x - 6)(x - 7) = 0 \Rightarrow x = 6$ or 7.
Hence $y + z = 7$ or 6.
$(y + z)^2 = y^2 + z^2 + 2yz$
As $(y + z)^2$ is a constant (it takes values of 49 or 36), $y^2 + z^2$ is minimum when 2yz is maximum, i.e. when y = z.

$\Rightarrow y = z = \frac{6}{2} = 3$.($y + z = 7$ can be ignored, as we are looking for the minimum value).
Hence the minimum value of $y^2 + z^2 = 3^2 + 3^2$
= 18. Choice (A)

76. The two inlet pipes are as good as an inlet pipe which can fill $\frac{1}{6} + \frac{1}{12}$ or $\frac{1}{4}$ th of the tank in a hour i.e. an inlet pipe which can fill the tank in 4 hours.
The emptying pipe will not affect the filling of the bottom $\frac{1}{4}$ th of the tank.

$\therefore$ Time taken to fill this part = $\left(\frac{1}{4}\right)(4)$ or 1 hour.

Time taken to fill the top $\frac{3}{4}$ th of the tank

$= \frac{1}{\frac{1}{\frac{3}{4}.4} - \frac{1}{\frac{3}{4}.16}} = \frac{1}{\frac{1}{3} - \frac{1}{12}}$ or 4 hours

The total time taken to fill the tank = 5 hours
Choice (D)

77. $\frac{1-P}{1-P}(1 + P)(1 + P^2)(1 + P^4)(1 + P^8)(1 + P^{16})$

$= \frac{1-P^{32}}{1-P}$

$= 1 + P + P^2 + \ldots. P^{31}$

[$\because 1 + 2 + 4 + 8 + 16 = 31$]
The sum of the first 14 terms would be

$= 1 + P + P^2 + \ldots + P^{13} = \frac{P^{14} - 1}{P - 1} = \frac{P^{14} - 1}{P - 1}$

at P = 2

Required sum = $\frac{2^{14} - 1}{2 - 1} = 2^{14} - 1$

= 16384 –1 = 16383 Choice (C)

78. Let the strengths of P, Q, R be p, q, r respectively
$62p + 71q = 66(p + q)$ and $71q + 79r = 74(q + r)$
$\therefore 5q = 4p$ and $5r = 3q$
$\therefore p : q : r = 25 : 20 : 12$.

Average marks of P and R = $\frac{62p + 79r}{p + r}$

$= 62\left(\frac{25}{37}\right) + 79\left(\frac{12}{37}\right) \approx 67.5$ Choice (B)

79. $y = x^2 + 4x + 7 = (x + 2)^2 + 3$
The values of y at $x = -2 + k$ and $x = -2 - k$ are the same.
$\therefore$ The graph is symmetric with respect to $x = -2$
$c = -2$ Ans: (–2)

80. $600^{\frac{1}{4}}$ lies between $256^{\frac{1}{4}}$ and $625^{\frac{1}{4}}$ i.e. between 4 and 5

$\left\lceil 600^{\frac{1}{4}} \right\rceil$ is the least integer greater than or equal to $600^{\frac{1}{4}}$. This is 5
Similarly,

$\left\lceil 600^{\frac{1}{4}} \right\rceil = \left\lceil 601^{\frac{1}{4}} \right\rceil = \left\lceil 602^{\frac{1}{4}} \right\rceil = \ldots\ldots\ldots \left\lceil 624^{\frac{1}{4}} \right\rceil = 5$

$\left\lceil 625^{\frac{1}{4}} \right\rceil$ is also 5.

While $\left\lceil 626^{\frac{1}{4}} \right\rceil = \left\lceil 627^{\frac{1}{4}} \right\rceil = \ldots\ldots \left\lceil 699^{\frac{1}{4}} \right\rceil = 6$

The given expression is = 25(5) + 5 + 74 (6) = 574
Choice (A)

81. A function $f : A \to B$ is said to be strictly increasing, if for all $x_i, x_j \in A$, $x_i > x_j \Rightarrow f(x_i) > f(x_j)$
In the present case, from the 6 elements of B, we need to select 4 (to be associated with 4 elements of A) we can see that repetitions need not be considered.
$\therefore$ Required number of strictly increasing functions = ${}^6C_4$

$= \frac{6(5)}{2} = 15$ Ans: (15)

82. Given, $S = \{(x, y) / 1 \le (x, y) \le 10$ and $x, y \in N\}$
The number of ordered pairs in the set $S = 10 \times 10 = 100$
The values for 'y' such that $3x + 7y \le 20$ are y = 1 and y = 2, as for $y \ge 3$, $x < 0$.
for y = 1, $3x \le 13$
$\Rightarrow$ x = 1, 2, 3, 4;
for y = 2, $3x \le 6$
$\Rightarrow$ x = 1, 2;
Hence, the favourable cases are
(1, 1); (2, 1); (3, 1); (4, 1); (1, 2) and (2, 2)

Hence, the required probability = $\frac{6}{100} = \frac{3}{50}$

Choice (A)

83. The given equation is $x^4 + \frac{1}{x^4} = \frac{257}{16}$

As x is real, the possible values of x can be 2, –2, 1/2 or –1/2.

Substituting $x = 2$, $x^3 - \frac{1}{x} = 8 - \frac{1}{2} = \frac{15}{2}$

Substituting $x = -2$, $x^3 - \frac{1}{x} = -8 + \frac{1}{2} = \frac{-15}{2}$

We need not check any further, since this gives us the answer. Choice (D)

84. Given: Theatre capacity = 300
Let the price of the ticket be ₹ (60 + 3x)
For every ₹3 increase in the price of the ticket from ₹60, the strength of the audience drops by 10.
$\therefore$ The strength at the above price = 300 – 10x
Revenue at this price (in ₹)
$= (60 + 3x)(300 - 10x) = 18000 + 300x - 30x^2$
$= 18000 - 30(x^2 - 10x)$
$= 18000 - 30(x^2 - 10x + 25) + (30)(25)$
$= 18750 - 30(x - 5)^2$
This is maximum i.e. when $(x - 5)^2 = 0$
$\therefore$ Maximum revenue = ₹18750 Choice (C)

85. $\frac{44-11\sqrt{5}}{4+\sqrt{5}} = \frac{11\left(4-\sqrt{5}\right)}{4+\sqrt{5}}$

$= \frac{11\left(4-\sqrt{5}\right)^2}{\left(4+\sqrt{5}\right)\left(4-\sqrt{5}\right)} = \left(4-\sqrt{5}\right)^2$

$= 21 - 8\sqrt{5}$

$21 - 8\sqrt{5} = 21 - \sqrt{320}$

$\sqrt{320}$ lies between 17 and 18

$\therefore 21 - \sqrt{320} = 3 + 18 - \sqrt{320} = 3 +$ (A number lying between 0 and 1)

$18 - \sqrt{320}$ must be the fractional part of $21 - \sqrt{320}$

i.e., $f = 18 - \sqrt{320}$.

$\frac{f}{2} + \frac{2}{f} = \frac{18-8\sqrt{5}}{2} + \frac{2}{18-8\sqrt{5}}$

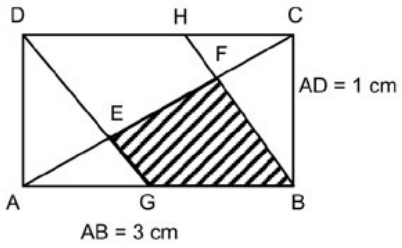
$= 9 - 4\sqrt{5} + \frac{1}{9-4\sqrt{5}}$

$= 9 - 4\sqrt{5} + \frac{9^2 - \left(4\sqrt{5}\right)^2}{9-4\sqrt{5}}$

$= 9 - 4\sqrt{5} + 9 + 4\sqrt{5} = 18.$ Ans: (18)

86. $S_n = 10^8 n^2 + 10^5 n$ ..... (1)
Let $S_n = pn^2 + qn$ ..... (2)
By replacing n with n–1
we get $S_{n-1} = p(n-1)^2 + q(n-1)$ .... (3)
(2) – (1) $\Rightarrow T_n = p(2n-1) + q$ ..... (4)
(1) $\Rightarrow T_n = 10^8 (2n-1) + 10^5$
$\Rightarrow T_n = 2(10^8)n - 10^8 + 10^5$
common difference, d = coefficient of $n = 2(10^8)$
For first term 'a', put n=1, then
$a = 2(10^8) - 10^8 + 10^5 = 10^8 + 10^5 = 10^5 (10^3 + 1)$
$= 1001(10^5)$ Choice (D)

87.



AB = 3 cm

EF divides the parallelogram GBHD into two congruent quadrilaterals.
Given that AG = AB/3 = 1 cm
GB = 2 cm
Area of the parallelogram GBHD = (2) (1) = 2 cm²
∴The area of the shaded region = (1/2) (2)
= 1 cm² Ans: (1)

88. 12 sin x cos x (5 + sinxcosx)

$= 12 \frac{\sin 2x}{2}\left(5 + \frac{\sin 2x}{2}\right) = 6 \sin 2x \left(5 + \frac{\sin 2x}{2}\right)$

As $\sin 2x \le 1$,

$6 \sin 2x \left(5 + \frac{\sin 2x}{2}\right)$ cannot exceed $6(1)\left(5 + \frac{1}{2}\right)$

i.e. 33. Choice (D)

89. The product of 5 and 2 and powers of 10 give zeros at the end.
As there are 10 twos in $(2^4)(4^3)$, these along with 10 fives give 10 zeros. We get 4 more zeros from 10^4.
The first non-zero digit from the right is the units digit of $(3)^7 (5) (7)^2 (9)^2$
Here, five is multiplied with an odd number. Therefore, the first non-zero digit from the right is 5. Ans: (5)

90. Let the speeds of the trains A and B be a m/s and b m/s respectively
The time taken for A and B to cross each other in 10s. i.e.,
$a + b = \frac{800+800}{10} = 160$.
Time taken for A and B to meet = $\frac{2160}{(160)\times\frac{18}{5}}$ hr
= 3.75 hr. Choice (B)

91. The positive integer is less than 1000 and the sum of its digits is to 14.
The positive integer must have at least two digits.
The two-digit integers are 59, 68, 77, 86 and 95.
The three-digit integers are tabulated below.

Range	Integers	No. of integers
100-199	149,158,167,176,185,194	6
200-299	239,248,257,266,275,284,293	7
300-399	329,338,347,356,365,374,383,392	8
400-499	419,428,437,446,455,464,473,482,491	9
500-599	509,518,527,536,545,554,563,572,581,590	10
600-699	608,617,626,635,644,653,662,671.680	9
700-799	707,716,725,734,743,752,761,770	8
800-899	806,815,824,833,842,851,860	7
900-999	905,914,923,932,941,950	6

A total of 75 positive integers satisfy the given conditions.
Choice (C)

92. Given $\log_{0.4}(x-1) < \log_{0.16}(x-1)$
i.e., $\log_{0.4}(x-1) < \log_{(0.4)^2}(x-1)$ or

$\log_{0.4}(x-1) < \frac{1}{2}\log_{0.4}(x-1)$

$\Rightarrow \log_{0.4}(x-1) - \frac{1}{2}\log_{0.4}(x-1) < 0$ or $\log_{0.4}(x-1) < 0$

$\therefore x - 1 > 1$ or $x > 2$
$\therefore x \in (2, \infty)$ Choice (C)

93. a, b are the legs and c is the hypotenuse of a right-angled triangle. $\therefore \Rightarrow a^2 + b^2 = c^2$
By m^{th} power theorem,

$\frac{a^2+b^2}{2} \ge \left(\frac{a+b}{2}\right)^2 \Rightarrow \frac{(a+b)^2}{4} \le \frac{c^2}{2}$

$\Rightarrow (a+b)^2 \le 2c^2 \Rightarrow a + b \le \sqrt{2}c$

If a = b, then $c = \sqrt{2}a$ and $a + b = \sqrt{2}\,c$

$\therefore$ The maximum value of $\frac{a+b}{c}$ is $\sqrt{2}$

Choice (C)

94. $a \# b = (a^b)^3 = a^{3b}$
$\therefore 7 \# 6 = 7^{18}$
$(7 \# 6) \# 8 = 7^{18} \# 8 = (7^{18})^{24} = 7^{432}$ Choice (D)

95. (1) f(x) is the greatest integer less than x.
(2) g(x) is the greatest integer less than or equal to x. Therefore, for non integral values of x, g(x) = f(x).
But for integral values g(x) = f(x) + 1.
(3) h(x) is the least integer greater than or equal to x. Therefore for non integral values of x, h(x) = g(x) + 1. For integral values h(x) = g(x).

(4) i(x) is the least integer greater than x. Therefore for non integral values, i(x) = h(x). For integral values i(x) = h(x) + 1.

Consequently if we separate the integral and non-integral values, we can express g, h and i terms of f as shown in the table below.

	Non integral	Integral
f(x)	f	f
g(x)	f	f + 1
h(x)	f + 1	f + 1
i(x)	f + 1	f + 2

We can see that we can write relations between f(x) and h(x) and also between g(x) and i(x) which are true for all values of x. Thus h(x) = f(x) + 1 and i(x) = g(x) + 1. Relations A, B are true for all values of x but C, D are true only for non integral values. Ans: (AB)

96. Let there be x dozens of strawberries.
Let S% of them have got spoilt.
Total value of the initial lot of strawberries = ₹20x
Amount for which the unspoilt strawberries were sold = $\left(x-\frac{Sx}{100}\right)30$

Profit made = $\left(x-\frac{Sx}{100}\right)30-20x$

Profit percentage = $\frac{\left(x-\frac{Sx}{100}\right)30-20x}{20x}\times 100=5$

$\Rightarrow$ S = 30
So, 70% of the strawberries are unspoilt.

Ans: (70)

97. Let the number of cricket balls X, Y and Z have be 2a, 3a and 5a respectively.

we have, $2a + 36 + 36 = \frac{2}{3}(3a + 5a - 72)$ ---- (i)

Solving (i) we get a = 36
$\therefore$ Total number of cricket balls = 2a + 3a + 5a
= 10a = 360. Ans: (360)

98. Let the length of the first train be L m and the speed of the train be S m/s. The length of the second train is 3L.

Given, $\frac{L+3L}{S+S}=90$, $\frac{L}{S}=45$

When a train crosses a stationary pole, it travels its own length. Hence time taken by it to cross a stationary pole = $\frac{L}{S}$ = 45 seconds. Ans: (45)

99. The LCM of P and Q is P.

$\therefore \frac{P}{Q}$ is an integer.

$\frac{2^{x^2+10x+72}}{2^{x^2+16x+54}}$ is an integer.

2^{18-6x} is an integer.
18 – 6x must be a non-negative integer in order for 2^{18-6x} to be an integer.
$18 - 6x \geq 0$
$x \leq 3 \Rightarrow x = 1, 2$ or 3, i.e.,three values

Ans: (3)

100. Let the total area of the barn be 24

Part painted by $A=\frac{1}{3}(24)=8$

Part painted by $B=\frac{1}{8}(16)=2$

Part painted by A and B = 10.
Remaining area = 24 – (8 +2) = 24 – 10 = 14
Finally, 3/4th or 18 has to be painted
$\therefore$ C has to paint 8 out of the 14 parts
i.e., 4/7. Choice (D)

Difficulty level wise summary - Section III	
Level of Difficulty	Questions
Very Easy	–
Easy	67, 68, 92, 94, 96, 97, 98, 100
Medium	70, 73, 76, 78, 79, 81, 84, 87, 88, 90, 93, 99
Difficult	69, 71, 72, 74, 75, 77, 80, 82, 83, 85, 86, 89, 91, 95
Very Difficult	–