

(Key and Solutions for AIMCAT1806)

Key**SECTION – I**

1. D	7. 245	13. 1	19. 3	25. D
2. C	8. 24153	14. D	20. 2	26. C
3. B	9. 3	15. C	21. 25143	27. D
4. B	10. 5	16. A	22. 2	28. C
5. C	11. 23154	17. B	23. 384	29. B
6. D	12. 951	18. 43152	24. B	30. 1

SECTION – II

1. B	7. A	13. C	19. 50	25. 2
2. A	8. D	14. C	20. A	26. 1
3. C	9. 1	15. A	21. A	27. B
4. C	10. 5	16. A	22. B	28. D
5. B	11. C	17. 66	23. B	29. C
6. C	12. B	18. C	24. D	30. C

SECTION – III

1. 9	7. C	13. A	19. B	25. A
2. 5	8. 380	14. B	20. C	26. B
3. 42	9. D	15. C	21. D	27. D
4. D	10. 12	16. B	22. D	28. C
5. A	11. B	17. C	23. A	29. 9982
6. A	12. D	18. A	24. B	30. 7

Solutions**SECTION – I****Solutions for questions 1 to 4:****Number of words and Explanatory notes for RC:**

Number of words: 621

1. The first para lays the foundation stone for the whole passage. The resulting entrepreneurial culture has captured the world's imagination and driven the nation to great prosperity. Yet now it is clearly faltering. The second para also states: There's been a secular decline in business formation throughout the country, with a concurrent increase in business dissolution.
Option A: Choice A mentions nothing of the entrepreneurial loss.

Option B: Choice B only indicates what the author acknowledges. The author's attempt, however is to identify the reasons for the loss. Hence choice B is not the answer.
Option C: Though the author mentions 'consolidation' in paras 3 and 4, he goes on to raise a pertinent question: How does this consolidation impact entrepreneurs? Choice C fails to capture this point. In fact, choice C does not explain the 'entrepreneurial loss' angle at all. Choice C can be eliminated as it does not cover the breadth of the passage.

Option D: Choice D is appropriate as the author's attempt is to identify the reasons for the loss of entrepreneurial spirit. The author places the blame, squarely, on the rise of global corporate behemoths.

Choice (D)

2. The second para of the passage mentions Hathaway and Litan's report.
Option A: Choice A is a positive and feel-good statement. It is not the summary of Hathaway's and Litan's report.
Option B: Choice B mentions nothing of the "secular decline in business formation throughout the country". Hence choice B is not the answer.
Option C: Looking at data from all fifty states and all metropolitan areas, Hathaway and Litan conclude there's been a secular decline in business formation throughout the country, with a concurrent increase in business dissolution. The rate of business formation in 2016 was almost half of what it was in 1978, with the rate of dissolution somewhat higher than the past couple decades. National response **has not been**, contrary to our myths and history, **one of increased entrepreneurship**. Hence choice C is the apt summary.
Option D: Choice D is again a positive choice and does not capture the main premise of Hathaway and Litan's report. Only choice C is comprehensive. Choice C is the answer.
Choice (C)
3. Option A: Choice A is not even true. "Sell to us (buyer) or get lost" means that there is one buyer. So, monopsony is a market situation in which there is only one buyer (not 'one seller'). Giant firms seek the services of similarly large vendors. New, small entrants into the market will be at pains to form relationships with such firms, and the power imbalance is effectively a monopsony – **sell to us at our price, on our invoice terms, or get lost**.
Option B: "Consolidation of the financial sector" along with

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"power imbalance" supports choice B. Refer to para 5. New, small entrants into the market will be at pains to form relationships with such firms, and the power imbalance is effectively a monopsony – *sell to us at our price, on our invoice terms, or get lost*. Trying to sell into a world of enormous corporate cartels is considerably more difficult than it was forty years ago. Hence choice B is the answer.

Option C: Consolidation of the financial sector has led to similar dynamics in other industries. But choice C does not build on the author's basic argument How does this consolidation impact entrepreneurs? Hence choice C is less specific than choice B.

Option D: Choice D gets into details that have not been indicated, and have no relevance to the key argument made by the author in the passage. Choice (B)

4. Since the question asks about a mistaken assumption that the author corrects, this can only mean assumptions that others may have made, not those in the author's argument (that, thanks to the dominance of big fish, the SME (small and medium-sized enterprises) sector throws up very few new ventures, and even those that emerge are hoping not for organic growth on their own but to be swallowed up by the big fish).
- Option B: The current tech boom might serve as a counter example, (to concentrated industries) but (it doesn't) means that the mistaken assumption is choice B. This assumption is contested by the author through the point that the entrepreneurs behind these promising startups are more interested in cashing in on lucrative takeovers (by conglomerates) than on staying in the market and achieving growth themselves. Choice B is the answer.
- Option A: The American entrepreneurial mythos arose in an environment that was perfect for supporting new businesses: rapid growth, technological change, constant competition, limited government intervention. We need to find ways to bring that environment back. Choice A is not an assumption that the author corrects.
- Option C: Choice C is akin to a feature in the author's argument. It's not an assumption that he overturns.
- Option D: There is no discussion on what others believe the financial status tech start-ups to be or of what they think the terms of their possible take-overs are like. So this statement is irrelevant.

Choice (B)

Solutions for question 5 to 7:

Number of words and Explanatory notes for RC:

Number of words: 513

5. The sentence quoted in the question is from para 3. People receive all sorts of information from all sorts of sources. All this information has some effect on the mind.
- Option A: If you are more sympathetic to religious beliefs, you will say that they open up their minds to wondrous truths *beyond the reach of reason*. But the point is that if you accept this account, you assume that people first open up their minds, as it were; and then let it be filled by whatever religious beliefs So choice A is incorrect and not specific to "this scenario".
- Option B: Refer to para 1. So the problem, surely, is not just to explain how people can accept supernatural claims for which there is no strong evidence but also why they tend to represent and accept these particular supernatural claims rather than other possible ones. But choice B does not explain "the scenario" that is highly misleading. Choice B is not the answer.
- Option C: Refer to the last few sentences of para 2. You assume that people first open up their minds, as it were; and then let it be filled by whatever religious beliefs are held by the people who influence them at that particular time. This is often the way we think of religious adhesion. There is a gate-keeper in the mind that either allows or rejects visitors, that is, other people's concepts and beliefs. So "this scenario" refers to what is mentioned in choice C. The third para explains what is misleading with reference to

the point of view in choice C. Hence choice C is the answer.

Option D: We should go even further and abandon the credulity-scenario altogether. Credulity refers to a tendency to be too ready to believe that something is real or true. Choice D is not specific to the question. Choice D refers to the "credulity scenario" mentioned in para 2 and not to "this scenario" given in para 3.

Choice (C)

6. Option A: We cannot tell anything about the author's personal beliefs from this passage. Also the author does not address the reason that people subject their minds to religious beliefs. Hence choice A is incorrect.

Option B: Choice B is beyond the scope of the passage. There is no optimism displayed by the author. The author has a neutral tone in the passage and all his objections towards the misconceptions about religion are scientific objections. The author does not express any hope (emotion) that the unanswered questions related to the psychological basis of religions in human beings will be answered. So choice B is incorrect.

Option C: The problem, surely, is not just to explain how people can accept supernatural claims for which there is no strong evidence but also why they tend to represent and accept these particular supernatural claims rather than other possible ones. But we cannot infer that the author is affected by the fact that non-believers believe religion to be supernatural. So choice C is incorrect.

Option D: Refer to the last para. In ways that a good psychology of religion should describe, it so happens that only some pieces of information trigger these effects, They have some beliefs because, among all the material they acquired, some of it triggered these particular effects. {For one thing, 'psychological' and 'human mental machinery' mean the same thing, more or less. Also, when you consider "In ways that a good psychology of religion should describe...", you realise that he's saying that "psychology would be able to get into this in detail, (which I'm not doing here)."} So we can say that the author is a objective person (there isn't enough to say that he is a psychologist) and he seems to be mainly concerned with exploring the psychological bases for religion. This makes choice D the correct answer.

Choice (D)

7. Statement 1: There is only a limited catalogue of possible supernatural beliefs. Even without knowing the details of religious systems in other cultures, we all know that some notions are far more widespread than others. The idea that there are invisible souls of dead people lurking around is a very common one; the notion that people's organs change position during the night is very rare. Statement 1 is incorrect.

Statement 2: People relax ordinary standards of evidence for some reason (when accepting religious beliefs). If you are against religion, you will say that this is because they are naturally credulous, or respectful of received authority, or too lazy to think for themselves. Hence (2) is true.

Statement 3: The problem, surely, is not just to explain how people can accept supernatural claims for which there is no strong evidence but also why they tend to represent and accept these particular supernatural claims rather than other possible ones. Hence (3) is not true. We should explain why they are so selective in the claims they adhere to.

Statement 4: All this information has some effect on the mind. Every bit of information is fodder for the mental machinery. But then some pieces of information produce the effects that we identify as 'belief'. That is, the person starts to recall them and use them to explain or interpret particular events; they may trigger specific emotions; they may strongly influence the person's behaviour. They have some beliefs because, among all the material they acquired, some of it triggered these particular effects. So (4) is also correct.

Statement 5: People receive all sorts of information from all sorts of sources. All this information has some effect on the mind. Every bit of information is fodder for the mental

machinery. Some pieces of information produce the effects that we identify as 'belief'. That is, the person starts to recall them and use them to explain or interpret particular events; they may trigger specific emotions; they may strongly influence the person's behaviour. This is where the selection occurs. It also happens that the same piece of information will have these effects in some people but not others. Some beliefs because, among all the material they acquired, some of it triggered these particular effects. Hence (5) is also correct.

Ans: (245)

Solutions for question 8:

8. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the para. It introduces the topic of discussion: paying employees with shares. Sentence 4 follows sentence 2. "Young companies" in sentence 4 links with "tech startups" in sentence 2. Sentence 4 mentions the reason why paying employees with shares makes sense. "preserve their capital; potentially far more valuable than their salary" in sentence 4 links with "paying employees with shares makes sense" in sentence 2. Sentence 1 follows sentence 4. The contrast conjunction 'but' helps point to a problem related to 'paying employees with shares'. "The hitch: tech firms are taking much longer to list" in sentence 1 contrasts "preserve their capital potentially far more valuable than their salary" in sentence 4. Sentences 1 and 5 form a mandatory pair. "tech firms are taking much longer to list" in sentence 1 links with "average age at initial public offering (IPO) has risen from" in sentence 5. Sentence 5 is followed by sentence 3. Sentence 3 concludes the para.

Ans: (24153)

Solutions for question 9:

9. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. It introduces the background: Former champions were missing from this year's US Open and less-familiar names wished to make a name for themselves. Sentence 5 is followed by sentence 4. From "a throng of less-familiar names" (sentence 5), "one name is particularly surprising: Diego Schwartzman" (sentence 4). Sentence 4 is followed by sentence 2. "Diego Schwartzman who is just five feet and seven inches tall" in sentence 4 links with "Mr Schwartzman, nicknamed 'El Peque'" ("the small one")" in sentence 2. Sentences 2 and 1 form a mandatory pair. "once before reached the third round of a major" in sentence 2 links with "he had won fewer than half of his matches on hard courts". Sentence 2 concludes the para. Sentence 3 is the odd sentence out as it needs more substantiation.

Ans: (3)

Solutions for question 10:

10. On a careful reading of the sentences, it can be observed that the para is about a motorcycle. A motorcycle may not be perfect but it achieves dimensional precision. Remarkable and rationally explainable things happen when one travels on a motorcycle. John has negative feelings because he focuses his attention on the steel shapes of the motorcycle. He turns off the motorcycle. The author of the para looks at the steel shapes and is positive about the motorcycle. The penultimate sentence of the para "I look at the shapes of the steel now and I see ideas" is best captured, reiterated and continued in choice 5 (I'm working on concepts).

Choice 1 seems to connect with the penultimate sentence but it leaves the thoughtflow incomplete. Choice 1 sounds like the beginning sentence of another paragraph and can come later in the flow.

Choice 2 seems abrupt. "this precision" in choice 2 needs a precedent. It also needs further substantiation.

Choice 3 cannot complete the para. Why there is a reference to another cylinder is unclear. The penultimate sentence of the para does not point to a problem with the motorcycle as such.

Choice 4 is inverted. The inverse of choice 4 as given in

choice 5 is the correct understanding from the penultimate sentence of the para. So choice 4 is not the answer.
The correct answer is choice 5.

Ans: (5)

Solutions for question 11:

11. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the para. It introduces the background: few places where the ocean floor is actually dry land. Sentences 2 and 3 form a mandatory pair. "There are a few places" in sentence 2 links with "one such is the Danakil depression" in sentence 3. So, sentence 3 follows sentence 2. Sentence 3 is followed by sentence 1 which has the contrast conjunction 'but'. "covered millions of years" in sentence 3 contrasts "barriers of lava that isolated it from the ocean" in sentence 1. The pronoun 'it' in sentence 1 points to "the Danakil depression" in sentence 3. Sentence 1 is followed by sentence 5. "What water remained" in sentence 5 links with "isolated it from the ocean" in sentence 1. Sentence 5 is followed by sentence 4. "leaving brine lakes and saline flats" in sentence 5 links with "These are mined, and the resulting slabs of salt exported ..." in sentence 4. Sentence 4 concludes the para. So, 23154.

Ans: (23154)

Solutions for question 12:

12. On a careful analysis of the words given in the choices, we can understand that few of them are nouns, some are verbs and some are adverbs. The adverbs are {deferentially, ordinarily and callously}. The verbs are {contravened, countenanced and circumvented}. The nouns are {disagreement, reassurance, dismissal}.

It can be understood on a careful reading of the paragraph that the first blank would need a describing word to refer to 'naturalistic concerns' of Stephen Jay Gould. This blank would take an adverb which would modify the adjective 'naturalistic'. We can narrow down the choices for the first blank to the three adverbs listed above, viz, {(3) deferentially, (7) callously and (9) ordinarily} 'Deferentially' means 'marked by or exhibiting deference, in a servile manner'. A person can show deference and not the concerns. So we cannot call the naturalistic concerns of Stephen Jay Gould as deferential. 'Callously' means 'insensitively' or 'heartlessly' and again cannot be used to describe 'concerns'. Therefore the first blank is best filled with the word 'ordinarily' (so far outside the ordinary). Choice 9 fills the first blank.

It can also be inferred that the second blank needs a verb to go as a synonym of 'to give sanction or support to; tolerate or approve' (.... not to be supported or tolerated by those of a scientific frame of mind). So one has to critique the notion of immortality as wishful thinking and not 'scientific'. Let us analyse the verbs in the choices which are {(2) contravened, (5) countenanced and (8) circumvented}. The correct word is 'countenanced'. Countenanced means admit as acceptable or possible; to permit. "not to be circumvented" would be incorrect. Circumvented means to find a way around (an obstacle); to deceive. "not to be contravened" would be again incorrect. Contravened means 'to be in conflict with'. Choice 5 fills the second blank.

The third blank needs a synonym for 'not in conflict'. We can also see that the word needed here is a noun. The nouns in the choices are {(1) disagreement, (4) dismissal and (6) reassurance}.

Since there is another negative "don't" in the last part of the para, 'disagreement' would be the best fit for the last blank. Choice 1 fills the third blank. The positive word 'reassurance' cannot fill the last blank. 'in conflict' is related to 'disagreement' and not 'dismissal'. So 'dismissal' cannot be a part of the third blank.

Ans: (951)

Solutions for question 13:

13. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the para. It introduces the background: This is a bumper era for solar energy. Sentence 4 is linked with sentence 3. "this is a

bumper era for solar energy" in sentence 4 links with "the world invested more in photovoltaic cells" in sentence 3. Sentence 3 is followed by sentence 2. "Last year, for the first time, the world invested more in photovoltaic cells" in sentence 3 links with "This year, new solar installations in America are expected to more than double" in sentence 2. Sentence 5 concludes the para on a positive note. So, 4325. Sentence 1 which is a negative sentence is the odd sentence out. It runs tangent to the discussion by focussing on some energy firms fooling themselves through funding and technology.

Ans: (1)

Solutions for questions 14 to 17:

Number of words and Explanatory notes for RC:

Number of words: 754

14. Option A: Choice A is not true. For years the price of cork had been increasing. But plastic cork stoppers are not cheaper as well. ... the air in the bottle has to be expensively removed before the stopper is inserted.

Option B: Demand for wine in bottles (as opposed to wine in bags) is growing faster than the supply of properly prepared cork, so there is actually plenty of room in the market for different types of stopper. Traditional cork stopper defenders will be conscious about the quality and not the variety of synthetic stoppers for wine bottles. So choice B is not true.

Option C: Choice C is out of scope. It is not the central idea of the passage. There is no win-win solution discussed in the passage.

Option D: This increased awareness is largely due to the **battle now waging** between defenders of the traditional cork stopper and its opponents, who believe that an unacceptable percentage of wine is affected by "corkiness". How likely is the **wine-stopper war** to end in open hostilities? ... So choice D is true. Dependability here means what is more effective as stopper and as cap without affecting the properties of the wine.

Choice (D)

15. Option A: In Britain cork's defenders have unleashed a ferociously negative (and largely counter-productive) public-relations campaign. They have attacked plastic substitutes as imparting their own impurities and claimed that their use would destroy the cork-oak forests of Spain and Portugal, together with their dozens of rare species of birds. So choice A is distorted and does not answer the question.

Option B: The manufacturing processes remained primitive and continued to rely on the use of chlorine washes which increased the likelihood of contamination. Today washes have been changed, quality controls tightened and more care, generally, is taken that the corks are not exposed to moisture which encourages the development of TCA during the manufacturing process. Today corks can be treated in a process called INOS designed to use its inherent sponginess as a way of squeezing out possible contaminants. Choice B is not a current problem plaguing the cork industry.

Option C: Even Amorim and other quality-conscious producers such as Sabate are going to have to accept that plastic corks—and the screw caps used in many cheaper wines in the United States and by the Swiss for even their finest bevvies—are going to take an increasing share of the market. This is not because they are cheaper. Hence choice C is the discomfort that the cork industry faces today.

Option D: Choice D sounds like an illogical step. Supreme Corq from America is made from a recyclable, inert thermoplastic polymer used to store medicines – a field where cork was abandoned 80 years ago. Choice D is not the primary problem plaguing the wine cork stopper industry as of today.

Choice (C)

16. Option A: Refer to the latter half of the passage. The author

ends the passage by showing how plastic caps are going to take an increasing share of the market. "the top end" accounts for a very small amount of the total wine drunk, and **plastic's chances look correspondingly better**. As over 90% of all wine is consumed within a year of being bottled (and within 24 hours of being purchased) for most drinkers the argument about the **long-term effects of plastic will seem fairly theoretical**. Hence choice A is the correct answer.

Option B: Choice B is negated in the last para. For nobody can yet know whether plastic stoppers will remain sound for the 20 or more years during which the greatest wines mature before they are drunk. On the other hand, "the top end" accounts for a very small amount of the total wine drunk, and **plastic's chances look correspondingly better**. Over 90% of all wine is consumed within a year of being bottled (and within 24 hours of being purchased) for most drinkers. ...

Option C: The "twin top" and "Supreme Corq" are new cork varieties which have been mentioned in the passage. We cannot infer that the author favours these, though. Hence choice C is not the answer.

Option D: Choice D reflects the present scenario. More care, generally, is taken that the corks are not exposed to moisture which encourages the development of TCA during the manufacturing process. Today corks can be treated in a process called INOS designed to use its inherent sponginess as a way of squeezing out possible contaminants. Choice D is not specific to the question.

Choice (A)

17. Option A: A narrative passage tells a story, usually from one person's viewpoint. A narrative passage is a sequence of events and follows a story telling format. A narrative passage neither presents any analysis nor evokes any emotions. This passage is not narrative. Hence choice A is not the answer.

Option B: Analysis involves examining aspects of a situation in its pluses and minuses, and making an evaluation at the end of it. In this passage, the author analyzes a situation and weighs it up. The purpose of this passage is to offer an analysis: what's the problem the cork defenders had, how are they dealing with it, what are the alternatives available to their buyers, what are the prospects of each segment. His analysis is also evident in the last para. How likely is the wine-stopper war to end in open hostilities? The fact of the matter is that seem theoretical. Hence choice B is the answer.

Option C: A descriptive passage makes a discussion vivid with detail. Here the author is not using a descriptive style. Hence choice C is incorrect.

Option D: The passage is not argumentative. There is no debate i.e. the passage does not present arguments and counterarguments for any idea or concept. The author refrains from delivering an argument; neither does he try to convince people of an argument. Overall the style of the passage is analytical. The only small argument, associated to the last part of the analysis, is at the end – the nature of the market (not just its size) favours growth of the plastic stopper industry, more than it does the cork industry. Hence choice D is incorrect.

Choice (B)

Solutions for question 18:

18. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the para. It has a proper noun "Progressive" which is an American insurer. It introduces the topic of discussion: Drivers get a choice. Sentence 4 is followed by sentence 3. "get a choice" in sentence 4 is followed by "they can either supply or they can install" in sentence 3. Sentence 3 is followed by sentence 1. "install a small gadget in their car" in sentence 3 is linked with "the device" in sentence 1. "few bits of information about themselves and receive a quote based on the behaviour of similar people" in sentence 3 is parallel to "monitors their driving and adjusts the rate they pay accordingly" in sentence 1. So, 431. Sentence 5 follows

sentence 1. "Those who refrain from braking sharply and stay off the roads at night" in sentence 5 links with "monitors their driving" in sentence 1. Sentence 2 follows sentence 5 in a similar vein and concludes the para. "Metromile" is the name of another insurer and hence sentence 2 mirrors the introduction. So, 43152.

Ans: (43152)

Solutions for question 19:

19. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the para. It introduces the background: Dubai likes to set records. Sentence 5 is followed by sentence 2. "Set records" in sentence 5 is followed by "world's tallest building, largest shopping centre, longest handmade gold chain" in sentence 2. Sentence 2 is followed by sentence 1. The contrast conjunction 'but' in sentence 1 helps to connect sentence 2 to sentence 1. "world's tallest building, largest shopping centre, longest handmade gold chain" in sentence 2 links with "But beyond mere ostentation" and "more substantial achievements to its credit" in sentence 1. So 521. Sentence 4 concludes the para as it cites an example of the point mentioned in sentence 1. Hence 5214. Sentence 3 is the odd sentence out as it is slightly negative in tone. It needs a precedent and more substantiation.

Ans: (3)

Solutions for question 20:

20. Lyndon Johnson, who as Vice President had helped establish NASA and who succeeded John F. Kennedy as President, resolved to achieve Kennedy's goal of landing a man on the Moon by 1970. The para tells us that Lyndon Johnson faced political pressures stemming from his handling of the Vietnam war and his reelection was in real jeopardy. So choice 2 best connects with the penultimate sentence and completes the para. "needed a triumph to counterbalance the ongoing tragedy of Vietnam" in choice 2 connects with "political pressures stemming from his handling of the Vietnam war" and "move quickly on the Apollo moon-landing program". Hence choice 2 is the answer.

Choice 1 is inappropriate because "quality thinking" given in choice 1 needs a precedent and more substantiation. The penultimate sentence of the para refers to a quick move and not to "quality thinking".

Choice 3 (Johnson's strategy, think and work at breakneck speed) attempts to connect with the penultimate sentence "Johnson quietly passed the word to NASA to move quickly" but choice 3 only continues the thoughtflow and does not complete the para. "quality eroded" can be a part of the next para which can then be explained in a proper context. Choice 4 does not connect well with the penultimate sentence. The word "always" in choice 4 renders it out of scope. Choice 4 sounds more like an introductory sentence than a conclusion sentence of the paragraph.

Choice 5 sounds sarcastic in tone. "yield greater political benefit than a victory in Vietnam" in choice 5 seems to connect with "growing political pressures stemming from his handling of the Vietnam war". However, the paragraph has no indication of a comparison in the aspects of manner or benefit. As such, there isn't enough to progress to the words 'easier' and 'greater' as given in choice 5.

Hence choices 1, 3, 4 and 5 are not the answers. Choice 2 is the correct answer.

Ans: (2)

Solutions for question 21:

21. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. It introduces the background: Thinking beyond the bounds of conventional wisdom Sentence 2 is contrasted by sentence 5. "it" in sentence 5 points to "thinking beyond the bounds of conventional wisdom" in sentence 2. "produces unconventional answers" in sentence 2 is contrasted by "but ... no guarantee any one

solution will lead to success" in sentence 5. Sentence 5 is followed by sentence 1 which exemplifies the point given in sentence 5. "finding the best possible solution requires still more imagination" in sentence 1 links with "any one solution may not lead to success" in sentence 5. Sentences 1 and 4 form a mandatory pair. "whitewash ninety feet of board fence standing nine feet high" in sentence 1 links with "dipping his brush and sloshing a white streak on the wood-planked surface" in sentence 4. So, 2514. Sentence 4 is followed by sentence 3. "Tom felt overwhelmed by the huge task ahead" in sentence 4 links with "His day of play having turned into weary work" in sentence 3. "Tom ransacked his mind for some way out" in sentence 3 points to "more imagination of the sort Tom used" mentioned earlier in sentence 1. "Tom ransacked his mind for some way out" in sentence 3 points to "Thinking beyond the bounds of conventional wisdom" in sentence 2. Hence 25143.

Ans: (25143)

Solutions for question 22:

22. Sentence 1 introduces the topic of discussion. It is a standalone sentence that is best placed at the start of the paragraph. Sentence 4 follows sentence 1 as sentence 4 begins to explain the story behind the use of the phrase "how the tables have turned". Also, in sentence 4, the city "Aleppo" is introduced to us. Sentence 4 is followed by sentence 3. "Bashar al-Assad's forces launched an offensive to take back Aleppo" in sentence 4 links with "Bashar's battalions pushed back from the city" in sentence 3. "rebel fighters" in sentence 4 points to "the rebels then turned west and routed them from Idlib too" in sentence 3. We get to understand that the regime refers to "Bashar al-Assad" (Bashar al-Assad's forces launched an offensive to take back Aleppo, Bashar's battalions were pushed back from the city by the rebels, divided between the regime and rebel fighters). Sentence 3 which explains the situation in 2015 is followed by sentence 5 which explains the situation now (two years after 2015). "this time, he is succeeding" in sentence 5 contrasts "Bashar's battalions pushed back from the city" in sentence 3. The conclusion sentence 5 mirrors the introduction sentence "How the tables have turned". So, 1435. Sentence 2 is the odd sentence out as it needs more substantiation. It can be a part of another para.

Ans: (2)

Solutions for question 23:

23. On a careful analysis of the words given in the choices, we can understand that there are many nouns, a few verbs and one adjective. The nouns are {strength, correspondence, weakness, assumption, expediencies, manifestation}. The verbs are {satisfying and evaluating}. 'jejune' is an adjective. Jejune means 'not interesting; dull; lacking maturity'. The trigger words for the first blank are "opposite approach could be equally valid". So we need something which is opposite to or contrasts "the consumer's behaviour are characterised by a systematic lack of correspondence between action and needs." This opposition would be best indicated through the use of the word 'correspondence' in the first blank. Hence choice 3 best fills the first blank. The words 'manifestation' and 'assumption' do not provide the required opposition. The plural noun 'expediencies' cannot fill the first blank which is preceded by 'an underlying' (singular noun is required here). The words 'strength' and 'weakness' do not make any sense in the first blank. We need a verb in the second blank. The third sentence of the para which has the second blank begins with 'rather than'. We need to contrast 'lack of need satisfaction'. This contrast is best brought about by using 'satisfying' in the second blank (.... satisfying specific needs.) Choice 8 fills the second blank. The other words among the choices cannot fill the second blank. The third blank needs a word with a negative connotation: to compensate for failure or Choice 4 (weakness) is the best fit for the third blank. Jejune means 'not

interesting; dull; lacking maturity'. It also has a negative connotation but is contextually inappropriate. 'Expediencies' which has a positive connotation cannot fill the third blank. Expediency means appropriateness to the purpose at hand. The other words which are neutral or positive in tone cannot fill the third blank.

Ans: (384)

Solutions for questions 24 to 26:

Number of words and Explanatory notes for RC:

Number of words: 461

- 24.** The first para of the passage discusses culture and the standardisation of culture. The only bit that **seems** to discuss politics is - *Even the aesthetic activities of political opposites are one in their enthusiastic obedience to the rhythm of the iron system.* The iron system, here, is standardised culture. In simpler words this would mean – Even disparate political systems and political ideologies are presented in ways that are uniform ('aesthetics' would mean the appeal built into appearance or presentation of politics or ideologies).

Option B: Choice B is the correct answer. Culture now impresses the same stamp on everything. Films, radio and magazines make up a system which is uniform as a whole and in every part. Even the aesthetic activities of political opposites are one in their enthusiastic obedience to the rhythm of the iron system. Under monopoly, all mass culture is identical. millions participate in it, certain reproduction processes are necessary that inevitably require identical needs in innumerable places to be satisfied with identical goods. The technical contrast between the few production centres and the large number of widely dispersed consumption points is said to demand organization and planning by management. Furthermore, it is claimed that standards were based in the first place on consumers' needs, and for that reason were accepted with so little resistance. The result is the circle of manipulation and retroactive need in which the unity of the system grows ever stronger. Choice B is the correct answer.

Option A: "symbiotic relationship" with each other cannot be deduced from the passage. Hence choice A is not the answer.

Option C: Now, uniform ways of presentation would not mean that all politics and ideologies are uniform. In fact, it could leave one with the possibility of things being ostensibly similar, but actually different. So choice C is not the answer.

Option D: Choice D is out of scope of the passage and is not the answer.

Choice (B)

- 25.** Refer to the last paragraph, where automobiles, bombs and movies are mentioned.

Option A: Choice A is negated by the last sentence of the passage. Automobiles, bombs and movies **keep the whole thing together** until their levelling element shows its strength in the very wrong which it furthered. So 'disrupts the system of the culture industry' as given in choice A is incorrect.

Option B: Choice B cannot be inferred as what is given in choice B does not relate directly to automobiles, bombs or movies.

Option C: Choice C is what the author says about radio and movies; not about automobiles and bombs. Films, radio and magazines make up a system which is uniform as a whole and in every part. Movies and radio need no longer pretend to be art. The truth that they are just business is made into an ideology in order to justify the rubbish they deliberately produce. They call themselves industries; and when their directors' incomes are published, any doubt about the social utility of the finished products is removed. Interested parties explain the culture industry in technological terms. Hence choice C is not the answer.

Option D: Choice D is directly stated in relation to automobiles, bombs and movies. Refer to para 3. A technological rationale is the rationale of domination itself. It

is the coercive nature of society alienated from itself. Automobiles, bombs and movies keep the whole thing together until their levelling element shows its strength in the very wrong which it furthered.

Choice (D)

- 26.** The sociological theory that the loss of the support of objectively established religion, the dissolution of the last remnants of pre-capitalism, together with technological and social differentiation or specialization, have led to cultural chaos is disproved every day.

Option A: Choice A has not been mentioned in the passage at all. Hence it is not the answer.

Option B: The author is in agreement with choice B. Refer to the last paragraph. No mention is made of the fact that the basis on which technology acquires power over society is the power of those whose economic hold over society is greatest. A technological rationale is the rationale of domination itself. It is the coercive nature of society alienated from itself. Hence choice B is not the answer.

Option C: The author disputes choice C. Refer to the end of para 2. It is alleged that because millions participate in it, certain reproduction processes are necessary that inevitably require identical needs in innumerable places to be satisfied with identical goods. The technical contrast between the few production centres and the large number of widely dispersed consumption points is said to demand organization and planning by management. Furthermore, it is claimed that standards were based in the first place on consumers' needs, and for that reason were accepted with so little resistance. The result is the circle of manipulation and retroactive need in which the unity of the system grows ever stronger. Hence choice C is the answer.

Option D: It is alleged that because millions participate in it, certain reproduction processes are necessary that inevitably require identical needs in innumerable places to be satisfied with identical goods. But choice D cannot be inferred to be a point of dispute by the author.

Choice (C)

Solutions for question 27 to 30:

Number of words and Explanatory notes for RC:

Number of words: 718

- 27.** Refer to the penultimate and last paras of the passage.

Option A: Choice A finds no mention in the passage. The passage does not talk about declustering production in cities.

Option B: The passage does not talk about arresting the flow of credit to business services in cities. Some have concluded that they ought to slow the process down in order to minimise social upheaval. This view owes as much to anti-urban bias as it does to sober analysis. Yet new research published by the World Bank in its annual flagship World Development Report suggests that pessimism over the future of huge cities is wildly overdone (exaggerated). Slowing urbanisation down, or pushing it towards places not linked with world markets, is costly and futile. Hence choice B is not the answer.

Option C: what should countries do if they lack big cities – perhaps because they are landlocked, or cut off from world markets or have many poor people living in rural areas? These, the bank thinks, are the real problems of urbanisation, not the multiplication of slums or congestion. It is not until a more advanced stage of urbanisation is reached – with 75% of the population in cities (like, say, northern Egypt or Rio de Janeiro) – that it makes any sense to spend a lot on such policies as slum clearances. Hence choice C is not the answer.

Option D: The passage looks at various scenarios that give rise to 'the real problems of urbanization' and variously suggests' to establish land markets and basic services (schools, streets, sanitation) to help cities grow (penultimate para) and focus more on transport to connect lagging regions with fast-growing ones (last para).

Choice (D)

28. Option A: In poorer Malawi and Sri Lanka, city dwellers account for a much bigger share of consumption than of population (20% compared with 10%). But in richer Chile and Brazil, urbanites account for only slightly more consumption than population. But choice A is not specific to the question. Hence it is not the answer.

Option B: Why are third-world cities so big? They are not in relative terms all that large. But they are big because they do an economic job that is becoming more, not less, important. Hence choice B is not the answer.

Option C: The passage states: It is not until a more advanced stage of urbanisation is reached – with 75% of the population in cities (like, say, northern Egypt or Rio de Janeiro) – that it makes any sense to spend a lot on such policies as slum clearances, lest the now-teeming city is split apart by crime and grime. (last para). This indicates that access to the growing urban centers, from the outlying areas, is more a requirement of urbanization than slums and congestion are. Hence choice C is the answer.

Option D: Choice D is distorted. lest the now-teeming city is split apart by crime and grime. So as of now there is no concern about the 'crime' aspect in a city. The income gaps of rich countries have narrowed, so living standards in the West today are roughly the same between town and country. Hence choice D is not the answer.

Choice (C)

29. Option A: Choice A is stated in the passage. Urbanization is accelerating. But history suggests it will not go rising at this rate forever (para 5). Hence choice A is true and is not the answer.

Option B: Refer to paras 5 and 6. Income gaps of rich countries have narrowed, so living standards in the West today are roughly the same between town and country. That convergence is starting in poor countries, too. So choice B is not true and is the answer.

Option C: Cheap transport in the past 25 years has produced a second sort of trade revolution. Countries now sell each other not final products like port but intermediate ones such as recording heads for hard drives. That has been made possible by an extraordinary fragmentation of production: every step in the production line is broken down. Parts are made separately, then shipped for assembly. So the second trade revolution here refers to "specialized production". Hence choice C is true and is not the answer.

Option D: Choice D is stated. Between 1985 and 2015, the urban share of the population of developing countries rose by eight percentage points. Between 1870 and 1900 ---- the urban share in them ---- industrializing Europe ----- went up by about the same amount (para 5). **But relative to the size of countries' populations, the current growth is far from unusual.** Hence choice D is true and is not the answer.

Choice (B)

30. Statement 1: Statement 1 is not true. With 75% of the population in cities, it makes sense to ease urban growth. Refer to the last para.

Statement 2: Statement 2 is stated. 'Poor countries reduce internal migration to rein in urban growth (para 1).

Statement 3: Statement 3 is stated. The research also reaffirms the unfashionable view that the basic facts of geography – where people live and work, how they get around – matter as much as financial and fiscal policies. (para 3).

Statement 4: Statement 4 is implied. Why are third-world cities so big? The answer is that they are not in relative terms all that large. But another answer, suggests the World Bank, is that they are big because they do an economic job that is becoming more, not less, important. (third last para of the passage).

Statement 5: Statement 5 is implied. If they are trapped in underemployment in remote rural areas, the main task is to establish land markets and basic services (schools, streets, sanitation) to help cities grow (penultimate para).

Ans: (1)

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

SECTION - II

Solutions for questions 1 to 4:

For Amit, the sum of the three ranks is 8 and the difference between the highest and the lowest ranks is 3.

Let a, b and a + 3 be the ranks of Amit (the value of b should be between a and a + 3).

Since the sum is 8, $2a + b + 3 = 8 \Rightarrow 2a + b = 5$. The only possibilities for (a, b) are (1, 3) and (2, 1). But if (a, b) = (2, 1), b will not be between a and a + 3. Hence, the ranks received by Amit will be 1, 3 and 4.

For Giri, let a, b and a + 3 be the ranks. $2a + b = 8 \Rightarrow (a, b) = (1, 6)$ or (2, 4) or (3, 2). But in the first and last cases, b will not be between a and a + 3. Hence, the ranks of Giri must be 2, 4, 5.

For Kiran, we can see that the sum of ranks is 6. This is only possible if he received 1, 2 and 3 ranks in the three subjects in any order.

For Manoj, let a, b, a + 5 be the ranks. The possible values of (a, b) are (1, 5), (2, 3), (6, 1). In the last two cases, the rank of Manoj in one of the subjects will be 7 and 11 (since the rank in one subject is a + 5). Hence, the possible ranks of Manoj are 1, 5 and 6.

For Naveen, let a, b, a + 3 be the ranks. The possible values of (a, b) = (2, 6), (3, 4), (4, 2). In the first case, b will not be between a and a + 3. In the last case, a + 3 will be more than 7. Hence, the possible ranks of Naveen will be 3, 4 and 6.

For Ravi, let a, b and a + 4 be the ranks. The possible values of (a, b) = (2, 5), (3, 3), (4, 1). The last two cases are not possible and the only possible ranks of Ravi will be 2, 5 and 6.

The student in condition (i) can be Amit or Naveen (since they are the only students who received 3rd and 4th ranks).

The student in condition (ii) can only be Manoj (since he is the only student who received 1st and 6th rank). Hence, the rank of Manoj in Maths is 1 and his rank in Physics is 6. His rank in Chemistry will be 5.

If the student in (i) is Naveen, his rank in Maths will be 3 and his rank in Chemistry will be 4. His rank in Physics must be 6. But this is not possible because Manoj's rank in Physics is 6. Hence, the student in (i) has to be Amit.

Amit's rank in Maths, Physics and Chemistry will be 3, 1 and 4 respectively. Giri's rank in Chemistry cannot be 4 or 5. Hence, his rank in Chemistry will be 2. Kiran cannot be ranked 1 in either Maths or Physics. Hence, he would be ranked 1 in Chemistry. Kiran's rank cannot be 3 in Maths (since Amit is ranked 3 in Maths). Hence, Kiran's rank in Maths is 2 and his rank in Physics is 3.

Naveen's rank must be 3 in Chemistry (since Amit and Kiran are ranked 3 in Maths and Physics respectively). Naveen's rank must be 6 in Maths (since Manoj is ranked 6 in Physics) and his rank in Physics must be 4. Giri's rank in Maths and Physics must be 4 and 5 respectively. Ravi's rank in Maths, Physics and Chemistry must be 5, 2 and 6 respectively.

The following table provides the ranks of the six students in the three subjects:

Student	Maths	Physics	Chemistry
Amit	3	1	4
Giri	4	5	2
Kiran	2	3	1
Manoj	1	6	5
Naveen	6	4	3
Ravi	5	2	6

1. Kiran received the first rank in Chemistry. Choice (B)
2. Required difference = $5 - 5 = 0$ Choice (A)
3. Four students, Manoj, Kiran, Giri and Amit, received a better rank than Ravi in both Maths and Chemistry. Choice (C)
4. Naveen received the same rank in Physics as Giri in Maths. Choice (C)

Solutions for questions 5 to 8:

Given that from May 1st to May 4th, he was in Paris. On May 4th, he took a flight. He cannot be travelling to Paris or Zurich, since he left Zurich and landed in Paris on May 1st. Hence, he could have travelled to London or New York. On May 7th, he could not have travelled to Paris or Zurich because he left Zurich and Paris on May 1st and May 4th respectively (in both cases, ten days have not elapsed). Hence, he could have travelled to New York or London on May 7th (depending on where he travelled to on May 4th). Hence, on May 4th and May 7th, he must have travelled to New York and London in any order.

Consider that he travelled to London on May 4th and New York on May 7th.

On May 13th, he could not have travelled to Paris (because he left Paris on May 4th and cannot travel to Paris until after May 14th). He could not travel to New York or London. Hence, he must have travelled to Zurich.

On May 18th, he could not have travelled to New York. Hence, he must have travelled to Paris or London. On May 22nd, he could not have travelled to New York or Zurich. Hence, he must have travelled to Paris or London. Hence, on May 18th and May 22nd, he must have travelled to Paris and London in any order.

On May 26th, he could not have travelled to Paris or London or Zurich. Hence, he must have travelled to New York.

On June 1st, he could not have travelled London or Paris (because he would have left any city earliest by May 22nd). Hence, he must have travelled to Zurich.

On June 7th, he could have travelled to Paris or London. But he landed in Paris on 13th. Hence, he must have travelled to London on June 7th.

Similarly, we can consider the case that he travelled to New York on May 4th and London on May 7th.

In this case, all the instances in which he travelled to London in the previous case, he travelled to New York and vice versa.

The possible cases are presented in the following table:

Date	City	City
May 1 st to May 4 th	Paris	Paris
May 4 th to May 7 th	London	New York
May 7 th to May 13 th	New York	London
May 13 th to May 18 th	Zurich	Zurich
May 18 th to May 22 nd	Paris/London	Paris/New York
May 22 nd to May 26 th	London/Paris	New York/Paris
May 26 th to June 1 st	New York	London
June 1 st to June 7 th	Zurich	Zurich
June 7 th to June 13 th	London	New York

5. In both the cases, Pavan stayed in Paris for 5 days. Choice (B)
6. In all the cases, Pavan stayed in London for 10 days. Choice (C)
7. If Pavan stayed in New York on May 19th, he must have stayed in New York on June 10th as well. Choice (A)
8. Pavan did not travel from Paris to Zurich during the given period. Hence, this is not possible. Choice (D)

Solutions for questions 9 and 10:

9. Given that A is standing adjacent to both D and E. The three persons can be in the following ways:
D A E or E A D.

Statement I: C was standing two places to the left of A. Hence, they can be in the order C D A E or C E A D.
Since B was adjacent to C, they can be B C D A E or B C E A D.

In both the cases, B was to the extreme left.

Statement II: C was standing adjacent to E. The following cases are possible: D A E C or C E A D. Since B is standing adjacent to C, the following cases are possible:
D A E C B or B C E A D. Either B or D can be at the extreme left. Hence, the question cannot be answered using this statement.

Therefore, the question can be answered using statement I alone but not using the statement II alone. Ans: (1)

10. Since B and C have one draw each, they must have drawn the match that they played against each other.
B has one loss, which must have been against A.
A has one loss, which must have been against C.
In the match between B and C, each team could have scored 0 goals, 1 goal or 2 goals (since B scored only 2 goals in the tournament, there are no other possibilities).
If B and C scored 0 goals in the match that they played against each other, in the match between B and A, B must have scored 2 goals and A must have scored 4 goals (since the GF and GA for B is 2 and 4).
Since A scored 4 goals in the match against B, A cannot score any goals in the match against C. But, in this case, GA for C will become 0. Hence, this is not possible.
If B and C scored 1 goal each, in the match between B and A, B must have scored 1 goal and A must have scored 3 goals.
Since A scored 3 goals against B, A must have scored 1 goal against C. In this case, the number of goals scored against C can only be 2. Hence, this is also not possible.
If B and C scored 2 goals each, in the match between B and A, B must have scored 0 goals and A must have scored 2 goals. In the match between A and C, A must have scored 2 goals and C must have scored 3 goals.
In this case, all the values are satisfied.
Hence, the question can be answered without using either of the two statements.

Ans: (5)

Solutions for question 11:

11. Given that Shyam's watch gains 5 minutes every hour and Ram's watch loses ten minutes every hour. In each hour, the minute hands of the two watches move apart by 15 minutes. Every time they move apart by 60 minutes, they will be at the same position. Hence, every four hours, the minute hands will be at the same position. Hence, in fifteen hours, the minute hands of the two watches will be at the same position three times. [After four hours, Shyam's watch will show 4:20, while Ram's watch will show 3:20. After eight hours, Shyam's watch will show 8:40 and Ram's watch will show 6:40. After twelve hours, Shyam's watch will show 1:00 and Ram's watch will show 10:00]

Choice (C)

Solutions for questions 12 to 15:

We can start by looking at the states in which a person from AHP can become the Chief Minister.

In State A, AHP secured 20% votes. For a person from AHP to become a Chief Minister, it must form a coalition with at most two more parties, each of which secured 20% votes or less. This coalition must secure more than 50% of the votes. This is possible in State A (if AHP, EDP and one of CGP or TPL or TRP form a coalition).

Similarly, in State B, a person from AHP cannot become the Chief Minister.

In State C, a person from AHP can become the Chief Minister.

We can check for each party in each state and come up with the possibilities for each party. Since no person from WDP was the Chief Minister of any state, we can ignore WDP. This is presented in the following table:

State	Possible Parties
State A	AHP/EDP
State B	TPL/TRP
State C	AHP/CGP/TRP
State D	TPL/TRP
State E	EDP
State F	CGP/TRP
State G	TPL/TRP

We can see that in State E, the Chief Minister must be from EDP. For EDP to secure more than 50% votes in State E, it must have formed a coalition with WDP or TRP or both along with any other party.

Also, since there are two Chief Ministers from EDP, one more person must be the Chief Minister from EDP. Hence, the Chief Minister of State A must be from EDP.

If EDP formed a coalition with WDP, in State A, the Chief Minister cannot be from EDP because WDP has more votes than EDP. Hence, EDP and WDP cannot form a coalition.

Therefore, EDP must have a coalition with TRP. EDP and TRP have 32% votes in State A. They must have more than 18% votes to be able to come to power. Hence, AHP must be the third party in this coalition. Therefore, AHP, EDP and TRP form a coalition in State A and also in all the other six states.

In State A, the Chief Minister must be from EDP. Since there is one Chief Minister from AHP, the Chief Minister of State C must be from AHP.

Since there is one Chief Minister from CGP (among State C and State F), the Chief Minister of State F must be from CGP. CGP has 35% votes in State F. To have more than 50% votes, CGP must form a coalition with TPL and WDP. Hence, these three parties form another coalition.

In State B, the coalition of AHP, EDP and TRP has 45% votes and the coalition of CGP, TPL and WDP has 55% votes. Among these three parties, a person from TPL will be the Chief Minister of State B.

In State D, the coalition of AHP, EDP and TRP has 60% votes. The Chief Minister of this state will be from TRP.

In State F, CGP, TPL and WDP has 55% votes. The Chief Minister of State F will be from CGP.

In State G, CGP, TPL and WDP has 54% votes. The Chief Minister of State G will be from TPL.

The following table provides for each state the votes secured by each coalition and the party of the Chief Minister of that state:

State	Winning Coalition	Percentage Votes Secured	Party of Chief Minister
State A	AHP, EDP, TRP	52%	EDP
State B	CGP, TPL, WDP	55%	TPL
State C	AHP, EDP, TRP	55%	AHP
State D	AHP, EDP, TRP	60%	TRP
State E	AHP, EDP, TRP	60%	EDP
State F	CGP, TPL, WDP	55%	CGP
State G	CGP, TPL, WDP	54%	TPL

12. The Chief Minister of State C was from AHP.
Choice (B)

13. The Chief Minister of State D was from TRP.
Choice (C)

14. In two states (State A and State C), the Chief Ministers were from parties that secured less than 25% of the votes.
Choice (C)

15. In three states (State A, State C and State D), the Chief Ministers were not from the parties that secured the maximum number of votes.
Choice (A)

Solutions for questions 16 to 19:

Let n be the total number of seats and m be the total revenue if all the seats were filled. The following table provides the number of seats, revenue and price for each type of seat:

Type of Seat	Number of Seats	Revenue	Price of each seat
A	$0.2n$	$0.24m$	$\frac{1.2m}{n}$
B	$0.05n$	$0.12m$	$\frac{2.4m}{n}$
C	$0.25n$	$0.2m$	$\frac{0.8m}{n}$
D	$0.15n$	$0.3m$	$\frac{2m}{n}$
E	$0.35n$	$0.14m$	$\frac{0.4m}{n}$

16. Given that the revenue from each type of seat was the same, let the revenue from each type of seat be k . k can take a maximum value of $0.12m$ (since the revenue from seats of type B can never be more than $0.12m$). Hence, if all the seats of a particular type were filled, then the type of seat B would have been sold out.
Choice (A)

17. Given that the price of seat type C is Rs. 80. Hence, $m/n = 100$
The price of the seats A, B, D and E will be 120, 240, 200 and 40 respectively.

Since the revenue is the same, and we need to minimize the number of seats, we also need to minimize the revenue from each type of seat. Calculating the LCM of 40, 80, 120, 200 and 240 will give the minimum possible revenue from each type of seat.

The minimum possible revenue from each type of seat = 1200

Number of seats of type A that were filled = $1200/120 = 10$

Number of seats of type B that were filled = $1200/240 = 5$

Number of seats of type C that were filled = $1200/80 = 15$

Number of seats of type D that were filled = $1200/200 = 6$

Number of seats of type E that were filled = $1200/40 = 30$

Minimum number of seats that would have been filled = $10 + 5 + 15 + 6 + 30 = 66$

Ans: (66)

18. If 60% of each type of seat was filled, the revenue from seats of type A will vary between $0.24m \times 0.6 = 0.144m$ to $0.24m$

Similarly, we can find the variation in revenue for each seat type. The following table presents this range:

Type of Seat	Range of Revenue
A	0.144m to 0.24m
B	0.072m to 0.12m
C	0.12m to 0.2m
D	0.18m to 0.3m
E	0.084m to 0.14m

By observation, we can see that at most three types of seat would have given the same revenue (C, B and E for 0.12m OR A, C and D for 0.18m to 0.2m). Choice (C)

19. From the above question, we can see that for at least 60% of seats filled, revenue from three types of seats are the same. This needs to decrease so that the revenues from four types of seats overlap. By observation, we can see that if revenue of 0.144m from seat type A can decrease to 0.12m, this will make the revenues from A, C, B and E the same (revenue from each type of seat will be 0.12m).

Since the revenue from seat type A if all seats are filled is 0.24m, if 50% of seats are filled, then the revenue will become 0.12m. Hence, the maximum possible value of p is 50.

We can also notice that for p = 50, no other combination of four types of seats having the same revenue is possible.

Ans: (50)

Solution for question 20:

20. The number of children in A, B, C, D and E are 90, 95, 105, 100 and 85 respectively. The school that was ranked third was B.

$$\text{Required percentage} = \frac{60}{35} \times 100 = 171.43\% \approx 170\%.$$

Choice (A)

Solutions for questions 21 to 24:

Given that Pavan endorses a Smartphone. From (ii), Imran does not endorse a Video Game, but he endorses Pop. From (iv), Pop is not a Soft Drink. Hence, Imran does not endorse a Soft Drink either. Hence, Imran endorses either a Watch or a Backpack. From (iv), Gulp is a Watch but Imran does not endorse Gulp (as he endorses Pop). Hence, Imran endorses a Backpack.

From (iii), Rishi does not endorse Video Game or Soft Drink. Hence, he must endorse a Watch. From (iv), Rishi endorses Gulp.

Tarun and Himesh endorse Video Game and Soft Drink in any order.

From (v), Himesh does not endorse Fizz or Soda. Hence, Himesh endorses Carb. From (i), Pavan does not endorse Soda. Hence, Pavan endorses Fizz and Tarun endorses Soda.

The following table provides the product and brand that each person endorses:

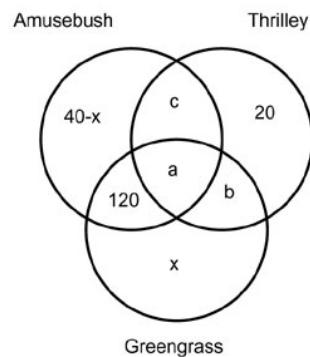
Person	Brand	Product
Pavan	Fizz	Smartphone
Rishi	Gulp	Watch
Tarun	Soda	Video Game/Soft Drink
Himesh	Carb	Soft Drink/Video Game
Imran	Pop	Backpack

21. Imran endorses a Backpack. Choice (A)
 22. Tarun endorses Soda. Choice (B)
 23. Himesh endorses Carb. Choice (B)
 24. Himesh endorses either Soft Drink or Video Game. The answer cannot be determined. Choice (D)

Solutions for questions 25 and 26:

25. Given that the number of persons who visited exactly one park is 60. The number of persons who visited only Thrilley is 20. Let the number of persons who visited only Greengrass be x. The number of persons who visited only Amusebush will be $40 - x$.

We can represent this and the other information given in the following Venn diagram:



Also, $a + b = 45$

Statement I: We get that $c = a = 0$.

Hence, $b = 45$. But we cannot find the value of $40 - x$.

Statement II: Given that $120 + a + b + x = 200$

$$\Rightarrow 120 + 45 + x = 200 \Rightarrow x = 35$$

Hence, the number of persons who visited only Amusebush = $40 - 35 = 5$

Therefore, the question can be answered using Statement II alone but not by using Statement I alone.

Ans: (2)

26. Let a be the price of the pen that P purchased. The price of the pen that Q purchased is $a + 25$ and the price of the pen that T purchased is $a + 45$. Let b and c be the prices of the pens that R and S purchased.

Statement I: Average price of a pen that they purchased was Rs. 25.

$$\Rightarrow \frac{a + a + 25 + a + 45 + b + c}{5} = 25$$

$$\Rightarrow 3a + b + c = 55$$

Now, a can be a minimum of Rs. 5. If a is Rs. 5, the price of the other pens must be 30 and 50.

b + c must be 40 and prices of the pens must be distinct. Hence, b and c can only be 15 and 25 in any order. The prices of the five pens are 5, 15, 25, 30 and 50.

If a is 10, the price of the other two pens must be 35 and 55 respectively.

$b + c$ must be 25. Hence, b and c can only be 5 and 20 in any order. The price of the five pens are 5, 10, 20, 35, 55. In both cases, the price of the cheapest pen was Rs. 5 (note that it is not necessary to find out who purchased the cheapest pen). Hence, this statement alone is sufficient to answer the question.

Solutions for questions 27 to 30:

From (iv), Lalit visited the coffee shop immediately before the person who had an Antoccino. From (iii), Kiran and Manoj did not have Antoccino. Naveen and Omar also did not have Antoccino (from v). Because if Naveen had Antoccino, then Lalit would have visited immediately before him. This will violate condition (v). Hence, Naveen cannot have Antoccino. Therefore, Piyush must have had Antoccino.

From (v), at least two persons, Naveen and Omar, visited the coffee shop before Lalit and Piyush. Hence, Lalit and Piyush can be 3rd and 4th OR 4th and 5th OR 5th and 6th.

If Lalit and Piyush were 3rd and 4th, Omar and Naveen must be 1st and 2nd. From (ii), the person who had Frappuccino and the person who had Marocchino visited one after the other. They cannot be Omar and Naveen (since Naveen did not have Marocchino). Hence, they can only be 5th and 6th. In this case, Manoj cannot have Chococcino. Therefore, this case is not possible.

If Lalit and Piyush were 4th and 5th, Omar must have visited immediately before Naveen. However, if these two conditions are satisfied, Kiran cannot visit immediately before Manoj. Hence, this case is not possible.

If Lalit and Piyush were 5th and 6th, Kiran and Manoj can be 1st and 2nd or 3rd and 4th. If Kiran and Manoj are 1st and 2nd, Omar and Naveen will be 3rd and 4th. In this case, Omar and Naveen must have had Frappuccino and Marocchino which will violate condition (v). Hence, this case is not possible. If Kiran and Manoj were 3rd and 4th, Omar and Naveen will be 1st and 2nd. In this case, Kiran would have had Marocchino, Naveen would have had Frappuccino and Omar would have had Mochaccino.

The following table presents the order in which they arrived (leftmost first):

Person	Omar	Naveen	Kiran	Manoj	Lalit	Piyush
Drink	Mochaccino	Frappuccino	Marocchino	Chococcino	Cappuccino	Antoccino

27. Piyush was the last person to visit the coffee shop.
Choice (B)
28. 3 persons visited the coffee shop before Manoj.
Choice (D)
29. Manoj, the person who visited the person immediately before the person who had Cappuccino, had Chococcino.
Choice (C)
30. Marocchino and Chococcino were had by the persons who visited the coffee shop consecutively.
Choice (C)

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

SECTION – III

Solutions for questions 1 to 3:

1. Let the two numbers be ha and hb, where h is their HCF, and hab their LCM. Let us consider $a < b$.
It is given that $ha + hb + hab = 143$
 $\Rightarrow h(a + b + ab) = 143$
Now, 143 can be expressed as the product of two numbers in 2 ways, i.e., 1×143 and 11×13

Case I: 1×143

$H = 1$ and $a + b + ab = 143$.
[$h = 143$ and $a + b + ab = 1$ is not possible]

$a + b + ab = 143$

Adding 1 to both sides, we get

$ab + a + b + 1 = 144$

$(a+1)(b+1) = 144$

144 can be expressed as the product of two numbers in the following ways.

Statement II: Using only this statement, we get multiple possibilities for the values of a, b and c and for the price of the least costly pen.

Hence, the question can be answered using statement I alone but not using statement II alone.

Ans: (1)

From (iv), Lalit visited the coffee shop immediately before the person who had an Antoccino. From (iii), Kiran and Manoj did not have Antoccino. Naveen and Omar also did not have Antoccino (from v). Because if Naveen had Antoccino, then Lalit would have visited immediately before him. This will violate condition (v). Hence, Naveen cannot have Antoccino. Therefore, Piyush must have had Antoccino.

From (v), at least two persons, Naveen and Omar, visited the coffee shop before Lalit and Piyush. Hence, Lalit and Piyush can be 3rd and 4th OR 4th and 5th OR 5th and 6th.

If Lalit and Piyush were 3rd and 4th, Omar and Naveen must be 1st and 2nd. From (ii), the person who had Frappuccino and the person who had Marocchino visited one after the other. They cannot be Omar and Naveen (since Naveen did not have Marocchino). Hence, they can only be 5th and 6th. In this case, Manoj cannot have Chococcino. Therefore, this case is not possible.

If Lalit and Piyush were 4th and 5th, Omar must have visited immediately before Naveen. However, if these two conditions are satisfied, Kiran cannot visit immediately before Manoj. Hence, this case is not possible.

If Lalit and Piyush were 5th and 6th, Kiran and Manoj can be 1st and 2nd or 3rd and 4th. If Kiran and Manoj are 1st and 2nd, Omar and Naveen will be 3rd and 4th. In this case, Omar and Naveen must have had Frappuccino and Marocchino which will violate condition (v). Hence, this case is not possible. If Kiran and Manoj were 3rd and 4th, Omar and Naveen will be 1st and 2nd. In this case, Kiran would have had Marocchino, Naveen would have had Frappuccino and Omar would have had Mochaccino.

	a	b	ha	hb	hab
1×144	0	143 [Not possible]			
2×72	1	71	1	71	71
3×48	2	47	2	47	84
4×36	3	35	3	35	105
6×24	5	23	5	23	115
8×18	7	17	7	17	119
9×16	8	15	8	15	120
12×12	11	11 [Not possible, as a, b are coprime to each other]			

Case II: 11×13

If $h = 11$, $a + b + ab = 13$

$\therefore ab + a + b + 1 = 14$

$\Rightarrow (a+1)(b+1) = 14$

	a	b	ha	hb	hab
1×14	0	13 [Not possible]			
2×7	1	6	11	66	66

If $h = 13$, $a + b + ab = 11$

$1 + a + b + ab = 12$

$\Rightarrow (a+1)(b+1) = 12$

Possible ways	a	b	ha	hb	hab
1×12	0	11 [Not possible]			
2×6	1	5	13	65	65
3×4	2	3	26	39	78

The following are the pairs of numbers satisfying the given condition:

1. (1, 71)
2. (2, 47)
3. (3, 35)
4. (5, 23)
5. (7, 17)
6. (8, 15)
7. (11, 66)
8. (13, 65)
9. (26, 39)

Thus, there are nine such pairs of numbers

Ans: (9)

2. Sum of the roots = $\alpha - 2$
 Product of the roots = $\alpha - 5$
 Let the roots be x_1 and x_2 .
 Then we have

$$\begin{aligned}x_1 + x_2 &= \alpha - 2 \text{ and } x_1 x_2 = \alpha - 5 \\x_1^2 + x_2^2 &= (x_1 + x_2)^2 - 2x_1 x_2 \\&= (\alpha - 2)^2 - 2(\alpha - 5) = \alpha^2 - 4\alpha + 4 - 2\alpha + 10 \\&= \alpha^2 - 6\alpha + 9 + 5 \\x_1^2 + x_2^2 &= (\alpha - 3)^2 + 5.\end{aligned}$$
 The minimum value of $x_1^2 + x_2^2$ is 5, since $(\alpha - 3)^2$ is always a non-negative quantity.
 Ans: (5)

3. Let the initial number of chocolates with Rahul be $2N$.
 Let the number of children in groups A and B be a^2 and b^2 respectively.
 $N = a(a^2) + 9 = a^3 + 9 \dots\dots\dots (1)$
 $N = b^2 \dots\dots\dots (2)$
 $\therefore b^2 = a^3 + 9$
 As $2N < 2000$, $N < 1000$.
 From (1), $N - 9$ is a perfect cube less than 1000.
 $\therefore N - 9$ can be 1, 8, 27, 64, 125, 216.....
 From (2),
 N is a perfect square.
 As only when $N - 9 = 27$ or 216, N is a perfect square, initial number of chocolates with Rahul could be 2(36) or 2(225), i.e., there are two possibilities. But if 36 - 9 = 27 chocolates were distributed in group A, then there were 9 children in that group. Hence, 9 chocolates cannot be remaining. Hence the only possibility that works is $N = 225$. Now if $N = 225$ the number of children in group A = $(216)^{2/3}$
 $= 36$ and number of children in group B = $\sqrt{225} = 15$
 Hence if (225 + 225) i.e. 450 chocolates, are distributed among (36 + 15) i.e. 51 children, 42 chocolates remain undistributed.
 Ans: (42)

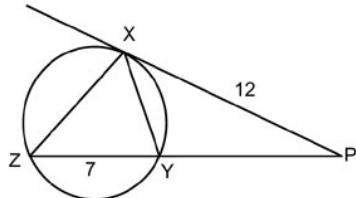
Solutions for questions 4 to 7:

4. Let the distance travelled by the man be d .
 Time taken to travel the distance d at 20 kmph = $d/20$
 Time taken to travel the distance d at 30 kmph = $d/30$
 The difference in the timings is $\frac{d}{20} - \frac{d}{30} = \frac{20}{60} + \frac{15}{60}$

$$\frac{d}{60} = \frac{d}{60} \Rightarrow d = 35 \text{ km}$$

 Actual time taken = $\frac{35}{20} - \frac{20}{60} = \frac{105}{60} - \frac{20}{60} = 85$
 If the man is travelling at 25 kmph, the time taken to cover 35 km is $\frac{35}{25} \times 60 = 84 \text{ min.}$
 \therefore He will be early by 1 min.
 Choice (D)

5.



We have $PX^2 = PY \times PZ$
 $\Rightarrow 144 = x(x + 7)$
 $x = 9$
 Also $\angle PXY = \angle XZY$ [Alternate segment Theorem]
 $\therefore \triangle PXY \sim \triangle PZX$
 \Rightarrow Perimeters of $\triangle PXY$ and $\triangle PZX$ will be in the ratio $PX : PZ$ i.e. 3 : 4
 Since perimeter of $\triangle PXY$ is 27 cm perimeter of $\triangle PZX$ is 36 cm.
 Choice (A)

6. $2\log_5(3^x - 65) = \log_5(3^x - 17) + \log_5 4$

$$\begin{aligned}\Rightarrow \log_5(3^x - 65)^2 &= \log_5 4(3^x - 17) \\(3^x - 65)^2 &= 4(3^x - 17) \\(3^x)^2 - 134(3^x) + 4293 &= 0 \\(3^x - 81)(3^x - 53) &= 0 \\3^x &= 81 \text{ or } 53 \\3^x &> 65 \\3^x - 17 &> 0, \text{ i.e., when } 3^x > 65. \\3^x &= 81 \\x &= 4, \text{ i.e., the square of an integer.}\end{aligned}$$

Choice (A)

7. The data and calculation are tabulated below.

Class / class Group	P	PQ	Q	QR	R
Average	78	80	83	80	77
Relative Number of students	3	2	3	2	3
	3	2	3	2	3

Assumed Average of P, Q, R = 80

Deviation	3(-2)	2(3)	2(-3)
Average of P, Q, R = 80 – 6/7 = 79 $\frac{1}{7}$			Choice (C)

Solutions for questions 8 and 9:

8. $S = \{1, 2, 3, 4, \dots, 20\}$
 According to the definition, if R is reflexive, then for every $x \in S$; $(x, x) \in R$.
 The set R contains at least one element and it contains a maximum 400 elements.
 Since R is Reflexive, the twenty ordered pairs (1, 1), (2, 2), ..., (20, 20) must be present and the remaining 380 elements may be present or may not.
 \therefore For each of the 380 ordered pairs, 2 choices can be made.
 Hence the number of reflexive relations in S = 2^{380} .
 $\therefore k = 380$
 Ans: (380)
9. $S = \{1, 2, 3, \dots, n\}$.
 R has at least one element (i.e., it is non-empty) and it contains a maximum of n^2 elements.
 Total number of sets of ordered pairs (i.e., relations defined on S) is $2^{n^2} - 1$.
 Suppose R is reflexive; then the n elements (1, 1) (2, 2), ..., (n, n) are present in R. The remaining $n^2 - n$ elements may or may not be present.
 \therefore Total number of reflexive relations in S is 2^{n^2-n} .
 \therefore Total number of relations which are not reflexive on S
 $= (2^{n^2} - 1) - 2^{n^2-n}$.
 $= 2^{n^2-n}(2^n - 1)$
 Choice (D)

Solutions for question 10:

10. Given $2^8 + 2^{11} + 2^7$ is a perfect square.
 By some observation and rearrangement we can rewrite the given expression as $(2^4)^2 + 2(2^4) \left(\frac{n}{2^2} \right) + \left(2 \left(\frac{n}{2} \right)^2 \right)$

Clearly, if $2^{\left(1+4+\frac{n}{2}\right)}$ were to be 2^{11} , then the given equation becomes $(2^4 + 2^6)^2$, i.e., a perfect square.

$$\text{Hence, } 5 + \frac{n}{2} = 11 \Rightarrow n = 12.$$

Alternative Solution:

$$2^8 + 2^{11} + 2^n = 2^8 [1 + 8 + 2^{n-8}]$$

$\therefore 9 + 2^{n-8}$ should be a perfect square = K^2 , say. Now by basic trial and error, let us check for $K^2 = 16, 25, 36$ etc.

Clearly, when $K^2 = 25$, $2^{n-8} = 16 \Rightarrow n = 12$ Ans: (12)

Solutions for questions 11 to 13:

11. It is given that $\mu_k = \mu_{k-1} - \mu_{k-2}$, for $k \geq 3$.

$$\therefore \mu_3 = \mu_2 - \mu_1 \Rightarrow \mu_2 = \mu_1 + \mu_3$$

i.e., In the sequence, every number is the sum of its successor and its predecessor in the series
Let $\mu_1 = a$, $\mu_2 = b$

$$\mu_3 = \mu_2 - \mu_1 = b - a$$

$$\mu_4 = \mu_3 - \mu_2 = b - a - b = -a$$

$$\mu_5 = \mu_4 - \mu_3 = -a - b + a = -b$$

$$\mu_6 = \mu_5 - \mu_4 = -b + a$$

$$\mu_7 = \mu_6 - \mu_5 = -b + a + b = a$$

$$\mu_8 = \mu_7 - \mu_6 = a + b - a = b$$

$\therefore \mu_7 = \mu_1$ and $\mu_8 = \mu_2$

and this cycle repeats for every 6 terms,

$$\text{i.e., } \mu_k + \mu_{k+1} + \mu_{k+2} + \mu_{k+3} + \mu_{k+4} + \mu_{k+5} = 0$$

i.e., Sum of any 6 consecutive terms in this series = 0

\therefore sum of 9006 terms in the series (9006 is divisible by 5) is 0.

$$\therefore \text{sum of 9007 + 9008 terms} = \text{sum of 1^{st} and 2^{nd} terms} \\ = -62.33 + 27 = -35.33. \quad \text{Choice (B)}$$

12. 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.

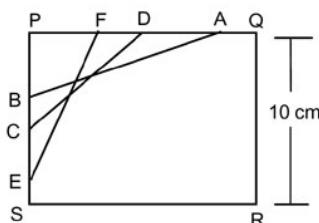
$$\therefore x + y = 360 \quad \text{--- (1)}$$

$$x + 5y = 600 \quad \text{--- (2)}$$

Solving, we get $y = 60$

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

13.



In the figure, PQRS is the square of side 10 cm. To get a triangular piece of paper with a cut of 8 cm, the paper can be cut along AB, CD, or EF each measuring 8 cm.

But to have the maximum area, since P is a right angle, the triangle cut should be right angled isosceles with cut of 8 cm being its hypotenuse.

$$\therefore \text{Length of each perpendicular side} = \frac{8}{\sqrt{2}} = 4\sqrt{2}$$

$$\therefore \text{Area of the triangle} = \frac{1}{2} \times 4\sqrt{2} \times 4\sqrt{2} = 16 \text{ cm}^2. \quad \text{Choice (A)}$$

Solutions for questions 14 and 15:

14. If each sport has to be played on at least one day of the seven-day period, then the following distributions are possible.

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- (1) One sport on 4 days and three sports on 1 day each.
- (2) One sport on 3 days, one on 2 days & two sports on 1 day each.
- (3) Three sports on 2 days each and one sport on 1 day.

Consider the

- 1st possibility:** One sport on 4 days and three sports on 1 day each.

Selection: The sport being played on 4 days can be selected in 4C_1 ways (any one out of the four)

Arrangement: Once the selection is completed, the order in which the sports are played can be arranged in

$$\frac{7!}{4!(1!)^3} \text{ ways. (7 objects of which 4 are identical)}$$

Since selection & arrangement are independent of each other, total number of ways in which such a schedule can

$$\text{be formed is } {}^4C_1 \times \frac{7!}{4!} \dots (1)$$

- 2nd possibility:** One sport on 3 days, one on 2 days and two sports on 1 day each.

Selection: ${}^4C_1 \times {}^3C_1$ ways. (first select the sport to be played on 3 days & then select the sport to be played on 2 days. The remaining two sports will be played on one day each)

$$\text{Arrangement: } \frac{7!}{3! 2!(1!)^2}$$

Total number of ways in this case

$$= {}^4C_1 \times {}^3C_1 \times \frac{7!}{3! 2!} \dots (2)$$

- 3rd possibility:** Three sports on 2 days each & one sport on 1 day.

Selection: 4C_3 ways (select the three sports being played on 2 days each)

$$\text{Arrangement: } \frac{7!}{(2!)^3 1!}$$

$$\text{Total number of ways} = {}^4C_3 \times \frac{7!}{(2!)^3 1!} \dots (3)$$

\therefore Total number of ways in which this schedule can be prepared = (1) + (2) + (3)

$$= \left({}^4C_1 \times \frac{7!}{4!} \right) + \left({}^4C_1 \times {}^3C_1 \times \frac{7!}{3! 2!} \right) + \left({}^4C_3 \times \frac{7!}{(2!)^3} \right) \\ = 8400 \text{ ways} \quad \text{Choice (B)}$$

15. Let the two sports that are played on 3 days each be X and Y, and they are scheduled on at least a total of $2 \times 3 = 6$ days.

X and Y can be chosen in ${}^4C_2 = 6$ ways.

Now there are two cases,

Case (i) where the seventh day is used to play one of X and Y.

Case (ii) where the seventh day is used to play any of the other two games (other than X and Y).

Case (i): $4X$ and $3Y \rightarrow \frac{7!}{4! 3!}$ ways

$3X$ and $4Y \rightarrow \frac{7!}{4! 3!}$ ways

$$\therefore \text{Total of } \frac{2 \times 7!}{4! \times 3!} = \frac{2 \times 7 \times 6 \times 5}{1 \times 2 \times 3} = 70 \text{ ways}$$

Hence, a total of $6 \times 70 = 420$ ways

Case (ii): $3X$ and $3Y$ and Z, where Z can be chosen in 2 ways

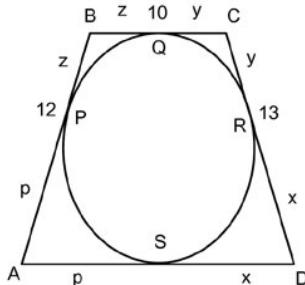
$$\Rightarrow 2 \times \frac{(3+3+1)!}{3! 3! 1!} = 2 \times \frac{7!}{3! 3!} = 280 \text{ ways}$$

Hence, a total of $6 \times 280 = 1680$ ways
 \Rightarrow Total of $420 + 1680 = 2100$ ways.

Choice (C)

Solutions for questions 16 to 22:

16.



Two tangents drawn from an external point to a circle are of same length
So let $AP = AS = p$

$$\begin{aligned} BP &= BQ = z \\ DS &= DR = x \\ CR &= CQ = y \\ AB + CD &= p + z + x + y \\ &= (x + p) + (y + z) = BC + AD \\ \therefore AB + CD &= BC + AD \\ \therefore AD &= 15. \end{aligned}$$

Choice (B)

17. Consider $f(x) = \log\left(\frac{1+x}{1-x}\right)$

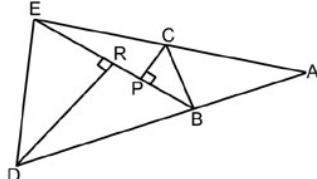
$$\begin{aligned} \therefore f\left[\frac{x_1 + x_2}{1 + x_1 x_2}\right] \\ &= \log\left[\frac{1 + \frac{x_1 + x_2}{1 + x_1 x_2}}{1 - \frac{x_1 + x_2}{1 + x_1 x_2}}\right] = \log\left[\frac{(1 + x_1)(1 + x_2)}{(1 - x_1)(1 - x_2)}\right] \\ &= \log\left[\frac{1 + x_1}{1 - x_1}\right] + \log\left[\frac{1 + x_2}{1 - x_2}\right] \\ &= f(x_1) + f(x_2) \end{aligned}$$

Choice (C)

18. For a composite number n in the range $50 \leq n \leq 70$, there are factors and at least one factor is less than $\sqrt{70} = 8$. If both factors are greater than $\sqrt{70}$ the product (i.e., n) has to be greater than 70. i.e., one of the numbers $n/2, n/3, n/4, n/5, n/6, n/7, n/8$ has to be an integer.
For a prime number $n \geq 50$, all the above numbers are non-integers.
Therefore, we need the number of composite numbers in the range $50 \leq n \leq 70$. There are altogether $70 - 49 = 21$ integers and the primes are 53, 59, 61, 67 (i.e., 4 in number). The number of composite numbers is $21 - 4 = 17$.

Choice (A)

19.



As $BC \parallel ED$, we can consider EB as a transversal between the two parallel lines.

Hence the angles $\angle CBE = \angle DEB$ and $\angle EDR = \angle BCP$ (because DR and PC are parallel to each other). Hence $\triangle EDR$ and $\triangle BPC$ are similar.

Also as $BC \parallel ED$, by basic proportionality theorem

$$\frac{BC}{ED} = \frac{AB}{AD}$$

$$\text{Hence } \frac{BC}{ED} = \frac{3}{10}$$

$$\frac{\text{Area of } \triangle EDR}{\text{Area of } \triangle BCP} = \left(\frac{BC}{ED}\right)^2 = \frac{9}{100}$$

Choice (B)

$$20. \text{ If } x = -0.2, (-x^{-1/x}) = -\left((-0.2)^{-1/-0.2}\right)$$

$$= -(-0.2)^5 = (0.2)^5$$

$$250x^2 = 250(-0.2)^2 = 250(0.2)^2 = 10$$

$$\frac{10}{(\sqrt{-x})^3} = \frac{10}{(\sqrt{(-0.2)})^3} = \frac{10}{(0.2)^{3/2}} = 10 \times 5^{3/2}$$

$$5^{\frac{-1}{2x}} = 5^{\frac{-1}{2(-0.2)}} = 5^{5/2} = 5 \times 5^{3/2}$$

$$\therefore \text{Clearly, } \frac{10}{(\sqrt{-x})^3} \text{ is the largest.}$$

Choice (C)

21. $f(p, q, r)$ is equal to the minimum of $(p+r)$ and $(q+r)$ is $p+r$. $g(p, q, r)$ is equal to either $q-p$ or $p-r$. $f(p, q, r)$ may or may not be greater than $g(p, q, r)$.

Hence choice (A) is not necessarily true.

$$h(p, q, r) = \frac{f(p, q, r) + g(p, q, r)}{2}$$

$$\text{Choice (B) states that } \frac{f(p, q, r) + g(p, q, r)}{2} < f(p, q, r)$$

$$\Rightarrow g(p, q, r) < f(p, q, r)$$

Which may or may not be true.

$$\text{Choice (C) states that } \frac{f(p, q, r) + g(p, q, r)}{2} < g(p, q, r)$$

$$\Rightarrow f(p, q, r) < g(p, q, r) \text{ which may or may not be true.}$$

Alternative Solution:

By taking $p = 1, q = 3, r = 1$, option (B) gets eliminated.
By taking $p = 2, q = 100, r = 1$, options (A) and (C) also are eliminated. Hence, option (D).

Choice (D)

22. $-3 \leq x \leq 5$

$$-4 \leq y \leq 4$$

$$-5 \leq z \leq 3$$

$$u = xyz$$

To get u_{\max} , we try to maximize the magnitude of u and keep the sign +ve.

We take $x = 5, z = -5, y = -4$.

$$\therefore u_{\max} = 100$$

This alone is sufficient to say that none of choices (A) through (D) are correct.

To get u_{\min} , we try to maximize the magnitude of u and keep the sign -ve.

We take $x = 5, y = 4$ and $z = -5$

$$\therefore u_{\min} = -100$$

Choice (D)

Solutions for questions 23 and 24:

Tap A can fill the tank in a minutes.Shiva thought that B could empty the tank in b minutes.

\therefore He calculates that A, B can fill the tank in $\frac{ab}{b-a}$ minutes i.e.,

$$m = \frac{ab}{b-a}$$

Actually, A and B can fill the tank in only $\frac{ab}{a+b}$ minutes.

Shiva returns after n minutes, when the fraction of the tank that is full is y , i.e., $y = \frac{n(a+b)}{ab}$.

$$23. n = \frac{m}{2} \Rightarrow n = \frac{ab}{2(b-a)}$$

$$\therefore y = \left(\frac{ab}{2(b-a)} \right) \times \left(\frac{a+b}{ab} \right) = \frac{a+b}{2(b-a)}$$

$$y < 1 \Rightarrow a+b < 2b - 2a$$

$$\Rightarrow 3a < b \Rightarrow \frac{b}{a} > 3$$

Among the choices $\frac{b}{a}$ can't be 3 : 1. Choice (A)

24. The fraction of the tank that is full when Shiva returns is 5/9

$$\text{i.e., } \frac{n(a+b)}{ab} = \frac{m}{3} \left(\frac{a+b}{ab} \right)$$

$$= \frac{1}{3} \frac{ab}{b-a} \left(\frac{a+b}{ab} \right) = \frac{a+b}{3(b-a)} = \frac{5}{9}$$

$$\Rightarrow 9a + 9b = 15b - 15a$$

$$\Rightarrow 24a = 6b \Rightarrow \frac{b}{a} = \frac{4}{1}$$

Choice (B)

Solutions for questions 25 to 28:

$$25. f(x) = (x-3)(x-5)(x-7) + k^2(x-4)(x-6)(x-8)$$

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

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

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

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

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

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

∴ There are 3 real roots, one each between (3, 4), (5, 6), and (7, 8) respectively. Choice (A)

26. From statement I alone:

If α and β are the roots of $x^2 - 3x + p = 0$, then the equation whose roots are $1/\alpha$ and $1/\beta$ is $px^2 - 3x + 1 = 0$. We are told the co-efficient of x^2 in this equation is given to be 2.

However, it would be presumptions to conclude that $p = 2$, since the quadratic $px^2 - 3x + 1 = 0$ can also be written as $K \cdot px^2 - K \cdot 3x + K = 0$.

Hence, we cannot determine the value of p using statement I alone.

From statement II alone:

We know $\alpha\beta = p$, $\alpha + \beta = 3$; we are given $\alpha - \beta = 1$

$$(\alpha + \beta)^2 - (\alpha - \beta)^2 = 4\alpha\beta \Rightarrow 9 - 1 = 4p \Rightarrow p = 2$$

Hence, we can answer the question using statement II alone. Choice (B)

27. The game is played on a board that has 8×12 squares.

The total number of squares of all sizes on the board can be found by finding squares of each size.

The number of squares formed by a single square = $8 \times 12 = 96$

The number of squares formed by size of four squares = $7 \times 11 = 77$

Similarly for all sizes they get the total squares as

$$8 \times 12 = 96$$

$$+ 7 \times 11 = 77$$

$$+ 6 \times 10 = 60$$

$$+ 5 \times 9 = 45$$

$$+ 4 \times 8 = 32$$

$$+ 3 \times 7 = 21$$

$$+ 2 \times 6 = 12$$

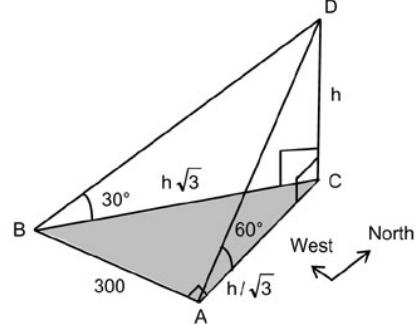
$$+ 1 \times 5 = 5$$

Choice (D)

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28. Let CD be the tower of height = h metres.
Given $\angle DAC$ (i.e.) elevation of tower at point 'A' is 60°



Since the second point is due west of A [C is north of A]
 $\therefore \angle CAB = 90^\circ$

From $\triangle ADC$:

$$AC = h \cot 60^\circ = \frac{h}{\sqrt{3}} \rightarrow (1)$$

In $\triangle CBD$:

$$BC = h \cot 30^\circ = h\sqrt{3} \rightarrow (2)$$

Applying Pythagoras theorem for ABC;

$$BC^2 = AB^2 + AC^2$$

$$\Rightarrow (h\sqrt{3})^2 = (300)^2 + \left(\frac{h}{\sqrt{3}} \right)^2$$

$$\Rightarrow \frac{8}{3}h^2 = (300)^2$$

or

$$h = 75\sqrt{6}$$

Choice (C)

Solutions for questions 29 and 30:

The difference between the three-digit number and the number formed by reversing the digits is always a multiple of 99, which lies the interval [0, 891]. Given that N x (the difference of M and its reverse) = 22770 = 99 x 5 x 46

∴ The difference between M and its reverse is 495 and N = 46

29. Let the difference between N and its reverse be ΔN (i.e., $N + \Delta N = \text{reverse of } N$). Similarly, let $M + \Delta M = \text{reverse of } M$. When both N and M are inverted the product will be $(N + \Delta N)(M + \Delta M)$ where $N + \Delta N = \text{reverse of } N = 64$, and ΔM is known as 495

Now difference between N ($M + \Delta M$) i.e., the first product that Ritu calculated, and $(N + \Delta N)(M + \Delta M)$ is given as 12816. $\Rightarrow \Delta N(M + \Delta M) = 12816$

$$\Rightarrow M + 495 = \frac{12816}{18} = 712$$

Therefore we can calculate M to be 217. Hence correct product = $46 \times 217 = 9982$
Ans: (9982)

30. Since it is known that $\Delta M = 495$, the minimum possible sum of the digits of M is possible when

$$\therefore M = 106$$

$$\therefore \text{Sum of the digits of } M = 1 + 0 + 6 = 7$$

Ans: (7)

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

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Choice (D)