

(Key and Solutions for AIMCAT1721)

Key

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Solutions

SECTION – I

Solutions for questions 1 to 3:

Number of words and Explanatory notes for RC:

Number of words : 462

1. Option A: Refer to the penultimate paragraph. Choice A is a proposal made by Conel Alexander's team. It is not a contradiction. So choice A is incorrect.
Option B: As given in para 5, Alexander's team shows that carbonaceous chondrites likely did not form in the same regions of the Solar System as comets because they have much lower deuterium content. So choice B is also a research finding and is not a contradiction. So choice B is incorrect.
Option C: Choice C is a contradiction as evident from the second sentence of the second paragraph and it is the answer. The team's findings contradict prevailing theories about the relationship between these two types of bodies (carbonaceous chondrites and comets) and suggest that meteorites, and their parent asteroids, are the most-likely sources of the Earth's water.
Option D: Choice D is incorrect and is not a contradiction. The last sentence of the first paragraph only tells us an area of focus of Conel Alexander's team. Conel Alexander focuses on frozen water that was distributed throughout

much of the early Solar System, but probably not in the materials that aggregated to initially form Earth.
Choice (C)

2. Refer to the third paragraph. Objects that formed farther out should generally have higher deuterium content in their ice than objects that formed closer to the Sun, and objects that formed in the same regions should have similar hydrogen isotopic compositions.
Option A: Higher deuterium content would imply a lower hydrogen to deuterium ratio in their ice. So choice A is incorrect.
Option B: Since higher deuterium content implies a lower hydrogen to deuterium ratio in the ice of objects that formed farther out in the solar system, choice B is correct.
Option C: It is given in the third paragraph that objects formed in the same regions would have similar hydrogen isotopic compositions. So choice C is not correct with respect to the question.
Option D: Choice D is absurd. Objects imply chondrites and comets. So saying that objects which formed farther out in the solar system will have a lower deuterium content in their chondrites and a higher deuterium content in their comets is incorrect.
Choice (B)
3. One has to scan various parts of the passage to ascertain the veracity of the choices.

Option A: It has been mentioned in the second paragraph that Conel Alexander's team suggests that meteorites, and their parent asteroids, are the most-likely sources of the Earth's water. So choice A is correct and is not the answer.
Option B: Carbonaceous chondrites have much lower deuterium content in their ice as compared to comets. Choice B is correct and is not the answer.

Option C: It has been mentioned in the fifth paragraph that chondrites had much lower deuterium content in their ice (frozen water). In the third paragraph, it has been given that objects that formed farther out in the solar system should generally have higher deuterium content in their ice than objects that formed closer to the Sun. So chondrites were formed closer to the sun and comets were formed farther from the sun. If the team suggests that carbonaceous chondrites formed in the asteroid belt that exists between the orbits of Mars and Jupiter, then it can be inferred that comets were formed in a region much beyond this i.e. much further away from the sun.

Option D: It is suggested by previous studies that comets and carbonaceous chondrites formed beyond the orbit of Jupiter and then moved inward, eventually bringing their bounty of volatiles and organic material to Earth. This has been mentioned in para 4. But Alexander's team suggests that carbonaceous chondrites formed instead in the asteroid belt that exists between the orbits of Mars and Jupiter. Chondrites and comets did not form in similar reaches of the Solar system. So choice D is not correct.

Choice (D)

Solutions for questions 4 to 9:

Number of words and Explanatory notes for RC:

Number of words : 621

4. The passage talks about whether struggling in a quicksand will make a person drown completely. It presents the research of Daniel Bonn to settle this issue.

Option A: According to the passage, "it is true that struggling can make you sink in further". Hence, we cannot say that if people struggle, they will float to the top. Therefore, this option is incorrect.

Option B: While denser objects might sink in a quicksand, the passage does not talk about different people having different densities. Hence, we cannot infer this from the passage.

Option C: The passage mentions that the aluminium beads which had the same density as humans "did sink, but never completely, only half way". Hence, we can infer from the passage that people will only sink halfway and never completely. Also, the passage mentions that "as the sand gradually began to mix with water again, the buoyancy of the mixture increases and they floated back up to the top". Hence, the people will also float up to the top eventually. Therefore, this is the correct answer.

Option D: The passage mentions that to release on foot, a person requires strength which is "the equivalent of the strength to lift a medium-sized car". The passage does not link this with sinking into a quick sand. Hence, this option is also incorrect.

Therefore, the correct answer is option C.

Choice (C)

5. The author mentions that "There are so many films featuring death by quicksand".

Option A: The author did not mention films to emphasize that the films educated the public. Rather, he points out in the next paragraph that the films are erroneously depicting the dangers of quicksand. Hence, this is not the correct reason.

Option B: The author, by mentioning the number of films in which quicksand fatalities occurred, emphasized that quicksands were popular in Hollywood films. The incident that he describes at the beginning of the paragraph serves to highlight the popular notion held about quicksand which he refutes in the subsequent paragraphs. Hence, this is a reason for the author to mention films at the beginning of the passage.

Option C: While the passage states that "All that's left is sinister sand, and maybe his hat", the author uses this imagery so that the reader will recollect the popular scenes involving quicksand from these movies. However, the hat is not central to the passage and this cannot be a reason for the author to mention films.

Option D: The author does not focus on the various dangers of the quicksand. The passage only talks about one danger of quicksand i.e., sinking. The first paragraph does not discuss in detail about any of the other dangers. The films are not mentioned to focus on 'various' dangers of quicksand and hence, this is not the correct answer. Therefore, the correct answer is option B. Choice (B)

6. According to the passage, "it is true that struggling can make you sink in further". However, the passage also mentions that "they did sink, but never completely, only half way".

Option A: Struggling in a quick sand will not result in drowning. The research by Daniel Bonn highlights this finding. Hence, this is not the correct answer.

Option B: The passage mentions that high tides are dangerous. But it does not provide any relation between struggling in a quicksand and chances of high tide. Hence, this is not the correct answer.

Option C: Struggling in a quicksand will make a person sink further. But he will not sink completely and will sink only halfway. Hence, this is the correct answer.

Option D: While the passage mentions that "as the sand gradually began to mix with water again, the buoyancy of the mixture increases and they floated back up to the top", it does not link this with struggling. Hence, we cannot infer from the passage that struggling helps in floating to the top of the quicksand.

Hence, the correct answer is option C. Choice (C)

7. The passage describes the features of quicksand in the second paragraph.

Option A: The passage mentions that the surface of a quicksand looks "solid" until someone steps on it. Hence, this is a feature of quicksand mentioned in the passage.

Option B: While the passage mentions that quicksand consists of water and sand, it does not mention that the surface appears moist. Further, the passage mentions that "The ground looks solid, but when you step on it the sand begins to liquefy". Hence, this is not a feature of quicksand.

Option C: The passage mentions that quicksand is found "often in river deltas". Hence, the first part of the option is correct. However, the passage does not talk about quicksand in desert. Hence, we cannot infer the second part of this choice from the passage. Hence, this is not the correct option.

Option D: The passage refutes the fact that people drown in quicksand if they struggle. The passage does mention that in films, quicksand is misrepresented to be more dangerous than it actually is. But this cannot be considered as a proxy for public perception. Moreover, others' perceptions of an object are not features of the object itself. Hence, this option is incorrect.

Therefore, the correct answer is option A.

Choice (A)

8. It's clear from the content in the passage that sand and water are the two necessary ingredients. We are also told that "Bonn's team found that salt was an essential ingredient". However, another team found a "kind of quicksand that doesn't need salt" which, instead, had bacteria. Hence, quicksand can have either salt or bacteria but neither are essential for a quicksand. Hence, both salt and bacteria are not essential ingredients.

Choice (D)

9. A team from Switzerland and Brazil discovered a quicksand in which "bacteria formed a crust on the top of the soil".

Option A: The passage does not mention that the bacteria prevent people from drowning. The bacteria form a crust which makes the ground look solid.

Option B: The passage does not compare the water content

present in the quicksand in the two countries. Hence, this option cannot be inferred from the passage.
 Option C: The passage does not compare the appearance of quicksand across the two countries. Hence, this option also cannot be inferred.
 Option D: The passage mentions that the quicksand is "very rarely deeper than the height of a human". Hence, this option is the correct answer.
 Choice (D)

Solutions for questions 10 to 12:

Number of words and Explanatory notes for RC:

Number of words : 407

10. The passage mentions a few factors which endangers the tiger population.
 Option A: The passage mentions logging as one of the factors. Hence, cutting down forests is mentioned in the passage.
 Option B: Building infrastructure projects is also mentioned in the passage. Hence, this is not the correct answer.
 Option C: Poaching tigers for their body parts is also mentioned. Hence, this option is also incorrect.
 Option D: The passage does not mention the expansion in human habitation as one of the factors responsible for endangering tigers. Hence, this is the correct answer.
 Choice (D)

11. According to the passage, "using the new technology, conservationists can pinpoint exactly where habitat loss is occurring and potentially curb future losses".
 Option A: The passage mentions that tiger monitoring can be done every year. Earlier, this could only be done every decade. Hence, this option is incorrect.
 Option B: The new technology allows conservationists to pinpoint "where habitat loss is occurring". It does not talk about location of all tigers. Hence, this option is also incorrect.
 Option C: According to the passage, conservationists can pinpoint "exactly where habitat loss is occurring". Hence, this is the correct option.
 Option D: The passage does not mention any link between the new technology and remote sensing expertise. Further, Joshi states that "We have developed a tool that anyone in those countries can use without having remote sensing expertise". Hence, this option is also incorrect.
 Therefore, the correct answer is option C. Choice (C)

12. The passage starts with the sentence "Forests that harbour tigers are being lost but are still large enough to take double the world's tiger population in the next six years". The importance of this is explained in the fourth paragraph of the passage.
 Option A: The passage does not talk about the tigers not being considered as an endangered species. Hence, this option is incorrect.
 Option B: The passage mentions that "a high-level summit was convened in Russia, where tiger nations agreed on a goal called Tx2 to double the world's wild tiger population by 2022". This is the goal that the passage mentioned at the beginning. Hence, this is the correct answer.
 Option C: Doubling the tiger population need not increase the number of tiger habitats. Hence, this option cannot be correct.
 Option D: The passage does not talk about the ecological balance between tigers and humans. Hence, this option is also not correct.
 Therefore, the correct answer is option B. Choice (B)

Solutions for questions 13 to 18:

Number of words and Explanatory notes for RC:

Number of words : 444

13. The passage opens with the statement: Many myths and misunderstandings about Soviet history persevere.

'perseverate' means to persist or prevail
 Option A: The myths and misunderstandings about Soviet history persist. The first paragraph of the passage talks about wrong things written about Russia. So choice A is correct.

Option B: It is not true that the misunderstandings about Soviet history have been cleared now. So choice B is incorrect.

Option C: The author firmly believes that the misunderstandings about Soviet history are myths and makes an attempt in the second paragraph to present the true events. So choice C which says that truths in the context of Soviet history are wrongly considered by the author to be myths is incorrect.

Option D: Choice D is incorrect. The author clearly presents myths about Soviet history in the first paragraph and corrects the myths by mentioning the related facts in the second paragraph. So whether the details are myths or facts are still debatable cannot be true. It is known that the myths are myths and there is nothing to be debated about the same.
 Choice (A)

14. The myths with respect to the history of the Soviet Union are mentioned in the first paragraph. (As often as not, textbooks state quite inaccurately)
 Option A: Choice A is not an accurate statement. Refer to the lines: They (the textbooks) state quite inaccurately that Lenin's party had been the principal revolutionary force in the Russian Empire and overthrew the tsar.

Option B: In the second paragraph, the author presents the facts. Refer to the last sentence of the second paragraph. The result by the early twentieth century was an imperial domain of unparalleled dimensions in which ethnic Russians represented barely half of the population. So choice B is correct.
 Option C: Choice C is again not accurate. It is presented as a myth in the first paragraph. The correct fact would be: The recent Russian Federation is one of several different post-Soviet states.

Option D: There is no hint in the passage that there is a myth or misunderstanding regarding the date the Soviet Union was dissolved, only the date it was created. So it is true that the Soviet Union was dissolved on 31 December 1991. Hence choice D is incorrect.
 Choice (B)

15. (I) Russia's imperial capital St. Petersburg was founded in 1703.
 (II) Soviet Union was dissolved on 31 December 1991.
 (III) The Tsarist Empire of 'all the Russias' reached its end in February 1917.
 (IV) The Russian conquest of Swedish and Polish lands began in the mid 17th century i.e. mid 1600s, according to the second paragraph.
 (V) Treaty of Nystadt was signed in 1721 and this confirmed Russia's possession of Estonia.
 (VI) The 'gathering of the lands', a long process whereby Moscow aimed to take control of all the East slavs, had been proclaimed in the fifteenth century.
 So we can arrange the historical events in the correct chronological order as follows:
 VI, IV, I, V, III, II.
 Choice (C)

16. Option A: According to the passage, 'the gathering of the lands' was a process proclaimed in the 15th century, whereas Peter the great lived in the 18th century. He created the Tsarist Empire of 'all the Russias' in 1721. So choice A is incorrect.

Option B: The author alludes to the phrase '*bulimia politica*' in para 2 to compare the pace of expansion in Russia with the eating disorder 'bulimia'. People with bulimia binge – eating large amounts of food – and then vomit (regurgitate), trying to get rid of the extra calories in an unhealthy way.) The second paragraph says "Despite some regurgitations" So the author does not primarily liken the political expansion of Russia with regurgitations observed in bulimia. Choice B is incorrect.

Option C: According to the second paragraph, Siberia and Central Asia were a 'demographic vacuum' i.e. sparsely populated, at the end of the 16th century (when the Russians started expanding their lands). So choice C is wrong.

Option D: Choice D can be inferred to be true from the second para of the passage. It is a myth that the Russian Civil War was fought out only between the Russian 'Whites' and Russian 'Reds'. The Russian Civil War happened in the twentieth century. Originally Russia formed by the tsars was a small empire. Peter the Great initiated territorial expansion and the Russian empire that resulted out of such similar expansions in the twentieth century was the largest in the world. But ethnic Russians represented barely half the population in the Russian empire. Everyone was taken and included in Russia. Russians were not the only people in Russia. So the Russian Civil war would have not been only about Russians Red and Whites. The non-Russians who had been subjugated would have been involved too.

Choice (D)

17. The passage presents an argument.

Option A: The author is not describing facts with a view to make the passage vivid or memorable. So choice A is incorrect.

Option B: The argumentative style is not disputive – the passage presents an argument. The author first debunks the common perceptions of the history of Russia, and then proceeds to present a different view, backed by historical reason. In other words, an argument is presented, and the style would be argumentative.

Option C: Analysis involves examining aspects of a situation in its plusses and minuses, and making an evaluation at the end of it. In this passage, the author is not analysing the history of Russia.

Option D: The passage is not difficult to comprehend. It does not have difficult vocabulary and it is not abstruse. Hence choice D is also wrong.

Choice (B)

18. The first paragraph of the passage deals with myths about Soviet history. The author talks about wrong things written about Russia and what people thought was correct. The second paragraph of the passage tries and corrects those myths. The author tells us how baseless the myths were. He tells the reader what was true.

Option A: There is no theory as such being discussed or challenged in the passage, just myths about Soviet history. Hence challenging a theory and exposing the inconsistencies in it are not the foci of the first and second paragraphs of the passage. Hence choice A is not correct.

Option B: The word 'phenomenon' in choice B is incorrectly used. In the first paragraph, he substantiates on myths about Soviet history. And in the second paragraph, he portrays a corrective view with respect to some of those myths. Hence 'provides evidence that contradicts it (phenomenon)' is again wrong. So choice B is incorrect.

Option C: Choice C is the answer. The claim of the author is presented in the opening sentence of the passage "Many myths and misunderstandings about Soviet history persevere". Examples of myths are also presented here. We get to know, for instance, that it is a myth that the Russian Civil War was fought out only between the Russian 'Whites' and Russian 'Reds'. The second para tells us that, originally, Russia formed by the tsars was a small empire. Peter the Great expanded the territorial complex and the Russian empire that resulted out of such similar expansions in the twentieth century was the largest in the world. But ethnic Russians represented barely half the population in Russia. Everyone was taken and included in Russia. Russians were not the only people in Russia. So Russian Civil war only about Russians Red and Whites is a myth and is not true. Other half were non-Russians whose lands were captured by the Tsars and other conquerors.

Option D: The first and second paragraphs do not present the causes and consequences of the myths of Soviet history. They only discuss the myths about Soviet history and a correction of some of the myths. So choice D is wrong.

Choice (C)

Solutions for questions 19 to 24:

Number of words and Explanatory notes for RC:

Number of words : 518

19. Refer to the first paragraph. It is stated that in India data regarding the poverty situation is mixed because poverty implies different types of deprivation and not just a lack of income. India has a mixed record with respect to these aspects of the definition of poverty.

Option A: The various aspects that define poverty by themselves are not the cause of difficulty in estimating poverty in India. The problem lies in the fact that the country has a "mixed record". If it did not, and all the aspects showed similar growth or decline, it would be easy to estimate poverty. Hence, the aspects in the definition of poverty by themselves do not create any difficulty in estimating poverty. Hence, this option is incorrect.

Option B: The small sample sizes is one of the reasons for the wide disparity in the poverty estimates. However, this is not a reason for difficulty in estimating poverty in India. Hence, this option is incorrect.

Option C: This option provides the correct reason for the difficulty in estimating poverty in India. Since India has a mixed record regarding the various deprivations, it is not possible to unequivocally estimate the poverty situation in India. If the country performed equally worse or equally better in all the aspects, it would be easier to estimate poverty. Hence, this is the correct option.

Option D: Option D does not address the issue correctly because if economic development takes place, then poverty should actually decline.

Therefore, option C is the correct answer. Choice (C)

20. Option A: The passage mentions that "Nutrition has also improved modestly in recent years, but malnutrition is still widespread". However, from this we cannot conclude that malnutrition has increased. We can only conclude that it is still rampant. Hence, this option is incorrect.

Option B: The passage also mentions that "malnutrition is still widespread... It seems to be only partially a problem of income". The passage mentions that the problem can only partially be attributed to income. Hence, we cannot conclude that malnutrition is still rampant in the country "primarily" because a significant fraction of the population is not able to afford a proper meal. Therefore, this option is incorrect.

Option C: Refer to para 2. It is clearly stated that nutrition has improved modestly in recent years but malnutrition is still widespread. Also, the second paragraph clearly states that malnutrition seems to be only partially a problem of income, so it may be prevalent among people of higher income groups also. Hence, choice C is incorrect.

Choice D: The passage mentions that despite improvement in diets, malnutrition is still widespread. Hence, we can say that the improvement in diets have not translated to any significant reduction in malnutrition. Hence, this is the correct answer.

Choice (D)

21. Option A: The last paragraph clearly states that people nowadays are more drawn towards non-cereal foods; hence the demand for coarse cereals has not shown any increase. However, we cannot conclude anything about the quantity of non-cereal foods consumed vis-à-vis the quantity of cereals consumed. So, choice A cannot be concluded.

Option B: Refer to the third para, penultimate sentence. It is clearly stated that population growth is fastest in states where poverty is worst and economic growth is slowest. However, the states with the fastest growth in population need not necessarily have the highest population. Hence, choice B also cannot be concluded.

Option C: The passage mentions that decline in fertility will ameliorate the poverty situation. Hence, we can say that decrease in fertility rate will result in improved economic status. Hence, this option is correct.

Option D: The last sentence of the third paragraph implies that fertility rate of a state does affect poverty. The third paragraph also states that better-off states make significant progress while the ones that are backward, make slow improvements. So choice D is not correct. Choice (C)

22. Refer to the last paragraph. Choices A, C and D have been clearly mentioned as factors contributing to the diversification of food patterns of people. Choice B is not mentioned.
Choice (B)

23. The passage mentions that there is a link between high fertility and poverty, but does not offer reasons for it. We are asked to identify the most appropriate reason.

Option A: If this option is true, there will be a definite causation between poverty and high fertility. Since families below poverty line need to increase their earning capacity, they will have more children. Hence, this option explains and establishes a cause for the link mentioned in the passage between high fertility and poverty. Therefore, this is the correct answer.

Option B: This option presents a fact which reinforces the correlation between high fertility and poverty. It does not provide any explanation as to why there could be a link between the two. Hence, this option is incorrect.

Option C: This option, if true, will explain the opposite of what is mentioned in the passage. This option will result in the conclusion that high fertility and absence of poverty (affluence) are correlated. Hence, this option is also incorrect.

Option D: This option also does not explain why poor families tend to have more children. This only provides an effect of having more children. Hence, this option is also incorrect.

Therefore, option A is the correct answer.

Choice (A)

24. Option A: Choice A is too broad because the conditions of people will involve many factors that are beyond the purview of the passage.

Option B: Choice B is too specific. Pattern of Food Consumption is discussed only in the last paragraph.

Option C: The passage is mainly about the poverty situation in India and the various inequalities and deprivations associated with it. Only choice C suitably covers the topics discussed in the passage.

Option D: Though both population and food have been discussed in the passage, environment in India is not dealt with. So Choice D can also be negated.

Hence, option C is the correct answer.

Choice (C)

Solutions for questions 25 to 27:

25. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the paragraph. It defines what a limerick is. Sentence 5 continues the discussion with an explanation of the features of some lines. Sentence 1 and 4 in that order then speak about the origin of the limerick. Sentence 1 (early years of 18th century) has to precede sentence 4 (19th century). Hence, 3514. It must be pointed out that sentence 3 (A limerick) has to precede sentence 1 (also be noted that the limerick). Sentence 2 leaves the thoughtflow incomplete. It can be a part of another paragraph discussing views of the limerick. "different view of the limerick" in sentence 2 needs a precedent and more substantiation.
Ans: (2)

26. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It primarily tells us what the Li-Fraumeni syndrome is. Sentence 4 is followed by sentence 2. The pronoun 'it' refers to the Li-Fraumeni syndrome. Sentence 2 which has the names of the physicians (After whom the Li-Fraumeni syndrome is named) is followed by sentence 3 which begins with "These physicians". So, 423. Sentence 3 and sentence 1 form a mandatory pair. "p53 tumour suppressor gene" in sentence 3 links with "this gene" in

sentence 1. So, 4231. Sentence 5 needs a precedent and more substantiation. It can be a part of another paragraph.

Ans: (5)

27. On a careful reading of the sentences, it can be inferred that sentence 5 is a general sentence that begins the paragraph. It tells us why firms use positioning maps. Sentences 5 and 1 form a mandatory pair. "the maps" in sentence 1 refer to "positioning maps" in sentence 5. Sentence 1 also provides another name for positioning maps i.e. perceptual maps. Sentence 4 follows as it tells us how positioning maps work. Sentence 3 highlights the benefit of positioning maps to firms. Hence 5143. Sentence 2 is the odd sentence out as it merely defines the term 'positioning' while the remaining sentences discuss the use of positioning maps to firms.
Ans: (2)

Solutions for questions 28 to 32:

28. On a careful reading of the sentences, it can be inferred that sentence 3 is a general sentence that begins the paragraph. It has the proper nouns Wilhelmus and Kingdom of the Netherlands. The pronoun "it" in sentence 5 refers to Wilhelmus. Sentence 5 follows sentence 3. "national anthem of Netherlands" in sentence 3 is followed by the detail "oldest national anthem in the world". Sentence 2 continues the discussion further. It compares Wilhelmus to other anthems and tells us its origin. So, 352. "originated in the nation's struggle to achieve independence" in sentence 2 links with "fighting against the King of Spain" in sentence 4. Hence sentence 4 follows sentence 2. Sentence 4 also introduces "William of Orange". Sentence 1 concludes as "quoting William of Orange himself" in sentence 1 can only follow "tells of William of Orange, his life". So, 35241
Ans: (35241)

29. Sentence 4 is a general sentence that begins the paragraph. It introduces the characters and the story (A man came to St. Dionysius's cell.....) to the reader. "begged the saint to hide him from his pursuers" in sentence 4 is followed by "was asked why he was being pursued" in sentence 2. So sentence 2 follows sentence 4. Sentence 2 (he had killed a man) and sentence 5 (he had killed the saint's own beloved brother Constantine) are logically linked. So sentence 5 follows sentence 2. Sentence 3 tells us the reaction of St. Dionysius and it follows sentence 5. "did not surrender him to the law" in sentence 3 is contrasted by "Instead he instructed him repentance" in sentence 1. So, 42531.
Ans: (42531)

30. Sentence 5 is a general sentence that begins the paragraph. It mentions the place, date, time and the activity (fourth nuclear detonation by North Korea). Sentence 1 follows sentence 5 as it again gives details of the test (underground nuclear test) and location (Punggye-ri Nuclear Test Site, 30 miles northwest of Kilju City). Sentence 3 follows sentence 1. "the location" in sentence 3 refers to the Nuclear test site mentioned in sentence 1. So, 513. Sentence 2 follows sentence 3. The announcement of the test by the media can be done only after the test is carried out. So sentence 2 with the date of the announcement "7 January 2016" logically follows the set of sentences describing the activity which was conducted on 6 January 2016. Hence 5132. Sentence 4 with the conjunctive adverb "however" concludes the paragraph. "Third-party experts doubted North Korea's claims" in sentence 4 contrasts "North Korean media made announcements" in sentence 2. Also "successfully tested a hydrogen bomb" in sentence 2 contrasts "device was probably a less destructive fission bomb" in sentence 4. So, 51324.
Ans: (51324)

31. On a careful reading of the sentences, it can be observed that sentence 2 is a topic sentence that introduces the background of the paragraph. The clergy condemned

Benjamin Franklin's invention of the lightning-rod. Sentence 5 (For) begins to discuss the justification of the clergy's condemnation. "lightning-rod is an impious attempt to defeat God's will" in sentence 2 is linked with "lightning is sent by God to punish impiety" in sentence 5. Sentence 5 is followed by sentence 3. Right-thinking people were aware that sinners were punished by God but the virtuous are not (struck by lightning). So 253. Sentence 1 follows with an inference or understanding. The lightning-rod should not defeat God's plan. The reason for the point mentioned in sentence 1 is provided in sentence 4. Sentence 4 concludes the paragraph. So, 25314. It must be noted that the sentence starters "For", "But", "Therefore" and "Indeed" play an important role in sentence structure and one should pay attention to them so as to arrange the sentences to form a coherent paragraph.

Ans: (25314)

32. On a careful reading of the sentences, it can be observed that sentence 4 which introduces the field of cryptozoology is the topic sentence of the paragraph. It highlights the fact that cryptozoology is a pseudoscience. "anecdotal evidence, stories, and alleged sightings" in sentence 4 is linked to "existence has not been proven due to lack of evidence" in sentence 1. Sentence 1 continues the discussion on the field of pseudoscience and so follows sentence 4. It can also be observed that sentences 2, 3 and 5 are specific to the animals studied under cryptozoology. Hence the set of sentences 2, 3 and 5 can logically be placed only after sentences 4 and 1. "search for creatures" in sentence 1 is linked to "animals cryptozoologists study" in sentence 5. Sentences 5 and 3 form a mandatory pair. "These include" in sentence 3 links to "cryptids (the animals cryptozoologists study)" in sentence 5. So, 4153. Sentence 2 concludes with another group of animals which are also included in the search by cryptozoologists. Hence 41532.

Ans: (41532)

Solutions for questions 33 and 34:

33. The technology experts agree that the basic premises of Ray Kurzweil's essay on exponential technological **change** hold true. They cite enabling technologies as evidence of **exponential advances**. Choice D (These **advances** significant **changes**) continues on the same note and concludes the paragraph.

Option A: This statement cannot end the paragraph as it projects a relatively negative point of view. It can serve as an introduction sentence of another paragraph much later in the text as it needs a precedent and further substantiation. It has been mentioned towards the end of the paragraph: "technology experts say that its basic tenets often hold". Choice A disrupts the thought-flow.

Option B: This statement, with the contrast conjunction 'yet', does not carry the idea projected in the penultimate sentence forward. The choice specifically focuses on

'predicting the future'. The paragraph begins by stating a premise from Ray Kurzweil's essay: humans found it hard to comprehend their own future. "not everyone is convinced that technological change will hit humanity quite so fast" in choice B seems to ignore "technology experts say that its basic tenets often hold" given in the paragraph. Choice B cannot continue after the penultimate sentence of the paragraph.

Option C: This statement provides a comment of a single person (**He** wrote "....."). The penultimate sentence refers to the opinions of the technology experts. (The evidence, **they** say). So choice C is a mismatch.

Choice (D)

34. The paragraph discusses the Delphi method and elaborates on the rounds in the communication technique. Experts revise their answers to questions based on the replies of other panel members.

Option A: The question paragraph begins by stating that the Delphi method is a structured communication technique. Moreover, the para moves from method to belief behind the method. Refer to the penultimate sentence of the paragraph (It is believed that). In this case choice A closes by providing the rationale behind the belief. In a paragraph, if a method is discussed then one normally discusses the rationale behind or the explanation for the method. i.e. The discussion of the method is followed by an evaluation.

Option B: It has already been mentioned in the second sentence of the paragraph that the experts answer questionnaires in two or more rounds. When you say 'two or more rounds', you're already indicating a **predetermination**. Choice B (.....**predefined** stop criterion eg. number of rounds) is a repetition of the same idea. So choice B cannot complete the paragraph. In fact, choice B reverts to method after having moved to belief.

Option C: This option provides a detail about the Delphi method which does not fit the thought-flow. Also choice C does not complete the discussion on the role of the facilitator.

Option D: This option is more or less, a repetition of the last two sentences of the paragraph just before the blank. It does not tell us about the final outcome. Choice D is true of any round but not the final round. So choice D cannot complete the paragraph.

Choice (A)

Difficulty level wise summary - Section I	
Level of Difficulty	Questions
Very Easy	-
Easy	4, 6, 9, 12, 13, 22
Medium	3, 5, 7, 8, 10, 11, 14, 15, 20, 23, 24, 25
Difficult	1, 2, 16, 17, 21, 26, 27, 28, 29, 30, 31, 32, 33, 34
Very Difficult	18, 19

SECTION – II

Solutions for questions 1 to 4:

The following table gives the difficulty level of each question.

Question	Number of Students who Attempted	Number of Students who Solved	Approx% did not Solve	Difficulty Level
Q1	120	83	~30%	E
Q2	160	94	>40%	M
Q3	180	165	<10%	VE
Q4	170	34	80.00%	VD
Q5	100	42	58.00%	M
Q6	150	13	>90%	VD
Q7	140	35	75.00%	D
Q8	120	100	16.67%	VE
Q9	180	142	~20%	E
Q10	110	23	<80%	D

1. Percentage of students who did not answer the sets given in each option is calculated below.

$$\text{Option A: } \frac{137+105+20}{150+140+120} = \frac{262}{410}$$

$$\text{Option B: } \frac{37+66+137}{120+160+150} = \frac{240}{430}$$

$$\text{Option C: } \frac{66+136+58}{160+170+100} = \frac{260}{430}$$

$$\text{Option D: } \frac{58+105+87}{100+140+110} = \frac{250}{350}$$

By observing the values, we can see that for option D, while the numerator is almost the same as the other options, the denominator is very low. Hence, the questions given in Option D are the most difficult.

Choice (D)

2. Starting with the most difficult question and working backwards,
For Questions 4, 6, 7, and 10, difficulty level %

$$= 1 - \frac{105}{570} = 81.58\% \rightarrow VD$$

Replacing Q7 (the least difficult among the four) with the next difficult question Q5, difficulty level

$$= 1 - \frac{112}{530} = 78.87\% \rightarrow D$$

Hence, the professor can select the questions in only one way.

Ans: (1)

3. Calculating the difficulty level for the given options,

Option A: 18.33%

Option B: 25.52%

Option C: 21.72%

Option D: 25.00%

Hence, Option A is the easiest set of question.

Choice (A)

4. The difficulty level of each option is

Option A: 28.39% → Easy

Option B: 32.98% → Easy

Option C: 36.67% → Easy

Since none of the options have any Easy questions, all the options are possible.

Choice (D)

Solutions for questions 5 to 8:

Let D, H, S and M represent the four theatres. Let d, h, s and m represent the total number of people who watched the four movies in that theatre respectively.

If Life of Pie played in D first, then $0.2d > 0.6h$. Then for Lord of the Onion Rings, $0.6d$ will be greater than $0.1b$. Similarly, for other movies also, the number of people who watched in D will be greater than the number of people who watched the movie in H. Hence, Life of Pie must have been shown in D only after H. Similarly, Life of Pie must have been shown in S only after H.

If Life of Pie played first in M, then $0.05m > 0.6h$. This would imply that for all the movies, the number of people who watched that movie in M will be greater than the number of people who watched it in H. Hence, between M and H, the movie must have been played first in H.

Therefore, Life of Pie must have been played first in H.

For Lord of the Onion Rings, if $0.1h > 0.6d$, then for the other three movies also, the number of people who watched that movie in H will be greater than the number of people who watched it in D. Hence, this movie must have been played in H only after it was played in D. Similarly, we can conclude that this movie must have been played in S only after it was played in D. Between M and D, we cannot conclude in which theatre it was played first.

Following the same reasoning, we can conclude that V for Vanilla must have been played in D and M only after S. We cannot conclude the same for H. However, since Life of Pie is already played first in H, this movie must have been played first in S.

The Inedible Hulk must have been played first in M. Hence, The Lord of the Onion Rings must have been played first in D.

Also, if Life of Pie is played last in D, $0.05m$ must be greater than $0.2d \Rightarrow 0.45m$ will be greater than $0.6d$. But this will mean that M must have played Lord of the onion rings first which is a contradiction. Hence, Life of Pie must have played in D before M. Similarly, between M and S, the movie must have played in S before M. Hence, Life of Pie must have played last in M.

Similarly, Lord of the Onion Rings must have played last in H.

If V for Vanilla played last in D, $0.05m$ must be greater than $0.1d \Rightarrow 0.45m$ will be greater than $0.6d$. This will contradict the first theatre in which Lord of the Onion Rings is played. Hence, V for Vanilla must have been played in D before M. The last theatre in which V for Vanilla will be played can be either M or H.

The Inedible Hulk must have played in D before H (since V for Vanilla played in D before H $\Rightarrow 0.1d > 0.2h \Rightarrow 0.1d > 0.1h$). The last theatre in which The Incredible Hulk must have been played can be H or S. From (ii), this has to be H. Also, V for Vanilla would have been played last in M from (ii).

From (iii), Darkroom must have played Life of Pie, V for Vanilla and The Inedible Hulk second.
The following table presents the order in which the movies were shown in the theatres:

Life of Pie	Hollywoodland	Darkroom	Silver Spleen	McPicture's
Lord of the Onion Rings	Darkroom	McPicture's/ Silver Spleen	Silver Spleen/ McPicture's	Hollywoodland
V for Vanilla	Silver Spleen	Darkroom	Hollywoodland	McPicture's
The Inedible Hulk	McPicture's	Darkroom	Silver Spleen	Hollywoodland

5. V for Vanilla was first played in Silver Spleen.
Choice (C) Hand at the beginning of the year. Hence, the answer is 3.
Ans: (3)
6. Lord of the Onion Rings was first screened in Darkroom.
Choice (A)
7. The Inedible Hulk was first shown in Darkroom followed by Silver Spleen and Hollywoodland. Since for all the three theatre, 10% of the people watched that movie, we can say that the total number of people who watched all the four movies will be the highest in Darkroom. Between McPicture's and Darkroom, we cannot conclude. But from the given choices, the answer will be Darkroom.
Choice (A)
8. Given $0.6d = 540$.
 $0.45m$ has to be less than $540 \Rightarrow m$ has to be less than 1200.
 $0.2d > 0.05m \Rightarrow m < 3600$
 $0.45m$ has to be greater than $0.1d \Rightarrow m > 200$
The number of people who watched V for Vanilla in McPicture's can be between 5% of 200 and 5% of 1200. Hence, the required number can be between 10 and 60. From the options only option B satisfies.
Choice (B)

12. Total Receipts in 2013 = 34460
Total Receipts in 2012 = 27690
$$\text{Percentage Increase} = \frac{6770}{27960} \times 100$$
 . This value is close to 25% but less than 25%. From the options, the answer is option A.
Choice (A)

Solutions for questions 13 to 16:

Number of runs scored by Kiran in Tournament 1 = 166
Number of runs scored by Kiran in Tournament 2 = 117
Number of runs scored by Kiran in Tournament 3 = 132
Number of runs scored by Kiran in Tournament 4 = 127
Number of runs scored by Kiran in Tournament 5 = 177

13. The highest number of runs scored in a single tournament = 177
Ans: (177)
14. The total number of runs scored by Kiran
 $= 166 + 117 + 132 + 127 + 177 = 719$
Average runs = $719/25 = 28.76$
Choice (D)

15. Kiran has to score more than 130 runs in the tournament for his average to be greater than 26. In tournaments 1, 3 and 5, his average will be greater than 26.
Ans: (3)

16. In tournaments 2 and 4, the number of runs decreased.
Percentage increase in Tournament 3 = $15/117$
Percentage increase in Tournament 5 = $50/127$
Clearly, the percentage increase is the highest for Tournament 5.
Choice (D)

Solutions for questions 17 to 20:

Given that at least one person is a truth teller.

Let Neil be a truth teller.

If Neil is a truth teller, then Neil is not a policeman and Harris drives a Koenigsegg. Patrick's first statement is false. However, Patrick's last statement is true. This is not possible as Patrick will neither be a liar nor an alternator.

Let Patrick be a truth teller.

Solutions for questions 9 to 12:

9. Total Receipts during 2010 = \$25,730
Total Disbursements during 2010 = \$25,910
Cash in Hand at the end of 2010 = $28790 + 25730 - 25910 = \$28,610$
Total Receipts during 2011 = \$37,580
Total Disbursements during 2011 = \$44,990
Cash in Hand at the end of 2011 = $28610 + 37580 - 44990 = \21200
Ans: (21200)
10. This difference will be the maximum if the difference between the receipts and disbursements is the maximum.
For 2010 = $25730 - 25910 = -180$
For 2012 = $27690 - 25540 = 2150$
For 2013 = $34460 - 30630 = 3830$
For 2014 = $28440 - 26920 = 1520$
Hence, the difference is the highest during 2013.
Choice (C)
11. Except for 2010 and 2011, for the other years, the Cash in Hand at the end of the year was greater than the Cash in

Patrick drives a Koenigsegg and Neil is a judge. Harris does not drive a Porsche. Therefore, Harris drives a Bugatti and Neil drives a Porsche.

Neil's first statement is false and last statement is also false. But his second statement is true. Hence, Neil is an alternator. Harris must be a liar. Therefore, Patrick is not a policeman. Hence, Patrick is a Lawyer and Harris must be a policeman. This is one possible case.

Let Harris be a truth teller.

Patrick is a policeman and Harris is a judge. Also, Harris drives a Bugatti. Neil must be a lawyer. Patrick's second statement is false. His third statement is true. Hence, Patrick must be an alternator and his first statement must also be true. Hence, Patrick drives a Koenigsegg. Neil must be a liar. However, Neil's first statement is true since the lawyer, Neil, drives a Porsche. Hence, this case is not possible.

Therefore, only one case is possible in which Neil is an alternator, Patrick is a truth teller and Harris is a liar. The following table presents the professions and vehicles of the three people:

Person	Profession	Car
Neil	Judge	Porsche
Patrick	Lawyer	Koenigsegg
Harris	Policeman	Bugatti

17. Patrick is the only truth teller. Choice (B)
18. Four statements are true in total. Ans: (4)
19. The lawyer drives a Koenigsegg. Choice (A)
20. Harris drives a Bugatti. Choice (A)

Solutions for questions 21 to 24:

Given that Pavan is seeing an equal number of red and blue hats. Hence, Pavan can be in 1st, 3rd, 5th or 7th position. However, Lokesh is standing immediately in front of Pavan and Lokesh sees 3 red hats. Hence, Pavan cannot be in 1st or 3rd (since Lokesh will not be able to see 3 red hats). If Pavan is in 5th position and Lokesh in 4th position, Lokesh can possibly see 3 red hats but Pavan will not be able to see equal number of red and blue hats. Hence, Pavan has to be in 7th position and Lokesh has to be in 6th position. Tarun is behind Pavan. Therefore, he has to be in 8th place.

Since Lokesh is able to see three red hats, he must be wearing a blue hat. The five persons in front of Lokesh must be wearing 3 red and 2 blue hats. Since Nitish knows the colour of the each person's hat, he would have been able to see all three red hats or all five blue hats. Clearly Nitish cannot see all five blue hats since Lokesh, Pavan and Tarun must all be wearing blue hats. Hence, Nitish must have been able to see all three red hats. Hence, Nitish can be at 4th or 5th place.

Omkar has to be in front of Satish and Satish has to be in front of Manoj. Ravi cannot be in front of Manoj because Ravi is wearing a red hat since Lokesh, Pavan, Tarun, Nitish and Omkar are wearing the five blue hats. Hence, Ravi has to be behind Manoj. Therefore, Ravi can be in 4th or 5th place. If Ravi is in 5th place, he has to be behind Nitish. In this case, Nitish cannot know the colours of the hats of all the people. Hence, Ravi has to be in 4th place and Nitish has to be in 5th place. Omkar, Satish and Manoj must be in 1st, 2nd and 3rd places respectively. Also, Omkar has to be wearing a blue hat (from Manoj's statement), Satish must be wearing a red hat. Nitish must also be wearing a blue hat and Manoj must be wearing a red hat.

The following table presents this information:

Person	Omkar	Satish	Manoj	Ravi	Nitish	Lokesh	Pavan	Tarun
Colour of Hat	Blue	Red	Red	Red	Blue	Blue	Blue	Blue

21. Tarun is standing at the end. Choice (C)
22. For Lokesh, Manoj and Pavan, the colours of the hats of both the persons adjacent to them is the same. Choice (A)
23. Both Satish and Ravi are wearing a red hat and are adjacent to Manoj. Choice (D)
24. Manoj will be able to see an equal number of blue and red hats. Choice (B)

If Rahul teaches Viswa (for example C), then Uday cannot learn Python, Java, Ruby and C. hence, Uday has to learn PHP. Satish cannot learn Python, Java, Ruby and C. hence, Satish also has to learn PHP. This is not possible. Hence, Rahul cannot teach Viswa. Therefore, one among Uday and Satish must teach Viswa. Uday and Satish must be taught by Viswa and Rahul in any order.

Also, Between Uday and Satish, the person who knows Python and C will teach Viswa. If Viswa learns C, Uday and Satish both can learn only PHP. Hence, Viswa must learn Python.
The following table presents this information:

Person	Languages Known	Language to learn	Learn from
Mani	PHP, Ruby	Java	Uday/Satish
Rahul	Java, C/PHP	Ruby	Mani
Satish	Python, C/Java	PHP/C	Rahul/Viswa
Uday	Python, Java/C	C/PHP	Viswa/Rahul
Viswa	Java, PHP/C	Python	Satish/Uday

25. Viswa wants to learn Python. Choice (A)
26. If Satish teaches Mani, Satish knows Java. Hence, Uday knows C \Rightarrow Uday wants to learn PHP. Choice (C)
27. If Rahul knows PHP, Viswa knows C. Either of Viswa and Rahul can teach Uday. Hence, the answer cannot be determined. Choice (D)
28. If Uday teaches Python, Satish teaches Java. Hence, Satish wants to learn C. Choice (B)

Solutions for questions 29 to 32:

Let G, H, L, P, R and S represent the houses of the six people. From (ii), H and L cannot be next to each other. From (ix), G and R cannot be next to each other.

Given that S is to the right of R and G is to the immediate right of P. Since H and L are not any of the ends, either P and S or R and G must be at the ends. Since R is not at any end, P and S must be at the ends. G must be next to P. From (iv), L should be to the immediate right of G followed by R and H in that order. Therefore, the order of the houses is P, G, L, R, H, S.

If L and H are painted Red, R and S will paint their houses in the same colour. Since L is red, G will be green and since G is green, R will also be green. If R is green, S will also be green. This will violate (v). Hence, L and H cannot be painted red.

H can only be painted red or green from (vii) and (viii). Since H cannot be painted red, it has to be painted green. L will also be green.

Also, P cannot be painted Red because in such case, G will have to be painted green (which violated (ii)). S cannot be painted blue because it will violate (iii). If S is painted Red, G and R cannot be painted blue, since it will violate the same condition.

The following table lists the possible cases for the paintings:

P	G	L	R	H	S
Blue	Red	Green	Red	Green	Yellow
Blue	Yellow	Green	Yellow	Green	Red

29. Pavani's house is blue. Choice (B)
30. If only one house is painted red, Gita's house will be yellow. Choice (C)
31. Lalitha's house is green. Choice (A)
32. Surekha's house could not have been blue. Choice (D)

Difficulty level wise summary - Section II				
Level of Difficulty	Questions			
Very Easy	-			
Easy	1, 3, 9, 10, 11, 12, 13, 14, 16			
Medium	2, 4, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32			
Difficult	5, 6			
Very Difficult	7, 8			

SECTION – III

Solutions for questions 1 to 34:

1. As $\frac{p}{q} = \frac{q}{r} = \frac{r}{s} = 6$

$$\frac{p}{q} = \frac{pq}{q^2} = 6, \frac{q}{r} = \frac{qr}{r^2} = 6$$

$$\frac{r}{s} = \frac{rs}{s^2} = 6$$

$$\text{Therefore } \frac{pq + qr + rs}{q^2 + r^2 + s^2} = 6 \quad \text{Ans: (6)}$$

2. Choice (A): Each of x^2y , y^2x and z^2x is odd. Hence their sum is odd, which, in turn, when multiplied by xyz will result in an odd number.

∴ (A) is true

Choice (B): $(xy + yz + zx)$ is odd $(x + 2y + 3z)$ is even. Therefore, their product is even.

∴ (B) is true.

Choice (C) : $(xy + yz + zx)$ and $(2x + y)^2$ are odd. Hence their product is also odd.

∴ (C) is true.

Choice (D): $(2x + 3y + 4z)$ is odd and $(xyz + 6)$ is also odd. Hence their product is odd.

∴ (D) is not true.

Choice (D)

3. By a simple trial of $x = 1$, $y = 3$, $z = -4$ (or $x = -1$, $y = -3$, $z = 4$) it can be seen that $x + y + z = 0$ and $x^2 + y^2 + z^2 = 26$. Hence $x^4 + y^4 + z^4$ would be $1 + 81 + 256 = 338$.

Alternate Solution:

$$(x + y + z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx) \\ \Rightarrow 0 = 26 + 2(xy + yz + zx) \\ xy + yz + zx = -13 \\ (xy + yz + zx)(x^2 + y^2 + z^2) = x^3y + xy^3 + xyz^2 + x^2yz + y^3z \\ + yz^3 + zx^3 + z^3x + zxy^2 \\ x^3(y + z) + y^3(x + z) + z^3(x + y) + xyz(x + y + z) \\ = x^3(x + y + z) - x^4 + y^3(x + y + z) - y^4 + z^3(x + y + z) - z^4 \\ + xyz(x + y + z) \\ \text{As } x + y + z = 0, (-13)(26) = -x^4 - y^4 - z^4 \\ \therefore x^4 + y^4 + z^4 = 338 \quad \text{Ans: (338)}$$

4. Let's calculate this from the last.

$$\begin{array}{cccc} A & B & C & D \\ x & x & x & x \end{array}$$

So after 'C' gave $1/5$ of her share to D she is left with 'x'.

$$\Rightarrow \text{Before she gave to D she had } \frac{5}{4}x.$$

$$\begin{array}{cccc} A & B & C & D \\ x & x & \frac{5}{4}x & \frac{3}{4}x \end{array}$$

So this is the situation before C gave to D (or) after B gave to C.

So B is left with 'x' after she gave $1/4$ th of his chocolates to C.

$$\Rightarrow \text{Before B gave to C, she had } \frac{4}{3}x.$$

$$\begin{array}{cccc} A & B & C & D \\ x & \frac{4}{3}x & \frac{11}{12}x & \frac{3}{4}x \end{array}$$

This is the situation after A gave $1/3$ rd of his share to B.

$$\Rightarrow \text{Initially 'A' had } \frac{3}{2}x$$

$$\therefore \begin{array}{cccc} A & B & C & D \\ \frac{3}{2}x & \frac{5}{6}x & \frac{11}{12}x & \frac{3}{4}x \end{array}$$

Given $A - B = 80$

$$\Rightarrow \frac{4}{6}x = 80 \Rightarrow x = 120 \text{ and } C - D = \frac{1}{6}x = 20$$

Alternative solution:

Considering only the transactions A → B and B → C, A will have $\frac{2}{3}A$ and B will have $\frac{3}{4}\left(B + \frac{A}{3}\right)$. But it is given that A and B finally had an equal number. So we get $\frac{2}{3}A = \frac{3}{4}\left(B + \frac{A}{3}\right)$ --- (1). Also, given that $A - B = 80$ ---- (2).

Now, from (1) and (2) we get $A = 180$ and $B = 100$ and also that everyone has 120 chocolates with them in the end.

Now considering the transactions B → C and C → D, we get

$$\frac{4}{5}\left(C + \frac{100 + \frac{80}{3}}{4}\right) = \frac{1}{5}\left(C + \frac{\left(100 + \frac{180}{3}\right)}{4}\right) + D = 120$$

$$\Rightarrow C = 110 \text{ and } D = 90$$

$$\Rightarrow C - D = 20$$

Choice (A)

5. Let the time taken by Kiran to reach the school if he travels at twice his normal speed be 't'.

Let the normal speed of Kiran be s .

$$\text{Given } t \times 2s = (t + 3) \times \frac{s}{2}$$

$$\Rightarrow 4t = t + 3 \Rightarrow t = 1 \text{ hour}$$

\Rightarrow time taken while walking at normal speed = 2 hrs

Thus, when he starts at 1:00 p.m. he will reach at 3:00 p.m.
Choice (D)

6. When the hypotenuse is reduced by 35% by cutting to along a line parallel to the hypotenuse, the perpendicular sides also get reduced by 35%. That is, the entire triangle is similar to the original triangle.

\therefore Each side is now 65% of its initial value.

\therefore New area is $65\% \times 65\%$

$$= 42.25\% \text{ of original area (since } A = \frac{1}{2}ab \Rightarrow A \propto ab)$$

$\Rightarrow x = 42$ (rounded off to the nearest whole number)

Ans: (42)

7. LCM of $\frac{10}{21}, \frac{15}{28}, \frac{20}{63}$ and $\frac{55}{42}$

$$= \frac{\text{L.C.M. of the numerators}}{\text{H.C.F. of the denominators}} = \frac{660}{7}$$

$$\text{H.C.F. of } \frac{10}{21}, \frac{15}{28}, \frac{20}{63} \text{ and } \frac{55}{42}$$

$$= \frac{\text{H.C.F. of the numerator}}{\text{L.C.M. of the denominator}} = \frac{5}{252}$$

$$\frac{\text{L.C.M.}}{\text{H.C.F.}} = \frac{660}{7} \times \frac{252}{5} = 4752.$$

Choice (B)

8. S.P = 25000

Let cost prices of both television sets be A & B

As he made no profit, no loss

$$A + B = 50,000$$

On B he made a loss of 10%

$$B \left(1 - \frac{10}{100}\right) = 25000$$

$$B \times \frac{9}{10} = 25000$$

$$B = 25,000 \times \frac{10}{9} \text{ so,}$$

$$A = 25000 \left(2 - \frac{10}{9}\right) = 25000 \left(\frac{8}{9}\right)$$

$$\text{Profit \%} = \frac{\text{S.P} - \text{C.P}}{\text{C.P}}$$

$$= \frac{25000 - 25000 \left(\frac{8}{9}\right)}{25000 \left(\frac{8}{9}\right)} \times 100\%$$

$$= \frac{\frac{1}{9}}{\frac{8}{9}} = \frac{1}{8} \times 100\% = 12.5\%.$$

Choice (B)

9. When an arithmetic progression, none of the terms of which are zero, has sum of its terms as zero, there are equal number of terms above zero and below zero. Hence, it always has an even number of terms.

Choice (A)

10. Let $R = \frac{r}{100}$

Year	SI	CI
1	PR	PR
2	PR	$PR + PR^2$

\therefore Difference in simple and compound interest at the end of

$$2^{\text{nd}} \text{ year} = PR^2 = P \left(\frac{r}{100}\right)^2$$

$$\text{It is given that } P = 9600 \text{ and } P \left(\frac{r}{100}\right)^2 = 150$$

$$\therefore 9600 \left(\frac{r}{100}\right)^2 = 150 \Rightarrow \left(\frac{r}{100}\right)^2 = \frac{1}{64}$$

$$\Rightarrow \frac{r}{100} = \frac{1}{8} \Rightarrow r = 12.5$$

Ans: (12.5)

11. This question can be best solved by considering the answer choices.

$$\log_a 120 = \log_a 5 + \log_a 24$$

\therefore Coefficient of $\log_a 5 = 1$

\therefore We look for a combination of x, y, z which gives 1 as the coefficient of $\log_a 5$.

$$\log_a 75 = 2 \log_a 5 + \log_a 3 = y$$

$$\log_a 40 = \log_a 5 + \log_a 8 = z$$

$$\therefore \frac{y+2z}{4} \text{ gives coefficient of } \log_a 5 \text{ as 1.}$$

\therefore Only 1st choice satisfies.

Choice (A)

12. The total amount we can make taking all the coins together is 391. But, some amounts may not be possible. Let us check what amounts can be made and what amounts cannot be made using the given denominations. We can clearly see that using the coins 1np, 2np, 3np and 5 np, we can get the amounts 1 to 11.

Using 10 np coins with the above amounts, we can make amounts till 21.

Using 20 np coin with the above amounts 1 to 21, we can make amounts till 41.

But, we cannot make totals 42 to 49 [i.e., eight amounts]

Using the amounts 1 to 41 (that we could make above) along with 50 np coin, we can make amounts 50 to 91.

But, we cannot make amounts 92 to 99. [another 8 amounts]

Similarly, we can see that even after using one rupee and two rupee coins along with the above we cannot make some more amounts.

The amounts that cannot be made are:

$$42 - 49 \quad \dots \quad 8 \text{ totals}$$

$$92 - 99 \quad \dots \quad 8 \text{ totals}$$

$$142 - 149 \quad \dots \quad 8 \text{ totals}$$

$$192 - 199 \quad \dots \quad 8 \text{ totals}$$

$$242 - 249 \quad \dots \quad 8 \text{ totals}$$

$$292 - 299 \quad \dots \quad 8 \text{ totals}$$

$$342 - 349 \quad \dots \quad 8 \text{ totals}$$

A total of 56 amounts out of 391 cannot be made.

\therefore Number of distinct amounts that can be made

$$= 391 - 56 = 335$$

Alternative Solution:

Since there are 9 coins, all the possible sums (including duplicates) will be $2^9 - 1 = 511$.

Now, there will be duplication in the following cases:

– when 1, 2 are not selected but 3 is. Number of cases = 2^6

– when 2, 3 are not selected but 5 is. Number of cases = 2^6

– when 2, 3, 5 are not selected but 10 is. Number of cases = 2^5

– when 2, 3, 5, 10 are not selected but 20 is. Number of cases = 2^4

Hence, total unique sums = $511 - 2^6 - 2^6 - 2^5 - 2^4 = 335$.

Choice (C)

13. Surface area of the base of the top

$$= \pi r l = \pi (3) \left(\frac{3}{\sin 30^\circ} \right) \left[\because \sin 30^\circ = \frac{r}{l} \right] = 18 \pi$$

Surface area of the upper and lower surface of the disc

$$= \pi (6)^2 + [\pi (6)^2 - \pi (3)^2]$$

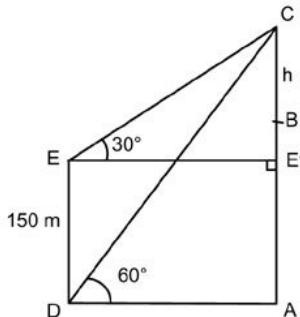
$$= 36\pi + 27\pi = 63\pi$$

Surface area of the trunk
 $= 2\pi rh = 2\pi (3)(12) = 72\pi$

$$\therefore \text{Total surface area of the top} = 18\pi + 63\pi + 72\pi \\ = 153\pi \text{ sq. cm}$$

Choice (B)

14. Let E' be a point, at a height of 150 m, on the first building.
 Let CE' = h



$$\therefore EE' = \sqrt{3} h$$

$$AD = EE' = \sqrt{3} h$$

$$AC = \sqrt{3} (AD) = 3h$$

$$\therefore AE' = 2h = 150 \text{ m}$$

$$\Rightarrow AC = 3h = 225 \text{ m}$$

Since, the height of the first building AB = 200 m, the height of the flag-post is 225 - 200 i.e. 25 m.

Choice (B)

15. The pulp content by weight in fresh grapes

$$= 100 - 80 = 20\%$$

\Rightarrow 10 kg of fresh grapes which have 2 kg of pulp, finally yield 2.5 kg of dry grapes.

This 2 kg of pulp is $\left(\frac{2}{2.5} \times 100\right)\%$ by weight of dry grapes.

\Rightarrow Dry grapes have 80% pulp by weight. Choice (D)

16. The angle between the hands change by $5\frac{1}{2}^\circ$ for every minute. In the given question, the angle has to change from 90° behind to 180° ahead, i.e., it has to increase by 270° .

\therefore The time taken for the angle to change by 270° =

$$270 \times \frac{2}{11} = \frac{540}{11} = 49 \frac{1}{11} \text{ minutes.}$$

Choice (C)

17. Let $\sqrt{8+\sqrt{60}} = \sqrt{a} + \sqrt{b}$

Squaring on both sides+

$$8 + \sqrt{60} = a + b + 2\sqrt{ab} = a + b + \sqrt{4ab}$$

Equating the rational and irrational parts respectively.

$$a + b = 8, \sqrt{4ab} = \sqrt{60} \Rightarrow ab = 15$$

By observation, $a = \sqrt{5}$ (OR $\sqrt{3}$) and $b = \sqrt{3}$ (OR $\sqrt{5}$)

Similarly, Let $\sqrt{8-\sqrt{60}} = \sqrt{5} - \sqrt{3}$ (positive difference of $\sqrt{5}$ and $\sqrt{3}$)

$$\text{Thus } \sqrt{8+\sqrt{60}} + \sqrt{8-\sqrt{60}} = \sqrt{5} + \sqrt{3} + \sqrt{5} - \sqrt{3}$$

$$= 2\sqrt{5}$$

Choice (C)

Note: For this question, one could also use the online calculator to evaluate each surd and identify the correct answer choice.

18. Since a, b are positive real numbers

$$|a+b| = |a| + |b|$$

Choice (B)

19. Let the cost of each pen be p , pencil be n and sharpener be s .

$$6p + 5n + 7s = 26 \rightarrow (1)$$

$$24p + 12n + 28s = 72 \rightarrow (2)$$

$$(1) \times 4 = 24p + 20n + 28s = 104 \rightarrow (3)$$

$$(3) - (2) = 8n = 32$$

$$\Rightarrow \text{Cost of pencil} = ₹4.$$

Choice (B)

20. 1 line can divide a plane into 2 parts

2 lines can divide a plane into at most 4 parts (i.e. 2 more)

3 lines, into at most 7 parts (i.e. 3 more)

4 lines, into at most 11 parts (i.e. 4 more)

$\therefore n$ lines can divide a plane into $1 + (1 + 2 + 3 + \dots + n)$ parts or $\frac{n(n+1)}{2} + 1$ parts.

$$\text{Given } \frac{n(n+1)}{2} + 1 = 79$$

$$\Rightarrow n(n+1) = 156 = 12(13)$$

$$\therefore n = 12$$

i.e., to divide a plane into 79 parts, we need a minimum of 12 lines

Ans: (12)

21. Each of the 5 numbers occurs in 6 triplets (i.e. Of the remaining 4 numbers, 2 can be selected in 4C_2 or 6 ways).

\therefore The sum of the 10 given sums is 6 times the sum of the 5 numbers.

\therefore 6 times the sum of the 5 numbers is $30 + (33 + 34 + 35 + 36 + 37 + 38) + (40 + 41 + 42) = 366$, or the sum of the five numbers is 61.

\therefore The sum of the 10 pairs that can be formed are (61 - 42), (61 - 41) etc., i.e., 19, 20, 21, 23, 24, 25, 26, 27, 28 and 31.

Let the 5 numbers be a, b, c, d and e where $a < b < c < d < e$.

$$\therefore a + b = 19 \rightarrow (1) \text{ and } c + e = 28 \rightarrow (2)$$

$$a + c = 20 \rightarrow (3) \text{ and } d + e = 31 \rightarrow (4)$$

$$\text{also } a + b + c + d + e = 61 \rightarrow (5)$$

$$(5) - (1) - (2) \text{ gives } d = 14$$

$$\Rightarrow \text{from (4), } e = 17$$

$$\text{Also, } (5) - (3) - (4) \text{ gives } b = 10$$

$$\Rightarrow \text{from (1), } a = 9$$

$$\text{Hence } a + e = 17 + 9 = 26.$$

Alternative Solution:

As $a < b < c < d < e$, among the triplets, the least is $a + b + c$ and the second least is $a + b + d$. Similarly, the greatest is $a + d + e$ and the second is $b + d + e$.

$$\therefore a + b + c = 30 \quad (1) \text{ and } b + d + e = 41 \quad (3)$$

$$a + b + d = 33 \quad (2) \quad c + d + e = 42 \quad (4)$$

Adding all the triplets, we get $6(a + b + c + d + e) = 366$ or $a + b + c + d + e = 61 \quad (5)$

$$(5), (1) \Rightarrow d + e = 31.$$

$$\therefore \text{From (4), } c = 11 \text{ and from (3), } b = 10$$

$$\therefore \text{From (1), } a = 9. \text{ From (2), } d = 14 \text{ and finally } e = 17$$

$$\therefore a + e = 9 + 17 = 26.$$

Choice (B)

22. The work involves $15 \times 9 = 135$ man-hours.

By noon, $3 \times 15 = 45$ man-hours of work get completed.

Hence we've got 90 man-hours of work left to be done.

Since every hour from then, one worker is added. The work done in every hour increases by 1 man-hour compared to the previous hour.

\therefore From 12:00 - 1:00 p.m. = 15 + 1 man-hour of work is done.

From 1:00 p.m. - 2:00 p.m. = 15 + 2 man-hours of work is done.

From let us assume it takes n hours from 12:00 p.m. to complete the work of 75 man-hours.

\therefore Work done = $(15 + 1) + (15 + 2) + (15 + 3) + \dots + (15 + n) = (15 + 15 + \dots + n \text{ times}) + (1 + 2 + \dots + n) = 90$ man hours.

$$\Rightarrow (n \times 15) + \frac{n(n+1)}{2} = 90 \text{ man hours.}$$

$$\Rightarrow n^2 + 31n - 180 = 0 \Rightarrow (n + 36)(n - 5) = 0$$

$$\Rightarrow n = 5 \text{ (as } n = -36 \text{ cannot be a solution to the above case)}$$

∴ The work gets completed by 5 hours past 12:00 noon i.e., 5:00 p.m.

Alternative Solution:

$$\text{Total work} = 15 \times 9 = 135 \text{ man-hours.}$$

Now 15 men work for 3 hours first (from 9:00 a.m. to 12:00 noon), i.e., work remaining

$$= 135 - 15 \times 3 = 90 \text{ man-hours.}$$

Now the work done (in man-hours) every successive hour from 12:00 noon will be 16, 17, 18, 19 so on.

∴ If $16 + 17 + 18 + \dots + n \geq 90$, then n will be 20, i.e., 5 hours after 12:00 noon, or 5:00 p.m. Choice (D)

23. The digits to be used are 0, 6 and 9. The required numbers are from 00001 to 99999.

∴ The numbers are five digit numbers. Therefore every place can be filled by 0, 6 and 9, i.e., in 3 ways.

$$\therefore \text{Total number of ways}$$

$$= 3 \times 3 \times 3 \times 3 \times 3 = 3^5.$$

But 00000 is also a number formed and this has to be excluded (since it is not a natural number)

$$\therefore \text{Total number of numbers} = 3^5 - 1$$

$$= 243 - 1 = 242.$$

Ans: (242)

24. The force of drag experienced by sphere 1: sphere 2

$$\begin{aligned} &= \left(\frac{\text{Density of liquid 1}}{\text{Density of liquid 2}} \right) \left(\frac{4\pi r_1^2}{4\pi r_2^2} \right) \left(\frac{\text{Speed of sphere 1}}{\text{Speed of sphere 2}} \right)^2 \\ &= \left(\frac{1.3}{0.91} \right) \left(\frac{5}{10} \right)^2 \left(\frac{3}{9} \right)^2 \\ &= \left(\frac{10}{7} \right) \left(\frac{1}{4} \right) \left(\frac{1}{9} \right) = \frac{10}{252} \end{aligned}$$

$$\begin{aligned} \text{The force of drag experienced by sphere 2} &= 1.4 \times \frac{252}{10} \\ &= 35.28 \text{ N} \end{aligned}$$

Choice (C)

25. Let B's current age be x .

A's age B's age

$$\begin{array}{ll} x & 5y \\ 7y & x \end{array}$$

$$\text{We get } 7y - x = x - 5y$$

$$\Rightarrow x = 6y$$

It is given that the sum of their present ages is 65

$$\Rightarrow 7y + 6y = 65$$

$$\therefore y = 5.$$

The difference between A's age and B's age is always constant and it is 5.

So, A's age and B's age can be written as $x + 5$ and x respectively.

A's age will be twice of B's age when

$$x + 5 = 2x \Rightarrow x = 5$$

A's age will be twice of B's age 25 (30 - 5) years ago.

Ans: (25)

26. The total age of all the members before any change

$$= 16 \times 8 = 128 \text{ years}$$

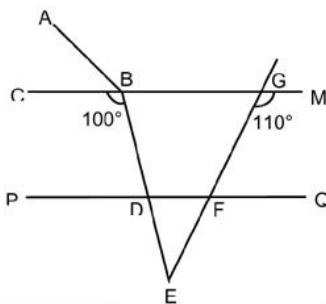
The total age of all the members after the changes = $14 \times 8 = 112$ years

Let the age of the new person be x years

$$128 + x - 36 = 112 \Rightarrow x = 20 \text{ years.}$$

Ans: (20)

- 27.



$$\Rightarrow \angle GBE = 180^\circ - 100^\circ = 80^\circ$$

$$\Rightarrow \angle BGE = 180^\circ - 110^\circ = 70^\circ$$

$$\Rightarrow \angle BEG = \angle DEF = (180^\circ - 80^\circ - 70^\circ) = 30^\circ$$

$$\therefore \angle ABC = 2\angle DEF = 2 \times 30^\circ = 60^\circ$$

Note: In this case, the information that $PQ \parallel CM$ is redundant.

Choice (D)

28. Let the number of enrollments be $60 + N$

Now, total revenue is given by,

$$R = (60 + N)(2400 - 15 \times N)$$

The above expression is a quadratic in N (with roots as

$$N = -60 \text{ or } 160), \text{ which attains its maximum when}$$

$$N = \frac{\text{sum of roots}}{2}$$

$$\text{Hence } N \text{ must be } \frac{(-60 + 160)}{2} = 50$$

Hence, number of enrollments for maximum revenue
= $60 + 50 = 110$. Ans: (110)

29. Given that $\sqrt{x + \sqrt{x + \sqrt{x + \sqrt{x + \dots}}}} = 4$

Squaring both sides of the above equation, we get

$$\Rightarrow x + 4 = 16 \text{ (since there are infinite number of terms)}$$

$$\Rightarrow x = 12$$

30. Total number of people in the party is 42. The total number of handshakes, if every person were to shake hands with every other person exactly once is ${}^{42}C_2$.

This includes handshakes between the family members, which need to be discounted.

Number of possible handshakes between 4 members of the same family is 4C_2

$$\therefore \text{Total number of handshakes} = {}^{42}C_2 - 10({}^4C_2) - 1 = 800 \text{ (we subtract 1 to discount the handshake between Chris and his wife).}$$

Alternative Solution:

Let us first assume that the host family also comprises four members, instead of two.

Hence, there are a total of 11 families of 4 members each.

For every member, there are 10 families that are not their's. Hence, number of handshakes

$$= \frac{[4 \times 11(\text{members})] \times [4 \times 10(\text{handshakes})]}{2(\text{persons per handshake})} = 880.$$

Out of these, we subtract the handshakes of the missing two members in the host family, i.e., $2 \times 40 = 80$.

$$\therefore 880 - 80 = 800. \quad \text{Ans: (800)}$$

31. As Aparna and Sushma celebrate their birthdays on the same day of the week every year, they both must have been born either before 29th February or after 29th February. As Aparna was born on 7th February, Sushma must have been born before 28th February.

As both were born on the same day of the week, the birthday of Aparna must fall on the same day of the week in the year in which Sushma was born as it was in the year in which Aparna was born i.e., the number of odd days between the year in which Aparna was born and the year in which Sushma was born must be a multiple of 7.

The number of odd days from 2005 to 2009

$$1(2005) + 1(2006) + 1(2007) + 2(2008) = 5 \text{ days}$$

The number of odd days from 2005 to 011 =

$$1(2005) + 1(2006) + 1(2007) + 2(2008) + 1(2009) + 1(2010) = 7 \text{ days.}$$

Hence, Sushma was born on 10th January, 2011.

Choice (A)

32. Time taken by tap to fill the tank = 8 hrs

Time taken to fill tank if leak is present = 13 hrs

Let the leak alone empty the tank in ' t ' hours.

$$\frac{1}{8} - \frac{1}{\ell} = \frac{1}{13}$$

$$\frac{1}{\ell} = \frac{1}{8} - \frac{1}{13} = \frac{5}{8 \times 13} \text{ i.e. } \ell = \frac{8 \times 13}{5} \text{ hours}$$

Amount of liquid filled in 8 hrs (from 6 a.m. to 2 p.m.), with

leak present = $\frac{8}{13}$ th of tank

Time taken by leak to empty $\frac{8}{13}$ th of tank

$$\frac{8}{13} \times \frac{8 \times 13}{5} = \frac{64}{5} \text{ hrs} = 12 \text{ hrs } 48 \text{ min}$$

∴ At 2 : 48 a.m., next day, the tank would get empty.
Choice (D)

33. Numbers satisfying second condition also satisfy the first condition. They are of the form

$$N = 33p + 29 \text{ and } N = 24q + 20$$

$$\Rightarrow N + 4 = k \text{ LCM of } (33, 24)$$

$$\Rightarrow N + 4 = 264k - 4$$

$$\Rightarrow N = 260 \text{ (when } k = 1)$$

$$524 \text{ (when } k = 2)$$

$$788 \text{ (when } k = 3)$$

Only 788 satisfies the third condition also. Ans: (1)

34. Let the integers be x and y . We have $2(x + y) = xy$

$$\Rightarrow 2x + 2y = xy$$

$$\Rightarrow y = \frac{2x}{x-2} = \frac{2x-4+4}{x-2} = 2 + \frac{4}{x-2}$$

$\frac{4}{x-2}$ is an integer, if and only if $x - 2 = 1, 2, 4$ or $-1, -2, -4$

i.e., $x = 3, 4, 6, 1, 0, -2$ and correspondingly $y = 6, 4, 3, -2, 0, 1$. Thus there are only 4 pairs $(3, 6), (4, 4), (1, -2)$ and $(0, 0)$.

Alternative Solution:

Since, $2x + 2y = xy$

$$\Rightarrow xy - 2x - 2y = 0$$

$$\Rightarrow xy - 2x - 2y + 4 = 4$$

$$\Rightarrow (x - 2)(y - 2) = 4.$$

Since 4 can be expressed as product of two integers in four ways, there are four pairs of x and y . Choice (A)

Difficulty level wise summary - Section III	
Level of Difficulty	Questions
Very Easy	-
Easy	1, 2, 6, 7, 9, 10, 15, 16, 17, 18, 26, 27
Medium	4, 5, 8, 11, 13, 14, 19, 20, 22, 24, 25, 28, 29, 30, 32, 33, 34
Difficult	3, 12, 23, 31
Very Difficult	21