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

(Key and Solutions for AIMCAT1715)

Key

SECTION – I
SUB-SECTION: RC

1. C	5. D	9. D	13. C	17. B	21. A
2. B	6. A	10. B	14. D	18. C	22. C
3. A	7. B	11. C	15. C	19. B	23. B
4. B	8. A	12. D	16. D	20. C	24. D

SUB-SECTION: VA

1. 2	5. 42531	9. B	13. 4
2. 5	6. 54132	10. D	14. 2
3. 1	7. 24135	11. 1	15. 1
4. 3	8. 31452	12. 45	16. 3

SECTION – II
SUB-SECTION: DI

1. A	5. D	9. A	13. A
2. A	6. 66	10. A	14. D
3. D	7. 90	11. 16	15. 4
4. 2600	8. A	12. 2	

SUB-SECTION: LR

1. C	5. 200	9. 3	13. D
2. C	6. B	10. 2	14. C
3. A	7. 100	11. D	15. B
4. D	8. A	12. A	

SECTION – III: QA

1. B	8. B	15. 3	22. 4	29. C
2. B	9. 6	16. 50	23. A	30. 46
3. C	10. A	17. 8	24. 360	
4. A	11. C	18. C	25. A	
5. A	12. B	19. B	26. 11	
6. 2413	13. 8	20. C	27. C	
7. B	14. 7957	21. 4	28. D	

Solutions

SECTION – I
SUB-SECTION: RC

Solutions for questions 1 to 6:

Number of words and Explanatory notes for RC:

Number of words : 651

1. The passage mentions that Derrick Taff described preliminary experiments "which suggest that listening to recordings from national parks, of waterfalls, birdsong and wind, helped people recover from the stressful events". In the subsequent paragraph, the passage describes one of the experiments conducted by Taff.
Option A: The passage mentions that people "calmed down faster when they listened to nature recordings". From this, we cannot infer anything about the recovery of people suffering from stress related diseases. Hence, this option is incorrect.
Option B: In the experiment described in the passage, people are asked to "give an impromptu talk". It concludes that people "calmed down faster when they listened to nature recordings". However, it does not limit the findings of experiment to be valid *only when* people are talking. Hence, this option is also incorrect.

Option C: The passage mentions that people calmed down faster when they listened to natural sounds. Hence, this option is the correct answer.
Option D: The passage mentions that people calmed down faster when they listened to sounds of nature as compared to sounds of traffic. However, we cannot infer that their stress levels increased when they listened to sounds of traffic. Hence, this option is also incorrect.
Therefore, the correct answer is option C.

Choice (C)

2. The passage talks about people listening to iPods in the third paragraph and the penultimate paragraph of the passage.
Option A: According to Fristrup, people are losing out on the gift of being able "to reach out and hear things hundreds of metres away". However, he does not blame specifically iPods for this. Hence, this cannot be the correct answer.
Option B: The passage mentions that people are "listening to iPods through their earphones instead of tuning in to the birds and other sounds of nature that can easily be drowned out by traffic". We can infer that people listening to iPods will miss out on hearing sounds of nature. Hence, this is the correct answer.
Option C: The passage does not mention that people listening to iPods increase the background noise in the environment. Hence, this option is also incorrect.
Option D: While missing out on the sounds of nature might increase the stress levels, we cannot infer that this will affect only people listening to iPods. Hence, this option is also incorrect.
Therefore, the correct answer is option B.

Choice (B)

3. Fristrup talks about these problems in the fifth paragraph of the passage.
Loss of auditory acuity is explained as "where we are exposed to noise for so long that we stop listening".
Loss of listening habits is explained as "where we lose the ability to engage with the environment the way we were built to".
Among the given options, only option A correctly rephrases the meaning of these terms. Hence, option A is the correct answer. Choice (A)

4. The passage talks about the problem of increasing background noise in cities. Fristrup states that "As you raise background sound levels it has the same effect on your hearing that fog would have on your vision".
Option A: While increased background noise will not allow people to hear distant sounds of nature, it only because they will be "aware of only a small area around you". Therefore, increased background noise does not have any specific effect on the ability to listen to sounds of nature. Hence, this option is incorrect.
Option B: Fristrup mentions that "Instead of having this expansive experience of all the sounds around you, you are aware of only a small area around you". Given the example of fog in the paragraph, we can infer that people will be able to hear sounds only in a small area around them. Hence this is the correct answer.
Option C: The passage does not mention that stress levels of people will increase due to background noise. In Taff's experiment, natural sounds which can be called background noise calmed people down. Hence, choice C cannot be the correct answer.
Option D: People in cities might miss out on hearing natural sounds due to the background noise (man-made) in cities. Further the question does not mention whether the background noise is man-made or natural sounds themselves. Since the question does not provide a specific context, this option is incorrect.
Therefore, the correct answer is option B.

Choice (B)

5. Fristrup presents a possible reason why natural sounds can calm people down in the last paragraph of the passage.
Option A: Fristrup mentions that "our brains may have come to associate the more tranquil sounds of the natural world with safety". However, when you compare this with D, you find that D provides the primary reason that this association takes place – ancestral brains. Hence, this could be an answer only in the absence of D.
Option B: Our brains have been programmed to associate the presence of natural sounds with the absence of predators and not their presence. Hence, this option is incorrect.
Option C: Fristrup does not talk about the rarity of natural sounds while speculating the reason for this. Hence, this option is also incorrect.
Option D: Fristrup states that "I suspect there's something about these intact soundscapes that reminds our ancestral brains of a place that's safe, where there's no sense of a predator nearby". Hence, this option is the correct answer.

Choice (D)

6. Taff believes that people want to "hear the natural quiet, the birdsong, and the wind and water". Taff advises people to visit protected areas to listen to these sounds and "experience what you are missing".
Option A: According to this statement, even the protected areas are not free from noises of human activity. Hence, the "natural quiet" that people want to experience in protected areas might not be present in those areas. Hence, this would make his advice ineffective.
Option B: Listening to natural sounds helps people recover from stress. However, this statement makes Taff's advice even more important. Hence, this is not the correct option.
Option C: This statement also supports Taff's advice and hence, is not the correct answer.
Option D: This statement is not directly related to Taff's advice and is not the correct answer.
Therefore, the correct answer is option A.

Choice (A)

Solutions for questions 7 to 12:

Number of words and Explanatory notes for RC:

Number of words : 572

7. According to natural law theorists, "property rights exist by virtue of human nature but that they can only have legal force when they are recognised by a sovereign government".
Option A: Property right can be legal only "when they are recognised by a sovereign government". Hence, this option is incorrect.
Option B: For property rights to carry import, they should be recognized by sovereignty. Hence, this is the correct answer.
Option C: Sovereignty does not require the presence of property rights. Hence, this statements is also incorrect.
Option D: Both of them are not dependent on each other. Only property rights are dependent on sovereignty. Hence, this option is also incorrect.
Therefore, the correct answer is option B. Choice (B)

8. The reasons for the US calling outer space "a global commons" is mentioned in the fourth paragraph of the passage.
Statement I: The passage mentions that "neither the USSR nor the US was keen to fight out the Cold War on yet another front". Another front here refers to national sovereignty in outer space. Hence, this is one of the reasons mentioned in the passage.
Statement II: The passage does not mention that the Soviet Union wanted territorial rights in outer space. Hence, this cannot be a reason.
Statement III: According to the passage, "The Soviet Union was difficult to infiltrate to gather intelligence, so open access to Soviet air space was crucial for the US during the Cold War". Hence, spying on Soviet was also one of the reasons why the US wanted outer space to be a global commons.
Statement IV: The passage does not talk about whether the

US was against granting open space access to the Soviet Union. Hence, this cannot be inferred.
Therefore, only Statement I and III are reasons mentioned in the passage. Hence, the answer is option A.

Choice (A)

9. The passage mentions a part of the Article II of the 1967 Outer Space Treaty. It says that the treaty "clearly forbids "national appropriation by claims of sovereignty, means of use or occupation by any other means"".
Option A: National appropriation by means of use is also forbidden according to the treaty. This implies that nations cannot claim ownership of the property that they use. Hence, this is not the correct answer.
Option B: The passage does not mention that the treaty provides any special concessions for scientific endeavours. Hence, this option is also incorrect.
Option C: The treaty also forbid occupation by any other means. Hence, this option is also incorrect.
Option D: This option correctly rephrases Article II of the 1967 Outer Space Treaty. Hence, this is the correct answer.

Choice (D)

10. The passage mentions that "Historical records of the Space Treaty negotiations clearly indicate people were against private appropriations at the time, but an explicit prohibition never made it into Article II". However, to fix this omission, Moon Agreement of 1979 was drawn up.
Option A: Banning national appropriation is present in the Article II of the 1967 Outer Space Treaty. Hence, this cannot be the correct answer.
Option B: Banning ownership by any organization or person would fix the Article II of the 1967 Outer Space Treaty, since it did not explicitly mention this. Hence, this would most likely have been a clause in the Moon Agreement of 1979.
Option C: We cannot comment on whether this clause was present in the Moon Agreement of 1979 or in the Article II of the 1967 Outer Space Treaty or in both. Hence, this cannot be the correct answer.
Option D: Nothing can be inferred from the passage regarding the environment of celestial bodies. Hence, this option is also incorrect.
Therefore, the correct answer is option B.

Choice (B)

11. The passage talks about "corporate possession (*corpus possidendi*)" as one of the reasons why title deed cannot be a proof of lunar ownership.
Option A: While it is true that Moon Agreement of 1979 prohibits private ownership of lunar property, we cannot conclude that this is the reason why title deed cannot be a proof of lunar ownership. This is because the passage mentions that "only 16 countries signed the agreement, none of which were involved in manned space exploration, leaving it somewhat meaningless as an international standard". Hence, this option is incorrect.
Option B: The last paragraph of the passage assumes that private citizens will not be able to travel to the moon. However, it does not mention that the reason for this is the lack of wealth. Hence, this cannot be the correct answer.
Option C: Corporate possession implies "In order to possess something, both mind and body need to be involved. Intention alone is not sufficient; possession also requires a physical act". Hence, physical occupancy is important for title deeds to be legal. Therefore, this is the correct answer.
Option D: While the passage mentions that national appropriations are not valid, it does not mention that there are no institutions which can issue title deeds. Hence, this option also cannot be inferred.
Therefore, the correct answer is option C.

Choice (C)

12. Dennis Hope thinks that there is a loophole in Article II. The loophole is mentioned in the preceding paragraph in the passage.
Option A: Article II is of the Treaty of 1967. The loophole referred to is in that Article and not in the Agreement signed in 1979 by 16 nations. Hence choice A is incorrect.
Option B: The loophole refers not to the penalty but to the prohibition of private ownership. Hence, this statement is also incorrect.
Option C: The passage does not mention the ambiguity in Article II anywhere. Hence, this option is also incorrect.
Option D: According to the passage, "an explicit prohibition never made it into Article II". Hence, this is the correct answer.

Choice (D)

Solutions for questions 13 to 15:

Number of words and Explanatory notes for RC:

Number of words : 491

13. The passage talks about John McAfee who evaded the police by disguising himself in an extreme manner. However, it also states that "Some people do not need to do anything nearly as extreme as McAfee to fool facial recognition systems".
Option A: The passage mentions that facial recognition technology is "still surprisingly clumsy". Hence, he would not have been caught using facial recognition technology.
Option B: The passage states that in order to prevent facial recognition, "they don't need to do anything at all". Hence, we cannot say that he would have been caught if his disguise was not extreme.
Option C: The passage mentions that with his disguise, McAfee probably would not have been caught. Hence this is the correct answer.
Option D: According to the passage, some faces are too 'normal' and they probably would not be caught using facial recognition technology. However, from the passage, we cannot conclude whether McAfee has distinctive facial features or not. Hence, this option is incorrect.
Therefore, the correct answer is option C.

Choice (C)

14. The passage mentions the steps involved in recognizing a face in the penultimate paragraph of the passage.
Option A: One of the steps mentioned in the passage is creating "mathematical representation of the face - something known as a "feature vector - that is constructed from pieces of hundreds of "standard faces" in different proportions". Hence, construction of feature vectors is mentioned as one of the steps.
Option B: Eigenfaces "are themselves generated by analysing thousands of real faces using a process called principal component analysis". Hence, generating Eigenfaces is also one of the steps.
Option C: Principal component analysis is used for analysing thousands of real faces. Hence, this is also one of the steps.
Option D: Detecting intensity signatures is part of detecting a face but not recognizing a detected face. Hence, this is not one of the steps and is the correct answer.

Choice (D)

15. The passage talks about the current state of facial recognition software.
Option A: A person with normal face (i.e., typical features) might not be recognized because "certain faces are just too "normal" for facial recognition systems to work with". Hence, the probability of a person with typical features being recognized is low.
Option B: According to the passage, "it may be possible to successfully disguise your face against a recognition system simply by grinning or pulling some other face". Hence, the probability of being recognized in this case is also low.
Option C: A person with distinctive features will have a higher probability of being recognized because he does not have a normal face.
Option D: The probability of a person with normal facial features making faces being recognized will be extremely low.

Hence, among the four options, a person with distinctive features is most likely to be recognized. Therefore, the correct answer is option C. Choice (C)

Solutions for questions 16 to 18:

Number of words and Explanatory notes for RC:

Number of words : 424

16. Option A: It has been mentioned in the second paragraph that the fact remains that for a vast majority of people in the developing world, the key question continues to be survival or basic needs. Unfortunately, public discourse on human rights has been almost exclusively on civil and political rights leaving very little space for "survival rights". But choice A is not mentioned in the paragraph as an observation of Amartya Sen or Justice Verma. So choice A is not true.
Option B: The first paragraph mentions: In the book "The New Universe of Human Rights", Justice J. S. Verma seeks a broad vision of the meaning of human rights encompassing human dignity in every aspect of human life. The message of Justice J. S. Verma's book is that the degree of human rights protection will determine the quality of governance and the ultimate test of justice lies in promising life with dignity to all the citizens. From the opening sentence of the second paragraph, we know that Amartya Sen highlighted "freedom" as the essence of human rights and Justice Verma's attempted to locate the essence on "dignity". From this we cannot say that Amartya Sen and Justice Verma differ because of their difference in determining the importance of human dignity as the essence of human rights. Hence choice B is not the answer.
Option C: We cannot infer from the passage that one out of Amartya Sen or Justice Verma thinks that in order to determine human rights one has to first understand survival needs. It has only been mentioned in para 2 that (the author believes that) for a vast majority of people in the developing world, the key question continues to be survival or basic needs. So choice C is not correct.
Option D: On reading the third paragraph, it is clear that both Amartya Sen and Justice Verma have handled the issue of human rights on the basis of their own perceptions, based on "freedom" and "dignity" respectively. They have very subjective approaches to the issue of human rights. Hence choice D is the answer. Choice (D)

17. Option A: Para 2 mentions: The key question continues to be survival or basic needs. Unfortunately, public discourse on human rights has been almost exclusively on civil and political rights leaving very little space for "survival rights".....
Para 3 mentions: .... did not help to advance "dignity" as the central issue in human rights protection, ... integrate the two sets of rights to make it meaningful to the rightholder.
So choice A is correct and is not the answer.
Option B: A covenant is a promise. Promises are referred to in paras 1 and 2. Mr. Verma's belief is that human rights imply the promise of life with dignity. So, that's one covenant. We can infer that Mr. Sen's belief is that human rights imply the promise of life with freedom. That's the second covenant. Then, in para 3, the author tells us that attempts have been made to reconcile these two beliefs by considering them indivisible and interdependent – but this has meant that dignity has been relegated to being a contributory and not a central thought. Refer to para 3. The consequent tensions between the two covenants were explained in terms of indivisibility and inter-dependence, which did not help to advance "dignity" as the central issue in human rights protection. So choice B cannot be inferred from the passage and is the answer.
Option C: The first sentence of para 3 mentions: They were seen as part of the development debate, a third generation issue in human rights agenda to be addressed by each country according to its needs and resources. So choice C is true and is not the answer.
Option D: Choice D has been mentioned in the last paragraph and is not the answer. Choice (B)

18. Option A: While the author of this passage is, on the whole, in favour of the book he is reviewing, he is not unequivocally so. Refer to paragraph 2 for one of his major criticisms. So we would not say that the author is greatly fascinated by the book. Hence choice A is not the answer.
Option B: The author does not express any doubts in the passage, so his attitude is not one of 'skepticism'. The author mentions some positive points about the book. For example, the book takes into account the Indian scenario and details the role played by the judiciary in the protection of human rights. The author's tone is not one of sarcasm. Hence choice B is not the answer.
Option C: Though he finds many of the ideas propounded in the book interesting, he believes that these ideas may not be applicable to the developing world. So we can say that the author's attitude is positive on the whole, but critical. Refer to para 2: The key question continues to be survival or basic needs. Unfortunately, public discourse on human rights has been almost exclusively on civil and political rights leaving very little space for "survival rights". Hence choice C is the answer.
Option D: The author's tone is not neutral. His tone is positive and critical (The writer has attempted, with some degree of success, ...) (Whether one goes by Justice Verma's attempt..... the key question remains .....). So choice D is incorrect. Choice (C)

Solutions for questions 19 to 24:

Number of words and Explanatory notes for RC:

Number of words : 681

19. The answer to this question lies in the first paragraph.
Option A: The word 'tradition' is never used in appreciation of either the living or dead authors. So, choice A can be eliminated.
Option B: Refer to the third sentence of the first paragraph. "Seldom, perhaps, does the word appear except in a phrase of censure." "Censure" means "disapprobation" or "disapproval". So choice B is correct.
Option C: We cannot refer to 'the tradition' or to 'a tradition'; at most, we employ the adjective in saying that the poetry of So-and-so is 'traditional' or even 'too traditional'. So choice C is not the answer.
Option D: We occasionally apply the name 'tradition' in deploring its absence. Choice D is not correct. The word 'only' makes it extreme. Choice (B)

20. In the second para of the passage, the author disagrees with the way the British arrive at the conclusion that the French are 'more critical' just because they produce lots of critical writing. The author employs phrases like - 'We know, or think we know'; 'we are such unconscious people' and 'but we might remind ourselves that criticism is as inevitable as breathing', which clearly shows his disapproval of this attitude. The author's viewpoint is also spelled out in the last sentence of para 2: But we might remind ourselves that criticism is as inevitable as breathing, and that **we should be none the worse** for articulating what passes in our minds when we read a book and feel an emotion about it, for criticizing our own minds in their work of criticism.
Option A: The tone is not plainly prosaic or unimaginative or matter-of-fact. Hence choice A is not the answer.
Option B: The author's comments are not too strong or sarcastic, so we cannot say that his tone is caustic.
Option C: The author here is talking about a whole practice (of a whole nationality). He is speaking of his own group (we the British). 'Self-disparaging' is quite OK – it doesn't have to be one individual, it could be an individual looking at the group of which he is part of. Since the word 'selves-disparaging' doesn't exist, 'self-disparaging' is quite correct

to describe the tone. The answer is choice C.
Option D: 'Ridiculing' is too strong a term for the second para. All the author does is to indicate that 'we' (the British) need to correct 'our' perspective. So choice D is not correct.
Choice (C)

21. Choice A: Refer to the penultimate sentence of the fourth paragraph. "This historical sense, which is a sense of the timeless as well as of the temporal, and of the timeless and of the temporal together, is what makes a writer **traditional**." Choice A is thus the answer.
Option B: Choice B is given in the passage only in relation to 'criticism' and 'practices' (in the second and third para of the passage). Choice B is not the answer.
Choice C: Choice C is a generalized statement and cannot be the answer.
Option D: The first part of choice D is out of scope. Though it has been mentioned at the end of the third para that "novelty is better than repetition" and some reasons have been provided as to when tradition should be positively discouraged, choice D is not the answer.
Choice (A)

22. The fourth para of the passage talks about the significance of tradition. ..... The historical sense compels a man to write not merely with his own generation in his bones, but with a feeling that the whole of the literature of Europe – from Homer and within it, the whole of the literature of his own country – has a simultaneous existence and composes a simultaneous order.
Option A: Refer to paragraph 3. According to the author, we should not focus too much on the individuality of a writer but this does not mean we should do away with the idea of individuality completely.
Option B: The author does not approve of difference for difference's sake either, so choice B is also wrong.
Option C: Refer to paragraph 4. The author states that a writer should keep in mind his place in history and the entire body of literature of his culture (in his case, European literature). Hence, choice C is the answer.
Option D: The author clearly states in paragraph 3 that he disapproves of Choice D. (Yet if the only form of tradition, of handing down, consisted in following the ways of the **immediate generation** before us in a blind or timid adherence to its successes, 'tradition' should positively be discouraged). Choice (C)

23. Refer to the last paragraph especially the penultimate sentence of the paragraph.....The whole existing order must be, if ever so slightly, altered; and so the relations, proportions, values of each work of art towards the whole are **readjusted**; and this is the conformity between the old and the new. This makes choice B correct. The remaining choices are out of scope. Choice (B)

24. The fourth paragraph of the passage tells us that tradition has a wide significance. It elaborates on the 'historical sense'. This involves a perception of the pastness of the past as well as of its presence. The penultimate sentence of the fourth paragraph again tells us that the historical sense is what makes a writer traditional. So key words like "timeless", "temporal", "not only of the pastness of the past, but of its presence" draw our attention to choice D as the answer. The historical sense makes a writer traditional and acutely conscious of his place in time, of his contemporaneity. Choice D emphasizes on the "sense of the timeless as well as of the temporal, and of the timeless and of the temporal together" spoken about in the penultimate sentence of the fourth paragraph.
Choice A does not link with the penultimate sentence and is out of scope. The second sentence of the fourth paragraph does mention Homer as an example of the whole of the literature of Europe which a writer should bear in mind. But "**changes**, and that this change is a development which abandons nothing *en route*" in choice A does not fit the context. Choice A can be placed in a paragraph much later in the text, especially after the last paragraph of the text which talks about 'order' and how the whole existing order must be altered by the introduction of the new work of art among the older or existing works of art.
Choice B leaves the thoughtflow incomplete. It is out of scope of the discussion of the paragraph.
Choice C comes close as an asnwer. It emphasizes on the "past" (consciousness of the past). The discussion of this aspect is not limited to only the fourth para of the passage. Choice C does not specify "timeless" given in the penultimate sentence. Choice (D)

Difficulty level wise summary - Section I	
Sub Section: RC	
Level of Difficulty	Questions
Very Easy	–
Easy	7, 13
Medium	2, 6, 8, 9, 10, 11, 12, 14, 15
Difficult	1, 3, 4, 16, 17, 18, 19, 20, 22
Very Difficult	5, 21, 23, 24

SUB-SECTION: VA

Solutions for questions 1 to 4:

1. 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 Hubble Space Telescope (HST) to us. Sentence 4 goes on to tell us that Hubble is not the first space telescope but it is the most versatile. Sentence 3 and 1 in that order then substantiate on the point made in sentence 4 about Hubble being one of the largest and most versatile. So, 5431. Sentence 2 is the odd man out. It does not specifically talk about Hubble Space Telescope and the point made about space telescopes in sentence 2 does not fit in with the content of the remaining sentences.
Ans: (2)

2. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence which introduces the gondola to the reader. Sentence 4 tells us the main function of the gondola and follows sentence 2. "Venetian rowing boat, well suited to the conditions of the Venetian Lagoon" in sentence 2 links with "chief means of transportation and most common watercraft within Venice" in sentence 4. Sentence 1 (In modern times .....) contrasts sentence 4 (For centuries) and hence sentence 1 follows sentence 4. Sentence 1 and sentence 4 form a mandatory pair. "still have a role" in sentence 1 links with "primary role" in sentence 3. "serving as ferries over the Grand Canal" in sentence 1 links with "carry tourists on rides at fixed rates" in sentence 3. Hence 2413. Sentence 5 can be a part of another paragraph. It will need more substantion. It is not congruent with the introductory tone of the remaining sentences Ans: (5)

3. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the paragraph. Daniel Kahneman is considered the world's most influential living psychologist by the author. Sentences 3 and 5 form a mandatory pair. "pretty much created the field of **behavioural** economics and has revolutionised .... cognitive **psychology** and social **psychology**" in sentence 5 links with "world's most influential living **psychologist**" in sentence 3. Sentence 2 continues the discussion by talking about a central (and important) message of Daniel Kahneman. Sentence 2 is followed by sentence 4. "these biases" in sentence 4 links with "fallacies and systematic errors" in sentence 2. So, 3524. Sentence 1 is not related to the remaining sentences. "so Kahneman helps explain why my claim is news" in sentence 1 needs a precedent and more substantiation. Ans: (1)

4. 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 topic of work force reduction. Sentence 2 is followed by sentence 4. "work force reduction" in sentence 2 links with "layoff stories" in sentence 4 and "count on seeing it on the evening news

and reading about it in the morning papers the next day" in sentence 2 links with "sobering staple of business journalism" in sentence 4. Sentence 1 with the contrast conjunction 'but' follows sentence 4. There is little follow-up. Sentence 5 follows sentence 4. The pronoun 'they' in sentence 5 points to "(hundreds of thousands of) ex-employees" in sentence 4. So, 2415. Sentence 3 is the odd man out. It needs further elaboration. It has a positive tone (The U.S. job market is so vast). The remaining sentences have a negative tone as they focus on layoffs and how layoffs may affect employees. Ans: (3)

Solutions for questions 5 to 8:

5. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It introduces Dr. Vikram Sarabhai to the reader. Sentence 2 tells us more about Vikram Sarabhai. "combined an acute intelligence with the qualities of a fine leader" in sentence 2 links with "scientist, educationist, institution builder and visionary, greatest thinker and doer" in sentence 4. Sentence 2 is followed by sentence 5. "I was immensely lucky to come in the orbit of such a man" in sentence 2 is linked with "**also** the country's good fortune ....." in sentence 5. The pronoun 'he' in sentences 2 and 5 refers to Dr. Vikram Sarabhai. So 425. Sentence 5 is followed by sentence 3. "chosen to helm its fledgling space programme after Independence" in sentence 5 links with "set up ISRO, articulated India's space mission" in sentence 3. Sentence 1 concludes the paragraph with the author's admiring comment about Dr. Vikram Sarabhai: These were the stuff of legends and made him somewhat of a heroic figure for a young rocket engineer like me. Hence 42531.
Ans: (42531)

6. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. It tells us what a *B-moive* is. It can also be observed that sentence 4 has the phrase "In its original usage during the Golden Age of Hollywood" and sentence 3 talks about "In its post–Golden Age usage". Sentence 5 is followed by sentence 4. "low-budget commercial motion picture that is not an arthouse film" in sentence 5 links with "film intended for distribution as the less-publicized, bottom half of a double feature" in sentence 4. Sentence 1 follows sentence 4. "the U.S. production of movies intended as second features largely ceased by the end of the 1950s" in sentence 1 links with "less-publicized, bottom half of a double feature" mentioned in sentence 4. Also "the term *B movie* continued to be used in the broader sense" in sentence 1 tells us the relevance of "original usage" and "post–Golden Age usage" of the term as used in the para. So, 541. Sentence 3 continues the discussion after sentence 1 by highlighting the "post–Golden Age usage" of the term *B movie*. "On the one hand ..... prurient, on the other ..... high degree of craft and aesthetic ingenuity" in sentence 2 highlights the "ambiguity" mentioned in sentence 3. Hence, 54132. Ans: (54132)

7. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. Aristotle thought that the earth was stationary ..... Sentence 2 is followed by sentence 4. "earth was stationary" in sentence 2 is followed by "earth was the centre of the universe" in sentence 4. Also "moved in circular orbits around the earth" in sentence 2 is linked with "circular motion of the other bodies was ideal" in sentence 4. Sentence 4 is followed by sentence 1. "These ideas" in sentence 1 refers to the points mentioned in sentence 4. So, 241. Sentences 1 and 3 form a mandatory pair. "this model" in sentence 3 refers to "complete cosmological model" in sentence 1. So sentence 3 follows sentence 1. Sentence 5 concludes the paragraph. "The planets themselves ..... their respective spheres" in sentence 5 runs parallel to "the earth stood at the center, surrounded by eight spheres" in sentence 3. Hence 24135.
Ans: (24135)

8. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the paragraph. It provides the background of the paragraph: how African-American history started with people from West Africa taken as slaves ..... and West African slaves taken to English colonies in North America. Sentence 3 and 1 form a mandatory pair. "founding of the United States in 1776" mentioned in sentence 1 would chronologically follow "in the 17th century with West African slaves taken to English colonies in North America" mentioned in sentence 3. Also "black people continued to be enslaved" in sentence 1 follows from sentence 3 which talks primarily about slaves. Sentence 1 is followed by sentence 4. The pronoun 'they' in sentence 4 refers to 'black people' mentioned in sentence 1. So, 314. Sentence 5 continues after sentence 4 as it tells us how black people were denied U.S. citizenship and the right to vote, reiterating that "black people were treated as second-class citizens" (sentence 4). Sentence 2 concludes the paragraph. "These circumstances" in sentence 2 refers to the circumstances mentioned in sentences 4 and 5. Hence 31452.
Ans: (31452)

Solutions for questions 9 and 10:

9. The first half of the paragraph seems to compartmentalize 'nature' and 'human beings'. Man is outside nature and yet plays a vital role in maintaining it. The paragraph also tells us that nature does not seem to be concerned about protecting animals and plants from extinction. The desire to preserve biodiversity and ecosystems is a very human desire. Hence choice B best completes the given paragraph. 'Many of us have what resembles an aesthetic appreciation' in choice B refers to the 'human desire' mentioned in the penultimate sentence of the paragraph.
Choice A seems to contradict the fifth sentence of the paragraph (This places humankind outside of nature and yet somehow instrumental in maintaining it). But it cannot complete the paragraph as it runs tangent to the text and is not connected to the penultimate sentence. The paragraph has moved on to tell us about the human desire of preserving biodiversity and ecosystems.
Choice C talks about the activity of humans and animals. One really cannot pinpoint the reason for the opinionated sentence as given in choice C. One cannot figure out the reason for the use of the word 'naturally'. Hence choice C would need a precedent and more substantiation and it can be a part of another paragraph, preferably in a paragraph that precedes the given paragraph. The given paragraph has spoken about 'natural human environment' and 'natural animal environment' and has also spoken about "artificial ecologies" and "human activity being intricately linked with the environments of animals". Hence choice C would be best placed prior to the discussion of the given paragraph.
Choice D cannot complete the paragraph. The para is about the role of humans in maintaining nature, in actively stewarding and protecting it. Choice D talks about 'changing nature'. Just because the penultimate sentence tells us that the desire to preserve biodiversity and ecosystems is a very human desire, one wouldn't conclude that this is because animals are incapable of changing nature. The second half of choice D is out of context.
Choice (B)

10. On a careful reading of the sentences, it can be observed that the last three sentences just before the blank are a key to completing the paragraph. The "proletarian revolution" could be and was applied to two different patterns. One pattern has been discussed in the penultimate sentence of the paragraph.
Choice A cannot complete the paragraph. The paragraph mentions "proletarian revolution" in the first sentence and the fifth sentence. So, to say that the proletariat is not interested in carrying out a revolution and is happy with status quo, as given in choice A is incorrect.
Choice B is a misdirection. It sounds as if it is matches the thought flow given that it is the converse of the penultimate sentence. But choice B is logically absurd and does not

complete the explanation of the second pattern of the proletariat revolution.
Choice C is out of scope of the discussion of this paragraph. "not something peculiar to the **socialist movement**, but extends into **socialism**" needs a precedent and more substantiation.
Choice D correctly talks about the second pattern with respect to the proletariat and logically completes the paragraph. The correct answer is choice D.

Choice (D)

Solutions for questions 11 to 13:

11. Part 1 has no errors.
In part 2, the word 'ancient' should be preceded by the indefinite article 'an'.
In part 3, the adverb 'carefully' is misplaced. The part should read: When it was carefully removed .....
In part 4, there is need for the past perfect tense. The sentence should be – This suggested that, under the knob, there had been something (made of wood .....).
In part 5, "leaving only the hole" should be preceded by a comma. Part 5 should read: made of wood which decayed and turned to dust, leaving only the hole. Ans: (1)

12. In part 1, the word 'autumn' needs to be preceded by the definite article 'the'.
In part 2, the word 'feature' should be in plural. Apart from this, the proper noun *Head of a Woman* needs 'the' before it since it refers to an inanimate object (a piece of sculpture). (This would not hold, however, if the name of the piece was preceded by a possessive noun or an adjective.)
In part 3, one should use the possessive case: Picasso's ....
Parts 4 and 5 are error free. Ans: (45)

13. In part 1, the preposition 'for' needs to be replaced with 'of'.
In part 2, there should be a comma after the word 'since'.
In part 3, the word 'like' needs to be replaced with 'as'. (was roughly the same in 2015 **as** it was 20 years earlier.
Part 4 is error free.
Part 5 should have the preposition 'at' and not 'with'. The word 'resucsitation' has a spelling mistake. The part should read: ..... its attempts **at** economic **resuscitation**.

Ans: (4)

Solutions for questions 14 to 16:

14. Statement 1: 'quickly made the rounds' is an idiom which means 'to be communicated or passed from person to person'. Statement 1 has a correct usage of 'round'.
Statement 2: Statement 2 has an incorrect usage of 'round'. In statement 2, the correct idiom should be 'rounded up' and not 'rounded off'. 'rounded up' means 'to seek out and bring together; gather; to herd (sheep or cattle) together from various places.'
Statement 3: "round sum of money" in statement 3 means large or considerable sum of money. Statement 3 has a correct usage of 'round'.
Statement 4: "rounding into" in statement 4 means "to take a circular course; complete or partially complete a circuit". Statement 4 has a correct usage of 'round'. Ans: (2)

15. In statement 1, the usage of the word 'read' is incorrect. The correct idiom should be "not to read too much into .....". The statement should read: You are requested not to read too much **into** such a thoughtless remark.
In statement 2, "read his students a lecture" means "to issue a reprimand". Statement 2 has a correct usage of 'read'.
In statement 3, the word 'read' refers to "something that is read". Statement 3 has a correct usage of 'read'.
In statement 4, the word 'read' means 'to discern or anticipate through examination or observation; descry'. Statement 4 has a correct usage of 'read'. Ans: (1)

16. In sentence 1, "break in the weather" means "a change from unpleasant to more pleasant weather". The usage of 'break' in sentence 1 is correct.
In sentence 2, "break apart" means disintegrate or cause to crash. Sentence 2 has a correct usage of the word 'break'.
In sentence 3, the phrasal verb 'breaks up' needs to be replaced with 'breaks down'. Sentence 3 is incorrect and should read: The sales executive's self control breaks **down** when he cannot meet his targets.
In sentence 4, 'break away' means 'To separate or detach oneself'. The usage of 'break' in sentence 4 is correct.

Ans: (3)

Difficulty level wise summary - Section I	
Sub Section: VA	
Level of Difficulty	Questions
Very Easy	–
Easy	–
Medium	1, 11, 12, 13, 14, 15, 16
Difficult	2, 3, 4, 8, 9, 10
Very Difficult	5, 6, 7

SECTION – II
SUB-SECTION: DI

Solutions for questions 1 to 4:

1. Number of AB25 motorcycles in city D

$$= \frac{100}{200} \times 18 = 90$$

Number of BC50 motorcycles in city D

$$= \frac{120}{20} \times 15 = 90$$

Number of CD100 motorcycles in city D

$$= \frac{140}{23.33} \times 25 = 150$$

Number of DE150 motorcycles in city D

$$= \frac{90}{22.5} \times 27.5 = 110$$

Number of EF200 motorcycles in city D

$$= \frac{60}{12} \times 26 = 130$$

The maximum number of motorcycles are of model CD100.

Choice (A)

2. Number of AB25 motorcycles in city E

$$= \frac{100}{20} \times 16 = 80$$

Number of BC50 motorcycles in city E

$$= \frac{120}{20} \times 25 = 150$$

Number of CD100 motorcycles in city E

$$= \frac{140}{23.33} \times 26.7 = 160$$

Number of DE150 motorcycles in city E

$$= \frac{90}{22.5} \times 15 = 60$$

Number of EF200 motorcycles in city E

$$= \frac{60}{12} \times 14 = 70$$

Required percentage $= \frac{160}{520} \times 100 = 30.77\%$

Choice (A)

3. Option A: 110 ~ 60 = 50
Option B: 120 ~ 50 = 70
Option C: 150 ~ 110 = 40
Option D: 60 ~ 160 = 100
Hence, option D is the highest. Choice (D)

4. Total number of motorcycles

$= \frac{100}{0.2} + \frac{120}{0.2} + \frac{140}{0.2333} + \frac{90}{0.225} + \frac{60}{0.12}$

$= 500 + 600 + 600 + 400 + 500 = 2600$

Ans: (2600)

Solutions for questions 5 to 8:

5. The total marks scored by Amar = 50 + 60 + 90 + 40 + 60 + 90 = 390
Total marks scored by Corey = 30 + 80 + 70 + 100 + 20 + 90 = 390
Total marks scored by Eswar = 70 + 50 + 80 + 50 + 60 + 70 = 380
Total marks scored by Dheeraj = 50 + 70 + 60 + 40 + 90 + 90 = 400
Hence, Dheeraj scored the highest marks.

Choice (D)

6. Average marks in Civics = $\frac{70+80+70+50+60}{5} = 66.$ Ans: (66)

7. The total marks scored by Amar = 50 + 60 + 90 + 40 + 60 + 90 = 390
Total score of Babu = 90 + 70 + 20 + 60 + 30 + 70 = 340
Total marks scored by Corey = 30 + 80 + 70 + 100 + 20 + 90 = 390
Total marks scored by Eswar = 70 + 50 + 80 + 50 + 60 + 70 = 380
Total marks scored by Dheeraj = 50 + 70 + 60 + 40 + 90 + 90 = 400
The lowest total marks were scored by Babu. The highest marks obtained by Babu in a single subject is 90.

Ans: (90)

8. Average marks in Geography

$= \frac{40+60+100+40+50}{5} = 58$

Average marks in Civics = 66

Average marks in Biology = $\frac{90+20+70+60+80}{5} = 64$

Average marks in Physics = $\frac{90+90+90+70+70}{5} = 82$

Hence, the lowest average, among the given options, is for Geography. Choice (A)

Solutions for questions 9 to 11:

9. The R&D expenditure will be the highest for the country for which the enclosed area between the perpendicular lines connecting the point to both the axes will be the highest. By observation, we can see that this area is greater for UK as compared to Italy.
For UK: 2400 × 0.016 = 38.40
For Sweden: 400 × 0.033 = 13.20
For Israel: 250 × 0.0425 = 10.62
Hence, the highest R&D expenditure among the give options is for UK. Choice (A)

10. Five countries satisfy the given condition – Slovenia, Austria, Denmark, Sweden and Israel.
The highest R&D expenditure among Slovenia, Austria, Denmark and Sweden is for Sweden.
R&D expenditure for Sweden: 400 × 0.033 = 13.2
R&D expenditure for Israel: 250 × 0.0425 = 10.62
Hence, from the options, the answer is $13.7 bn.

Choice (A)

11. The countries which fall in the area enclosed by (2000, 1%) and the axes will satisfy the condition. There are six countries in this region: Mexico, Turkey, Pakistan, Bulgaria, Ukraine, Egypt.

The countries which fall in the area enclosed by (1000, 2%) and the axes will also satisfy the condition.

There are two more countries in this region: Norway and Netherlands.
The countries which fall in the area enclosed by (500, 4%) and the axes will also satisfy the condition.

There are five more countries in this region: Belgium, Austria, Sweden, Denmark and Slovenia.

The countries which fall in the area enclosed by (4000, 0.5%) and the axes will also satisfy the condition. There is one more country in this region: Indonesia.

Among the remaining countries, Russia, UK, France, Germany, Italy definitely do not satisfy the given condition. Between, Spain, Canada and Israel, Spain and Israel satisfy the given condition and Canada does not.

Hence, a total of 16 countries satisfy the given condition.

Ans: (16)

Solutions for questions 12 to 15:

12. On Day 5 and Day 10, the price of Stock B was greater than that of Stock D but less than that of Stock C.

Ans: (2)

13. Variability Index on Day 2 (Stock B and Stock C)
= 19 – 9 = 10
Variability Index on Day 3 (Stock D and Stock C)
= 26 – 10 = 16
Variability Index on Day 8 (Stock C and Stock D)
= 31 – 17 = 14
Variability Index on Day 10 (Stock C and Stock D)
= 38 – 14 = 14
Hence, the answer is option A. Choice (A)

14. Average price on Day 4 = $\frac{25+20+14+34}{4} = 23.25$

Average price on Day 5 = $\frac{31+19+35+15}{4} = 25$

Average price on Day 8 = $\frac{24+18+17+31}{4} = 22.5$

Average price on Day 9 = $\frac{31+41+16+30}{4} = 29.5$

Hence, the highest average price, of the four days, is on Day 9. Choice (D)

15. If the average has to be less than ₹20, the sum has to be less than ₹80.
This condition is satisfied for Day 1, Day 2, Day 3 and Day 7. Ans: (4)

Difficulty level wise summary - Section II	
Sub Section: DI	
Level of Difficulty	Questions
Very Easy	–
Easy	1, 2, 4, 6, 7, 8, 9, 10, 12, 14
Medium	3, 5, 11, 13, 15
Difficult	–
Very Difficult	–

SUB-SECTION: LR

Solutions for questions 1 to 3:

No statement made by a truth teller can be made by a liar. Since there are three liars, if two or more people make the same statement, they will all be liars. By observation, second statement of Jinoy and first statement of Rajesh are the same. Hence, both will be liars. Hence, Jinoy must have spent ₹300.

Let Brijesh be the truth teller.

From Brijesh's second statement, Brijesh must have spent either ₹200 or ₹300. If Brijesh spent ₹200, then Gaurav and Rajesh must have spent ₹100 and ₹300 in that order. Since Jinoy spent ₹300, this is not possible. Brijesh could not have spent ₹300 since Jinoy spent ₹300.
Hence, Brijesh cannot be the truth teller.

Let Gaurav be the truth teller.

Gaurav came to the stadium in an auto and he spent ₹400. Jinoy must have spent ₹300. Rajesh could not have spent ₹100 (from his second statement). Hence, Rajesh spent ₹200 and Brijesh spent ₹100. Brijesh must have come to the stadium in a bike. Rajesh must have come to the stadium in a car and Jinoy must have come in a bus.

Therefore, only one case is possible and the distribution is given below:

Person	Transport	Amount Spent
Brijesh	Bike	100
Gaurav	Auto	400
Jinoy	Bus	300
Rajesh	Car	200

1. Jinoy came to the stadium in a bus. Choice (C)

2. Jinoy spent ₹300 at the stadium. Choice (C)

3. Gaurav spent the highest amount at the stadium. Choice (A)

Solutions for questions 4 to 7:

Since every person spends 5 minutes (i.e., 300 seconds) at all the five exhibits combined, we can ignore that for the purpose of this solution.

From G1, a person can take the following routes: ABDCE (76 seconds), ABDEC (74 seconds) and AECDB (88 seconds). However, since any person will opt for the route that takes the shortest time, he will go through only ABDEC.

From G2, a person can take the following routes: BAEDC (70 seconds), BAECD (77 seconds) and BDCEA (88 seconds). In this case, all the persons who enter the museum through G2 will take the route BAEDC.

From G3, the following routes are possible: DCEAB (77 seconds) and DBAEC (85 seconds). Only the route DCEAB will be used.

From G4, the following routes are possible: CDEAB (70 seconds), CDBAE (73 seconds), CEDBA (74 seconds) and CEABD (85 seconds). Only the route CDEAB will be used.

Further, the first 200 persons will use the gates G2 and G4, the next 100 will use the gate G1 and the last 100 will use the gate G3.

4. Ram would have used gate G1 for entry and G4 for exiting the museum. Choice (D)

5. Only the people entering the museum through G3 andG4 will exit the museum through G2. Hence, a total of 200 people will exit the museum through G2. Ans: (200)

6. Average time spent
$= \frac{374+370+377+370}{4} = 372.75$ seconds
Choice (B)

7. Only for the people who entered the museum through G1 will visit exhibit B second. Ans: (100)

Solutions for questions 8 to 11:

From the common information, we can infer that there should either be three batsmen or three bowlers.

If there are three bowlers, E, F and G will be in the team. From (iii), D must also be in the team. From (ii), I will also be in the team. The two batsmen in the team can be A and D or B and D or C and D.

If A and D are in the team, then the wicket keeper has to be K (since there are two overseas players). ⇒**Team: A, D, E, F, G, I, K**

If C and D are in the team, then the wicket keeper has to be J (from (v)). ⇒**Team: C, D, E, F, G, I, J**

If B and D are in the team, then the wicketkeeper has to be J. (from (v)). ⇒**Team: B, D, E, F, G, I, J**

If there are three batsmen, A, B and D can be in the team or A, C and D can be in the team (from (i)).

If A, B and D are in the team, F must be in the team. The other bowler can be either E or G.

If F and E are in the team, K and I must be in the team (since there are two overseas players). ⇒ **Team: A, B, D, F, E, I, K**

If F and G are in the team, I must be in the team (from (ii)) and J must also be in the team (since A is the only other overseas player). ⇒ **Team: A, B, D, F, G, I, J**

If A, C and D are in the team, two bowlers from E, F and G must be in the team. If E is present in the team, then I and K must be part of the team (since A and E are overseas players). But this will violate condition (v). Hence, E cannot be in the team.

If F and G are in the team, I must be in the team and J will also be in the team. ⇒ **Team: A, C, D, F, G, I, J**

Hence, a total of six teams are possible.

8. H cannot be a part of any of the teams. Choice (A)

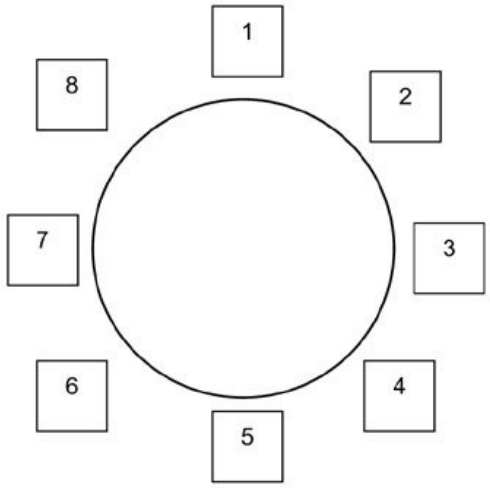
9. Ravi can select the team in three ways, if E, F and G are to be in the team. Ans: (3)

10. If K is to be selected, he can select the team in two ways. Ans: (2)

11. If C is not selected, F will definitely be in the team. Choice (D)

Solutions for questions 12 to 15:

Let the adjacent diagram represent the circular table.



From (vi), let 007 be at seat 1 and 005 be at seat 5. Given that 005 speaks Chinese. Hence, only the persons sitting at seats 8 and seat 2 can speak Chinese. From (iv), either Naman or 006 speaks Chinese. 006 cannot sit at either 8 or 2 (since he will then be adjacent to 007 which violates condition (i)). Hence, Naman has to be at seat 8 and 006 will be at seat 7. Also 006 can speak Russian.

Agent 002 and Rashid are opposite each other. They cannot sit at seat 1 and seat 5 (since 007 and 005 are sitting there). They cannot sit at seat 3 and seat 7 since the person at seat 7 speaks Russian.They can sit either at seat 4 and seat 8 or seat 2 and seat 6.
If they sit at seat 8 and seat 4, Naman has to be 002. From (ii), Manish has to be at seat 6 or seat 2. If Manish is at seat 6, he cannot be sitting adjacent to agent 003. Hence, Manish will be at seat 2. Then, agent 003 will be in seat 3. Agent 004 cannot sit at seat 2 or seat 4 (since he will be adjacent to agent 003) and he cannot sit at seat 6 as well (since he will be adjacent to agent 005). Hence, this case is not possibe as there is no place for agent 004.

If Agent 002 and Rashid sit at seat 2 and seat 6 in any order, Manish will be in seat 4. Agent 003 will be in seat 3. Since Agent 003 is in seat 3, Agent 002 cannot be in seat 2. Hence, Agent 002 will be in seat 6 and Rashid will be in seat 2. Now agent 004 can only be sitting at seat 8, i.e., Naman is agent 004. Agent 008 cannot be Rashid. Hence, agent 008 will be Manish and agent 001 will be Rashid. Chirag and Bibek can only be sitting at seat 7 and seat 3 (they cannot sit at seat 1 and seat 5 because agent 007 is not Chirag and agent 005 cannot be Chirag, since Chirag speaks russian). Agent 006 is Chirag and Agent 003 is Bibek.

From (v) and (vi), neither 007 nor 002 is Karan. Hence, 005 will be Karan. Therefore, the following cases are possible:

Seat Number	Name	Languages	Code Number
1	Ankit/Dev	R/G/E	007
2	Rashid	G/E	001
3	Bibek	G/E	003
4	Manish	R/G/E	008
5	Karan	C	005
6	Dev/Ankit	E/G	002
7	Chirag	R	006
8	Naman	C	004

12. Agent 002 is sitting opposite agent 001. Choice (A)

13. Agent 002 and agent 001 speak different languages. Agent 001 and agent 003 speak different languages. Since all three can speak only German or English, agent 003 and agent 002 speak the same language. Agent 008 and agent 003 will speak different languages. Hence, agent 002 and agent 008, Manish, will speak different languages. Hence, option D is true. Choice (D)

14. Agent 007 will be Ankit. Choice (C)

15. Bibek is sitting to the right of Agent 008. Choice (B)

Difficulty level wise summary - Section II	
Sub Section: LR	
Level of Difficulty	Questions
Very Easy	–
Easy	1, 2, 3
Medium	4, 7, 8, 9, 10, 11
Difficult	5, 6
Very Difficult	12, 13, 14, 15

SECTION – III: QA

Solutions for questions 1 to 30:

1. Let the four-digit number be denoted by *abcd*
It is given that, $a + c = 8\ (b + d)$
$\therefore a + b + c + d = 9(b + d)$ [which is divisible by 9]
Therefore, the four digit number is divisible by 9.
Choice (B)

2. It is given that
$N = (80)^{100}$
Taking log of both sides, we get
$\log N = \log (80)^{100}$
$\log N = 100 \log 80$
$= 100 [\log 8 + \log 10]$
$= 100 [3\log 2 + 1]$
$= 100 [3 \times 0.3010 + 1]$
$= 100 [1.903]$
$= 190.3$
Therefore the number of digits in N is 190 + 1 = 191.
Choice (B)

3. Let the cost price of the article be denoted by x.

Now $x + \frac{25}{100}x = 120$

$\Rightarrow \frac{5}{4}x = 120$

$\Rightarrow x = 96$.

In order to make a profit of 50%, he should have sold it for $x + \frac{50}{100}x = \frac{3}{2}(x) = \frac{3}{2}(96) = 144$. Choice (C)

4. It is given that, $xyz = x + y + z$

$\therefore x + y = xyz - z$

By the triangle inequality, we get $x + y > z$

$\therefore xyz - z > z$

$z(xy - 2) > 0$

$\because z > 0$, so $xy - 2 > 0 \Rightarrow xy > 2$

Similarly, we can conclude that $yz > 2$ and $xz > 2$.

Now $(x + y + z)^2 - (x^2 + y^2 + z^2) = 2(xy + yz + zx)$

$\therefore 2(xy + yz + zx) > 12$ Choice (A)

5. Let $a^2 - b^2 = 98\ 98\ 98\ 98\ 98$ where a, b are natural numbers

$(a - b)(a + b) = 98\ 98\ 98\ 98\ 98$.

We will get integral values of a and b only

When both $(a - b)$ and $(a + b)$ are odd OR

When both $(a - b)$ and $(a + b)$ are even.

Now, since her mobile no is even, both $(a - b)$ and $(a + b)$ cannot be odd.

Again if both $(a - b)$ and $(a + b)$ are even then her mobile no must be divisible by 4, which, again, is not true.

Hence, $x = 0$. Choice (A)

6. For any real numbers a and b, and a natural number n, $a^n - b^n = (a - b)(a^{n-1} + a^{n-2}.b + a^{n-3}.b^2 + ... a^2.b^{n-3} + a.b^{n-2} + b^{n-1})$

It can be observed for the given A, B, C, D, that the difference $(a - b)$, i.e., the first factor, in the R.H.S of the above identity, is the same (i.e., 4) for all of A, B, C, D.

However, since the second factor is clearly a sum of positive terms, it can be concluded that, if both a and b are increased then the magnitude of the second factor will increase.

Hence, $A = 827^{123n} - 823^{123n} = (827 - 823)(827^{123n-1} + 827^{123n-2}.823 + ... + 827.823^{123n-2} + 823^{n-1})$

and $B = 627^{123n} - 623^{123n} = (627 - 623)(627^{123n-1} + 627^{123n-2}.623 + ... + 627.623^{123n-2} + 623^{123n-1})$

$\therefore A > B$

Similarly, we can compare all of A, B, C and D and get $C > A > D > B$.

$\therefore$ Ranks of ABCD are 2413.

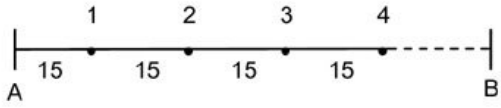
Note:

In general if $a - b$ is a constant, then the higher the value of a (or b) the greater the value of $a^n - b^n$.

Alternative Solution:

One could also assume $n = 1$ (say) and then use the calculator provided to evaluate and compare the given quantities. For the given scale (very large) of numbers involved, considering the exponent part (i.e., 10's power) of the calculations itself will be sufficient to make the requisite comparisons. Ans: (2413)

7. Considering $U_1 = 30$ kph and $U_2 = 45$ kph, the points where the buses are placed when he starts are denoted by 1, 2, 3, ...



The times after which he crosses a bus moving in opposite directions will be as follows

$\frac{15}{45+30}, \frac{30}{45+30}, \frac{45}{45+30}$ i.e $t_1 = 12$ min

The times after which he overtakes a bus moving in the same direction will be as follows

$\frac{15}{45-30}, \frac{30}{45-30}, \frac{45}{45-30}$,.... i.e $t_2 = 60$ min

$\therefore t_1 : t_2 = 1 : 5$

Alternative Solution:

The distance between any two buses moving in the same direction $= \left(\frac{30}{60}\right) \times U_1 \text{ km} = \frac{U_1}{2} \text{km}$

The time taken interval between coming across two buses in the opposite direction

$$t_1 = \frac{\left(\frac{U_1}{2}\right)}{U_2 + U_1}$$

Similarly, $t_2 = \frac{\left(\frac{U_1}{2}\right)}{U_2 - U_1}$

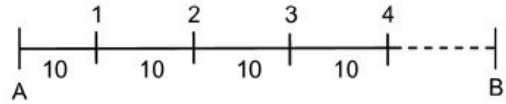
$$\therefore \left(\frac{t_1}{t_2}\right) = \left(\frac{U_2 - U_1}{U_2 + U_1}\right)$$

given $U_1 : U_2 = 2 : 3$, $t_1 : t_2 = 1 : 5$.

Note:

$t_1 : t_2$ = Relative speed in the same direction : Relative speed in opposite direction. Choice (B)

8. The points where the buses are placed when he starts are denoted by 1, 2, 3, 4 .....



In the same direction, he meets the buses after every

$\frac{10}{50-20}, \frac{20}{50-20}, \frac{30}{50-20}$, ... i.e after every 20 mins

In opposite direction, he meets the buses after every

$\frac{10}{50+20}, \frac{20}{50+20}, \frac{30}{50+20}$, ... i.e after every $\frac{60}{7}$ mins.

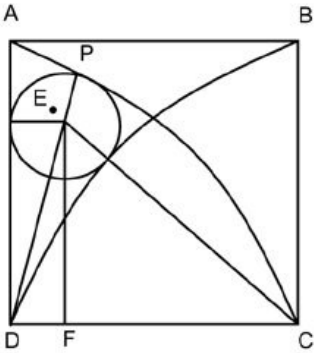
$t_3 = \text{LCM}\left(20, \frac{60}{7}\right) = 60$ mins Choice (B)

9. Let the side of the square and the radius of the small circle be denoted by R and r respectively.

Let the centre of the small circle be E.

The radii of each quadrant is R.

Now, if P is the point of contact of the smaller circle with the arc AC, then PE, when extended, will also pass through D.



In ΔDEF, $EF^2 = DE^2 - DF^2 = (R - r)^2 - r^2$
In ΔEFC, $EF^2 = EC^2 - FC^2$
$= (R + r)^2 - (R - r)^2$
$\therefore (R - r)^2 - r^2 = (R + r)^2 - (R - r)^2$
$R^2 - 2Rr = 4Rr$
$6Rr = R^2$
$R(6r - R) = 0$
$\because R \neq 0, 6r - R = 0$

$\Rightarrow r = \frac{R}{6}$

$\therefore \frac{R}{r} = \frac{1}{6}$ Ans: (6)

10. Let the population of A be 100
Therefore the population of B will be 300.

	A	B	Total
No. of octogenarians	2	18	20

Therefore the percentage of octogenarians $= \frac{20}{400} \times 100$
$= 5\%$ Choice (A)

11. $x + \frac{1}{x} = \sqrt{2} + 1$

$x^2 + 1 = \sqrt{2}\, x + x$
Taking the square of both sides, we get
$x^4 + 2x^2 + 1 = 2x^2 + x^2 + 2\sqrt{2}\, x^2$
$x^4 - x^2 + 1 = 2x(x^2 - x + 1)$ ($\because \sqrt{2}\, x = x^2 - x + 1$)
$x^4 - 2x^3 + x^2 - 2x + 1 = 0$
$\therefore x^4 - 2x^3 + x^2 - 2x + 1 + 4 = 4$

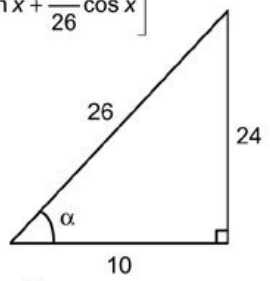
Alternative Solution:

One could solve for x from the equation $x + \frac{1}{x} = \sqrt{2} + 1$ and then use the calculator to numerically evaluate the given expression in x and arrive at an answer.
Choice (C)

12. $10 \sin x + 24 \cos x$

Multiplying and dividing by $\sqrt{10^2 + 24^2}$ i.e 26.

$26\left[\frac{10}{26}\sin x + \frac{24}{26}\cos x\right]$



Let $\cos \alpha = \frac{10}{26}$

$\therefore \sin \alpha = \frac{24}{26}$

$\therefore$ we get $26 [\sin x \cos \alpha + \cos x \sin \alpha]$
$= 26 \sin (x + \alpha)$
Now $-1 \leq \sin (x + \alpha) \leq 1$
$-26 \leq 26 \sin (x + \alpha) \leq 26$.
Thus, the maximum value is 26. Choice (B)

13. The relative speed of the car with respect to the cart
$= 44 - 8 = 36$ km/hr

$= 36 \times \frac{5}{18} = 10$ m/s. Now, the car would be visible to the driver of the cart till the car is 80m ahead of the cart.
Time for which the car is visible

$= \frac{80}{10} = 8$ seconds Ans: (8)

14. $f(25) = 25^3 - 25^2 - f(24)$
$= 25^3 - 25^2 - 24^3 + 24^2 + f(23)$
$= 25^3 - 25^2 - 24^3 + 24^2 + 23^3 - 23^2 - f(22)$
$= (25^3 - 24^3 + 23^3 - 22^3 + .- 2^3) - (25^2 - 24^2 + 23^2 - 22^2 + ... + 2^2) + f(1)$
Now, $(25^3 - 24^3 + 23^3 - 22^3 + ... + 3^3 - 2^3)$
$= (1^3 + 2^3 + 3^3 + ...+25^3) - 2(2^3 + 4^3 + 6^3 + ...+24^3) - 1^3$

$= \left(\frac{25 \times 26}{2}\right)^2 - 16(1^3 + 2^3 + ... + 12^3) - 1$

$= (325)^2 - 16\left(\frac{12 \times 13}{2}\right)^2 - 1$

$= 8280$
Similarly, $25^2 - 24^2 + 23^2 - 22^2 + ... + 3^2 - 2^2$
$= (1^2 + 2^2 + ...+25^2) - 2(2^2 + 4^2 + ...+24^2) - 1$

$= \frac{25 \times 26 \times 51}{6} - 8(1^2 + 2^2 + ... + 12^2) - 1$

$= 25 \times 13 \times 17 - 8\left(\frac{12 \times 13 \times 25}{6}\right) - 1$

$= 324$.
$\therefore f(25) = 8280 - 324 + 1 = 7957$ Ans: (7957)

15. Let the number when expressed in base 6 be represented by $(a\ b\ c)_6$

It is given that $4(a\ b\ c)_6 = (c\ b\ a)_{11}$
$\Rightarrow 4(36a + 6b + c) = (121c + 11b + a)$
$\Rightarrow 143a + 13b = 117c$
$\Rightarrow 11a + b = 9c$

As the number is expressed in base 6, b can be any digit from 0 to 5.
If $b = 0$, then $9c = 11a$

$\Rightarrow \frac{c}{a} = \frac{11}{9}$

This is not possible as a and c needs to be from 0 to 5.

If $b = 1$, $9c = 11a + 1$
$\Rightarrow 9c = 9a + 2a + 1$.

As L.H.S is divisible by 9, R.H.S must be divisible by 9 i.e., $2a + 1$ must be divisible by 9.
$\therefore a = 4$ and $c = 5$.

If $b = 2$, $9c = 11a + 2$
$\Rightarrow 9c = 9a + 2a + 2$
We do not get any possible value of a within the admissible range.

If $b = 3$, $9c = 9a + 2a + 3$

As $2a + 3$ is divisible by 9, we get $a = 3$ and $c = 4$.

If $b = 4$, $9c = 9a + 2a + 4$.

Again $2a + 4$ to be divisible by 9 does not given any value of a in the admissable range.

If $a = 5$, $9c = 9a + 2a + 5$
As $2a + 5$ is divisible by 9, we get $a = 2$ and $c = 3$.

Thus the numbers satisfying the given criteria in base 6 are $(415)_6$ or $(334)_6$ or $(253)_3$.

Therefore three possible values exist for N.
Ans: (3)

16. Let the year of birth of Rounak be $19ab$.
Now $19ab + ab = 1948$
$1900 + 2ab = 1900 + 48$
$\Rightarrow ab = 24$
Rounak was born in the year 1924.
His grandfather must have been born in the previous century.
Let his grandfather's year of birth be $18cd$
Now, $18cd + cd = 1948$
$1800 + 2cd = 1800 + 148$

$cd = 74$
His grandfather's year of birth was 1874.
Therefore, the difference between their ages was 50 yrs.

Alternative Solution:
Once we conclude that they were born in different countries, the difference between their ages will always be 50. As $2cd - 2ab = 100 \Rightarrow cd - ab = 50$.

Ans: (50)

17. $m = \frac{n+76}{n+4} = \frac{n+4+72}{n+4} = 1 + \frac{72}{n+4}$

For m to be an integer, 72 must be divisible by $n + 4$ i.e., $n + 4$ must be a factor of 72.
$72 = 2^3 \times 3^2$ number of factors = (3 + 1) (2 + 1) = 12
Therefore $n + 4$ can take 12 values of which 1, 2, 3 and 4 are not admissible as n must be positive. Thus 8 values are possible. Ans: (8)

18. Let the root common to both the equations be denoted by t.
$\therefore t^2 - at + 3 = 0$ and $t^2 + at - 5 = 0$
$\therefore t^2 - at + 3 = t^2 + at - 5$
$\therefore 2at = 8$

$t = \frac{4}{a}$

Substituting $\frac{4}{a}$ in $x^2 - ax + 3 = 0$, we get

$\frac{16}{a^2} - 4 + 3 = 0$

$\Rightarrow a = \pm 4$
Only for $a = 4$, we get a positive root (i.e., 1) in common.

Hence, the value of a is 4. Choice (C)

19. Let the principal and the rate of interest (per annum) be denoted by p and r respectively.

$p + \frac{nrp}{100} = 3p$

$1 + \frac{nr}{100} = 3$

$n = \frac{200}{r}$

The new rate after it is increased by 50%, is $\frac{3}{2}r$

$p + \frac{p\frac{3}{2}rN}{100} = 3p$

$1 + \frac{\frac{3}{2}rN}{100} = 3$

$N = \frac{400}{3r}$

$\therefore \frac{N}{n} = \frac{\frac{400}{3r}}{\frac{200}{r}} = \frac{2}{3}$

$N = \frac{2}{3}n$

Thus, the percentage reduction in the time taken is

$\frac{\frac{1}{3}n}{n} \times 100 = 33\frac{1}{3}\%$

Alternative Solution:

As $p + \frac{npr}{100} = 3p$

$nr = 200$

Now, n and r are inversely proportional to each other, so in r is increase by 50%, it becomes $\frac{3}{2}$ times, so n will become $\frac{2}{3}$ times i.e., it will decrease by $33\frac{1}{3}\%$.

Choice (B)

20. It is given that,

$\frac{\tan A}{a} = \frac{\tan B}{b} = \frac{\tan C}{c}$

$\therefore \frac{a}{\tan A} = \frac{b}{\tan B} = \frac{c}{\tan C}$

From the sine rule, we have

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$

Where R is the circum radius of the triangle
$\therefore a = 2R \sin A$, $b = 2R \sin B$ and $c = 2r \sin C$
It is given that,

$\frac{a}{\sin A/\cos A} = \frac{b}{\sin B/\cos B} = \frac{c}{\sin C/\cos C}$

$\Rightarrow 2R \cos A = 2R \cos B = 2R \cos C$

$\Rightarrow \cos A = \cos B = \cos C$

$\Rightarrow A = B = C$

It is an equilateral triangle. Choice (C)

21. Let the first page number be a and the number of page numbers whose sum was 180 be n.
Now, $(a) + (a + 1) + (a + 2) + \ldots\ldots + (a + n - 1) = 180$

$\frac{n}{2}[2a + n - 1] = 180\ 2$

$n[2a - 1 + n] = 360$.
As, on every leaf, there are two page numbers so n must be even. Again, if n is even, $(2a + n - 1)$ will be odd, and $(2a + n - 1) > n$ ($\because 2a - 1 > 0$).
Now, if $n = 2m$ (where m is the number of leaves) we have
$2m \times$ (odd number) = 360
$\Rightarrow m \times$ odd number = 180.
where, odd number > $2m$

Now, the only odd factors of 180 are 1, 3, 5, 9, 15 and 45.

But only for $m = 4$, i.e., 4×45, is the odd factor greater than $2m$.

Therefore the number of leaves that were missing was four. Ans: (4)

22. Any terminating number must have its denominator (in the lowest terms) in the form 2^a5^b.
Thus the number must be of the form 2^a5^b. since it has 6 factors the possible forms of the number are as follows : 2^5 or 5^5 or $2^2 \times 5^1$ or $2^1 \times 5^2$.
Hence, there are four such numbers. Ans: (4)

23. Let the output per minute through the inlet and the leak be a units and b units respectively.

Time taken to fill $\frac{1}{4}$ th of the tank $\frac{\frac{v}{4}}{a-b}$ minutes

Time taken to fill the next $\frac{3}{4}$ th of the tank = $\frac{\frac{3}{4}v}{a}$

Since it took the same time in both the cases $\frac{\frac{v}{4}}{a-b}$

$= \frac{\frac{3}{4}v}{a}$

$\Rightarrow a = 3(a - b)$

$\Rightarrow 2a = 3b$

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

Time taken by the leak to empty the tank = $\frac{v}{b}$

Time taken by the inlet to fill the tank = $\frac{v}{a}$

Now $\frac{\frac{v}{b}}{\frac{v}{a}} = \frac{3}{2}$

Alternative Solution:

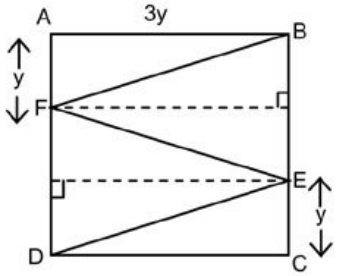
As we see that the time taken to fill the first one-fourth of the tank is equal to that taken to fill the remaining three-fourths, Let us consider the total time as 2 hrs and the volume of the tank as 4 units. Now in 1 hr, if 3 units is filled, in 2 hrs 6 units will be filled

$\therefore$ The leak emptied 2 units in 1 hr. Considering the work done in an hour, the ratio of the efficiencies = 3 : 2.

Choice (A)

24. Since BF = FE, ΔBFE is isosceles and AF = $\frac{BE}{2}$ and

Similarly, EC = $\frac{FD}{2} = \frac{BE}{2}$ ($\because \Delta BFE \equiv \Delta FED$).



Let the side of the square be $3y$

$BF = \sqrt{(3y)^2 + \left(y^2\right)} = \sqrt{10y^2}$

$\sqrt{10y^2} = 20$

$\Rightarrow 10y^2 = 400$

$\therefore y^2 = 40$

Area of the square = $(3y)^2 = 9y^2$

= 9(40)

= 360 sq. cm Ans: (360)

25. Considering $\frac{1}{3} = x$, we get,

Let $S = 1 - 4x + 9x^2 - 16x^3 + 25x^4 - 36x^5 + \ldots$ where $x = \frac{1}{3}$.

$\therefore Sx = \quad x - 4x^2 + 9x^3 - 16x^4 + 25x^5$

$S(1 + x) = \quad 1 - 3x + 5x^2 - 7x^3 + 9x^4 - 11x^5 + \ldots$

$xS(1 + x) = \quad x - 3x^2 + 5x^3 - 7x^4 + 9x^4 - \ldots$

$S(1 + x)^2 = \quad 1 - 2x + 2x^2 - 2x^3 + 2x^4 - 2x^5 + \ldots$

$S(1 + x)^2 = \quad 1 - 2x\{1 - x + x^2 - x^3 + \ldots\}$

$S(1 + x)^2 = \quad 1 - \frac{2x}{1 + x}$

$S(1 + x)^2 = \quad \frac{1 - x}{1 + x}$.

$\therefore S = \frac{1 - x}{(1 + x)^3}$.

Now, substituting $x = \frac{1}{3}$, we get

$S = \frac{1 - \frac{1}{3}}{\left(1 + \frac{1}{3}\right)^3} = \frac{2}{3} \times \frac{3^3}{4^3} = \frac{9}{32}$. Choice (A)

26. The number of proper subsets of set A is $2^a - 1$ whereas the number of proper subsets of set B is $2^b - 1$

It is given that, $2^a - 1 + 2^b - 1 = 142$

$\Rightarrow 2^a + 2^b = 144$.

Let $a < b \Rightarrow 2^a(2^{b-a} + 1) = 144$

Now, we need to express 144 as a product of two numbers one of which is a power of 2 and the other is one more than a power of 2.

As $144 = 2^4(2^3 + 1)$, we can conclude $a = 4$ and $b - a = 3$

Therefore, $a = 4$ and $b = 7$.

Thus, the value of $a + b$ is 4 + 7 = 11. Ans: (11)

27. For the equation to have equal roots,

$(m!)^2 = 4n!$

$m! = 2\sqrt{n!}$

Now $n!$ is a perfect square, which is possible only for $n = 0$ or $n = 1$, giving $m = 2$ in each case.

$\therefore (m, n)$ can be (2, 0) or (2, 1) Choice (C)

28. They can take 2 out of the 3 soups in $3_{C_2}\left(3_{C_2} \times 2_{C_1} \times 1_{C_1}\right) = 18$ *ways*

First we determine which two of the 3 soups and then which two of the 3 persons took which one of the 2 soups already selected and which one took the second soup.

They can take the 3 starters in 3! or 6 ways

They can take 3 of the 4 main courses in $4_{C_3} \times 3!$

= 24 ways

Therefore the total number of ways in which they could have taken their lunch = 18 × 6 × 24 = 2592.

Choice (D)

29. $\frac{1}{x - 2} > \frac{3}{x - 3}$

$\Rightarrow \frac{1}{x - 2} - \frac{3}{x - 3} > 0$

$\Rightarrow \frac{x - 3 - 3(x - 2)}{(x - 2)(x - 3)} > 0$

$\Rightarrow \frac{-2x + 3}{(x - 2)(x - 3)} > 0$

$\Rightarrow \frac{(2x - 3)}{(x - 2)(x - 3)} < 0.$

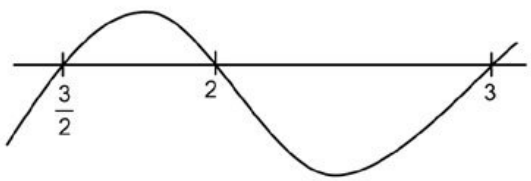
Multiplying both numerator and denominator by $(x - 2)(x - 3)$, we get,

$\frac{(2x - 3)(x - 2)(x - 3)}{(x - 2)^2(x - 3)^2} < 0.$

As $(x - 2)^2(x - 3)^2$ is positive, so it can be ignored.

$\therefore (2x - 3)(x - 2)(x - 3) < 0.$

The critical points are $x = \frac{3}{2}$, $x = 2$ and $x = 3$



The above inequality holds, if $x < \frac{3}{2}$ or $2 < x < 3$, i.e.,

$x \in \left(-\infty, \frac{3}{2}\right) \cup (2, 3)$. Choice (C)

Alternative Solution:
Clearly, x cannot be 2 or 3. Hence, options (A) and (D) are eliminated. Further, checking for $x = 0$, option (B) is also eliminated.

30. The area of the pentagon formed by joining the vertices (x_1, y_1), (x_2, y_2), (x_3, y_3), (x_4, y_4) and (x_5, y_5) is given by.

$$\frac{1}{2}\begin{vmatrix} x_1 & x_2 & x_3 & x_4 & x_5 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_5 & y_1 \end{vmatrix}$$

$= \frac{1}{2}[x_1 y_2 - x_2 y_1 + x_2 y_3 - y_2 x_3 + x_3 y_4 - y_3 x_4 + x_4 y_5 - y_4 x_5 + x_5 y_1 - y_5 x_1]$

Using the given co ordinates, we get the area of the pentagon as

$\frac{1}{2}$ [(5) (3) – (5) (–1) + (–1) (–2) – (3) (–2) + (–2) (–4) – (–2) (1) + (1) (0) – (–4) (6) + (6) (5) – (0) (5)]

$= \frac{1}{2}$ [15 + 5 + 2 + 6 + 8 + 2 + 0 + 24 + 30 – 0]

$= \frac{1}{2}$ [92] = 46 sq. units Ans: (46)

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