

(Key and Solutions for AIMCAT1816)

Key**SECTION – I**

1. C	8. A	15. B	22. 3	29. 31524
2. D	9. B	16. B	23. A	30. 14253
3. A	10. B	17. C	24. D	31. 51324
4. D	11. A	18. A	25. 1	32. 23514
5. C	12. D	19. 5	26. 4	33. 248
6. D	13. D	20. D	27. 2	34. 367
7. C	14. C	21. B	28. 3	

SECTION – II

1. A	8. 4200000	15. B	22. D	29. 4500
2. C	9. C	16. A	23. C	30. B
3. C	10. B	17. 3	24. B	31. 1600
4. B	11. D	18. 2	25. A	32. 0.1
5. B	12. A	19. C	26. C	
6. D	13. B	20. D	27. C	
7. D	14. D	21. C	28. D	

SECTION – III

1. B	8. 60	15. C	22. -6	29. C
2. D	9. C	16. A	23. D	30. D
3. D	10. 20	17. A	24. B	31. C
4. 18	11. 83	18. D	25. B	32. B
5. B	12. A	19. B	26. D	33. B
6. B	13. A	20. C	27. D	34. 61
7. A	14. C	21. C	28. 4	

Solutions**SECTION – I****Solutions for questions 1 to 6:****Number of words and Explanatory notes for RC:**

Number of words: 724

1. According to the passage, "Manufacturing exerts a powerful grip on politicians and policymakers in the rich world". The politicians say that it is central because "it used to provide good jobs" which provided "decent and dependable wages for people".

Option A: The author does not imply that politicians are concerned about the GDP. Hence, this is not the correct answer.

Option B: Manufacturing "used to provide good jobs". The subsequent paragraphs in the passage explains why this is not the case now. However, the politicians say that manufacturing is central because the people want such jobs and "suffer from the lack of them". Refer to the last two sentences of para 2. Because the people want such jobs, they turn to the politicians to provide such jobs and they say that it is central to the agenda. Hence, we can infer that the politicians do not say that manufacturing is central because it provides good jobs.

Option C: The politicians say that manufacturing is central because people want the kind of jobs that manufacturing provides. "People suffer from the lack of them" and "in their suffering, they turn to politicians". Hence, this can be inferred to be the reason that politicians say that manufacturing is central to what they want for their countries.

Option D: The author does not talk about unionization in this context and hence, this cannot be inferred from the passage.

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

2. The author talks about the Mercedes AMG factory in Brixworth in the first paragraph of the passage. He draws the attention of the reader to the vices because "The only vestige of the old world are the vices". He highlights how the process of manufacturing and the implements used have changed the complexion of how a manufacturing factory looks.

Option A: While the author says that "Here things are quiet and calm", he does not say that the vices are the ones that stand out because they make noise. They stand out because they are from the old world. Hence, this is not the correct answer.

Option B: The author does not mention that the vices are untidy. He only says that they are not new inventions.

- Option C: The author mentions that the mechanics use "high-tech tools amid operating-theatre cleanliness". The vices are also present on every work bench. This does not imply that the vices are out of date. This is because "nothing better than the vice has come along". Hence, we cannot say that the vices are out of date unless the author implies that a newer alternative to vices is present.
- Option D: The author states that "The only vestige of the old world are the vices". We can infer from this that everything else has been 'upgraded'. Hence, the vices are the only piece of technology that has not been replaced yet. Therefore, this is the correct answer. Choice (D)

3. In the fifth paragraph of the passage, the author states that "Once you understand what manufacturing now looks like, you come to see that the way it is represented in official statistics understates its health". He provides the explanation for this in the antepenultimate paragraph.

Statement I: The author mentions that "as manufacturing became more productive, and prices dropped, its share of GDP fell". The increase in productivity resulted in the official statistics depicting a bleaker than actual image of the manufacturing sector.

Statement II: The number of manufacturing jobs in the rich world reduced. This was because some of the jobs of a routine nature were relocated to poor countries. Because of this relocation, the jobs offered by these firms in the rich countries reduced. Hence, the relocation of these jobs also resulted in the official statistics understating the health of the sector.

Statement III: The passage mentions that the manufacturing contribution of GDP reduced. But the reason that the author says that the official statistics "understates" the health of the sector lies in why this contribution reduced. It reduced because of improvement in productivity which does not imply that the manufacturing sector is in bad shape. Hence, this statement, by itself, cannot be a reason that the official statistics underestimate the health of the sector.

Therefore, the reasons are statement I and statement II only. Choice (A)

4. In the last two paragraphs of the passage, the author talks about how different kinds of jobs were affected by the changes in the manufacturing sector.

Option A: The author says that routine work was "easily moved to poor countries where labour was cheap". However, in the last paragraph, the author mentions that semi-skilled jobs "were destroyed by new ways of boosting productivity and reducing costs". From this we can infer that the number of jobs that manufacturing firms offered reduced. Hence, the first part of this option is incorrect.

Option B: The author mentions that semi-skilled jobs were destroyed. But the routine jobs were relocated. Hence, we cannot say that both these kinds of jobs no longer exist. Therefore, this option is also incorrect.

Option C: The semi-skilled jobs were not relocated but destroyed. The routine jobs were relocated. Hence, this option is also incorrect.

Option D: The routine jobs were moved to the poor countries as can be inferred from the penultimate paragraph. The semi-skilled jobs were destroyed by "new ways of boosting productivity and reducing costs".

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

5. The author states that "Companies were using technology and new practices in ways that made it easier to "separate straightforward, well-delineated work from the more complicated bits of the enterprise".

Option A: Improvements in productivity did not enable shifting of routine jobs to poor countries. Improvements in productivity is, in itself, a result of many factors one of which can include the shifting of the routine jobs. Hence, this is not the correct answer.

Option B: The author does not talk about the politicians' focus on improving the productivity of the sector in this context. Hence, this is not the correct answer.

Option C: The author mentions that technology and new practices made it easier to "separate straightforward, well-delineated work from the more complicated bits of the enterprise". Because of this separation, companies were able to shift routine jobs to poor countries. Hence, the advances in technology and manufacturing practices enabled the relocation of routine jobs. Therefore, this is the correct answer.

Option D: The author does not talk about unionization in this context. Hence, this is not the correct answer.

Therefore, the correct answer is option C.

Choice (C)

6. The author talks about unionization when explaining how manufacturing evolved during the 20th century in the sixth and seventh paragraph of the passage.

Option A: In the early 20th century, "Unionisation helped those workers win a large share of the value generated by industry." However, the author mentions that "In the latter part of the century, though, this system came undone," i.e., the unionization came undone in the latter part of the 20th century. During this time, many politicians were "happy to see them reined in". Hence, we cannot say that in the latter part of the 20th century, unions wielded "strong influence". Hence, this option is incorrect.

Option B: The author states that "at the time when those unions were flexing their muscles many politicians were happy to see them reined in". This does not imply that the politicians supported the unions when the unions were strong. Hence, this is not the correct answer.

Option C: According to the passage, the "politicians now like the good jobs unionised factories provided". Hence, we cannot say that they are wary of bringing the unionized jobs back.

Option D: The author states that many politicians were "happy to see them reined in". We can infer from the passage that many politicians were not happy with their influence earlier. Now they "like the good jobs unionised factories provided". Hence, this option is correct.

Choice (D)

Solutions for Questions 7 to 9:

Number of words and Explanatory notes for RC:

Number of words: 309

7. Refer to the last para. In our relationships with other human beings, what we truly are is all that counts, yet it is precisely here that we most often betray ourselves by trying to be whatever the other person expects us to be. This is invidious (objectionable). Hence choice C is the answer.

Option A: Choice A is a consequence or an aftereffect of what the author calls objectionable. Choice A is not what Sartre considers objectionable. Pay close attention to the lines: trying to be whatever the other person expects us to be. This is invidious, on Sartre's view, since it exhibits a total lack of faith in ourselves. So choice A is incorrect.

Option B: The first para talks about the basic question which is always whether or not I will be true to myself. Self-deception invariably involves an attempt to evade responsibility for myself. But choice B is not considered objectionable by Sartre.

Option D: Choice D is an explanation for an example mentioned in para 2. Focussing exclusively on what-we-might-become is a handy (though self-deceptive) way of overlooking the truth about what-we-are. Choice D is not considered objectionable by Sartre. Choice (C)

8. Option A: The passage is explanatory in style. The author explains Sartre's views, backed with Sartre's reasons and an example and a conclusion. (Note: Though the passage is from the area of Philosophy and is replete with profound phrases, the style of the passage is not abstract. Depiction of abstract ideas can happen in a non-abstract style.)

Option B: The passage is more matter-of-fact than analytical. 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 making an analysis. Hence choice B is not the answer.
- Option C: The passage is not argumentative. There is no debate i.e. the passage does not present arguments and counterarguments for any idea or concept. The author refrains from delivering an argument; neither does he try to convince people of an argument. Hence choice C is incorrect.
- Option D: The author is not describing facts with a view to make the passage vivid or memorable. A descriptive passage evokes emotions making the discussion vivid. This passage is not descriptive. There is no description of emotions, feelings and images. Hence choice D is incorrect.
Choice (A)
9. The central idea of the passage is "whether or not I will be true to myself".
- Option A: Choice A can be placed at the end of para 2. The second para talks about two examples of "bad faith" in action. The first example in para 2 (people who pretend to keep all options open while on a date) is followed by the observation: Focussing exclusively on what-we-might-become is a handy (though self-deceptive) way of overlooking the truth about what-we-are. So choice A can be placed after the second example (that of the servers) mentioned in para 2. "But once again, of course, the cost is losing what we uniquely are in fact (choice A)" is a learning that parallels "Focussing exclusively on what-we-might-become is a handy (though self-deceptive) way of overlooking the truth about what-we-are." in para 2.
- Option B: Choice B best completes the last para of the passage. The first para talks about "self-deception" while the third para throws light on the importance of fidelity and sincerity (to ourselves). Choice B is the answer.
- Option C: Choice C does not connect with the penultimate sentence of the last para. It is a misfit at the end of the passage.
- Option D: Choice D cannot be placed at the end of the last para. It does not stress the importance of fidelity and sincerity enough. Choice D can be placed much earlier in the text. The first para mentions: Since the central feature of human existence is the capacity to choose in full awareness of one's own non-being, it follows that the basic question is always whether or not I will be true to myself.
Choice (B)
- Solutions for Questions 10 to 15:**
- Number of words and Explanatory notes for RC:**
- Number of words: 672
10. Option A: A narrative passage tells a story, usually from one person's viewpoint. A narrative passage has details which relate in some way to the main point the writer is making. This passage is not narrative. Hence choice A is not the answer.
- Option B: 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 analyzes and weighs up a study claiming that the origins of human language are rooted in gesture. Hence choice B is the answer.
- Option C: The author is not describing facts with a view to make the passage vivid or memorable. A descriptive passage evokes emotions making the discussion vivid. This passage is not descriptive. The passage does not describe emotions, feelings and images. Hence choice C is incorrect.
- Option D: The passage is not argumentative. There is no debate i.e. the passage does not present arguments and counterarguments for any idea or concept. The author refrains from delivering an argument; neither does he try to convince people of an argument. Hence choice D is incorrect.
Choice (B)
11. The second para mentions that animals communicate through gestures. Animals don't know about languages, gestures are insufficient for communication. "Language is considered the jewel in the crown of human superiority over other animals None can use these displays to convey a sentence like "I kicked the ball". So the key idea in the second para is that humans have verbal language, something that other species don't.
- The third para talks about the possible origin of human language.
- So, there is a connection between the 2 paras and choice A is the correct answer.
- The remaining choices provide incorrect interrelationship details between the two paras.
Choice (A)
12. Option A: Choice A has been stated in the first two sentences of para 2. Language is generally considered the jewel in the crown of human superiority no other animal's communication comes close to it. Choice A is true and is not the answer.
- Option B: Choice B has also been stated in the last sentence of para 2. But none can use these displays to convey a simple sentence such as "I kicked the ball". Hence choice B is also true and is not the answer.
- Option C: Choice C is also provided in the second para – see the last sentence. Hence choice C is true and is not the answer.
- Option D: Through clicks, hoots, barks, and bleats, some animals can inform each other of how they are feeling. But the contrast between language and gestures in choice D cannot be ascertained from the second para. Hence choice D is the answer.
Choice (D)
13. Option A: Choice A is a distortion. Corballis assigns a central role to the brain's mirror neurons, which seem to echo action in observation (in monkeys, mirror neurons fire when they reach to grasp objects, and when they observe another animal doing the same).
- Option B: Choice B is not true. There is an overlap between the mirror neuron system and two areas in the brain's left cerebral cortex in humans.
- Option C: Mirror neurons also seem to be involved with other actions. One is pointing (in children especially). The second part of choice C has not been explicitly stated in the passage.
- Option D: There is an overlap between parts of the mirror-neuron system and two areas in the brain's left cerebral cortex that are associated in humans with language production – Broca's and Wernicke's areas. This makes choice D the correct answer.
Choice (D)
14. Option A: The primatologist and ethologist Frans de Waal will find Corballis' assessment of primate vocalizations harsh. But choice A does not explain what the author means when he mentions the quoted sentence in para 6. Hence choice A is not the answer.
- Option B: Choice B is not the correct implication of the quoted sentence in the question. The author is not judgemental about Corballis' analysis of the origins of language and does not term the same unacceptable.
- Option C: Many including the primatologist and ethologist Frans de Waal will find Corballis' assessment of primate vocalizations harsh. Hence choice C can be inferred.
- Option D: Humans are on top in terms of communication because of language. The first part of choice D provides a reason for Corballis' assessment of primate vocalization. ... Corballis counters that primate vocalizations, unlike gestures, seem barely under voluntary control. He contends that they emerge like nervous tics, more closely connected to expression of emotion than to a deliberate exchange of information. The second part of choice D is a distortion. Choice D is not an implication of the sentence given in the question.
Choice (C)
15. Refer to para 7. Language arose from gestures.
- Option A: The first part of choice A is true from para 7. But it has not been explicitly stated in the seventh para that

following others' gazes is an act of theft in a human environment.

Option B: Gesturing may indicate a theory of mind, the ability to understand what others might know or be thinking; and surely that is a requisite for language. Hence the first part of choice B is correct. Humans take this understanding for granted, but it has proved difficult to show conclusively in other animals. The second part of choice B is also correct. Choice B is related to the question posed in the first sentence of para 7: What does it mean to say that language – the exchange of information between senders and receivers – arose from gestures? Hence choice B is the answer.

Option C: Choice C is a misrepresentation of facts. Some dogs respond to pointing, but they have been selected to do so (and don't point things out to other dogs). Chimpanzees can point, but do it rarely: not what would be expected in routine social communication. Choice C is not the conclusion of the seventh para.

Option D: Gazing is not an intentional act of communication. This is a detail mentioned in the seventh para. But the remainder of choice D is out of scope. It is not the conclusion of the seventh para. Choice (B)

Solutions for Questions 16 to 18:

Number of words and Explanatory notes for RC:

Number of words: 455

16. The answer is stated in the first para "linguistic invention in most subcultures of the modern West is a halting and largely unconscious process. Hackers, by contrast, regard slang formation and use as a game to be played for conscious pleasure." Choice B states this.

Option A: Choice A is contradicted by the sentence: ... the electronic media which knit them together are fluid, 'hot' connections, well adapted to both the dissemination of new slang and the ruthless culling of weak and superannuated specimens.

Option C: Choice C has not been mentioned in the passage.

Option D: Choice D is also wrong. Linguistic invention in most subcultures of the modern West (and not the hacker subculture) is a halting and largely unconscious process.

Choice (B)

17. Refer to the last para. But it is also true that hackers use humorous wordplay to make strong, sometimes combative statements about what they feel. Some of these entries reflect the views of opposing sides in disputes that have been genuinely passionate; this is deliberate. We have not tried to moderate or pretty up these disputes; rather we have attempted to ensure that everyone's sacred cows get gored, impartially.

Option A: Choice A is contradicted by "We have not tried to moderate or pretty up these disputes" Also choice A does not explain the last sentence of the passage which is given in quotes in the question.

Option B: Hackers use humorous wordplay to make strong, sometimes combative statements about what they feel. Choice B is true but does not answer the question. It does not reflect "impartially" mentioned in the question statement.

Option C: We have not tried to moderate or pretty up these disputes; rather we have attempted to ensure that everyone's sacred cows get gored, impartially. Here "we" represents the Jargon File keepers. "these disputes" refers to the disputes of the hackers themselves. It's the hackers who come up with terms which are the 'combatants' with 'sacred cows'. So, it's their sensibilities that are going to be offended without favour (and not those of the readers. The readers are going to find the work interesting and humorous: Even a complete outsider should find at least a chuckle on nearly every page, and much that is amusingly thought-provoking). This makes choice C the correct answer.

Option D: Choice D is true of the slang style which is high-context communication (elliptical, emotive, nuance-filled, multi-modal, heavily coded), which is associated with cultures which value subjectivity, consensus, cooperation, and tradition. But choice D does not answer the question.

Choice (C)

18. From a careful reading of para 2, we can infer that hackerdom is themed around extremely low-context interaction with computers and exhibits primarily "low-context" values, but cultivates an almost absurdly "high-context" slang style. Hence choice A is the answer.

Choice (A)

Solutions for Questions 19 to 24:

Number of words and Explanatory notes for RC:

Number of words: 760

19. Three-dimensional (3D) printing on demand has been adopted on the front line. ... Far better to produce what is needed, when it is needed. Making what is needed to order has huge potential.

(1): (1) is not the answer. "Watching paint dry" is a standard idiom. It means that you find things boring and dull since you wait for the outcome of a process or development that is so slow that the progressive changes are hardly discernable. Since there's nothing in the context that indicates the levels of interest/boredom and since there is nothing to indicate the very slow pace at which the process runs, (1) is not the answer.

(2): If you make hay while the sun shines, it means that you take advantage of the chance to do something while conditions are good. (2) is not relevant in the context. (2) talks about making the final product in advance and does not refer to "making what is needed when it is needed."

(3): Keep your powder dry is an idiom which means to remain cautious and ready for a possible emergency, be prepared and save your resources until they are needed. The allusion is to gunpowder which soldiers had to keep dry in order to be ready to fight when required. {Etymology: from the idea that gunpowder (*an explosive substance in the form of a powder*) will not explode if it is wet.} But, this idiom implies that inventory needs to be kept in readiness for use. The situation in the passage is about dealing with requirements on the spot so that inventory needn't be maintained. So (3) is not the correct answer.

(4): (4) implies that something of great importance may depend on an apparently trivial detail. The saying comes from a longer proverb: "For want of a nail the shoe was lost. For want of a shoe the horse was lost. For want of a horse the rider was lost. For want of a rider the message was lost. For want of a message the battle was lost." (4) is easy to eliminate.

(5): "To whip something up" is an idiom which means to prepare, create, or put something together very quickly. Since the situation in the passage is about dealing with requirements on the spot so that inventory needn't be maintained, (5) is the correct answer.

Ans: (5)

20. Option A: Land-based printers can make things out of metal by building up layers of metallic powder that are then melted with a laser or electron beam and allowed to cool into a solid. But printers, like people, get seasick. ... This is why a printer of metal ship parts operated by Canada's navy sits safely on dry land, at the Cape Scott fleet-maintenance facility in Halifax, Nova Scotia. But this is not reason enough to say that the printers are non-functional in the seas. Choice A does not specifically answer the question. The passage does say that plastic items are printed at sea.

Option B: The passage does not say that cooling of the molten metallic powder used to print metallic items becomes difficult in the sea. Choice B is out of scope.

Option C: A ship's constant yawing, pitching and rolling disturbs the powder and not laser or electron beam. Also

"prevents it from cooling the molten metallic powder" is incorrect as it is the laser or electron beam that melts the metallic powder. Choice C is a distortion.

Option D: A ship's constant yawing, pitching and rolling disturbs the powder before the beam can do its work of melting the layers of metallic powder that are used to print metal parts. So choice D is the correct answer.

Choice (D)

21. Refer to para 4. Nor are sailors the only servicemen who will benefit from 3D printing. China's army prints both basic items, such as ratchets, and more sophisticated ones, including raised physical relief maps of local terrain that help soldiers plan operations more effectively than a paper map or screen display can. Hence choice B is the answer.

Option A: Choice A has not been suggested in the passage. Even if true, it is not sufficient to answer the question.

Option C: The first part of Choice C paints '3D printed maps' in a negative light. Hence choice C cannot be the answer.

Option D: Choice D has not been mentioned in the passage. We do not know whether 'an exact replica, on exactly the same scale, of the place where the army is' is a plus point or not.

Choice (B)

22. "forward deployed" printers of this sort make items out of plastic only. In their case the problem with printing in metal is not constant movement but grit – for this is a much more sensitive process than printing in plastic.

Statement 1: (1) can help overcome the problem of instability that a land-based printer faces when the ship is in motion. ... Mounting printers on damping platforms that hold them steady by compensating for a ship's motion could be one answer. But (1) does not explain how the problem faced by forward deployed printers with reference to printing in metal can be overcome.

Statement 2: (2) can also help overcome the problem of instability that a land-based printer faces at sea, when the ship is in motion. ... Another might be to form the metal "ink" into wires instead of powders, for wire is more easily held in place than a layer of dust is. In this arrangement the laser or electron beams would melt the tips of the wires. But (2) is not a solution for forward deployed printers.

Statement 3: (3) is the answer. Even that limitation will be overcome. The Army Research Laboratory is paying two firms to develop technologies which can turn blocks of metal into printable powder within the confines of a shipping container.

Statement 4: The Army Research Laboratory is paying two firms to develop technologies which can turn blocks of metal into printable powder within the confines of a shipping container. At the moment this "atomisation" process works like an old-fashioned shot tower. Molten metal poured in at the top of a chamber breaks into droplets that cool and solidify on their way down. But this requires a chamber at least six metres high, which is too tall to fit upright inside a standard shipping container. So (4) presents challenges and is not a successful method. (4) is not an answer.

Statement 5: The purpose of the method employed by ARL is to recycle battlefield scrap into new equipment. But the use of 'laser beam' in (5) is incorrect.

So, only (3) answers the question.

Ans: (3)

23. Option A: The crew of the American aircraft-carrier, *USS Harry S. Truman*, devised and printed items such as better funnels for oil cans, protective covers for light switches and also a cleverly shaped widget they dubbed the TruClip. TruClips alone have saved more than \$40,000 in replacement parts. The two 3D printers themselves, by contrast, cost about \$2,000 each. Hence choice A is true and is the answer.

Option B: Marines at Camp Pendleton in California finished converting a shipping container into a rugged "expeditionary-manufacturing facility" movable by lorry, ship, train or aircraft. If printers that make use of these solidified droplets can also be made rugged enough to withstand the battlefield, then broken parts themselves will become recyclable. Choice B is not correct and is not the

answer. Also 'rugged enough to handle all materials' is incorrect. At the moment they're using them for plastic parts at their bases in Afghanistan. (And the army, too, is involved. It has already sent some 3D printers to bases in Afghanistan. ... For now, like those on board ship, "forward deployed" printers of this sort make items out of plastic only (not metal) ...)

Option C: In the sentence, "the problem with printing in metal is not constant movement but grit." (penultimate para), "grit" refers to the small (hard) particles of the byproduct. Molten metal poured in at the top of a chamber breaks into droplets that cool and solidify on their way down. The problem related to the "atomisation" process has been mentioned in the last para: "orienting the chamber diagonally, and employing jets of inert gas to stop the droplets touching the sides before they have cooled." So "non-crucial components which interfere with the printing process" in choice C is incorrect. Choice C is not the answer.

Option D: But this requires a chamber at least six metres high, which is too tall to fit upright inside a standard shipping container. MolyWorks Materials of Los Gatos, California, has managed to shrink the process so that it does fit inside such a container. It does so by orienting the chamber diagonally, and employing jets of inert gas to stop the droplets touching the sides before they have cooled. Choice D is incorrect and is not the answer.

Choice (A)

24. Option A: There is no cynical view presented in the passage. The author talks about the positive aspects of 3D printing in the passage. While he does talk about some current problems related to the 3D printing process adopted by the armed forces on the front line, he also highlights what can be done in the future to make the process better. So choice A is incorrect.

Option B: While the boldfaced part of the passage does reflect mild humour, it does not serve as a counter-argument to the second sentence of the first paragraph. The passage clearly indicates that the ability to turn out parts when required in operations would improve the efficiency and response times of the armed forces. Hence choice B is ruled out.

Option C: "Amateurs talk strategy, but professionals talk logistics." This only suggests that for marines or the armed forces who are on the front line (of the battlefield), logistics are very important. So the part "even at the cost of strategy" in choice C is incorrect. It has been mentioned in the fourth para that soldiers need to plan operations. Also the second part of choice C is not correct. The word 'always' in the second part of choice C is extreme. 3D printing will become an important part of the American navy's supply chains. Broken parts themselves will become recyclable, supply chains may no longer need to deliver even raw materials. (Reshoe a horse suggests that every part can be replaced/ recycled easily using 3D printing. This is not what is happening currently. It may happen in the future.) Choice C is not the answer.

Option D: While the boldfaced part of the passage does reflect mild humour, the passage clearly indicates that the ability to turn out parts when required in operations would improve the efficiency and response times of the armed forces. This would then leave decision makers free to deal with strategy. Hence choice D is the answer.

Choice (D)

Solutions for Questions 25 to 28:

25. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the para. It provides the background and has the proper nouns "Alfred Nobel", "Stockholm", the "Nobel Center" and the proper adjective "Swedes". Sentence 5 is followed by sentence 2. The contrast conjunction 'yet' in sentence 2 contrasts "influential" in sentence 5 with "reluctant to promote" in sentence 2. Sentence 2 and sentence 4 form a mandatory pair. Sentence 4 provides a wrong reason for

Alfred Nobel's countrymen not promoting him. Sentence 3 explains the correct reason and follows sentence 4. So, 5243. Sentence 1 is the odd sentence out. It will need further elaboration and substantiation. It can be a part of another para following the given para. "kerfuffle" in sentence 1 means a commotion or fuss, especially one caused by conflicting views.

Ans: (1)

26. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the para. It gives introductory details about the ark of the synagogue and provides the background: archaeologists digging at Ein Gedi, dug up the ark of a synagogue. Sentence 3 is followed by sentence 5. "within" and "the ark" in sentence 5 point to "ark of a synagogue" in sentence 3 and "worst of the blaze badly scorched" in sentence 5 links with "destroyed by fire" in sentence 3. Sentence 2 follows sentence 5. "They were, indeed, so damaged" in sentence 2 links with "worst of the blaze, they were badly scorched" in sentence 5. "That left archaeologists with a cruel dilemma" in sentence 1 is a consequence of the point mentioned in sentence 2 and it follows sentence 2. "any attempt to handle them simply made things worse" in sentence 2 links with "attempt to read their discoveries, which would destroy them, or preserve them as found, but remain ignorant of what they said" in sentence 1. So, 3521. Sentence 4 is a positive sounding sentence and is the odd sentence out. It can come later in the flow. It needs a precedent.

Ans: (4)

27. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the para. It introduces the context: "intelligence" was a factor for success in life and work for thousands of men and women who were interviewed. Sentence 1 follows sentence 4. "the importance of "intelligence" was mentioned again and again" in sentence 4 links with "when the researchers pressed for the definition of intelligence" in sentence 1. Sentence 5 clarifies what intelligence was not defined as. Sentence 3 talks about the correct definition of intelligence. So 4153 form a coherent para. Sentence 2 is the odd man out. It does not fit in with the remaining sentences.

Ans: (2)

28. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the para. Sentence 1 tells us that the 'newspaper clipping' mentioned in sentence 5 was an editorial. Sentence 5 is followed by sentence 1. Sentence 4 tells us the name of the editorial and follows sentence 1. Sentence 2 concludes by telling us the reaction of the person who saw the editorial/ newspaper clipping. So, 5142. Sentence 3 is the odd sentence out. "that bill" in sentence 3 needs a precedent and more substantiation.

Ans: (3)

Solutions for Questions 29 to 32:

29. On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that begins the para. Latin Americans are known for their conspicuous consumption and love for the fiesta. Sentence 1 follows sentence 3. Sentence 3 provides a reason for Latin Americans figuring in opinions polls as among the world's happiest people. Sentence 5 provides a contrasting viewpoint – that Latin Americans spend with little regard for tomorrow. So sentence 5 with the contrast conjunction 'yet' follows sentence 1. Sentence 2 reiterates the point mentioned in sentence 5 and follows sentence 5. So, 3152. Sentence 4 concludes the para by summarizing the points of view mentioned in sentences 5 and 2.

Ans: (31524)

30. On a careful reading of the sentences, it can be observed that sentence 1 is a general sentence that begins the para. It introduces the background: managers are instructed to look over the horizon. Sentence 4 comes after sentence 1. "Business theorists routinely instruct managers" in sentence 1 links with "most successful book on business master-

planning in recent years" in sentence 4. Sentence 2 follows sentence 4 as it tells us what the book "Blue Ocean Strategy" deals with. So, 142. The main premise of the book is mentioned as: companies should trawl for profits in "blue oceans" that their rivals ignore rather than "red oceans" that they squabble over. Sentence 5 highlights the normal course adopted by companies. "blue oceans" that their rivals ignore rather than "red oceans" that they squabble over" in sentence 2 links with "break new ground lest a rival or new entrant does the same and pulls the rug from beneath them" in sentence 5. Sentence 3 highlights the blue ocean strategy and concludes the para. "reinventing a business from the ground up, to avoid being consumed by the fires of new technology" contrasts "break new ground lest a rival or new entrant does the same and pulls the rug from beneath them" given in sentence 5. So, 14253.

Ans: (14253)

31. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the para. It introduces the background to this para. The 'but' in sentence 5 is a reference to a prior thought, and since that would be divergent from what this para has, that could only be a previous para. An example of the point mentioned in sentence 5 is given in sentence 1. "entertaining rant against the passive" in sentence 5 points to "critics of the passive voice" in sentence 5. Sentences 1 and 3 form a mandatory pair. "but it (*passive voice*) isn't a tense" in sentence 1 is explained in sentence 3 which highlights the basic difference between tense and voice. "Voice structures who did what to whom in a sentence" in sentence 3 is explained further in sentence 2 (subject is the doer of the action) and sentence 4 (recipient of action becomes the subject). So, sentences 2 and 4 in that order follow sentence 3. Hence, 51324.

Ans: (51324)

32. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the para. It is a general sentence that introduces the topic: Europe's economic crisis Sentence 2 is followed by sentence 3. "Europe's economic crisis was a stew with many ingredients" in sentence 2 links with "the stock in which it all simmered" in sentence 3. Also "spendthrift governments to inadequate safeguards in the banking system" (mentioned in sentence 2) were all part of a bigger problem consisting of "imbalances in trade and capital flows" (mentioned in sentence 3). "imbalances in trade and capital flows resulting from economic integration" in sentence 3 links with "Economic integration encouraged high-saving households in slow-growing northern economies to ship their money to the periphery" in sentence 5. Sentence 5 is followed by sentence 1. "The flipside of this lending by the households" in sentence 1 links with "high-saving households shipping their money to the periphery" in sentence 5. So sentences 5 and 1 in that order highlight "big imbalances in trade and capital" mentioned in sentence 3. Sentence 4 mentions the reason for the point given in sentence 1. Sentence 4 concludes the paragraph. So, 23514.

Ans: (23514)

Solutions for Questions 33 and 34:

33. The para begins by describing a "compulsive urge to do something self-destructive". The first blank needs a word to describe the emotion experienced by a person who contemplates but resists a self-destructive act. Hilarity (Great merriment or laughter) and hauteur (pride and arrogance) are contextually inappropriate as they do not collocate with 'felt'. (1) does not exactly explain the desired feeling. Rapprochement (reestablishing of cordial relations, as between two countries) can be ruled out. The correct words for the first blank are 'frisson' which means 'a moment of intense excitement' and 'exuberance' which means 'full of unrestrained enthusiasm'. (2) is the correct answer for the first blank.

Others may have contemplated the self-destructive act, but resisted it. Mr. Hollande seems to have surrendered. This means that he has not only contemplated but also

committed something self-destructive. The second blank is followed by a list of people: judges, footballers, his own ministers and more. Hence 'all and sundry' (everyone) can fill the second blank. Though 'judges' is there is the list of people mentioned after the second blank, 'authoritarianism' is not the correct word to describe the people from various walks of life (footballers, his own ministers and more). So (5) is incorrect for the second blank. Oppugnant means combative, antagonistic, or contrary. Recreant means unfaithful or disloyal to a belief, duty, or cause. The words mentioned in (6) are unwarranted. (4) is the correct answer for the second blank.

The last blank requires a phrase, as evident from the options numbered (7), (8) and (9). Mr. Hollande's allies have been left dumbstruck and his political future has been in freefall because of _____. Mr. Hollande should not have exercised his compulsive urge to do something self-destructive, six months before France's presidential election. 'Politically suicidal exercise' is the best phrase that can fill the last blank. The use of 'politically' in choice (8) is correct as can be gathered from "re-election" and "presidential election" mentioned in the paragraph. The insult can be termed as a 'politically suicidal exercise'. Hence (8) is the correct answer for the third blank. 'Purge' in blank (9) means an abrupt or violent removal of an unwanted feeling, memory, or condition. 'unctuous' means excessively flattering or ingratiating. 'jejune' means naive, simplistic, superficial; dry and uninteresting. The phrases in (7) and (9) are inapt in describing the self-destructive insult by Mr. Hollande.

The correct answer for the question is "248".

Ans: (248)

34. "litigious" means "of, relating to, or characterized by litigation" or "tending to engage in lawsuits". "indecipherable" means impossible to read or understand, illegible.

The first blank in the question para needs a synonym of 'something suggestive of a dense collection of legal texts, as in impenetrability or thickness'. Note that "indecipherable text" is an additional description. The blank word is not a synonym for 'indecipherable'. So the blank in the sentence which needs to qualify the world's prose can be best filled by the word 'clunkiest'. 'clunkiest' here means 'awkwardly heavy; clumsy or unwieldy'. Hence (3) is the answer for the first blank. Stultifying means to cause to appear stupid, inconsistent, or ridiculous; to render useless or ineffectual. There is nothing in the paragraph to suggest the use of 'dissembled' (conceal, pretend, simulate).

The second blank can be filled by a clue available in the previous sentence: Some firms require agreement, as when users are asked to click a box The blank needs an adjective to describe customers' consent (i.e. "without seeking customers' _____ consent"). 'Explicit' which means "stated clearly and in detail, leaving no room for confusion or doubt" best fills the second blank. 'Expedient' which means "convenient and practical although possibly improper or immoral" cannot be used to describe 'consent' in the given context. We rule out 'flagitious' which means criminal; villainous. So (6) is the answer for the second blank.

We now need to fill the last blank. 'Unencumbered' is a misdirection as it appears to contrast the previous line: firms often insert language conferring broad protections. But the blank cannot take the word 'unencumbered' which means not having any burden or impediment. 'Contradistinct' means 'distinguished by opposite qualities' and again can cause confusion. There are no opposing features mentioned in the latter part of the para. Just because legal disclaimers that were designed to limit lawsuits are now unleashing litigation, one cannot term them as 'contradistinct'. So (8) is incorrect for the third blank. There is no hint of regret in the last sentence of the para. Hence 'unfortunately' is also a misfit here. So (9) is incorrect for the third blank. The best word to complete the last blank is "in a new twist". "in a new twist" helps explain "now unleashing litigation". The new twist is that previously,

legal thickets were designed to protect companies from litigious online shoppers and users of web services (with some firms inserting language conferring broad protections to lower their risk of liability) but now, legal disclaimers designed to limit lawsuits are unleashing litigation. (7) is the answer for the third blank.

The correct answer for the question is "367".

Ans: (367)

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

SECTION – II

Solutions for questions 1 to 4:

From the given information, we can assign the numbers 1 to 26 for the letters from A to Z. The numbers assigned to the consonants do not change. However, the numbers assigned to the vowels depends on the letter that follows the vowel.

Hence, A can be 1 OR 2, E can be 5 OR 6, I can be 9 OR 10, O can be 15 OR 16 and U can be 21 OR 22.

- If the password is BADAEN, B will be assigned 2. A will be assigned 2 (since the next letter is D, a consonant). D will be assigned 4. A will be assigned 1 (since it is followed by a vowel). E will be assigned 6. N will be assigned 14. Hence, the encrypted password will be 2241614.
Choice (A)
- Option A: BAEFDAE will be encrypted as 2166415.
Option B: UEEDAF will be encrypted as 2156426.
Option C: UEEDP will be encrypted as 2156416.
Hence, option C is the correct answer. Choice (C)
- Option A: In the encrypted password 1561617, consider the first three digits 156. The first digit can represent A. The second digit can represent E. If the second letter is E, the third digit must represent a vowel. Hence, the third letter must also be E. However, the fourth letter must be a consonant as the value of E (third letter) was 6. Hence, 16 must represent one single letter, P. This can be followed by Q. In this case, the password is AEEPQ.

In the first three digits, 156, if the first two digits represent the letter O, it must be followed by a vowel. Hence, the first two letters can also be OE. The third letter must be a consonant, which will be P. The last letter will be Q. Hence, the password can also be OEPQ. Since there are multiple possibilities for this password, this cannot be the encrypted password.

Option B: Consider the first three numbers of 16516139. Consider the first three digits, 165. If the first letter is A, it must be followed by a vowel. Since the second digit is 6, it can be E. However, this must be followed by a consonant. But the third digit is 5 which must be E. Hence, this is not possible.

The first letter cannot be A and it must be P. The second letter must be E. The third letter can be A followed by a vowel, E. Or the third letter can be O followed by a consonant. OR the third letter can be P. If the third letter is A followed by E, the next letter must be a consonant (since E is assigned a value of 6). Hence, the next letter is M and the last letter is I.

If the third letter is O, the next two letters must be M and I. If the third letter is P, the next two letters must be M and I. Hence, the password can be PEAEMI or PEOMI or PEPMI. Hence, this is not possible.

Option C: Consider the first three digits of 16521135. As we saw in the previous option, the first letter cannot be A. Hence, the first letter must be P.

The second letter must be E. Since the value of E is 5, it must be followed by a vowel. Hence, the next letter must be A. Since the value of A is 2, it must be followed by a consonant. The next digit is 1, but it cannot be A (since we need a consonant after the preceding A), and the digit after that is 1. If the next letter is represented by 11, then the letter will be K, which is a consonant. Hence, the next letter must be K. The next digit, 3, can only represent C and the last letter must be E. Therefore, in this case, the password is unique, which is PEAKCE. Choice (C)

4. Option A: 21123 is possible if the sequence of letters is UAAC or BAAAC.

Option B: 151819 is not possible because the first two digits can represent A and E or O. IN either case, it must be followed by vowel. It can be followed by A. But the value of is also 1. Hence, this must also be followed by a vowel. But 8 does not represent any vowel. Hence, this is not possible.

Option C: 159612 is possible if the sequence of letters is OIEL.

Option D: 22115 is possible if the password is BBAAE. Choice (B)

Solutions for questions 5 to 8:

5. The number of new subscribers in each month from each state is given below:

State	January	February	March	April
AP	15	20	2	13
UP	5	13	11	12
MP	18	17	12	17
HP	8	16	21	7
Total	46	66	46	49

Hence, the highest number of new subscribers across the four states was in February. Choice (B)

6. From the table given in the above solution, we can see that in AP, the number of new subscribers increased from 2000 in March to 13000 in April. Therefore, the highest percentage increase = 550% Choice (D)
7. Number of new subscribers from MP was greater than that from HP in three months – January, February and April. Choice (D)
8. The highest number of new subscribers in any month from any state was 21000 (from HP in March).
The subscription charges earned from these new subscribers = $21000 \times 200 = ₹42,00,000$

Ans: (4200000)

Solutions for questions 9 to 12:

After manufacturing 20 batches (Batch 1 to Batch 20) of PTS, 5 kg of ABS was purchased. To manufacture 20 kg of PTS, there must have been at least $20 \times 0.44 = 8.8$ kg of ABS and less than $8.8 + 0.44 = 9.24$ kg of ABS. If there was any more ABS, more batches of PTS would have been manufactured before purchasing ABS.

Hence, the range of ABS initially available will be 8.8 to 9.24.

After purchasing 5 kg of ABS, there would be 5 to 5.44 kg of ABS available.

After purchasing this, 12 batches (Batch 21 to Batch 32) of PTS was manufactured. This would require at least $12 \times 0.44 = 5.28$ kg of ABS. Hence, there must have been at least 5.28 kg and at most 5.44 kg of ABS available before manufacturing these 12 batches of PTS.

After this, 6 kg of ABS was purchased. Hence, there must have been 6 kg to 6.16 kg of ABS. After this purchase, 13 batches

(Batch 33 to Batch 45) of PTS were manufactured. For manufacturing 13 batches of PTS, at least 5.72 kg and at most 6.16 kg of ABS must be present. Hence, after manufacturing these 13 batches of PTS, there will be at least 0.28 kg and less than 0.44 kg of ABS must be remaining.

After this, 8 kg of ABS was purchased. Hence, there must have been between 8.28 kg and 8.44 kg of ABS. Using this, 19 batches (Batch 46 to Batch 64) of PTS was manufactured. This would mean that there must be at least $19 \times 0.44 = 8.36$ kg of ABS. Hence, there must have been at least 8.36 kg and at most 8.44 kg of ABS after the 8 kg of ABS was purchased.

Working backwards, after batches 33 to 45 were manufactured, there must have been at least 0.36 kg and at most 0.44 kg remaining. Hence, before manufacturing batch 33, after purchasing 6 kg of ABS, there must have been at least 6.08 kg and at most 6.16 kg of ABS.

After manufacturing batches 21 to 32, there must have been at least 5.36 kg and at most 5.44 kg of ABS.

Hence, before manufacturing the first batch, there must have been at least $8.8 + 0.36 = 9.16$ kg of ABS and at most 9.24 kg of ABS.

For KME, before making the first purchase, 25 batches of PTS were manufactured. Hence, there must have been at least $25 \times 0.27 = 6.75$ kg and less than 7.02 kg of KME initially.

After purchasing 4 kg of KME, there will be at least 4 kg and less than 4.27 kg of KME.

14 batches (batches 26 to 39) of PTS were manufactured after this. This will require at least $14 \times 0.27 = 3.78$ kg at KME and at most 4.05 kg of KME. Since there must be a minimum of 4 kg of KME before manufacturing batch 26, there must have been at least 4 kg and less than 4.05 kg of KME. After manufacturing batches 26 to 39, there will be at least 0.22 kg and less than 0.27 kg of KME remaining.

Another 3 kg of KME was purchased after this. Hence, there must have been at least 3.22 kg and at most 3.27 kg of KME.

12 batches (batches 40 to 51) of PTS were manufactured after this. Hence, there must have been at least $12 \times 0.27 = 3.24$ kg of KME. Hence, before batch 40 was manufactured, there must have been at least 3.24 kg of KME and at most 3.27 kg of KME.

Working backwards, just before manufacturing batch 26, i.e., after purchasing 4 kg of KME, there must be at least 4.02 kg of KME and less than 4.05 kg of KME.

Hence, initially, there must have been at least 6.77 kg of KME and less than 6.8 kg of KME.

Hence, the initial quantity of ABS available was at least 9.16 kg and less than 9.24 kg.

The initial quantity of KME available was at least 6.77 kg and less than 6.8 kg.

9. The amount of ABS available initially was at least 9.16 kg and less than 9.24 kg. Among the given options, only option C falls in this range. Choice (C)

10. The minimum amount of ABS and KME available initially = $9.16 + 6.77 = 15.93$ kg. Choice (B)

11. Manufacturing 38 batches requires $38 \times 0.44 = 16.72$ kg of ABS and $38 \times 0.27 = 10.26$ kg of KME.

Total available ABS will be at least $9.16 + 11 = 20.16$ kg and less than $9.24 + 11 = 20.24$ kg.

Total available KME will be at least $6.77 + 4 = 10.77$ and less than $6.8 + 4 = 10.8$ kg.

The minimum quantity of ABS and KME remaining will be $20.16 - 16.72 = 3.44$ kg and $10.77 - 10.26 = 0.51$ kg respectively. Total minimum = 3.95 kg

Maximum quantity available will be less than $20.24 - 16.72 = 3.52$ kg and $10.8 - 10.26 = 0.54$ kg respectively. Total maximum = $3.52 + 0.54 = 4.06$ kg

Hence, the total quantity should be at least 3.95 kg and less than 4.06 kg. Among the given options, only option D satisfies.
Choice (D)

12. Total ABS available at the end of January will be at least 3 kg and less than 3.08kg.
Total KME available at the end of January will be at least 0.49 and less than 0.52 kg.
Only 1 batch of PTS can be manufactured before purchasing any additional raw materials. Choice (A)

Solutions for questions 13 to 16:

Since the values of a and b are not given, we need to find the values of a and b from the prices of commodities X and Y (in the first graph) and the CPI (from the second graph).

$$\begin{aligned} \text{From the values for January, } 20a + 50b = 375 & \quad \text{--- (i)} \\ \text{From the values for February, } 15a + 40b = 297.5 & \quad \text{--- (ii)} \\ 4 \times (\text{i}) - 5 \times (\text{ii}) \Rightarrow 80a - 75a = 12.5 \Rightarrow a = 2.5 \\ \text{Hence, } b = 6.5 \end{aligned}$$

13. Given that the CPI for May = 345
Let the price of commodity Y be p .
The price of commodity X is 0.8p.
Hence,
 $2.5 \times 0.8p + 6.5 \times p = 345 \Rightarrow p = 40.59$
Price of commodity X = $0.8 \times 40.59 = 32.47$ Choice (B)
14. Given that the prices of commodities X and Y increased by 30% and 40%.
However, without knowing the actual prices of the commodities X and Y (or the ratio of the prices), we cannot determine the percentage increase in the CPI.
Choice (D)

15. Given that CPI for May = 396
Since the price of commodity X is the same as that of Y, the price of commodity X (or Y) = $396/9 = 44$
The percentage increase in the price of commodity Y
 $= \frac{44 - 20}{20} = 120\%$ Choice (B)

16. For the price of commodity X to be minimum, the price of commodity Y should be maximum and CPI should be minimum.
Since the price of commodity Y did not increase by more than 5%, the maximum possible price of commodity Y in June = $20 \times 1.05 \times 1.05 = 22.05$
Price of commodity X = $\frac{350 - 6.5 \times 22.05}{2.5} = 82.67$

The value of x is minimum when the price of commodity X increases by the same percentage in each of the two months.

Hence, minimum value of x

$$= \left(\sqrt{\frac{82.67}{80}} - 1 \right) \times 100 = 1.655 \quad \text{Choice (A)}$$

Solutions for questions 17 to 20:

Let 1 to 9 represent the positions of the chairs in the clockwise direction. Let the person who arrived first sit at 1. The person

Solutions for questions 21 to 24:

Given that both Balu and Charu go to the office on 4 days. Hence, at least one of them does not go to the office on 3 days. From the given information about the days that each person does not go to the office, the following cases are possible for the days on which Balu and Charu do not go to the office:

(Saturday, Sunday; Tuesday, Sunday) OR (Saturday, Sunday; Friday Saturday) OR (Monday, Friday, Saturday; Friday, Saturday) OR (Tuesday, Thursday, Saturday; Thursday).

From (ii), the number of days that both Farhan and Harsh do not go to their office is 2 (only then at least one of them go to the office on 5 days). Hence, there is only one possibility for the days on which Harsh and Farhan do not go to the office, i.e., one of them does not go on Mondays, Fridays and Saturdays and the other one does not go on Fridays and Saturdays, in any order.

who arrived second will sit at 6. The person who arrived third will sit at 2. Similarly, the persons who arrived fourth, fifth, sixth, seventh, eighth and ninth will sit at 7, 3, 8, 4, 9 and 5 respectively. We can take the order in which they arrived to be a proxy for their positions around the table.

From (i), B must be at 3 or 8, i.e., B must have been the fifth to arrive or the sixth to arrive.

From (iii), H arrived after D and H was sitting two places to the right of D.

D and H could have arrived 1st and 6th OR 3rd and 8th OR 4th and 9th OR 2nd and 7th. From (vi), D was not the second to arrive and H was not the last to arrive. Hence, they could not have arrived 4th and 9th OR 2nd and 7th.

Let D and H be the 1st and 6th to arrive. B must be the 5th to arrive.

From (iv) and (vi), G and I can be the 3rd and 6th to arrive OR they can be the 2nd and 5th to arrive (in each case, two persons arrived between them and two persons sitting between them). But neither of the two cases are possible since H was the sixth to arrive and B was the fifth to arrive. Hence, this case is not possible.

Hence, D and H must be the 3rd and 8th to arrive. G and I cannot be the 3rd and 6th to arrive. Hence, they must be the 2nd and 5th to arrive. B must be the sixth to arrive.

From (ii), C cannot be the 1st to arrive, since he is not adjacent to H. C must be the 4th to arrive, since he arrived before I (who was the 5th to arrive).

From (i), E cannot be the 1st to arrive, since he is not adjacent to H. E must be the 7th to arrive. A is not the last to arrive. Hence, A must be the first to arrive and F must be the last to arrive.

The following table provides the positions of the nine persons (from 1 to 9) around the table and the order in which they arrived:

Position	Order	Person
1	1	A
2	3	D
3	5	I
4	7	E
5	9	F
6	2	G
7	4	C
8	6	B
9	8	H

17. Three persons arrived before C did. Ans: (3)
18. H was the 8th person to arrive. Two seats were empty just before H arrived at the conference. Ans: (2)
19. Among the two persons who were sitting adjacent to D, A arrived before D and hence, he would have been sitting in a chair adjacent to the one in which D sat by the time D arrived. Choice (C)
20. G was the second person to arrive. Among the given options, C was sitting adjacent to G. Choice (D)

From (iii), Ankit goes to the office on all the days that Dinesh goes to the office. Only two options are possible, i.e., (Monday, Friday, Saturday; Friday, Saturday) OR (Tuesday, Thursday, Saturday; Thursday). However, the first option is not possible since Farhan and Harsh do not go to the office on those days. Hence, Ankit does not go to the office on Thursdays and Dinesh does not go to the office on Tuesdays, Thursdays and Saturdays.

From (iv), both Harsh and Charu go on at least four days. Hence, at least one of them should not go to the office on at most 3 three days, i.e., the number of distinct days that at least one of them does not go to the office is 3 days.

From the available cases, this is possible only if Charu does not go on Saturdays and Sundays and Harsh does not go on Fridays and Saturdays. Only in this case, both Harsh and Charu go on 4 days, i.e., Mondays, Tuesdays, Wednesdays and Thursdays.

Balu does not go on Tuesdays and Sundays. Farhan does not go on Mondays, Fridays and Saturdays.

The other person, Giri, does not go to the office on Mondays, Tuesdays and Wednesdays.

The following table provides the days that each person does not go to his office:

Person	Days that (s)he does not go to the office
Ankit	Thursdays
Balu	Tuesdays, Sundays
Charu	Saturdays, Sundays
Dinesh	Tuesdays, Thursdays, Saturdays
Farhan	Mondays, Fridays, Saturdays
Giri	Mondays, Tuesdays, Wednesdays
Harsh	Fridays, Saturdays

21. Giri goes to the office on 4 days. Choice (C)
 Minimum possible average = $4980/75 = 66.4$
 From the given choices, only the value given in (i) falls within this range.
 Choice (A)
22. At least one among Balu and Farhan go to the office on any day. Hence, the answer is none of the days. Choice (D)
 Minimum possible number of runs that Hanu could have scored in Sri Lanka = $94 \times 8 + 90 \times 11 + 80 \times 26 + 70 \times 14 + 60 \times 13 + 50 \times 2 + 48 = 5730$
 Maximum possible number of runs that Hanu could have scored in Sri Lanka = $94 + 91 \times 7 + 81 \times 11 + 71 \times 26 + 61 \times 14 + 51 \times 13 + 48 \times 3 = 5129$
 Maximum possible average = $5730/75$
 Minimum possible average = $5129/75$
 Required difference = $\frac{5730 - 5129}{75} = \frac{601}{75} = 8 \frac{1}{75}$
 Choice (C)
23. Ankit and Balu both go to the office on 4 days. Choice (C)
 Minimum possible number of runs that Hanu could have scored in Sri Lanka = $94 \times 8 + 90 \times 11 + 80 \times 26 + 70 \times 14 + 60 \times 13 + 50 \times 2 + 48 = 5730$
 Maximum possible number of runs that Hanu could have scored in Sri Lanka = $94 + 91 \times 7 + 81 \times 11 + 71 \times 26 + 61 \times 14 + 51 \times 13 + 48 \times 3 = 5129$
 Maximum possible average = $5730/75$
 Minimum possible average = $5129/75$
 Required difference = $\frac{5730 - 5129}{75} = \frac{601}{75} = 8 \frac{1}{75}$
 Choice (C)
24. On Thursdays, both Farhan and Giri go to the office. Choice (B)

Solutions for questions 25 to 28:

Number of innings in India in which Hanu scored more than 80 runs but less than 91 runs = $21 - 10 = 11$

Similarly, we can calculate the number of innings in which Hanu scored more than 90 runs, between 80 and 90 runs, between 70 and 80 runs and so on for each country. The following table provides the number of innings for each interval:

Runs	India	Sri Lanka
91 and above	10	8
81-90	11	11
71-80	20	26
61-70	11	14
51-60	13	13
41-50	10	3

25. Since Hanu scored a maximum of 96 runs in India, he could have scored a maximum of $96 \times 10 = 960$ runs whenever he scored more than 90 runs.
 Similarly, for each interval we can calculate the highest number of runs that he could have scored in India.
 Maximum possible number of runs that Hanu could have scored in India = $96 \times 10 + 90 \times 11 + 80 \times 20 + 70 \times 11 + 60 \times 13 + 50 \times 9 + 42 = 5592$
 Minimum possible number of runs that Hanu could have scored in India = $96 + 91 \times 9 + 81 \times 11 + 71 \times 20 + 61 \times 11 + 51 \times 13 + 42 \times 10 = 4980$
 Maximum possible average = $5592/75 = 74.56$
 Minimum possible average = $4980/75 = 66.4$
 From the given choices, only the value given in (i) falls within this range.
 Choice (A)
26. Maximum possible number of runs that Hanu could have scored in Sri Lanka = $94 \times 8 + 90 \times 11 + 80 \times 26 + 70 \times 14 + 60 \times 13 + 50 \times 2 + 48 = 5730$
 Minimum possible number of runs that Hanu could have scored in Sri Lanka = $94 + 91 \times 7 + 81 \times 11 + 71 \times 26 + 61 \times 14 + 51 \times 13 + 48 \times 3 = 5129$
 Maximum possible average = $5730/75$
 Minimum possible average = $5129/75$
 Required difference = $\frac{5730 - 5129}{75} = \frac{601}{75} = 8 \frac{1}{75}$
 Choice (C)
27. Since we need to maximize the runs scored by Hanu in the interval 61-70, we need to minimize the runs scored by him in the other intervals.
 The minimum number of runs scored by Hanu in the other intervals in both the countries combined = $5129 - 61 \times 14 + 4980 - 61 \times 11 = 8584$
 Total number of runs scored by him in both the countries combined = $68 \times 150 = 10200$
 Maximum runs that he could have scored in the 25 innings in the interval 61-70 = $10200 - 8584 = 1616$
 Average = 64.64
 Hence, the maximum value thatx can take is 64.
 Choice (C)
28. Average runs scored by Hanu can be 68 only in India.
 Since he scored a maximum of 960 in one innings, from the given information, every time he scored more than 90, he scored 96.
 Since we need to maximize the average runs scored in the interval 81-90, we need to minimize the runs scored in the other intervals.
 Minimum runs scored in the intervals other than the two mentioned above = $71 \times 20 + 61 \times 11 + 51 \times 13 + 42 \times 10 = 3174$
 Total runs scored by Hanu = $68 \times 75 = 5100$

Maximum possible runs scored in the 11 innings in the interval 81-90 = 5100 - 3174 - 960 = 966

$$\text{Maximum average} = \frac{966}{11} = 87 \frac{9}{11} \quad \text{Choice (D)}$$

Solutions for questions 29 to 32:

Given that for each person, the salary that they receive from one family is four times that from the other. Hence, the total salary that each person receives must be of the form $5x$.

Let the total salary that Mary receives from the two families be $5x$. Mary must receive $x/4x$ from one family and $4x/x$ from the other.

From (iii), the salary that Anne receives from Jones = $10x$.

The salary that Anne receives from Smiths can be $40x$ or $5x/2$.

But the minimum value of x is 100 (since the salary of each person is a multiple of 100). If Anne receives $4x$ from Smiths, then the Smiths must be paying Anne ₹4000 each month. This will violate condition (i). Hence, the salary that Anne received from the Smiths must be $5x/2$.

Since John does not receive a salary greater than ₹300 from the Jones, he can receive a salary of either ₹100, ₹200 or ₹300. In each case, the salary that he receives from the Smiths can be ₹400, ₹800 or ₹1200 respectively. The salary that Anne and Mary together receive from the Smiths can be ₹2600 or ₹2200 or ₹1800 respectively.

The total salary that both Anne and Mary receive can be either

$$x + \frac{5x}{2} = \frac{7x}{2} \quad \text{OR} \quad 4x + \frac{5x}{2} = \frac{13x}{2}$$

If the total salary that they receive is $7x/2$, this must be equal to either 2600 or 2200 or 1800. In none of these cases, x will be a multiple of 100.

If the total salary that they receive is $13x/2$, this must be to either 2600 or 2200 or 1800. Only when $13x/2 = 2600$, we get the value of x to be an integral multiple of 100. Hence,

$$\frac{13x}{2} = 2600 \Rightarrow x = 400$$

The salaries that Mary, Anne and John receive from the Smiths are ₹1600, ₹1000 and ₹400 respectively. The salaries that Mary, Anne and John receive from the Jones are ₹400, ₹4000 and ₹100 respectively.

The following table provides the salaries that each person receives from the two families:

Person	Smiths	Jones
Anne	1000	4000
Mary	1600	400
John	400	100

29. The Jones pay a total of 4500 to the three persons.
Ans: (4500)

30. Only Anne receives a higher monthly salary from the Jones as compared to that from the Smiths.
Choice (B)

31. Mary receives Rs. 1600 from the Smiths. Ans: (1600)

32. The ratio of monthly salaries of John and Anne = 500/5000
= 0.1
Ans: (0.1)

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

SECTION – III

Solutions for questions 1 to 34:

1. Let x be the initial monthly income of Gerrard.
Let y be his monthly expenditure.
⇒ His monthly savings = $1.3x - y$.
 $\Rightarrow 1.3x - y = \left(1 + \frac{120}{100}\right)(x - y)$
 $\Rightarrow 1.3x - y = 2.2x - 2.2y$
 $\Rightarrow 1.2y = 0.9x$
 $\therefore \text{The required percentage} = \frac{y}{1.3x} \times 100 = \frac{0.75x}{1.3x} \times 100$
 $\approx 57.7\%$

Alternative Solution:

Since the expenditure remained the same, the entire increase in income is reflected in the increase in savings. Hence, 30% of previous income = 120% of previous savings
⇒ previous savings = 25% of previous income.
⇒ previous expenditure = 75% of previous income.
⇒ present expenditure as a percentage of new income
 $= \frac{75}{130} \times 100 \approx 57.7\%$ Choice (B)

2. Let the roots of $4x^2 - 15x + 12 = 0$ be α and β .

$$\text{Given } \alpha + \beta = \frac{15}{4} \text{ and } \alpha\beta = \frac{12}{4} = 3$$

The roots of new equation are $\frac{3}{\alpha} + \frac{3}{\beta}$

$$\text{Sum of roots} = \frac{3}{\alpha} + \frac{3}{\beta} = \frac{3(\alpha + \beta)}{\alpha\beta} = \alpha + \beta = \frac{15}{4}$$

$$\text{Product of roots} = \frac{3}{\alpha} \cdot \frac{3}{\beta} = \frac{9}{\alpha\beta} = 3$$

Hence, the sum and product of roots are same as for the given equation.

$$\therefore \text{The required equation is } 4x^2 - 15x + 12 = 0$$

Alternative Solution:

If the roots are the reciprocals of the roots of the given equation.

The equation will be obtained by simply interchanging, the coefficient of x^2 and the constant.

Hence, we get $12x^2 - 15x + 4 = 0$

Now, if the roots are three times the original roots, then x

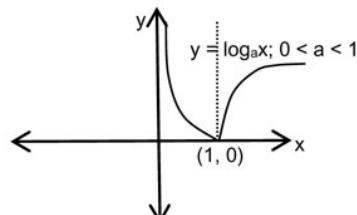
should be replaced with $\left(\frac{x}{3}\right)$.

$$\text{Thus, we get } 12\left(\frac{x}{3}\right)^2 - 15\left(\frac{x}{3}\right) + 4 = 0$$

$$\text{i.e., } 4x^2 - 15x + 12 = 0$$

Choice (D)

3. The graph of $|\log_a x|$ when $0 < a < 1$ is as follows:



The given graph is estimated by shifting the origin through 1 unit in positive X-axis direction.

$$\therefore \text{Required equation is } y = |\log_{0.5}(x-1)|$$

Alternative Solution:

$\log_2(x+1)$ is defined for values of $-1 < x < 1$, but the given graph does not lie to the left of $x = 1$ (i.e., for $x < 1$). Hence, option (A) is eliminated. $\log_2(x-2)$ becomes zero for $x = 3$. However, the given graph attains zero at $x = 2$. Hence, option B is also eliminated.

Further, $\left(\frac{x-2}{x-1}\right)$ is defined for all x , except $x = 1$, but the given graph does not lie to the left of $x = 1$.

Hence, option (C) is also eliminated.

Hence choice (D).

Choice (D)

4. The minimum value of $\frac{(x+a)(x+b)}{(x+c)}$ is obtained when

$$x = \sqrt{(a-c)(b-c)-c}$$

$$\ln \frac{(x+4)(x+10)}{x+2}, a = 4, b = 10, c = 2$$

$$X = \sqrt{(4-2)(10-2)} - 2$$

$$= \sqrt{2-8} - 2$$

$$= 4 - 2 = 2$$

$$\therefore \text{The minimum value is } \frac{6 \times 12}{4} = 18$$

Alternative Solution:

$$\begin{aligned} \frac{(x+4)(10+x)}{x+2} &= \frac{x^2 + 14x + 40}{x+2} \\ &= \frac{(x^2 + 4x + 4)}{x+2} + \frac{(10x + 36)}{x+2} \\ &= x+2 + \frac{10(x+2)}{x+2} + \frac{16}{x+2} \\ &= 10 + \left[(x+2) + \frac{16}{(x+2)} \right] \end{aligned}$$

Now, the product of the above two terms in the brackets is a constant and equal to 16. Hence, the sum is the minimum when each term is equal to the square root of the constant product, i.e., 16.

$$\text{Hence, } (x+2) = \frac{16}{(x+2)} = \sqrt{16} = 4$$

$$\text{Hence, required minimum of } \frac{(x+4)(10+x)}{x+2}$$

$$= 10 + [4 + 4] = 18$$

Ans: (18)

5. Let the age of the son be x years, when his father was nine times his age.

$$\text{Age of father} = 9x \text{ (or)}$$

$$= 32 + x \text{ (Since difference in ages does not change)}$$

$$\Rightarrow 9x = 32 + x$$

$$\Rightarrow 8x = 32$$

$$\Rightarrow x = 4 \text{ years}$$

\therefore When the son was 4 years of age, the father was nine times as old as the son.

Choice (B)

6. The no. of diagonals in a n -sided regular polygon is

$$\frac{n(n-3)}{2}$$

$$\Rightarrow n(n-3) = 88$$

$$\Rightarrow n = 11$$

The interior angle of a regular n -sided polygon

$$= 180^\circ - \frac{360^\circ}{n}$$

$$\begin{aligned} &= 180^\circ - \frac{360^\circ}{11} \\ &= 147 \frac{3}{11}^\circ \end{aligned}$$

Choice (B)

Note: Once it is found that $n = 11$, which is not a factor of 360° , the exterior angle (and hence, even the interior angle) will not be a whole number. Hence, only choice (B) is possible.

$$\begin{aligned} 7. f(x) &= \frac{4x^2 - 5}{4x^2 + 2} = \frac{4x^2 + 22 - 5}{4x^2 + 2} \\ &= \frac{4x^2 + 2}{4x^2 + 2} - \frac{7}{4x^2 + 2} \\ &= 1 - \frac{7}{4x^2 + 2} \end{aligned}$$

For $f(x)$ to be minimum, $\frac{7}{4x^2 + 2}$ should be maximum, which means $4x^2 + 2$ should be minimum. Now, $4x^2 + 2$ is minimum at $x = 0$.

$$\therefore \text{Minimum value of } f(x) = -\frac{5}{2} \quad \text{Choice (A)}$$

8. Given $f(x+y) = f(x) + f(y)$
If any function satisfies the above condition. Then it must be of the form Kx where K is a constant.
 \therefore Let $f(x) = Kx$
Given $f(4) = 16$
 $\Rightarrow 4K = 16$
 $\Rightarrow K = 4$
 $\therefore f(x) = 4x$ and $f(15) = 4(15) = 60$

Alternative Solution:

$$\begin{aligned} f(4) &= 16 \\ \Rightarrow f(2) + f(2) &= 16 \\ \therefore f(2) &= 8 \\ \text{and similarly } f(1) &= 4 \\ \text{Now } f(4+2) &= f(6) = f(4) + f(2) = 16 + 8 = 24 \\ \text{and } f(6+1) &= f(7) = f(6) + f(1) = 24 + 4 = 28 \rightarrow (1) \\ \text{Also, } f(4) &= 16 \\ \Rightarrow f(8) &= f(4) + f(4) = 32 \rightarrow (2) \\ \text{Now } f(15) &= f(8+7) = f(8) + f(7) \\ &= 32 + 28 \text{ (from (1) and (2))} \\ &= 60. \end{aligned}$$

Ans: (60)

9. The function is not defined when $2x^2 - 17x + 33 = 0$

$$\Rightarrow (2x-11)(x-3) = 0$$

$$\Rightarrow x = \frac{11}{2}, x = 3$$

x^2 should be > 0 and $\neq 1$

$$x^2 > 0$$

$$\text{Domain} = \mathbb{R} - \{-1, 0, 1, 3, 11/2\}$$

Choice (C)

Solutions for questions 10 and 11:

10. The total journey given is a round trip i.e., from A to B and then from B to A.

For a round trip, the total distance travelled uphill is equal to total distance travelled downhill.

Total distance travelled = 1600

Total uphill/downhill

$$\begin{aligned} &= \frac{\text{Total distance} - \text{Distance on level surface}}{2} \\ &= \frac{1600 - 600}{2} = 500 \text{ km} \end{aligned}$$

Let the fuel consumption on level road be x litres per km.
Total fuel consumption

$$= 600(x) + 500 \left(\frac{120}{100}x \right) + 500 \left(\frac{50}{100}x \right)$$

$$= 600x + 500 \times \frac{170}{100}x$$

$$= 600x + 850x$$

$$= 1450x$$

Given that $1450x = 145$

$X = 0.1$ litre per km.

$$\text{Mileage} = \frac{1}{\text{Fuel consumption}} = \frac{1}{0.1} = 10 \text{ km/litre}$$

Mileage downhill = 20 km/litre

Ans: (20)

11. As the uphill journey from A to B is a fourth of downhill, the downhill journey from B to A will be one-fourth of uphill journey.

Total journey = uphill + level + downhill

$$800 = \text{uphill} + 300 + \frac{1}{4} \text{uphill}$$

$$800 = 300 + \frac{5}{4} \text{uphill}$$

Uphill distance = 400 km

Downhill distance = 100 km

Total fuel consumption

$$= 300 \times 0.1 + 400 \times \frac{120}{100} \times 0.1 + 100 \times \frac{50}{100} \times 0.1$$

$$= 30 + 48 + 5 = 83 \text{ litres}$$

Ans: (83)

12. The amount repaid by Amar to RIB

$$= 15000 \times \left(1 + \frac{20}{100}\right)^2 = 15000 \times \frac{36}{25}$$

Amount repaid by Amar to SIB

$$= 15000 \times \left(1 + \frac{10}{100}\right)^{2 \times 2}$$

$$= 15000 \times \left(\frac{11}{10}\right)^4$$

$$\text{Required ratio} = \frac{36}{25} \times \left(\frac{10}{11}\right)^4 = \frac{36 \times 400}{11^4} = \frac{14400}{14641}$$

Choice (A)

13. From top of the pole

$$\tan 30^\circ = \frac{(h-30)}{d}$$

$$\frac{1}{\sqrt{3}} = \frac{h-30}{d} \Rightarrow d = \sqrt{3}(h-30) \rightarrow (1)$$

From bottom of the pole

$$\tan 60^\circ = \frac{h}{d}$$

$$\sqrt{3} = \frac{h}{d}$$

$$d = \frac{h}{\sqrt{3}} \rightarrow (2)$$

From (1) and (2)

$$\sqrt{3}(h-30) = \frac{h}{\sqrt{3}}$$

$$3h - 90 = h \Rightarrow h = 45 \text{ m}$$

Choice (A)

14. The foot of the perpendicular from (3,4) on the line / will be the midpoint of (3,4) and its reflection along the line / i.e., (5,-8). Hence, the required point is

$$\left(\frac{3+5}{2}, \frac{4-8}{2} \right) = (4, -2)$$

Choice (C)

15. $x = \log_a(3 \times 5)$

$y = \log_a(3^2 \times 5)$

$z = \log_a(3 \times 5^2)$

$10125 = 81 \times 125 = 3^4 \times 5^3$

The best way to quickly solve this question is by going through the options.

Checking for power of 5 in choice (A)

$$\frac{2x+4y+2z}{3} = \log(5^2 \times 5^4 \times 5^4)^{1/3}$$

= $\log 5^{10/3}$, Not correct

Similarly checking for other options, we get only for option (C)

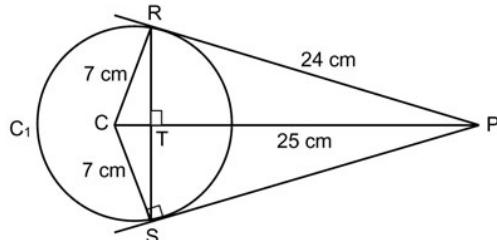
$$\frac{3x+4y+z}{3} = \log_a \left(3^3 \times 5^3 \right) + \log \left(3^8 \times 5^4 \right) + \log \left(3 \times 5^2 \right)$$

$$= \frac{1}{3} \log_a \left(3^{12} \cdot 5^9 \right)$$

$$= \log_a(3^4 \cdot 5^3) = \log_a 10125$$

Choice (C)

16. Let T be the foot of the perpendicular drawn from R to CP.



PR is a tangent to circle C1.

$$\Rightarrow PC^2 = PR^2 + CR^2$$

$$\Rightarrow PC^2 = 7^2 + 24^2$$

$$\Rightarrow PC = 25 \text{ cm}$$

PRC is a right-angled triangle,

$$RT = \frac{(PR)(RC)}{PC} = \frac{(24)(7)}{25} = \frac{168}{25}$$

$$PT = \left(\frac{PR}{PC} \right) (PR) = \frac{PR^2}{PC} = \frac{24 \times 24}{25}$$

$$\therefore \text{The required area} = \frac{1}{2} (RS)(PT)$$

$$= \frac{1}{2} (2RT)(PT)$$

$$= \frac{168}{25} \times \frac{576}{25} = \frac{96768}{625}$$

Choice (A)

17. Arithmetic mean of the terms of an A.P

$$= \frac{n(2a + (n-1)d)}{n} = \frac{2a + (n-1)d}{2}$$

\therefore Arithmetic mean

$$= \frac{2(4) + (26)3}{2} = 43$$

Alternative Solution:

Arithmetic mean of 27 terms (odd)

$$= 14^{\text{th}} \text{ term} = a + (14-1)d$$

$$= 4 + 13 \times 3 = 43.$$

Choice (A)

18. Mean = $\frac{1+3+8+12+x}{5}$

$$= \frac{24+x}{5}$$

Median

$$= 3, \text{ if } x = 2$$

$$= x, 3 < x < 8$$

$$= 8, \text{ when } x > 8$$

Now, as x is increased beyond 12, the median remains 8. Hence, we can intuitively conclude that there are infinite possible values of x for which mean \geq median.

$$\text{If } \frac{29+x}{5} \geq 8, \text{ then } x \geq 16.$$

Hence, for every integer value of $x \geq 16$, mean \geq median
Choice (D)

19. Given $\|x+3|-x|=4$

Case (i): When $x < -3$

$$|x+3| = -x-3$$

$$\Rightarrow |-x-3-x|=4$$

$$\Rightarrow |-2x-3|=4$$

$$\Rightarrow -2x-3=-4 \text{ (or)} -2x-3=4$$

$$\Rightarrow x=1/2 \text{ (or)} x=\frac{-7}{2}$$

Only $x = \frac{-7}{2}$ satisfies (since, $x < -3$)

Case (ii): When $x > -3$

$$|x+3|=x+3$$

No solution exist as $|3| \neq 4$

\therefore The equation has one solution
Choice (B)

20. Let the present ages of A and B be $3k$ years and $7k$ years respectively.

$$\text{The ratio of their ages 15 years ago} = \frac{3k-15}{7k-15} = \frac{1}{4}$$

$$\Rightarrow 12k-60=7k-15 \Rightarrow k=9$$

Therefore the present ages of A and B are 27 years and 63 years and the difference between the present ages is 36 years. As the difference between the age of two persons does not change with time, the difference between their ages after 2n years will also be 36 years. Choice (C)

21. If B attempted the exam on Day 1 Slot 2, A would have attempted on Day 1, Slot 1. C could have attempted in two ways (Day 3, Slot 1 and Slot 2).

If B attempted the exam on Day 2 Slot 1, A could have attempted in two ways and C could have attempted in three ways (One Day 1 slot and two Day 3 slots) i.e. a total of $2 \times 3 = 6$ ways.

If B attempted the exam on Day 2 Slot 2, they could have attempted the exam in 6 ways.

If B attempted the exam on Day 3 Slot 1, they could have attempted the exam in 4 ways.

If B attempted the exam on Day 3 Slot 2, they could have attempted the exam in 6 ways.

Total number of ways = $2 + 6 + 6 + 4 + 6 = 24$ ways.
Choice (C)

22. We need to find the points of intersection of $F(x)$ and $G(x)$

$$\Rightarrow x^2 + 12 - 6 = 3x - 6 - x^2$$

$$\Rightarrow 2x^2 + 9x = 0$$

$$\Rightarrow x(2x+9) = 0$$

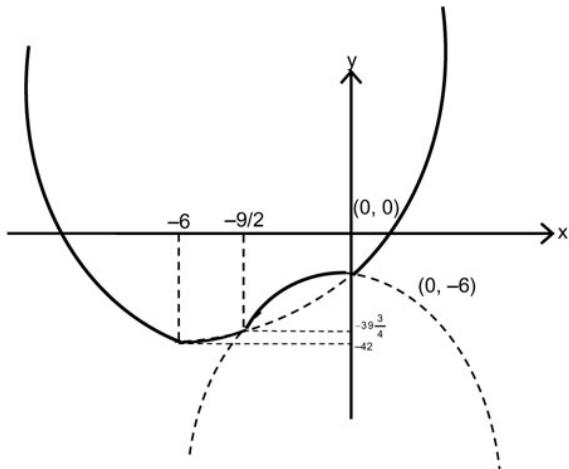
$$\Rightarrow x = 0 \text{ or } -\frac{9}{2}$$

When $x = 0$, $H(x) = F(x) = G(x) = -6$

and when $x = -\frac{9}{2}$, $H(x) = F(x) = G(x)$

$$= \left(-\frac{9}{2}\right)^2 + 12\left(-\frac{9}{2}\right) - 6,$$

i.e., $-39\frac{3}{4}$, which is less than -6 .



In the figure above, the solid line represents $H(x)$

We can observe that $F(x)$, reaches its minimum at $x = -6$ ($\because F(x) = (x+6)^2 - 42$). And the minimum value at $x = -6$ is -42 , which is lesser than $-39\frac{3}{4}$.

Hence, $H(x)$ achieves it minimum at $x = -6$.

Ans: (-6)

23. The amount of discount received on the first transaction

$$= \frac{40}{100} \times 330 = ₹132$$

The amount of discount received on the second transaction

$$= \frac{40}{100} \times 370 = ₹148$$

The amount of discount received on the third transaction

$$= \frac{40}{100} \times 430 = ₹172 > 150$$

Since, $172 > 150$, the amount of discount received on third transaction is ₹150.

$$\therefore \text{The required percentage} = \frac{(132+148+150)}{(330+370+430)} \times 100$$

$$= \frac{430}{1130} \times 100 \approx 38.05\%$$

Choice (D)

24. $\frac{x}{112} = \frac{343}{\sqrt[3]{x}}$

$$x^1 \times x^{1/3} = 7 \times 16 \times 7^3$$

$$x^{4/3} = 7^4 \times 2^4$$

$$\Rightarrow x^{2/3} = 7^2 \times 2^2 = 196.$$

Choice (B)

25. Let the price of each apple banana, mango and pineapple be a, b, m, p respectively

Given

$$3a = 10b$$

$$5b = 4m$$

$$8m = 3p$$

$$\text{i.e., } 3a = 10b = 8m = 3p$$

For easier calculation, let

$$a = 40$$

$$p = 40$$

$$b = 12$$

$$m = 15$$

Now, by checking each option, we can see that option (B) would cost the highest.

Choice (B)

26. Arithmetic mean = $\frac{5+5+8+8+7+9+9}{8}$

$$= \frac{56}{8} = 7$$

$$\text{Standard deviation (S. D)} = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n}}$$

$$= \sqrt{\frac{3(-7+5)^2 + 2(-7+8)^2 + 1(-7+7)^2 + 2(-7+9)^2}{8}}$$

$$= \sqrt{\frac{12+2+0+8}{8}} = \sqrt{\frac{22}{8}} = \frac{\sqrt{11}}{2} \quad \text{Choice (D)}$$

27. P, Q and R satisfy the condition

$$3(P+Q) = 2(R-Q)$$

$$\Rightarrow 3P + 5Q - 2R = 0$$

$$\Rightarrow 2R - 5Q - 3P = 0$$

Dividing by -3, we get

$$R\left(-\frac{2}{3}\right) + Q\left(\frac{5}{3}\right) + P = 0$$

Hence the co-ordinates of the point $\left(-\frac{2}{3}, \frac{5}{3}\right)$ satisfy the equations of the concurrent lines and it lies on each of these lines i.e., the point of concurrence.

Alternative Solution:

Assuming $P = Q = 1$, we get $R = 4$.

\Rightarrow One of the possible lines is $4x + y + 1 = 0$. Checking each option given, we can see that only option (D) satisfies.

Choice (D)

28. $x = K(y^3 + 6)$

$$28 = K(8 + 6)$$

$$\Rightarrow K = \frac{28}{14} = 2$$

$$\Rightarrow 140 = 2(y^3 + 6)$$

$$\Rightarrow 70 = y^3 + 6$$

$$\Rightarrow y^3 = 64$$

$$\Rightarrow y = 4$$

Ans: (4)

29. Let the part of job done by a man and a woman each day be m units and w units respectively

Given

$$2m + 5w = \frac{2}{15} \quad (\text{A})$$

$$5m + 25w = \frac{1}{2} \quad (\text{B})$$

$$S(\text{A}) - S(\text{B})$$

$$10m - 5m = \frac{2}{3} - \frac{1}{2} \Rightarrow 5m = \frac{1}{6}$$

$$\Rightarrow m = \frac{1}{30}$$

\therefore One man can complete $1/30$ th of job in 1 day.

Hence, 10 men can complete the job in 3 days.

Choice (C)

30. During the 1st minute, only tap 1 would be opened. So 1 litre would be emptied. During 2nd minute, taps 1 and 2 would be opened. The taps 1 and 2 would empty 1 litre and 2 litres respectively.

Similarly in the n^{th} minute $(1 + 2 + 3 \dots n)$ litres would be removed.

Now adding Σn from 1 to n

$$1 + (1+2) + (1+2+3) \dots (1+2+3 \dots n) \geq 200$$

$$\sum \frac{n(n+1)}{2} = \sum \frac{n^2+n}{2}$$

$$= \frac{1}{2} \left[\frac{1}{6} n(n+1)(2n+1) + \frac{n(n+1)}{2} \right]$$

$$= \frac{n(n+1)(n+2)}{6}$$

If $n = 9$, i.e., 9 taps are opened, total water empited.

$$\frac{9 \times 10 \times 11}{6} = 165 \text{ litres}$$

At the end of 9th minute there would be 35 litres remaining, and the rate at which the tank will be emptied during the 10th minute $= (1 + 2 + 3 + \dots + 10) = 55$.

Hence, the tank will be empty in $\left(9 + \frac{35}{55}\right)$ minutes

$$= 9 \frac{7}{11} \text{ minutes} \quad \text{Choice (D)}$$

31. Quantity of water in 5 litres of 70% solution

$$= \frac{(100 - 70)}{100} \times 5 = 1.5 \text{ litres}$$

After adding 2 litres of water, total quantity is 7 litres and amount of water becomes $(1.5 + 2 = 3.5 \text{ litres})$

$$\therefore \text{Water percentage} = \frac{3.5}{7} \times 100 = 50\% \quad \text{Choice (C)}$$

32. If the lengths of the minute hand and hour hand are equal, the area covered by the minute hand will be 12 times the area covered by the hour hand in the same time (for example, consider a duration of exactly one hour).

Since the length of the minute hand is 40% more and area is $\propto (\text{radius})^2$, the area covered by the minute hand $= 12 \times (1.4)^2 \times \text{Area covered by the hour hand}$.

$$\therefore \text{Required ratio} = 12 \times 1.96 = 23.52 : 1 \quad \text{Choice (B)}$$

33. Let the first term and the common ratio of a an d r respectively.

Given that

$$\frac{a}{1-r} = 18 \Rightarrow \left(\frac{a}{1-r}\right)^2 = 324$$

$$\text{And } \frac{a^2}{1-r^2} = 162$$

$$\Rightarrow a^2 = 324 (1-r)^2 = 162 (1-r^2)$$

$$324(1-r)^2 - 162(1-r)(1+r) = 0$$

$$162(1-r)[2(1-r) - (1+r)] = 0$$

$$\Rightarrow (1-r)(1-3r) = 0$$

$$r \neq 1 (\because |r| < 1)$$

$$\therefore r = \frac{1}{3}$$

Choice (B)

34. No. of arithmetic progressions with at least three terms, where first term is a and last term is $b = [\text{No. of factors of } (b-a)] - 1$

$$\text{No. of factors of } (b-a) = 11 + 1 = 12$$

For $(b-a)$ to have 12 factors $(b-a)$ should be of the form. p^{11} (or) $p^5 q^1$ (or) $p^3 q^2$ (or) $p^2 q r$ where p, q, r are prime numbers.

To get minimum value of $(b-a)$ let $p = 2, q = 3$ and $r = 5$. The values we get are $2^{11}, 2^5 \cdot 3, 2^3 \cdot 3^2, 2^2 \cdot 3 \cdot 5$

$$\therefore 60 \text{ is least value } (b-a) = 60$$

Least values of $a = 1, b = 61$

Ans: (61)

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