

(Key and Solutions for AIMCAT1822)

Key

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2. D	9. 4	16. D	23. D	30. 2
3. C	10. B	17. A	24. A	31. 3
4. B	11. A	18. B	25. 14253	32. 4
5. C	12. D	19. C	26. 42513	33. 4
6. C	13. 135	20. 25	27. 21543	34. 1
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1. C	8. B	15. 44	22. DC	29. 3
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4. 10	11. D	18. 4	25. C	32. 1
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1. C	8. 12	15. 6000	22. 33	29. B
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3. 4031	10. A	17. C	24. A	31. 43.2
4. C	11. 150	18. B	25. C	32. D
5. C	12. C	19. D	26. D	33. D
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7. B	14. B	21. A	28. D	

Solutions

SECTION – I

Solutions for questions 1 to 3:

Number of words and Explanatory notes for RC:

Number of words: 408

1. According to the author, "If we go back some 15 to 20 years ago, web design was all about visual design" and these websites were "gorgeous".

Option A: The author mentions that they looked "gorgeous" but he does not say anything about the buttons in the website. Hence, this is not the correct answer.

Option B: According to the author, these websites were "pieces of art, and the actual benefit to the user, the result, was secondary, if that". Hence, we can say that the actual benefit to the user was not very important in these websites. Therefore, this is the correct answer.

Option C: While the author mentions that the benefit to the user was "secondary", we cannot infer from the passage that these websites provided no benefits to the user. Hence, this option is incorrect.

Option D: The author does not mention the features or the complexity of these websites and, therefore, we cannot infer this option from the passage.

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

2. The author mentions that while designing the web, we did not learn from other fields where it was already known that "time spent with the product itself was wasted time".

Option A: The author does not talk about the interactions between experts from different fields. Hence, this is not the correct answer.

Option B: The author implies that web designing did not borrow knowledge from other fields. He states that "No studies or best practices for the web were available". Therefore, this option is incorrect.

Option C: The author mentions that the "quickest route to the result is the best way to design". He probably would not advocate that users like to spend more time using appealing products. Hence, this is not the correct answer.

Option D: The author mentions in the last paragraph that Google used the information available in other fields, that "that time spent with the product itself was wasted time". This information was not used in the early days of web designing. Hence, this is the correct answer.

Choice (D)

3. From the passage, we can infer that the author will consider any website which minimizes the time spent by a user on the website as the best designed website. From the options, the answer is the website described in option C.

Choice (C)

Solutions for questions 4 to 6:**Number of words and Explanatory notes for RC:**

Number of words: 403

4. The author mentions that it is a worrying news because "life in your 90s is not always much fun".

Option A: The author mentions that "In the UK, our health and social care setups are going down the pan already". However, we cannot infer from this that the social care systems are lacking in the developed world. Hence, this is not the correct answer.

Option B: The author provides the example of his mother who suffered during her 90s. He also mentions that "healthy life expectancy falls a good deal short of life expectancy. And that's the big problem." Hence, the reason why this news is worrying is because people cannot lead a healthy life after their 90s.

Option C: The author states that in their 90s, people "feel like a useless burden" but does not say that they become a useless burden. Hence, this is not the correct answer.

Option D: The author talks about the lack of independence and the problems associated with old age. However, he does not mention that they will not be taken care of. Hence, this is not the correct answer.

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

5. The fifth paragraph of the passage mentions that the "health and social care setups are going down the pan already". Further, the author also states that "I imagine 70- and 80-year-old children ... who can afford to be retired for 25-30 years?"

Option A: The author mentions that the 90-year-old persons will all be retired and he does not talk about the children of these persons. Hence, this is not the correct answer.

Option B: The author mentions that "70- and 80-year-old children tottering around caring for their ancient parents". Hence, this option is incorrect.

Option C: The author feels that no one can afford to be retired for 25-30 years. Because of this, he feels that 90-year-old persons have to depend on their children. This is the problem that the author discussed in this paragraph. I imagine 70- and 80-year-old children tottering around caring for their ancient parents. Unless they're still working, because who can afford to be retired for 25-30 years? When people live to beyond 90, it will be left to their 70 year-old kids to look after them. Unless, people don't retire at 70. If they don't retire they might not be able to give their 90+ parents the time, affection, physical assistance, attention they need. Hence choice C is the answer.

Option D: While this option may be true, it does not explain the problem that the 90-year-olds may face. Hence, this is not the correct answer.

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

6. In the last paragraph of the passage, the author mentions that he is "frightened of death" but "more frightened of living to a very old age in this country". The author compares having to live for over 90 years and not having to live for 90 years because of the "caveats to these reports: climate change, natural disasters, new and uncontrollable diseases or gigantic wars may wipe out millions of us". Therefore, he is comparing living for long with life expectancy reducing due to these catastrophes. Hence, the correct answer is option C (I and III). Choice (C)

Solutions for questions 7 to 12:**Number of words and Explanatory notes for RC:**

Number of words: 746

7. The common popular view of alchemy, its practitioners, and place of practice is that of Renaissance Europe. The practice of something akin to alchemy can be traced back to ancient Babylon. This makes choice B the correct answer. Choice (B)

8. Two of the most famous Islamic alchemists were Al Jabir ibnHayyan (722-815) and Al Razi (866-925). Jabir, known to his later Christian admirers as Geber, created a number of alchemical apparatus – such as the distillation flask, alembic, and test tubes – that became standard equipment in any alchemical laboratory. Hence choices A, B and D are mentioned in the passage. Choice C has not been mentioned and is the answer. Choice (C)

9. Statement (1) The most well-known aim of alchemy was to find a technique through which the alchemist could transmute base metals like lead into gold. Hence 1 is true and is not the answer.

Statement (2) For some alchemists "the great work" was less about the prosaic transformation of materials than about a higher transformation of one's soul: to leave baser human foibles behind for spiritual enlightenment. So 2 is true and is not the answer.

Statement (3) The Greek mania for simplifying the universe so it could be better understood led to the creation of the four elements concept The Greeks visualized the world around a diagram listing air, fire, earth, and water as the four basic building blocks of the universe It is persuasively argued by historians that alchemical research helped pave the way for later understandings of the universe and was a pivotal intellectual part of the Scientific Revolution Therefore 3 is true and is not the answer.

Statement (4) 4 has not been discussed in the passage and is therefore the answer. The traditional view is that alchemy was a strange, irrational fringe pursuit and that chemistry, as a logical practice, evolved out of it almost accidentally. This implies that creation of a subject called chemistry was not the objective of alchemy.

Statement (5) Alchemy was seen not as a way to produce silver and gold to make one rich, but as a means of producing medicines to make one healthy Hence 5 is correct and is not the answer.

Ans: (4)

10. The vehicle by which either transmutation would occur was the production of the Philosopher's Stone.

Option A: The traditional view is that alchemy was a strange, irrational fringe pursuit and that chemistry, as a logical practice, evolved out of it almost accidentally. So we cannot say that the discovery of the Philosopher's Stone led to the emergence of a separate field called chemistry.

Option B: Taken internally, the Philosopher's Stone would act as an elixir of life. Hence choice B is correct.

Option C: A higher transformation of one's soul: to leave baser human foibles behind for spiritual enlightenment. The vehicle by which either transmutation would occur was the production of the Philosopher's Stone. But the Philosopher's stone was not the vehicle through which human weaknesses could be converted into spiritual strengths. Therefore choice C cannot be inferred.

Option D: Choice D cannot be inferred to be true from the passage. Choice (B)

11. Option A: The traditional view is that alchemy was a strange, irrational fringe pursuit and that chemistry, as a logical practice, evolved out of it almost accidentally. Hence choice A is not correct and is the answer.

Option B: The traditional view is that alchemy was a strange, irrational fringe pursuit and that chemistry, as a logical practice, evolved out of it almost accidentally. So choice B is true and is not the answer.

Option C: After the early part of the 16th century, however, a division between the two practices did appear, with alchemy veering off into the more spiritual and metaphysical aspect of the endeavor (including the transmutation of metals) and chemistry moving toward its modern form as a non-metaphysical science of materials and atomic structure. Hence choice C is true and is not the answer. Choice (A)

12. Option A: The modern reappraisal of alchemy, and its resurrection as a worthwhile topic of historical study, came in the late 1970s with the publication of Belgian historian of science Robert Halleux's *Les Textes Alchémiques*. So choice A is not the answer.

Option B: As a result, an entire body of knowledge, not all of which was alchemical, was developed based upon the writings attributed to this character and called the *Hermetica*.

Option C: The first alchemical book to reach Europe was a translation by Englishman Robert of Chester called *The Book of the Composition of Alchemy*.

Option D: TurbaPhilosophorum finds no mention in the passage and is the answer.

Choice (D)

Solutions for questions 13 to 18:

Number of words and Explanatory notes for RC:

Number of words: 728

13. The last sentence of para 3 needs to be considered for this question: **Reflections** on **those** men (all of whom Baldwin knew) and their legacies are interspersed with passages from other sources. The penultimate sentence of para 3 mentions: Much of it comes from notes and letters written in the mid-1970s, when Baldwin was somewhat reluctantly sketching out a book, never to be completed, about the **lives and deaths** of **Medgar Evers, Malcolm X and Martin Luther King Jr.**

So the correct answers are (1), (3) and (5).

Statement (2): (2) is not the answer for the question. The voice-over narration (read by Samuel L. Jackson) is entirely drawn from Baldwin's work

Statement (4): A documentary about Patrice Lumumba has been referred to in the passage as the previous work of the filmmaker Mr. Raoul Peck. Statement 4 does not apply.

Ans: (135)

14. Option A: Choice A is not correct. You glimpse an aspect of his personality that was often evident in his writing: the vulnerable, bright, **ambitious** man thrust into a public role that was not always comfortable. 'resilient' in choice A would counter or contradict 'vulnerable'.

Option B: Choice B is correct. He understood the deep, contradictory patterns of our history, and articulated, with a passion and clarity that few others have matched, the **psychological dimensions of racial conflict**

Option C: The first part of choice A is incorrect. You are aware of Baldwin's **profound weariness**. You glimpse an aspect of his personality that was often evident in his writing: the vulnerable, bright, ambitious man **thrust into a public role that was not always comfortable**. The second part of choice C is again incorrect. He must explain himself – and also his country – again and again, with what must have been sorely tested **patience**. The disarming, intimate **candor** of that statement characterized much of what would follow, as would a reckoning with the **difficulties of living up to such apparently straightforward aspirations**. Choice C is not true.

Option D: The passage describes Baldwin as a former child preacher. Baldwin modestly described himself as a witness, and his alienation from the Christianity of his childhood. So choice D is incorrect.

Choice (B)

15. Refer to the first two paras of the passage. An anonymous reader wanted to know: "Since when is everything about race?" Perhaps it was a rhetorical question.

Option A: A flippant – though by no means inaccurate – answer would have been 1619. This makes choice A incorrect.

Option B: Choice B is out of scope. There is no audience mentioned in the passage.

Option C: But a more constructive response might have been to recommend Raoul Peck's life-altering new documentary, "I Am Not Your Negro." Whatever you think about the past and future of what used to be called "race relations" – white supremacy and the resistance to it – this movie will make you think again. Hence choice C is the answer.

Option D: The author does say that the question posed could be a rhetorical question. He does not hint at the reader who posed the question as insouciant or flippant

(not showing a serious or respectful attitude). It has only been mentioned in the passage that "1619" would be a flippant answer to the question. Hence choice D cannot be inferred to be true.

Choice (C)

16. Option A: Baldwin could not have known about Ferguson and Black Lives Matter. But choice A (..... could not be associated with Black Lives Matter even though he wanted to) is out of scope.

Option B: Baldwin was somewhat reluctantly sketching out a book, never to be completed, about the lives and deaths of Medgar Evers, Malcolm X and Martin Luther King Jr. But choice B is out of context and is not the reason for the question.

Option C: Choice C is a clever distortion.

Option D: Baldwin could not have known about Ferguson and Black Lives Matter, about the presidency of Barack Obama and the revival of white nationalism in its wake, but in a sense **he explained it all in advance**. Its subject or principal figure, James Baldwin, **has been dead for 30 years**, Hence choice D can be inferred.

Choice (D)

17. A more constructive response might have been to recommend Raoul Peck's life-altering new documentary, "I Am Not Your Negro." Also refer to the last few paragraphs.

Option A: "I Am Not Your Negro" reproduces and redoubles this effect. It doesn't just make you aware of Baldwin, or hold him up as a figure to be admired from a distance. You feel entirely in his presence, hanging on his every word, following the implications of his ideas as they travel from his experience to yours. At the end of the movie, you are convinced that you know him. And, more important, that he knows you. "I Am Not Your Negro" is a thrilling introduction to his work, a remedial course in American history, and an advanced seminar in racial politics – a concise, roughly 90-minute movie with the scope and impact of a 10-hour mini-series or a literary doorstop.

Option B: Choice B has been discussed in the earlier part of the passage. But it is not the final conclusion of the author.

Option C: "I can't be a pessimist because I'm alive," Baldwin had said. "I'm forced to be an optimist." But the word 'always' in choice C makes it extreme.

Option D: Choice D is a distortion of the part: "You would be hard-pressed to find a movie that **speaks to the present moment** with greater clarity, insisting on drawing stark lessons **from the shadows of history**." Choice D is not the final conclusion of the author.

Choice (A)

18. Option A: This is not to say that he transcended the struggle or detached himself from it. Hence we cannot say that he did not experience the struggle of ordinary people. So choice A is incorrect.

Option B: Recounting his visits to the South, where he reported on the civil rights movement and the murderous white response to it, Baldwin modestly described himself as a **witness**, a **watchful presence** on the sidelines of tragedy and heroism; an outsider by virtue of his Northern origins and his alienation from the Christianity of his childhood. But he was also a prophet, able to see the truths revealed by the contingent, complicated actions of ordinary people on **both sides of the conflict**. Hence choice B is correct.

Option C: Choice C is not entirely correct. The penultimate para only mentions: a ruthless critical spirit is necessary for moral and political action.

Option D: Choice D is true but it is out of context. ".... his alienation from the Christianity of his childhood"

Choice (B)

Solutions for questions 19 to 24:

Number of words and Explanatory notes for RC:

Number of words: 798

19. Refer to the last para of the passage.

Option A: The author does talk about the disadvantages of self-righteousness in the first para. This self-righteousness

- can be destructive. But "it is bad..." in choice A is judgmental in tone. Choice A also does not connect with the penultimate sentence of the last para. Choice A is not the answer.
- Option B: This self-righteousness can be destructive Choice B echoes the points of view of the author in the first para. It does not extend the thought expressed in the penultimate sentence of the last para. Choice B is not the answer.
- Option C: Choice C follows as a consequence of the point of view expressed in the penultimate sentence. "our moral self-image is well-established (either through actions or the self-enhancement effect)" in the penultimate sentence links with "we tend to believe that we are above the moral average" in choice C. "we may feel less obligated to follow a strict ethical code" in the penultimate sentence links with "could ironically makes us less so (i.e. less moral)". Choice C aptly brings the passage to a close.
- Option D: On the other hand, self-enhanced moral superiority could erode our own ethical behavior. When our moral self-image is well-established (either through actions or the self-enhancement effect), we may feel less obligated to follow a strict ethical code. "we may feel less obligated" in the penultimate sentence does not translate into "will lead to people". "less obligated to follow a strict ethical code" and "people following lenient ethical codes" are repetitive in tone. Choice D does not complete and conclude the last paragraph.
- Choice (C)
- 20.** When comparing ourselves versus other people, we tend to rate **ourselves** more highly on a host of positive measures, including intelligence, ambition, friendliness, and modesty. This self-enhancement effect is most profound for moral characteristics. So (1), (3) and (4) would be examples of the "Self-enhancement effect". (2) provides a reference to some people vs other people without including a reference to 'self'. (5) with its emphasis on 'all' is again not an example of "self-enhancement effect".
- Ans: (25)
- 21.** Option A: The key to estimating the rational component of self-enhancement is understanding **how** an individual might infer the characteristics of others. Choice A is a misdirection.
- Option B: The key to estimating the rational component of self-enhancement is understanding how an individual might infer the characteristics of others. To do this, Tappin and McKay adapted the Social Projection Index (SPI). This makes choice B the correct answer.
- Option C: Choice C is not the reason for the question.
- Option D: Choice D has been mentioned in para 3 but "to prove" in choice D is out of context. "When we make judgments about ourselves and others, we have far more information about our own actions and behaviors than we do about the average person" is an explanation for how rational people were being. It is not the reason that Tappin and McKay adapted the Social Projection Index.
- Choice (B)
- 22.** The Social Projection Index (SPI) recognizes that statistically, most people are in the majority most of the time, so to make accurate judgments about others we should, to some extent, project what we know about ourselves. Of course the extent of that projection will vary
- Option A: People are rational when they accurately perceive how similar they are to the average person, and make use of that. ... Jane's ratings of herself are very similar to the average of the self-ratings made by others. She is fairly typical. In her case, it would be rational for her to assume that others have similar ratings to her own. And, conversely, it would be irrational for her to assume that she is better than others Those with a high coefficient of similarity (like Jane) would be expected to have similar ratings for self and others. So choice A is true and is not the answer.
- Option B: Jack rates himself in ways that are atypical of the average of the self-ratings made by others. He is objectively unusual. In his case, it would be more rational for him to assume that he is better than others in some way. Those with a low coefficient of similarity (like Jack) would be expected to have less similar ratings for self and others. Hence choice B is correct and is not the answer.
- Option C: Choice C does not follow from the Jack and Jane example. A challenge in making rational self-evaluations has been mentioned in para 6: Of course one challenge in making rational self-evaluations is knowing how typical (or atypical) you truly are. Choice C is erroneous and is the answer to the question.
- Option D: Choice D hints at "Social projection" mentioned in the passage To make accurate judgments about others we should, to some extent, project what we know about ourselves. Of course the extent of that projection will vary: it depends on how unusual a person truly is. Therefore choice D is correct and is not the answer.
- Choice (C)
- 23.** Tappin and McKay were able to measure individuals' typicality more precisely using the responses from their experiment. First, they calculated the profile of the "typical Joe" by averaging the self-evaluation ratings for all participants. Then, for each participant, they evaluated the extent to which individual self-ratings aligned with those of the "typical Joe," a measure known as the "coefficient of similarity." Hence choice D is the correct answer. The remaining choices do not apply.
- Choice (D)
- 24.** Option A: The irrational component of the self-enhancement effect was greater for morality traits than either agency or sociability traits. Choice A is true and is the answer.
- Option B: Choice B is not correct. First, they calculated the profile of the "typical Joe" by averaging the self-evaluation ratings for all participants. Then, for each participant, they evaluated the extent to which individual self-ratings aligned with those of the "typical Joe," a measure known as the "coefficient of similarity."
- Option C: Tappin and McKay not only considered the discrepancy between actual self-ratings and inferred self-ratings; they also considered the extent to which these ratings were differentially affected by trait desirability. Choice C is a parameter and is not a finding. So choice C is not the answer.
- Option D: Trait desirability predicted actual self-judgments of morality to a much greater extent than it predicted inferred self-judgments of morality. So choice D is distorted.
- Choice (A)
- Solutions for questions 25 to 29:**
- 25.** On a careful reading of the sentences, it can be observed that sentence 1 is a general sentence that begins the paragraph. It introduces the background: Japan lowered the voting age from 20 to 18. Sentence 1 is followed by sentence 4. "Japan lowered the voting age" in sentence 1 links with "But Minami does not plan to vote" in sentence 4. Sentence 2 highlights the fact that Minami is not 20 yet. Sentence 2 follows sentence 4. So, 142. Sentence 2 is followed by sentence 5 as sentence 2 provides the reason for Minami not voting. Sentence 5 is followed by sentence 3. The pronoun 'their' in sentence 3 points to "many Japanese" in sentence 5. So, 14253.
- Ans: (14253)
- 26.** On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It has the introductory words (At the outset ...) and establishes the background: ... the lesson here ... Sentence 4 is followed by sentence 2. Sentence 2 begins to explain the learning or the lesson mentioned in sentence 4. "caught in the myths of the best and the brightest ... we (wrongly) think outliers spring naturally from the earth" in sentence 2 implies that what we think is incorrect and that's a simple lesson to learn (mentioned in sentence 4). Sentences 2 and 5 form a mandatory pair. "we think outliers spring naturally from the earth" in sentence 2 is exemplified in sentence 5: "We look at the young Bill Gates and marvel that our world". Sentences 5 and 1 form another

mandatory pair. "allowed that thirteen-year-old unlimited access to a time sharing terminal in 1968" in sentence 5 links with "If a million teenagers had been given the same opportunity" in sentence 1. Sentence 3 is an appropriate conclusion to the para (Hence). "we need to replace the patchwork of lucky breaks and arbitrary advantages that today determine success" in sentence 3 would burst the myths of the best and the brightest and the self-made and the wrong thought that outliers sprang naturally from the earth" in sentence 2. So, 42513. Ans: (42513)

27. 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 importance of time when dealing with a stroke. Sentences 2 and 1 form a mandatory pair. "loss of blood supply to the brain" in sentence 2 links with "blood flow can often be restored using clot-busting drugs" in sentence 1. Sentences 5 and 1 form another mandatory pair. 'those drugs' in sentence 5 points to 'clot-busting drugs' in sentence 1. "blood flow can often be restored" in sentence 1 contrasts "drugs if swallowed too late, **however**, can do more harm than good" in sentence 5. "swallowed too late do more harm than good" in sentence 5 reiterates "time is of the essence" mentioned earlier in sentence 2. So, 215. Sentence 5 is followed by sentence 4. "do more harm than good" in sentence 5 links with "nature's crueler ironies" (..... Note the comparison: 'crueller') in sentence 4. Also "restoring blood flow becomes damaging in itself" in sentence 4 links with "they can do more harm than good" in sentence 4. Sentence 3 defines the process mentioned in sentence 4 and hence follows sentence 4. Hence 21543. Ans: (21543)

28. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. It is the only sentence that can begin the paragraph. The other sentences need a precedent and more substantiation. Sentence 5 is followed by sentence 4. "It features a permanent gallery of one hundred ordinary people" in sentence 4 points to "The television show 1 vs. 100" mentioned in sentence 5. Sentences 4 and 1 form a mandatory pair. The pronoun 'they' in sentence 1 links with 'one hundred ordinary people or "the mob"' mentioned earlier in sentence 4. So sentence 4 is followed by sentence 1. Sentences 1 and 3 form another mandatory pair. "special invited guest" in sentence 1 links with "the guest" in sentence 3. "his or her hundred adversaries" in sentence 3 points to the "one hundred ordinary people" mentioned earlier in sentence 4. Sentence 2 concludes the paragraph. The pronoun 'few' in the part "few have ever seemed as superbly qualified as Christopher Langan" refers to 'the (special invited) guest' mentioned in sentences 1 and 3. "And by that standard superbly qualified" in sentence 2 points to the condition "The guest has to be smart enough to answer more questions correctly" in sentence 3. So, 54132. Ans: (54132)

29. On a careful reading of the sentences, it can be observed that sentence 1 is a general sentence that begins the paragraph. The remaining sentences need a precedent and more substantiation. "workersparticipate in the management of their enterprises" in sentence 1 is contrasted by "Yet bureaucratic hierarchies, separating those who "make decisions" from those who merely carry them out, are being altered, side-stepped or broken" in sentence 3. So sentence 3 follows sentence 1. Sentence 3 is followed by sentence 5. "This process" in sentence 5 points to the process mentioned in sentence 3. "irresistible pressures are battering hierarchical arrangements" in sentence 5 links with "bureaucratic hierarchies are being altered, side-stepped or broken" in sentence 3. So, 135. Sentence 2 (He declares) follows sentence 5 (... Professor William H. Read of the Graduate School of Business at McGill University). "virtual revolution" in sentence 2 refers to "irresistible pressures" mentioned in sentence 5. Sentence 2 is followed by sentence 4. "For people communicating "sideways"" in sentence 4 links with "is increasingly shifting

to 'sideways'" (the same level of organization) mentioned in sentence 2. "shifting from up and down" in sentence 2 parallels "those who must communicate up and down a hierarchy" in sentence 4. Hence 13524.

Note: 'Pollyannish' in sentence 1 refers to a person regarded as being foolishly or blindly or excessively optimistic.

Ans: (13524)

Solutions for questions 30 to 32:

30. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It highlights the symbiotic relationship between the anemone and the clownfish. Sentence 4 is followed by sentence 1. "Recent research has, however" in sentence 1 contrasts "best-known relationships" in sentence 4. Sentence 1 is followed by sentence 3. "A new study in 2015 revealed" in sentence 3 points to "recent research" in sentence 1. "waste excreted by clownfish provides vital nutrients to anemones" in sentence 3 links with "there is much more going on as far as the clownfish is concerned" in sentence 1. So sentence 3 follows sentence 1. "clownfish can boost their hosts' oxygen supplies at night too" in sentence 5 provides additional details about how the clownfish can benefit the anemones. So, 4135. Sentence 2 is the odd sentence out as it needs a precedent. "some fish species" in sentence 2 is very general in tone. Sentence 2 can be a part of another paragraph.

Ans: (2)

31. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. It talks about rock musicians writing poetry. Sentences 2 and 5 form a mandatory pair. "Some rock musicians write poetry" in sentence 2 links with "others poets for inspiration" in sentence 5. Sentence 4 follows sentence 5 as an example. Musicians (Bob Dylan and Patti Smith) have looked to the poet Arthur Rimbaud for inspiration. "owes much to" in sentence 4 links with "even looked to" in sentence 5. Sentence 1 follows sentence 4, providing a contrast through the contrast conjunction 'but'. Few contemporary poets regard rock lyrics with admiration. Sentence 1 concludes the para. So, 2541. Sentence 3 needs a precedent and more substantiation and is the odd sentence out.

Ans: (3)

32. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the para. MacMillan was concerned about Jamaica's educational system. Sentence 5 is followed by sentence 2. "if you could call what happened in the wooden barn next door to my grandparents' house "formal schooling"" in sentence 2 links with "Jamaica had no public high schools or universities" in sentence 5. Sentence 2 is followed by sentence 1. ""formalschooling" – went only to fourteen years of age" in sentence 2 is linked with "academic inclined took extra classes with the head teacher in their teenage years" in sentence 1. Sentence 1 is followed by sentence 3. "Those with broader ambitions" in sentence 3 links with "Those with academic inclinations" in sentence 1. So 5213. Sentence 4 runs tangent to the discussion as it talks about another topic – ranking of schools. This would need further elaboration and it can be a part of another paragraph.

Ans: (4)

Solutions for questions 33and34:

33. Part (1) needs the construction 'both and'. Hence 'as well as' is incorrect and needs to be replaced with 'and'. The part should read: The amaranth flower is praised both in Aesop's fables and John Milton's "Paradise Lost" In part (2) "set out" is incorrect and needs to be replaced with "set up". In part (3), "stellar investment record" needs to be preceded by the indefinite article 'a'. Part (4) is error free. Part (5) should have "pursuit of reward" and not "pursuit for reward".

Ans: (4)

34. Part (1) is error-free.

Part (2) needs the construction "as as". The part should read: as much of a cultural talking point as the enigmatic director himself.

Part (3) has an error in subject-verb agreement. The main subject in part (3) is "That prominence". So the verb should be singular. The plural verb 'have' needs to be replaced with the singular verb 'has' (has ballooned Nolan).

Part (4) needs the plural 'guarantees' in place of the singular 'guarantee'.

In part (5), the adverb 'almost' is misplaced. The adverb 'almost' is modifying the adjective 'irrational' and should be placed close to it. The part should read: can be met with almost irrational levels of contention.

Ans: (1)

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

SECTION – II

Solutions for questions 1 to 4:

We can represent the dates on which each person arrived and left on a number line for visualizing the given information.

1. We can see that on 12th, eight persons were present in the resort. On none of the other days, more than seven were present. Hence, the highest number of persons were present on the 12th. Choice (C)

2. Lohit would have met five persons, Akash, Pavan, Ratan, Harish and Minnie. Pavan would have met nine persons, Akash, Bob, Lohit, Omar, Ratan, Harish, Jai, Minnie and Wasim. Ratan would have met everyone except Kalyan, Jeeva, Manu, Wasim and himself, i.e., a total of 10 persons. Harish would have met nine persons Akash, Bob, Lohit, Pavan, Omar, Ratan, Jai, Minnie and Wasim. Hence, among the four of them, Ratan met the highest number of persons. Choice (D)

3. The sum of the number of persons in the resort for each day will be the same as the sum of the number of days spent at the resort by each person.

Required Average

$$= \frac{10+14+5+8+6+9+6+11+7+10+10+7+8+10+7}{30} = 4.2667$$

Choice (B)

4. Manu met Ajay, Kalyan, Rajesh, Jai and Jeeva at the resort. The highest number of days that any person stayed was 10 days (by both Ajay and Jai). Ans: (10)

Solutions for questions 5 to 8:

Let 1 to 6 represent the positions from East to West.

From (ii), the child who played a rock can only be at 5 or 6.

If the child who played a rock is at 6, the child who played a river must be at 2. From (v), James will be at 5. Since James played the sun, Jim must be at 6 or 4 (from (i)). But Jim cannot be at 6 because he was not at the extreme right. Hence, Jim must be at 4. In this case, from (i), Jerry must be 2. Therefore, Jerry must be the child who played a river. But this violates condition (iv). Hence, this case is not possible.

Therefore, the child who played a rock has to be at 5 and the child who played a river has to be at 1. From (v), James, who played the sun, must be at 4 (since he cannot be at any end). From (i), Jim must be at 5 or 3. If Jim is at 3, Jerry will be at 1

and will play a river, which will violate (iv). Hence, Jim has to be at 5. Jerry will be at 3. From (iii), Jack did not stand at either end. Hence, Jack has to be at 2. Since Jack is standing adjacent to the child who played a flower, Jerry has to be the child who played the flower. From (iv), Jude played a tree. Jude can only be at 6. Jack played the moon and John will be at 1.

The following table provides the positions (from East to West) of the children and their dresses:

Child	John	Jack	Jerry	James	Jim	Jude
Dress	River	Moon	Flower	Sun	Rock	Tree

5. Jack played the moon. Choice (D)
6. Jerry stood two places to the left of the child who played the river. Choice (A)
7. The child standing at the extreme right played a tree. Choice (C)
8. Among the given options, Jerry is standing adjacent to the child who played the Moon. Choice (B)

Solutions for questions 9 to 12:

Let x be the total revenue earned by the six companies combined in 2014. In 2015, the total revenue will be $1.1x$ and in 2016, the total revenue will be $0.935x$.

9. The revenue earned by E in 2016 = $0.2 \times 0.935x = 0.187x$
 Revenue earned by C in 2014 = $0.25x$
 Given that $0.25x - 0.187x = 9.45 \Rightarrow x = 150$
 Revenue earned by A in 2015 = $0.2 \times 1.1 \times 150 = ₹33 \text{ mn}$ Choice (B)
10. For A, the revenues will be lesser, because the revenue share of A decreased in 2016 as compared to 2014 and the overall revenues also decreased.
 For B, C and F, the revenues will be lesser, for the same reason.
 For D, the revenues will be higher because the growth in revenues of D are higher than the reduction in the total revenues.
 For E, the revenues will decrease, because the percentage share remained the same and the overall revenues reduced.
 Hence, for five companies, the revenues will decrease. Choice (C)

11. Revenue earned by A across the three years = $0.15x + 0.2 \times 1.1x + 0.1 \times 0.935x = 0.4635x$
 Similarly, we can calculate the revenues for the other companies. The revenues of the B, C, D, E and F will be $0.45025x, 0.547x, 0.55875x, 0.497x, 0.5185x$.
 Hence, the highest revenue is for D. Choice (D)

12. By observation, we can see that the third highest percentage growth in revenue from 2014 to 2015 is shown by A.
 Percentage decrease from 2015 to 2016 for A
 $= \frac{0.1 \times 0.85 - 0.2}{0.2} = -57.5\%$ Choice (A)

Solutions for questions 13 to 16:

13. The shortest route from A to F is A-B-D-G-F, which adds up to 21 km. Ans: (21)
14. The longest route from B to F without passing through any city twice is B-A-C-G-D-E-F, which translates to a distance of 46 km. Ans: (46)
15. The shortest route from C to E is through F. The person would have covered a distance of 16 km.
 From E to A, without visiting B, the shortest route is E-F-C-A covering a total distance of 28 km.
 The total distance travelled by him = 44 km. Ans: (44)

16. By observation, we can see that G is directly connected to three cities (C, D and F) by roads whose lengths are less than 10 km. From G, a person can also reach E (through F) by travelling for 9 km. Hence, G is one possibility.
 From F, a person can travel to G, E and D by travelling for less than 10 km. But he cannot reach any other city. Hence, F is not possible.
 By observation, we can rule out the other cities. Hence, there is only one possibility. Choice (B)

Solutions for questions 17 to 20:

17. Given that there must be three boys and three girls. From (iv), if E is in the team, B and J cannot be in the team. Hence, for three girls to be in the team, D, E and F must be in the team. However, this is not possible because of condition (iii). Hence, E cannot be in the team. Since E cannot be in the team, either D or F or both must be in the team.
 If both D and F are in the team, the third girl can be B or J. If the third girl is B, from (i), C cannot be in the team (since F is in the team). If A is in the team, H and I cannot be in the team. If A is in the team, three boys cannot be in the team. Hence, A cannot be in the team. The only possible way to select three boys is to select G, H and I. This is the only possibility if the third girl is B.
 If the third girl is J, the three boys can be (A, C, G), (C, G, H), (C, G, I), (G, H, I) and (C, H, I). Hence, there are five possibilities in this case.
 If only D is selected, the other two girls must be B and J. If A is selected, then the other two boys can be selected in only one way (by selecting C and G). If A is not selected, then the three boys can be selected from the remaining four in four ways. Hence, five teams are possible in this case.
 If only F is selected, the other two girls must be B and J. C cannot be in the team because F is in the team (from (i)). If A is selected, then two boys cannot be selected. The three boys can be selected in only one way by selecting G, H and I. But from (v), I cannot be in the team since D is not in the team. Hence, it is not possible to select any team in this case.
 Therefore, the total number of ways in which the team can be selected = $1+5+5=11$ Choice (B)

18. If there are more number of girls than boys, Ramesh can select 5 girls and 1 boy OR 4 girls and 2 boys. However, all five girls cannot be in the team from (iv). Hence, only 4 girls and 2 boys can be selected.
 E cannot be selected because if E is selected four girls cannot be selected. Hence, except E, all the other girls will be in the team. Since B and F are in the team, from (i), C cannot be in the team.
 If A is one of the two boys, then the other boy can only be G. If G is one of the two boys, then the other boy can be one among H or I (apart from A). Also, H and I can be selected as the two boys.
 Hence, there are a total of $1+2+1=4$ ways. Ans: (4)

19. From the above solution, C can never be in the team if there are more number of boys than girls in the team. Choice (B)
20. From the above solution, we can see that D will always be in the team. Choice (D)

Solutions for questions 21 to 24:

21. Since he can buy only twice, he can buy the stocks on 12th and 24th and sell them on 20th and 31st respectively.
 On 12th, he can buy 13 stocks for ₹156 and sell them on 20th for ₹30 each. He will have ₹394 at the end of this transaction.
 On 24th, he can buy 39 stocks for ₹390 and sell them on 31st for ₹30 each. He will have ₹1174 by the end of this transaction.
 The maximum profit that he can make = $1174 - 160 = 1014$ Choice (C)

22. He can purchase 5 stocks for ₹90 on 5th Jan and sell them on 8th Jan for ₹24 each. He will have $24 \times 10 + 10 = ₹130$ at the end of this transaction.

On 12th Jan, he will buy 10 shares for ₹12 each and sell them on 13th Jan for ₹18 each. He will have ₹190 with him at the end of this transaction.

On 14th Jan, he will buy 11 shares for ₹16 each and sell them on 20th Jan for ₹30 each. He will have ₹344 with him at the end of this transaction.

On 24th Jan, he will purchase 34 shares for ₹10 and sell them on 31st Jan for ₹30 each. He will have ₹1024 at the end of this transaction.

Hence, the maximum amount that he can have at the end of this period is ₹1024. Choice (D)

23. Given that Tarun purchased the stock on 8th Jan and sold it on 11th Jan, he would have made a loss of ₹8. In the next transaction, he must make a profit of ₹8 so that he will incur neither a profit nor a loss during the given period.

If we take $n = 1$, Tarun must have purchased the stock for ₹12 on 12th Jan (after 1 day) and sold the stock on 13th Jan for ₹18 (after 1 more day). He would have made a profit of ₹6 and, therefore n cannot be 1.

If $n = 2$, Tarun would have purchased on 13th and sold it on 15th making a profit of ₹2. Hence, n cannot be 2.

If $n = 3$, Tarun would have purchased on 14th and sold it on 17th making a profit of ₹8. Hence, this is a possible value of n .

Checking for all the other possibilities, from $n = 4$ till $n = 10$ (n cannot be more than 10 for the given period), we find that the given condition is satisfied for $n = 3$ and $n = 4$.

Hence, n can take two values, 3 and 4. Choice (B)

24. Since we have to find the minimum amount with Jai, he should incur the highest loss possible on all his transactions.

He must buy 7 stocks on 8th Jan at ₹24 and sell them on 12th Jan for ₹12 each. He will have $12 \times 7 + 10 = ₹94$ at the end of the transaction.

He must buy 5 stocks on 13th Jan for ₹18 each and sell them on 14th Jan for ₹16 each. He will have ₹84 at the end of this transaction.

He can buy 2 stocks for ₹30 each or he can buy 3 stocks for ₹28 each. If he buys 2 stocks for ₹30 each, he will end up with ₹20 (by selling each stock at ₹10) and he can buy one stock for ₹22 with ₹24 left from the previous transaction. Selling these shares, he will end up with ₹32.

If he buys 3 stocks for ₹28 each, he will end up with ₹30 (by selling the three stocks for ₹10 each).

Hence, he can have a minimum of ₹30 by the end of the given period. Choice (A)

Solutions for questions 25 to 28:

We can calculate the CGPA for each student. But since the questions do not ask for the CGPA values, we can calculate the sum product of the weightage and credits for the seven courses. This is presented in the following table along with the possible ranks of the students:

Student	Rank	$\Sigma (W \times C)$
Jack	1/2	162
Mary	5/6	144
Kim	8/9	138
Susan	7/8	140
Gary	2/3	154
Danny	3/4	150
Tom	4/5	148
John	10/11	116
Annie	6/7	142
Jude	11/12	112
Lea	9/10	136
Carrie		

25. The maximum number of students whose rank can be less than that of Annie will be 6 (since she can be ranked 7).
Choice (C)

26. Given that Carrie obtained the same grade in all the courses other than AE. Since the total number of credits for the other courses is 18, the value of $\Sigma (W \times C)$ for Carrie can be $180/144/108/72/0$. Since Carrie was ranked neither first nor last, this value cannot be more than 162 and less than 112. Hence, the only three possibilities are 144, 108 and 72 (since this does not include the grade for AE).

For 144, the grade in AE can be A, B, C, D or E and the value of $\Sigma (W \times C)$ will be 194, 184, 174, 164, 144. Among these values, 194, 184, 174 and 164 are not possible (since the CGPA cannot be greater than 162). 144 is also not possible since the CGPA cannot be the same for any two students.

For 108, the possible values for $\Sigma (W \times C)$ will be 158, 148, 138, 128, 108. Among these, 108 is not possible because she was not ranked last. 148 and 138 are not possible as Tom and Kim have the same value. Hence, the possibilities are 158 and 128. If it is 158, her rank will be 2 and if it is 128, her rank will be 10.

For 72, the values can only be 122, in which case the rank will be 10.

The sum of the possible ranks for Carrie = $2 + 10 + 10 = 22$
Choice (B)

27. The value of $\Sigma (W \times C)$ for the courses which carried three credits will be $6 \times 4 \times 3 = 72$

Since we have to minimize the grade for AE, we can maximize the grades for the other courses.

Let her grade be A in CM and POM. The value of $\Sigma (W \times C)$ considering these two courses will be 132.

To be ranked 2nd, the value of $\Sigma (W \times C)$ must be at least 155 and at most 161. Hence, the value of $W \times C$ for AE must be at least $155 - 132 = 23$. Hence, she cannot receive any grade below C.

The worst grade that she can receive in AE will be C. (For the given case, this is not possible as she will be ranked first. But if we consider that she was graded B in POM, she can receive a C grade in AE).
Choice (C)

28. Given the weightages for all the grades are even numbers, the value of $\Sigma (W \times C)$ for Carrie can never be an odd number. Therefore, she cannot obtain any rank which corresponds to an odd value of $\Sigma (W \times C)$. From the totals above, we can see that the ranks which correspond to an odd value of $\Sigma (W \times C)$ are 4 (149), 6 (143), 7 (141), 8 (139) and 9 (137). Among the given options, Carrie's rank cannot be four.
Choice (B)

Solutions for questions 29 to 32:

Given that there are three generations. Hence, there must be one married couple in the first generation and one married couple in the second generation.

From (ii), G is F's uncle. Since the grand parents do not have any siblings, F must be in the third generation and G must be in the second generation. From (iii), D is the youngest male. If D is in the second generation, he cannot be the youngest male because from (i), he will be older than F. Hence, D has to be in the third generation and must be the younger brother of F. From (ii), E and C are siblings. Both of them cannot be in the third generation. Hence, both of them must be in the second generation. Therefore, in the second generation, E, C and G are siblings. From (iv), all three of them must be the children of A.

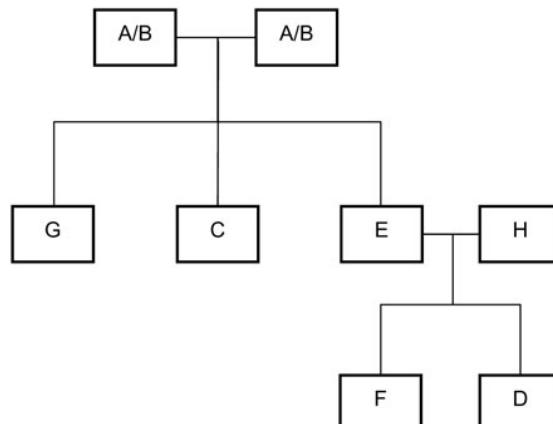
Between these three siblings, E and G are males. G cannot be married because there are only two married couples and he is the uncle of F. C is older than E. From (iv), E must be the youngest among the three and he must be the one who is married.

From (i), H is younger than E (since H is the wife of E). Also, H must be younger than G and C (since E is younger than them). If C is a male, then irrespective of who the eldest child (G or C) of A is, there will not be two females younger than him. Hence, C has to be a female and has to be younger than G.

Therefore, G will be the eldest son, whose younger sister is C, whose younger brother is E. E is married to H and they have two sons, D and F (among whom D is the youngest). A and B are the parents of G, C and E, but we cannot determine who is male and who is female among the two.

The following table provides the order of the persons from oldest to youngest, along with the family tree:

Person (from oldest to youngest)	Gender
A/B	M
B/A	F
G	M
C	F
E	M
H	F
F	M
D	M



29. A and B have the maximum number of children, three.
Ans: (3)

30. H is the third youngest.
Choice (C)

31. Four persons are older than the father of F (i.e., E).
Ans: (4)

32. Only G has one sister younger than him.
Ans: (1)

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

SECTION – III

Solutions for questions 1 to 34:

- If the roots of a quadratic equation are of opposite sign, then constant term must be less than 0.
 $a^2 - 5a + 4 < 0$
 $(a - 1)(a - 4) < 0 \Rightarrow a \in (1, 4)$
Choice (C)
- Let us suppose that each kg of sugar costs ₹1
So, for ₹100 he should get 100 kg but he gets 120 kg.
Let us assume he is selling all the 120 kg, provided the customer asks for 120 kg + 30% (120 kg) = 156 kg. Hence,

the customer pays ₹156. In addition to this he charges 10% of what he has invested on the actual sugar delivered, i.e., 100 i.e., ₹10 as transportation charges. So he sells the entire 120 kg for ₹166.

$$\therefore \text{Gain\%} = 66\%$$

Choice (A)

3. The number of factors of 15^{2015} ($= 3^{2015} \times 5^{2015}$) is $(2016)^2$

The number of factors of 15^{2014} ($= 3^{2014} \times 5^{2014}$) is $(2015)^2$

All the factors of 15^{2014} are factors of 15^{2015} .

$$\therefore \text{The required number} = (2016)^2 - (2015)^2 = 4031$$

Alternative Solution:

Since the highest powers of each of 3 and 5 in 15^{2014} are 3^{2014} and 5^{2014} respectively, no number with 3^{2015} or 5^{2015} as a factor will be a factor of 15^{2014} . Hence $(5^0 \times 3^{2015})$, $(5^1 \times 3^{2015})$... $(5^{2015} \times 3^{2015})$ and similarly $(3^0 \times 5^{2015})$, $(3^1 \times 5^{2015})$... $(3^{2015} \times 5^{2015})$, i.e., a total of $2016 + 2016 - 1$ [since $3^{2015} \times 5^{2015}$ repeats] = 4031 numbers are factors of 15^{2015} but not of 15^{2014} .

Ans: (4031)

4. Amount paid for 60 km = 360 rupees

$$\therefore \text{Average amount paid per km} = \frac{360}{60} = 6 \text{ rupees}$$

If the time taken is less than or equal to 4 hours he had to pay an amount of max $(4 \times 40 \text{ hour}, 10 \times 60) = \text{max } (160, 600) = ₹600$

But he hasn't paid ₹600. Hence the time taken is more than 4 hours.

\therefore The amount paid must be maximum of (number of hours travelled \times 36, 5 \times 60).

Since 5×60 sums up to only ₹300.

The payment is not equal to 300.

\therefore The payment has been made on the number of hours travelled.

\therefore The number of hours \times 36 = 360

$$\Rightarrow \text{The number of hours travelled} = 10 \text{ hours}$$

Choice (C)

5. When eleven parallel lines intersect nine parallel lines, then all the quadrilaterals that are formed will be parallelograms and their number will be equal to

$${}^{11}C_2 \times {}^9C_2 = \frac{11 \times 10}{1 \times 2} \times \frac{9 \times 8}{1 \times 2} = 1980$$

Therefore, Kirti can arrive at a maximum value of 1980 for q .

Choice (C)

6. The relative speed of Ajay with respect to Vijay = $29 - 19 = 10 \text{ km/hr}$ and this is constant throughout the time as (both decrease their speed equally and simultaneously, every time they meet).

Since track length = 1 km, they will meet when Ajay covers 2.9 km and Vijay 1.9 km (i.e., $2.9 - 1.9 = 1 \text{ km}$), and the meeting point will be exactly 0.1 km before the starting point. The second meeting point will be 0.2 km before the first meeting point, as this time they will meet after covering 2.8 km and 1.8 km respectively (owing to decrease in speeds). In total, they will meet 19 times before Vijay comes to rest.

This way, every time $0.1 + 0.2 + 0.3 + 0.4 \dots 1.9$ is a whole number, they meet at the starting point. This is

equivalent to the case when $\frac{n(n+1)}{2}$ is a multiple of 10, for

$$n \leq 19.$$

Hence, $n(n+1)$ is a multiple of 20, the possible values of n are 4, 15 and 19.

Hence, they meet at the starting point on 3 occasions on the whole.

Ans: (3)

7. The expression can be easily reduced (by factorising the quadratics) into the form

$$\begin{aligned} & \frac{(x-3)(x+2)}{(x+2)(x-1)} + \frac{(x+4)(x-2)}{(x+4)(x-1)} + \frac{(2x+1)(x-1)}{(x-1)(x-1)} \\ &= \frac{x-3+x-2+2x+1}{x-1} = \frac{4(x-1)}{x-1} = 4 \end{aligned}$$

Alternative Solution:

Assume $x = 2$ (or any natural number greater than 1)

$$\text{If } x = 2, \text{ the expression equals } \frac{(-4)}{4} + 0 + \frac{5}{1} = 4.$$

Also, for $x = 3$, we can see that the expression equals to 4.

Choice (B)

8. The remainder of a power of 5 divided by 13 follows a cycle of 4.

The given power of 5 is S.

$$S = 0! + 1! + 2! + 3! + 4! + 5! + 6! + 7!$$

$= 10 + (4! + 5! + 6! + 7!)$

Factorials from 4 to 7 are all divisible by 4.

\therefore S is divisible by 2 but not by 4.

Hence, remainder of $10 + (4! + 5! + 6! + 7!)$ divided by 4 is 2. Hence, required remainder is same as the remainder of 5^2 divided by 13; and the value is 12.

Ans: (12)

9. Since $|ax + b|$ is always non-negative, the minimum value

$$\text{of } |ax + b| + c \text{ is } c, \text{ when } x = -\frac{b}{a}.$$

Given, the minimum value of $|ax + b| + c$ is 9 when $x = 4$.

$$\therefore c = 9 \text{ and } \frac{-b}{a} = 4 \Rightarrow b = -4a$$

Given $f(2) = 15$

$$\Rightarrow |2a + b| + 9 = 15$$

$$\Rightarrow |2a + b| = 15 - 9$$

$$\Rightarrow |2a + b| = 6$$

$$\Rightarrow 2a + b = \pm 6$$

$$\Rightarrow 2a - 4a = \pm 6$$

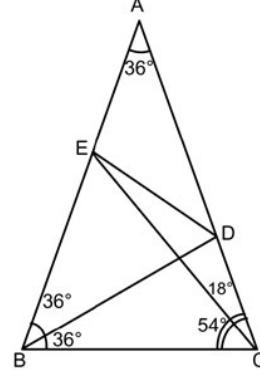
$\therefore a = +3 \text{ or } -3 \text{ and } b = -12 \text{ or } +12 \text{ (i.e., } (3, -12) \text{ and } (-3, 12))$

$$f(x) = |-3x + 12| + 9$$

$$f(5) = |-15 + 12| + 9 = 12.$$

Choice (A)

- 10.



$$\angle A = 36^\circ$$

$\therefore \angle ABC = \angle ACB = 72^\circ$ (since $\triangle ABC$ is isosceles)

Given, $\angle DBC = 36^\circ$

Now, in $\triangle BDC$, $\angle BDC = (180^\circ - (36^\circ + 72^\circ)) = 72^\circ$

i.e., $\triangle BDC$ is also isosceles and $BD = BC \rightarrow (1)$

In $\triangle BCE$, $\angle B = 72^\circ$, $\angle C = 54^\circ$

$$\therefore \angle E = 54^\circ$$

i.e., $\triangle BEC$ is also isosceles and $BE = BC \rightarrow (2)$

$\therefore BE = BD$ (from (1) and (2))

Statement II = $2(ab + bc + ca)$; this also is the same as the given expression.

Statement III = $(a.2b) + (2b.c) + (c.2a) = 2(ab + bc + ca)$; this also is the same as the given expression.

Choice (D)

20. The amounts spent on apples, mangoes and custard apples have to be multiples of 5, 6, and 4 respectively. These amounts (in ₹) are P, 2P and 3P.

$\therefore P$ has to be a multiple of 5 and 3 and 4, i.e. at least 60. The total amount is 6P or at least $6(60) = 360$.

Ans: (360)

21. $N = 98q + 74$

$$\therefore \text{Rem } \frac{N}{49} = 25 = (34)_7$$

The last two (or k) digits of any number expressed in base m represent the remainder when the number is divided by m^2 (or m^k). As $\text{Rem}(N/49) = 25$, the last two digits of N expressed in base 7 represent 25, i.e. the last two digits are 34.

Choice (A)

22. Consider the simple case of student making exactly 40 attempts, with all questions being answered correctly. Now, another student could get a net score of 40 by attempting another four questions wrongly along with one more question being answered correctly

$$\left(\text{i.e., } \left(\frac{-1}{4} \right) \times 4 + 1 = 0 \right) \text{ with a net contribution of zero from}$$

the additional attempts. Similarly, one could have an additional eight wrong attempts along with two correct attempts (and still get the same net score of 40) and so on. Hence, the possible values for total number of questions attempted will be 40, 45, 50 200

$$\text{Hence a total of } \frac{200 - 40}{5} + 1 = 33 \text{ cases are possible.}$$

Hence, the maximum number of such students possible is 33.

Ans: (33)

23. We can use the symbol P and T for the length of the platform and train respectively.

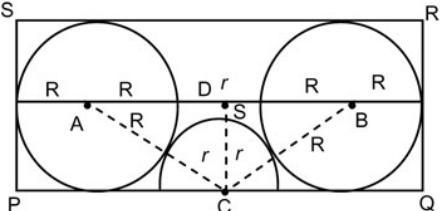
The data is tabulated below

$$\begin{array}{lll} P_1 = 2p & T_1 = 2t & S_1 = 4u = 72 \text{ kmph} \\ P_2 = 3p & T_2 = 3t & S_2 = 3u = 54 \text{ kmph} \end{array}$$

The ratio of the times taken

$$= \frac{P_1 + T_1}{S_1} : \frac{P_2 + T_2}{S_2} = \frac{2p + 2t}{3p + 3t} : \frac{3}{4} = \frac{1}{2} \quad \text{Choice (C)}$$

- 24.



Consider the figure above. A and B are the centres of the two larger circles, while C is the centre of the smaller semicircle. Let R and r be the radii of the larger circles and the smaller semicircle.

Consider right angled triangle ADC, where $\angle ADC = 90^\circ$. $AC^2 = AD^2 + DC^2$

$$\Rightarrow (R+r)^2 = \left(R + \frac{r}{2} \right)^2 + R^2$$

$$\Rightarrow R^2 + r^2 + 2Rr = R^2 + \frac{r^2}{4} + Rr + R^2$$

$$\Rightarrow R^2 - \frac{3r^2}{4} - Rr = 0$$

$$\Rightarrow 4R^2 - 4Rr - 3r^2 = 0$$

$$\Rightarrow R = \frac{4r \pm \sqrt{16r^2 + 48r^2}}{8} \Rightarrow R = \frac{4r + 8r}{8} = \frac{3r}{2}$$

Hence, length = PQ = $4R + r = 7r$

Breadth = QR = $2R = 3r$

\therefore Required ratio = 7 : 3

Choice (A)

25. The distance travelled by Jayesh and Mohan (in km) in one minute is

$$\frac{(130 + 122)}{60} = \frac{252}{60} = 4.2$$

Choice (C)

26. Initially there are four piles and at the end of the game there will be $(35 + 36 + 37 + 38) = 146$ piles (of one marble each).

And after every move exactly one new pile is created.

\therefore exact number of moves which the game will comprise.

$$= (146 - 4) = 142$$

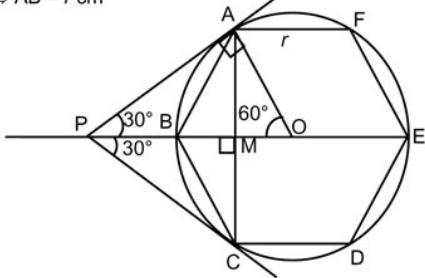
\Rightarrow The person who starts always loses.

\therefore Only I is true, while II, III and IV are false.

Choice (D)

27. Let r cm be the radius of the circle which circumscribes the regular hexagon ABCDEF.

$$\Rightarrow AB = r \text{ cm}$$



Given that the tangents drawn from P touch the circle at A and C. So, $\angle OAP = 90^\circ$.

It is known that each side of the regular hexagon subtends

an angle of $\frac{360^\circ}{6} = 60^\circ$ at the centre O, i.e., $\angle AOB = 60^\circ$.

$$\therefore \angle APO = 180^\circ - (90^\circ + 60^\circ) = 30^\circ$$

In the right angled triangle APO,

$$\frac{AO}{PO} = \cos 60^\circ = \frac{1}{2} \quad [\because \cos 60^\circ = 1/2]$$

OR alternatively, $\angle BAP = \angle BPA = 30^\circ$

$$\Rightarrow PB = AB = BO = AO$$

$\Rightarrow PO = 2 \cdot BO = 2r \text{ cm}$ and $PE = PO + OE = 2r + r = 30 \text{ cm}$ (given)

$$\Rightarrow r = 10 \text{ cm}$$

$$\text{In right triangle OPA, } PA = \sqrt{4r^2 - r^2} = r\sqrt{3} \text{ cm}$$

$$[\text{OR alternatively } PA = OA \cdot \tan 60^\circ = r\sqrt{3}]$$

$$\Rightarrow PA = 10\sqrt{3} \text{ cm}$$

Also $PA = PC$ (tangents from the same point)

$$\therefore \text{Area of triangle APC} = \frac{1}{2} (PA \times PC) \sin \angle APC$$

$$= \frac{1}{2} (r\sqrt{3}) (r\sqrt{3}) \sin 60^\circ$$

$$= \frac{1}{2} (10\sqrt{3})^2 \times \frac{\sqrt{3}}{2} = 75\sqrt{3} \text{ sq.cm.}$$

[OR Alternatively, after finding $r = 10$ cm, one could find AM

$$= \frac{r\sqrt{3}}{2}, \text{ and } OM = \frac{r}{2}. \text{ Now } AC = 2AM = r\sqrt{3}$$

$$\text{and } PM = PO - OM = 2r - \frac{r}{2} = \frac{3r}{2}.$$

$$\therefore \text{Area of } \triangle APC = \frac{1}{2} \times PM \times AC = \frac{1}{2} \times \frac{3r}{2} \times r\sqrt{3} = 75\sqrt{3}$$

Alternate Solution:

From symmetry and observation, it can be seen that both triangle APC and triangle ACE are equilateral. Hence, PE equals twice the altitude (PM) of triangle APC. Therefore,

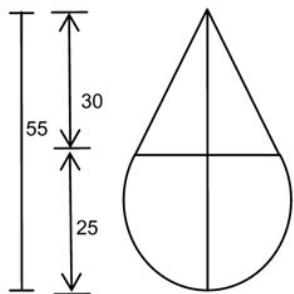
$$PM = \frac{30}{2} = 15 \text{ and area of } \triangle APC = \frac{(PM)^2}{\sqrt{3}} = 75\sqrt{3}$$

Choice (B)

28. Going by the choices it can be seen that only square of choice (D) equals $27 - 6\sqrt{6} + 12\sqrt{3} - 6\sqrt{2}$.

Choice (D)

29. The toy when viewed from front side will be seen like this:



Given the volume of the conical top is 250π cu. units.

$$\therefore \frac{1}{3}\pi r^2 h = 250\pi$$

Given, $h = 30$ units.

$$\Rightarrow \frac{1}{3}\pi r^2 (30) = 250\pi$$

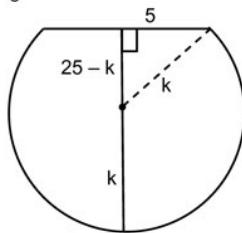
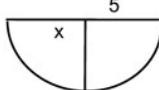
$$\Rightarrow r = 5 \text{ units.}$$

Consider the spherical section of the toy.

$$x = 55 - 30 = 25$$

As $x > 5$, x is greater than the radius of the sphere.

\therefore the actual figure will be



Let k be the radius of the sphere, then $k^2 = 5^2 + (25 - k)^2$

$$\Rightarrow 50k = 650$$

$$\therefore k = 13.$$

Hence the surface area of the sphere

$$= 4\pi (13)^2 = 676\pi \text{ sq. units.}$$

Choice (B)

30. If Bhavan finally had 90 marbles, then the other two finally have a total of $150 - 90 = 60$ marbles with them. But they have 60 marbles after Bhavan doubled their respective number of marbles. Hence, the other two had a total of

$$\left(\frac{60}{2}\right) = 30 \text{ marbles with them (before Bhavan gave to them)}$$

them) and Bhavan had a total of $90 + \left(\frac{60}{2}\right) = 120$ marbles before giving. But Bhavan had 120 marbles with him only after Ajay had doubled the number of marbles with him (and Chetan as well). Hence, Bhavan must have had

$$\frac{120}{2} = 60 \text{ marbles initially.}$$

Alternative solution:

Let the numbers of marbles which Ajay, Bhavan and Chetan initially had be a, b and c respectively.

Numbers of marbles	Ajay	Bhavan	Chetan
Initially	a	b	c
After Ajay gives	$a - b - c$	$2b$	$2c$
After Bhavan gives	$2(a - b - c)$	$3b - a - c$	$4c$

When Ajay gives marbles, he would give a total of $b + c$ marbles. He would then be left with $(a - b - c)$ marbles. Similarly, Bhavan would finally remain with $(3b - a - c)$ marbles.

$$\therefore 3b - a - c = 90$$

$$\Rightarrow 4b - (a + b + c) = 90$$

$$\Rightarrow b = \frac{90 + 150}{4} = 60.$$

Choice (B)

31. The total volume of water that flows through the pipes P_1 and P_2 per second

$$= \left\{ 2\left(\frac{15}{10000}\right) + 6\left(\frac{25}{10000}\right) \right\} m^3 = 0.018 m^3.$$

Therefore every second $0.018 m^3$ of water will flow through the pipes into the tank.

Thus in 40 minutes $40 \times 60 \times (0.018) m^3$ or 43.2 kilolitres of water will be filled.

So the capacity of the tank is 43.2 kilolitres. (since $1 m^3 = 1$ kilolitre)
Ans: (43.2)

32. It can be observed that among the four terms in $f(x)$, the first two involve only p and q , while the last two involve only r and s .

Further, the expression in both sets of terms is exactly the same. Hence, we can analyse only the first two terms and apply the same result to the last two terms.

Consider $|p+q| - |p-q|$:

First, let's assume $p > q$, then the expression becomes $(p+q) - (p-q) = 2q$, i.e., $= 2\text{Min}(p, q)$

Alternatively, the other possibility is that $q > p$. In which case, the expression becomes $(p+q) - (q-p) = 2p$, i.e., $2\text{Min}(p, q)$.

Hence, any expression of the form $|a+b| - |a-b|$ is always equal to $2\text{Min}(a, b)$.

Following this result, $|r+s| - |r-s| = 2\text{Min}(r, s)$

$$\therefore f(x) = |p+q| - |p-q| + |r+s| - |r-s| = 2\text{Min}(p, q) + 2\text{Min}(r, s)$$

Note: It may also be observed from the symmetry of (p, q) and (r, s) in the expression of $f(x)$, that the choice must also be symmetric and hence can be one among (C) or (D) only.

Alternative Solution:

If we assume p, q, r, s as (say) 1, 2, 3, 4 respectively, we calculate $f(x)$, we see that only choices (B) and (D) satisfy. Now, if we assume p, q, r, s and 2, 3, 4, 5, we see that only choices (A) and (D) satisfy. Hence, (D) is the answer.

Note: If we assume p, q, r, s as 3, 4, 5, 6, then we can see that only (D) satisfies.

Choice (D)

33. Given

$$f(x) = \frac{2x^2 - 5}{2x^2 + 1} = \frac{2x^2 + 1 - 1 - 5}{2x^2 + 1} = \frac{2x^2 + 1}{2x^2 + 1} - \frac{6}{2x^2 + 1}$$

$f(x)$ is minimum, if $\frac{6}{2x^2 + 1}$ is maximum.

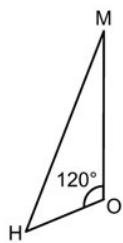
$\frac{6}{2x^2 + 1}$ is maximum, if $2x^2 + 1$ is minimum.

\therefore The minimum value of $2x^2 + 1$ is 1 when $x = 0$

$$\therefore \text{The minimum value of } f(x) \text{ is } 1 - \frac{6}{1} = 1 - 6 = -5$$

Choice (D)

34. Let M and H represent the tips of the minute and hours hand.



$$\text{Length of the hour hand} = \left(1 - \frac{1}{3}\right) (12) = 8 \text{ cm}$$

Angle between the hands of the clock at 8:00 = 120°
If the centre of the clock is O, HM^2

$$= HO^2 + OM^2 - 2(HO)(OM)(\cos 120^\circ)$$

$$= 12^2 + 8^2 - 2(12)(8) \left(-\frac{1}{2}\right) = 304$$

$$HM = 4\sqrt{19} \text{ cm}$$

Choice (C)

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