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

(Key and Solutions for AIMCAT1705)

Key

SECTION – I
SUB-SECTION: RC

1. B	6. C	11. D	16. A	21. B
2. C	7. B	12. D	17. C	22. C
3. D	8. B	13. D	18. 35	23. A
4. A	9. C	14. B	19. D	24. B
5. B	10. B	15. B	20. C	

SUB-SECTION: VA

1. 2	5. 4351	9. 2	13. D	17. D
2. 4	6. 2413	10. 3	14. B	18. C
3. 2	7. 4152	11. 2	15. A	19. A
4. 3	8. 5132	12. 2	16. 249	20. B

SECTION – II
SUB-SECTION: DI

1. D	5. B	9. 5	13. 39
2. A	6. A	10. D	14. D
3. B	7. D	11. B	15. C
4. 2	8. C	12. 8	16. B

SUB-SECTION: LR

1. B	5. 25	9. C	13. 60
2. D	6. 12	10. D	14. 8
3. C	7. D	11. D	15. A
4. B	8. 55	12. B	16. D

SECTION – III: QA

1. C	8. 116	15. 807040	22. B	29. B
2. 3	9. C	16. A	23. A	30. 324
3. B	10. B	17. 16	24. 11	31. 360
4. C	11. D	18. A	25. B	32. B
5. 90	12. 50	19. B	26. 0	33. 209
6. C	13. B	20. A	27. D	34. C
7. 210	14. A	21. A	28. 6817	

Solutions

SECTION – I
SUB-SECTION: RC

Solutions for questions 1 to 6:

Number of words and Explanatory notes for RC:

Number of words: 579

1. The author mentions the "self-driving cars and safe passenger airplanes" and calls the design of the bicycle as "simple" "which almost anyone can understand". He asks a rhetorical question "Surely the bike can't still hold any physics or engineering mysteries?"
Option A: The author asks the question to point out that we still cannot completely explain how a bicycle works. Hence, we cannot infer that we know everything that we need to know about the bicycle. Therefore, this option is incorrect.
Option B: The author mentions "self-driving cars" and "safe passenger airplanes" to emphasize our advancements in technology. He asks the question "Surely the bike can't still hold any physics or engineering mysteries?" because he believes that given these technological advances, we should be able to answer all the questions about something as simple as a bicycle but we are not able to. Hence, this option is the correct answer.
Option C: The author does not comment on the scientific principles underlying the "self-driving cars" and "safe passenger airplanes". Hence, this option is incorrect.
Option D: The author does not imply that there is no *need* to understand the science behind a bicycle. In the passage, he talks about various attempts to understand the same and hence, this option is not the correct answer.
Therefore, the correct answer is option B.

Choice (B)

2. The passage talks about two theories "the gyroscopic theory" and the caster theory". Both the theories try to explain the science behind the bicycle. It should be noted that the focus is on the 'self-balancing' property of the cycle.
Option A: The second paragraph of the passage mentions that the "heart of the puzzle" is how a rider-less bicycle balances itself. Further, the third paragraph of the passage mentions that "there are two theories as to how the bike keeps itself upright". The author does not state that the theories explain how it is possible for a person to ride a bicycle. Rather, he states that the theories explain "how the bike keeps **itself** upright". Hence, this option is incorrect.
Option B: The theories do not try and explain how easy it is to ride a bicycle. The two theories try and explain how a bike can keep itself upright. However, in the last paragraph of the passage, the author mentions that the caster theory ends up explaining "how easy a bike is to ride". But this is not what the theories try to explain. Hence, this option is incorrect.
Option C: The two theories try and explain how a moving bicycle keeps itself upright. Hence, this option is the correct answer.
Option D: Explaining the role of gyroscopic effect and trail of a bicycle is not the primary objective that the theories set out to explain. Hence, this option is also incorrect.
Hence, the correct answer is option C. Choice (C)

3. The author mentions that "Jones was so pleased with his discovery that he was still **crowing about it 40 years later**". Further, he also mentions that "In his memoir, he wrote: "I am now hailed as the father of modern bicycle theory." From this, we can say that the author would most probably attribute pride or vanity to David Jones. From the options, the author would most probably describe David Jones as "vainglorious". Hence, the answer is option D.
Choice (D)

4. The fifth and the sixth paragraphs of the passage explain the caster theory proposed by David Jones.
Option A: The fifth paragraph of the passage talks about the similarity between a bicycle and a shopping cart. The author explains how "the caster automatically aligns itself to the direction of travel". We can infer from this that the caster theory explains how the front wheel of a bicycle aligns itself to the direction of travel. Hence, this option is the correct answer.
Option B: The author does not talk about turning the bicycle while explaining the caster theory. Hence, this option is also incorrect.
Option C: The last paragraph of the passage mentions that neither of the two theories "is responsible for the self-balancing effect of the bike". Hence, this is not explained by the caster theory.
Option D: The author does not talk about the weight of the rider when explaining caster theory. Hence, this cannot be inferred from the passage.
Therefore, the correct answer is option A.
Choice (A)

5. The author talks about Jim Papadopoulos in the last paragraph of the passage.
Option A: Jim Papadopoulos was not able to explain how a bicycle in motion can balance without a rider. He only demonstrated that "a bike with significant negative trail can be ridden". Hence, this option is incorrect.
Option B: According to caster theory, the trail of a bike explains the self-balancing effect of a bicycle. But the author states that it is not "responsible for the self-balancing effect of the bike". Jim proved that the caster theory does not completely explain the stability of a bike. Hence, we can say that he demonstrated that David Jones' theory does not explain everything about the stability of a bike. Therefore, this is the correct answer.
Option C: Jim did not prove that the gyroscopic theory does not explain the stability of a bike. In the fourth paragraph, it is given that David Jones cancelled out the gyroscopic effect of a bicycle and "had little problem riding it hands-free." Hence, David Jones disproved the gyroscopic theory. Therefore, this option is incorrect.
Option D: The passage does not mention the assumptions of David Jones. Hence, this option is also incorrect.
Therefore, the correct answer is option B.
Choice (B)

6. Option A: David Jones proved that a bicycle can be ridden even after the gyroscopic effect is cancelled out. Hence, this option is true and is not the correct answer.
Option B: The passage mentions that it is easier to ride a bicycle with a positive trail. But it does not mention what happens when a weight is added to the front of a bicycle with a positive trail. Hence, this option need not be false.
Option C: A bicycle with a negative trail can be ridden "as long as it has a weight jutting out front". Hence, this option is definitely false and is the correct answer.
Option D: The last paragraph of the passage states that a bicycle with a negative trail can be ridden with "as long as it has a weight jutting out front". Hence, this option is not false.
Therefore, the correct answer is option C.
Choice (C)

Solutions for questions 7 to 12:

Number of words and Explanatory notes for RC:

Number of words: 516

7. The passage mentions that according to Lewis Carroll, "a perfectly objective and faithful representation of the world would literally have to be the same size as the place it depicted".
Option A: The passage does not talk about the ease of using a map which is the same size as the place it depicted. (Further, a world map the size of the world will be more difficult to use than a smaller map). Hence, this option is incorrect.
Option B: The passage mentions that "mapmakers must make sensible design decisions in order to compress the physical world into a much smaller, flatter depiction" and this introduces subjectivity into the maps. Hence, a faithful representation must be the same size as the place it depicted. Therefore, this is the correct answer.
Option C: The author does not state that mapmakers make absurd decisions to compress the map. He states that they "must make sensible design decisions" which will "inevitably introduce personal biases. Hence, this option is incorrect.
Option D: The author does not mention that this is the reason why a map must be the same size as the place it depicted. He mentions this only as one of the many biases in mapmaking. Hence, this is not the correct answer.
Therefore, the correct answer is option B.
Choice (B)

8. The third paragraph of the passage mentions that "the first thing most new Google Earth users do is to look up their own address". Jerry Brotton explains the reason for this in the preceding paragraph.
Option A: The passage does not talk about Google Earth users verifying whether their region has been accurately represented in the map. Hence, this option is incorrect.
Option B: According to Brotton, "We want to find ourselves on the map, but at the same time, we are also outside of the map, rising above the world and looking down as if we were god". Hence, new Google Earth users look up their own address to look down on the world and feel like god. Therefore, this is the correct answer.
Option C: The author states that the reason why Google Earth users look up their own address is "look down as if we were god". Mapmakers put their homeland at the centre of the maps to satisfy this tendency. However, Google Earth users do not look up their address not to put their region at the centre of the map but to have a "transcendental experience". Hence, this option is incorrect.
Option D: The passage does not talk about new Google Earth users looking at their address to know about their surroundings. Hence, this option is incorrect.
Therefore, the correct answer is option B.
Choice (B)

9. The author states that "the tendency itself is nothing new" and talks about the tablet discovered near Baghdad where Babylon was placed at the centre of the world map.
Option A: The tendency does not refer to Google earth users looking up their own address. It refers to the tendency of mapmakers to place themselves at the centre of the world. Hence, this option is incorrect.
Option B: The "tendency" does refer to mapmakers distorting the maps by placing themselves at the centre of the world map. It does not refer to all/any of the way in which mapmakers distort the maps. Hence, this option is incomplete.
Option C: The tendency refers to mapmakers placing themselves at the centre of the world map. The author provides various examples of this distortion in the same paragraph. He talks about the map found in Baghdad, and states that "Mapmakers throughout history adopted a similar bias toward their own homeland". Hence, this is the correct answer.
Option D: The tendency does not refer only to the people who use modern technology. The author states that the tendency is not new and hence, this is not the correct answer.
Therefore, the correct answer is option C.

Choice (C)

10. Brotton talks about various types of biases that will be introduced in maps because of the subjectivity of the mapmaker.
Option A: The last paragraph of the passage mentions that "maps of remote regions can contain errors that go unnoticed for years". However, we cannot determine whether this is a view of Brotton. Further, we also cannot say that maps of remote regions will *always* contain errors. Hence, this option is incorrect.
Option B: According to Brotton, "A map… will always have an agenda, an argument, a proposal about what the world looks like from a particular perspective." Hence, this option is the correct answer.
Option C: Brotton does not differentiate between ancient maps and modern maps in the passage. Hence, this option is also incorrect.
Option D: Brotton talks about how maps were used for furthering political idealogy during World War II. However, we cannot imply from this that only during times of war, maps were distorted to convey political messages. Hence, this option is incorrect.
Therefore, the correct answer is option B.

Choice (B)

11. The author mentions various skews that are present in maps, in general and in digital maps, in particular.
Option A: The author mentions that "Even digital maps skew toward the things that their users deem most important". Further, he also states that "areas unworthy of attention" are "grossly undermapped". Hence, this is a skew of digital maps.
Option B: The passage also mentions that the "places the mapmakers do not often go to" also remain undermapped. Hence, this is also a skew mentioned in the passage.
Option C: The author mentions in the first paragraph that while making any map, personal biases are inevitably introduced. He does not differentiate between digital maps and non-digital maps. Further, Brotton states that "A map will **always** have an agenda, an argument, a proposal about what the world looks like from a particular perspective". Hence, we can infer that this distortion will be present in all maps, digital maps included. Therefore, this is also a drawback of digital maps.
Option D: The passage mentions one instance in which a "phantom island" was discovered after some years in Google Earth. However, we cannot conclude that this is usually the case because of this one incident. Hence, this cannot be inferred from the passage as a distortion in digital maps.
Therefore, the correct answer is option D.

Choice (D)

12. The author mentions various reasons why maps are biased.
Option A: The author mentions that "maps can overestimate their creators' geographic worth" and also states that "Even digital maps skew toward the things that their users deem most important". Hence, this factor contributes to distortions in maps.
Option B: The author mentions that "Religious, political and economic agendas also come into play, adulterating a map's objectivity." Hence, this is also mentioned in the passage.
Option C: The author mentions that the political agenda of the mapmaker will distort the map. Hence, this will distort the map. So, this choice has also been mentioned in the passage.
Option D: The author mentions that "maps of remote regions can contain errors that go unnoticed for years" and gives an example of Sandy Islands. This difficulty in accessing certain areas makes verifying the accuracy of maps difficult. Because of this difficulty in verification, the errors remain "unnoticed for years". However this does not contribute to the introduction of biases. Hence this is the right answer.
Therefore, the correct answer is option D.

Choice (D)

Solutions for questions 13 to 15:

Number of words and Explanatory notes for RC:

Number of words: 429

13. The author mentions that "it was years before the hook-and-loop fastener was incorporated into the diaper chassis". He explains that this is because "until over-all manufacturing costs were reduced, it was just too expensive".
Option A: The author does not talk about the complexity of manufacturing diapers with the hook-and-loop fastener. Hence, this option is incorrect.
Option B: The author says that "it was years before the hook-and-loop fastener was incorporated into the diaper chassis". From this, we can infer that the hook-and-loop fasteners were available but were not introduced in diapers. Hence, this option is incorrect.
Option C: The author mentions the shortcomings of the "little pieces of tape". Therefore, we can infer that there was a need for an improvement. Hence, this option is also incorrect.
Option D: As the distribution costs were high when the diapers were larger, it was not possible to "improve diapers without raising diaper prices". With the reduction in the size of the diaper, it became possible to make improvements without making the diapers too expensive.
Therefore, the correct answer is option D.

Choice (D)

14. The author talks about how companies can afford to improve diapers after the reduction in the latter's size in the first paragraph of the passage.
Option A: The author mentions that after the reduction in costs, "it became possible to improve diapers without raising diaper prices". Further, when talking about the hook-and-loop fasteners, he says that it was "just too expensive". From this, we can infer that companies will incur additional cost for improving the diapers even when the diapers' size is reduced. Hence, this option is false because it states that companies can improve diapers **without incurring additional production cost"**.
Option B: The reduction in the distribution costs made it possible for the companies to incur additional costs for improving the diapers. Hence, this option is true.
Option C: The passage does not say that the price of the diapers was reduced. It only mentions that not increasing the diaper prices is important and that the distribution cost of diapers reduced. Hence, this option is also false.
Option D: The author mentions that the manufacturing cost of the diapers decreased. However, the companies also tried to improve the diapers (an example of which is the introduction of hook-and-loop fasteners). These improvements would have increased the cost. However, we cannot compare the reduction in manufacturing cost of the diapers (due to reduced size) with the possible increase in the cost (due to the improvements). Hence, we cannot

definitely say that the profitability of the companies increased.
Therefore, the correct answer is option B.

Choice (B)

15. The author mentions various benefits due to the reduction in the size of the diaper. Some of these benefits can be reaped by the parents as well.
Option A: At the beginning of the passage, the author states that the decrease in the size of diaper is "chiefly a matter of convenience to the parent taking a bag of diapers home from the supermarket". Hence, this is one of the benefits that the parents can enjoy.
Option B: The passage talks about how the diapers will be in stock in supermarkets because of the reduction in the size of diapers. However, we cannot infer from the passage that the diapers will now be stocked in a larger number of stores than before. Therefore, this cannot be one of the benefits of smaller sized diapers.
Option C: The author mentions the hook-and-loop fasteners which will make it easier for a parent to use the diaper. Hence, this is also one of the benefits.
Option D: The last line of the passage reads "if you can fit twelve bags on a shelf, you can introduce different kinds of diapers". Hence, different kinds of diapers with different features will be made available to the parents. Therefore, this is also one of the benefits.
Hence, the correct answer is option B. Choice (B)

Solutions for questions 16 to 21:

Number of words and Explanatory notes for RC:

Number of words: 725

16. There's good reason why carbon is the basis for life on Earth, and probably on most other worlds that shelter biology.
Option A: From paras 4 and 5 (Carbon has half of its outer electron shell filled ..... and complex structures are the bricks of life), we can say that choice A is correct.
Option B: While choice B (abundance of carbon .....) is factually correct, it is not the reason for carbon getting lucky on earth or carbon being really special. The author states an important point: Carbon, in other words, is adept at making complex structures. And complex structures are the bricks of life.
Option C: Refer to para 2. Folks seldom inquire whether the Krebs cycle could be prevalent on other worlds, or if adenosine triphosphate might underpin the energy production of active aliens. Choice C cannot be validated from the passage.
Option D: While carbon hooks up with two oxygen atoms to make carbon dioxide, a nice waste product for both humans and SUVs, the silicon equivalent, silicon dioxide, quickly assembles itself into a crystalline lattice. But "inability of carbon ....." as mentioned in choice D runs tangent to the passage and is not an answer for the question. Choice (A)

17. Refer to para 6. Silicon might also seem to be an obvious basis for life, a point that was first made at the end of the nineteenth century by the German astrophysicist, Julius Scheiner.
Option A: The author highlights a few similarities between carbon and silicon. The point of contention is not about the possibility of alien life or life on other planets but about silicon-based life. Also the second half of choice A cannot be inferred from the passage. So choice A is wrong.
Option B: The optimistic Scheiner was certain that other planets in our solar system (including roasty toasty Mercury) sported life. But his sunny attitude was misplaced when it comes to silicon-based beings. Choice B is out of scope. Apart from the fact that there's been no mention of attempts to 'find' life on other worlds, other than the fictional attempts in Star Trek, the line about the misplaced sunny attitude is a link sentence between that para and the next. Let's remember that misplaced means wrongly placed. From the following para, it's clear that the author believes that that attitude is befitting of carbon, because of its properties, and not silicon.
Option C: It has been mentioned at the end of the third paragraph that carbon is responsible for life on earth and on other worlds that shelter biology. Choice C is an implication of the sentence given in the question. So choice C is correct.
Option D: Choice D is not the answer. The Enterprise in the popular TV series Star Trek has been mentioned to add to the humourous tone of the passage. It is not related to the question which needs a factual basis to answer it.

Choice (C)

18. Refer to para 7. Silicon may be carbon's chemical cousin, but it's a poor relation.
Statement 1: The quoted sentence in the question is a part of para 7. Statement 1 is a part of the next para and is not the primary reason for the author to mention the sentence in quotes.
A slew of complex carbon-based molecules are easily produced in comets, interstellar dust, and university glassware. But if you check out nature's chemistry lab for silicon (consider volcanic lava), the products are far less interesting. **If that's not enough to dissuade you from silicon**, consider this: there's just a lot more carbon around. Cooked up in the searing interiors of stars, the cosmic abundance of carbon is more than ten times that of silicon ..... And by the way, silicon is a distant second in the biology sweepstakes. So statement 1 is not the answer.
Statement 2: Statement 2 contradicts the question statement. From the phrase 'chemical cousin' we can say that the two elements have atleast some chemical properties in common. So statement 2 is not the answer.
Statement 3: Because the silicon atom is larger, its bonds with other elements are weaker. While carbon hooks up with two oxygen atoms to make carbon dioxide, a nice waste product for both humans and SUVs, the silicon equivalent, silicon dioxide, quickly assembles itself into a crystalline lattice. Hence statement 3 is correct.
Statement 4: For the same explanation as given for statement 3 in this question, statement 4 is rendered incorrect.
Statement 5: The weaker bonds of silicon also preclude the easy formation of those long, same-atom molecular chains that underlie many biological compounds ..... Because carbon's outer shell is both half filled and half empty, it can handily hook up with other carbon atoms, creating the sort of elaborate molecular chains and rings that fuel companies love to pump. Carbon, in other words, is adept at making complex structures. And complex structures are the bricks of life.
Hence statement 5 is correct.
Statement 6: Statement 6 is not correct. Cooked up in the searing interiors of stars, the cosmic abundance of carbon is more than ten times that of silicon. If you check out nature's chemistry lab for silicon (consider volcanic lava), the products are far less interesting. If silicon is a distant second in the biology sweepstakes, the elements under it in the periodic table i.e. germanium, tin, and lead are worse as they're less abundant, and less inclined to make biologically interesting compounds. Ans: (35)

19. The author begins the passage with the question: Will alien life be carbon-based? He ends the passage with the answer: It's more than likely that overweight aliens will be watching their carbs and not their sils. In the passage, he debates the carbon based vs non-carbon based biochemistry of aliens. It can be easily inferred that choices A, B and C support the last sentence of the passage. Choice D (there may be other ways to accomplish this beyond mundane chemistry) points to other possibilities besides carbon-based life and provides a rider, just in case in future silicon-based life is discovered. So choice D, in a way, weakens the last sentence of the passage. Since it does not strengthen the last sentence of the passage, choice D is the answer. Choice (D)

20. Option A: Carbon-based life is not simply a provincial conceit. There's good reason why this element is the basis for life on Earth, and probably on most other worlds that shelter biology. Carbon is adept at making complex structures. And complex structures are the bricks of life. There's just a lot more carbon around. Cooked up in the searing interiors of stars, the cosmic abundance of carbon is more than ten times that of silicon ..... So choice A is true and is not the answer.
Option B: Though the author argues against the possibility of non-carbon-based life through most of the passage, in the penultimate para, s/he adopts a more cautious approach. Of course, one must always beware of hubris in speculating on the properties of extraterrestrial life. ..... So choice B is true and is not the answer.
Option C: Choice C is partially correct because the author says in para 6: The optimistic Scheiner was certain that other planets in our solar system (including roasty toasty Mercury) sported life. But his sunny attitude was misplaced when it comes to silicon-based beings. But to say that the author **scoffs at** and **refutes** the finding of Julius Scheiner and thinks that a silicon-based life is **impossible** on other planets would be extreme. Hence choice C is not correct and is the answer.
Option D: The first boldfaced portion of the text is: Will alien life be carbon-based? The author ends the passage with the second boldfaced portion: It's more than likely that overweight aliens will be watching their carbs and not their sils. Hence choice D is correct and is not the answer.
Choice (C)

21. This is a fact-based passage overall. The author maintains an informal, tongue-in-cheek attitude throughout. This is evident from certain lines in the passage: If they're carbon-based, well, they must be like us (and possibly edible, too), ... The optimistic Scheiner was certain that other planets in our solar system (including roasty toasty Mercury) sported life but his sunny attitude was misplaced, ... overweight aliens will be watching their carbs and not their sils, tin-based life in Wizard of Oz suffered from lack of lubricant. So 'humorous' is the correct tone. This makes choice B correct.
There is no condescension on the author's part. So patronising (to treat with an apparent kindness which betrays a feeling of superiority) would not be the correct tone of the author. Hence choice A is incorrect.
Though the author tries to argue against the possibility of non-carbon-based life, s/he adopts a more cautious approach in the penultimate paragraph. But 'skeptical' would be too extreme to describe the author's tone. Hence choice C is ruled out.
Sarcastic is too negative to describe the author's tone. This makes choice D wrong. Choice (B)

Solutions for questions 22 to 24:

Number of words and Explanatory notes for RC:

Number of words: 715

22. Option A: Choice A would fit the definition of "Script kiddies" given in para 6. This includes what hacker slang calls "script kiddies," people breaking into computers using programs written by others, with very little knowledge about the way they work. So choice A is not the exception.
Option B: Choice B would be true of "black hats". Hackers are people involved with circumvention of computer security. This primarily concerns unauthorized remote computer break-ins via communication networks such as the Internet (*Black hats*). Para 3 tells us that they intrude into people's computers with malicious intent for exploiting or stealing data. Choice B is not the exception.
Option C: Choice C which is a positive feature has not been mentioned in the passage. White hats are only described as those who look for vulnerabilities. Their capacity to correct vulnerabilities has not been discussed in the passage. Hence choice C is the answer.
Option D: Choice D is a characteristic of white-hat hackers. White hats are great hackers employed with the efforts of keeping data safe from other hackers by looking for loopholes and hackable area.
Choice D is not the exception. Choice (C)

23. Today, mainstream usage of "hacker" mostly refers to computer criminals or **criminal** "crackers", due to the mass media usage of the word since the 1980s.
Option A: Choice A would include the role of a cracker. Hence it is the answer.
Option B: An analogy has been provided in the passage to compare a cracker in the computer world with a safecracker. But choice B does not depict any criminal intent and hence it is not the answer.
Option C: Choice C does not reflect any illegal or unethical activity. Hence it is not the answer.
Option D: Choice D would apply to a White-hat and not to a cracker. White hats are great hackers employed with the efforts of keeping data safe from other hackers by looking for loopholes and hackable area. Here the bank is hiring the White-Hat for a specific job. Hence choice D is not the answer. Choice (A)

24. Refer to para 8.
Option A: Hackers from the programming subculture usually work openly (overt) and use their real name, while computer security hackers prefer secretive groups (covert) and identity-concealing aliases. Hence choice A is not correct. The second sentence in choice A is out of scope. We are only told in para 5 that a cracker is not the white collar heroes as security hackers are.
Option B: The former i.e. the hackers from the programming subculture focus on creating new and improving existing infrastructure (especially the software environment they work with), while the latter i.e. the computer security hackers primarily and strongly emphasize the general act of circumvention of security measures, with the effective use of the knowledge (which can be to report and help fixing the security bugs, or exploitation reasons). Hence this choice is correct.
Option C: For the same reason as given for choice B, choice C is rendered incorrect.
Option D: The first sentence in choice D may be said to be true. Historically, members of the programmer subculture of hackers were working at academic institutions and used the computing environment there. In contrast, the prototypical computer security hacker had access exclusively to a home computer and a modem. The second sentence in choice D is out of scope. Choice (B)

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

SUB-SECTION: VA

Solutions for questions 1 to 4:

1. On a careful reading of the paragraph, one may get the feeling that the highlighted sentence seems to fit in multiple places. For eg. After the sentences: In China, the central bank has made a habit of **silence**; Sudden shifts in the value of the yuan always bear the central bank's fingerprints, but are **infrequently explained**; Blank 2 .....; Blank 4 ..... Hence it is imperative that one read the paragraph correctly and completely.
On a careful reading of the paragraph, it can be inferred that the highlighted sentence does not belong to blank (1). The sentence is completely out of place in blank (1), as it interrupts the flow of thought. "**Sudden** shifts .... ***infrequently*** explained" in the sentence after blank (1)

needs to continue after the sentence preceding blank (1) (Policy announcements are ***rare*** and, if they are offered, come at **unpredictable** hours, often over the weekend).
The highlighted sentence is a misfit in blank (3). The sentence preceding blank (3) has some statistics "reported to have injected as much as 1.8 trillion yuan ($294 billion) to prop up the slowing economy" which find a continuation in the sentence following blank (3): That is a lot of money ....
The highlighted sentence cannot conclude the given paragraph. "**trying to understand"** would need further elaboration and substantiation. It needs to be placed earlier in the text.
The highlighted sentence can be best placed in blank (2). "**This taciturn tendency"** in the highlighted sentence has a reference in the motto "If you know what we did, we must have done it wrong" which precedes blank (2). Also, the pronoun 'it' in the sentence following blank (2) refers to "this taciturn tendency" given in the highlighted sentence. "**has long bemused"** links with "**has** reached new and dangerous extremes". Ans: (2)

2. On a careful reading of the paragraph, one can understand that the paragraph talks about the many problems that Vladimir Putin faces. The first part of the paragraph mainly discusses the political problems of Russia and second part of the paragraph focuses on its economic woes.
The highlighted sentence is a poor example of an introductory or opening statement of the paragraph. The paragraph best begins with the sentence following blank (1): Vladimir Putin is not short of problems .....
The highlighted sentence does not belong to blank (2). The paragraph takes a new direction with the sentence preceding blank (2): But one problem could yet eclipse all these: Russia's wounded **economy** could fall into a crisis.
The highlighted sentence would interfere with the thoughtflow if placed in blank (2). There are a lot of facts mentioned after blank (2) which highlight the economic crises in Russia.
The highlighted sentence again does not fit in blank (3) as it would need a precedent there and further elaboration which is not provided by the sentence succeeding blank (3).
In short, there is no indication or justification of '**kleptocracy'** around the blank statements (1), (2) and (3).
The highlighted sentence can best be placed in blank (4). "not just to Mr Putin's cronies, but to a much longer tally of Russian businesses" precedes blank (4). "wealth has been divided among Mr Putin's friends" explains the effect of kleptocracy on Russia's businesses and the economy at large. (kleptocracy is a term referring to government officials taking advantage of corruption to extend their personal wealth and political power at the expense of the wider population). Ans: (4)

3. From the statements "Every life deserves telling" and "I wanted some distinguishing features", we can understand that Ms Light was interested in the characteristic patterns that people made as they walked life's chequered pathway ("in the carpet woven by events, by chance and accident, and by the play of forces larger than us").
The highlighted sentence starts with the pronoun 'they' referring to people.
Blank (1) can be dismissed on the grounds that the preceding sentence (census returns and registrations of baptism, marriage and death) finds a link with the succeeding sentence (Hunting through the records .....). The characteristics of people are not given in these sentences. So to say that the people were not the solid masses, all clogs and snap tins ..... in this part of the text would be odd.
The highlighted sentence best fits in blank (2) as the preceding sentence makes an important contrasting point: ..... lies not so much in its individual characters as in the patterns they make. The succeeding sentence (After blank 2) goes on to say that the people were constantly on the move ..... The given sentence tells us that the people being referred to were not merely part of a uniform mass of persons such as agricultural or industrial labour (Clogs refer to heavy, traditionally wooden-shoes; snap tins refer to containers for food – both typical of the regular working class.) The sentence fits into Blank 2, giving us the idea that they weren't all of a uniform type. The following sentences then highlight and exemplify what these people were i.e. the patterns they made.
If placed in blank (3), the highlighted sentence would disrupt (through the negation: they were not ...) the link between the preceding and succeeding sentences, which highlight what these people were and became.
The highlighted sentence is fairly superfluous in blank 4 and it would change the tense of the last few sentences. Ans: (2)

4. Here 'mere rhetoric' in the highlighted sentence means language designed to have a persuasive or impressive effect, but which is often regarded as lacking in sincerity or meaningful content.
The highlighted sentence cannot fit in blank (1) after the analogical slogans: "Four legs good, two legs bad" and "Long-termism good, short-termism bad". The sentence succeeding blank (1) is not sufficient to counter "mere rhetoric".
The middle of the text – From "The *Harvard Business Review ....." till* just before blank (3) – harp on what is verbally expressed about the evils of short-terminism and the benefits of long-terminism: ..... give off-the-record briefings bemoaning shareholders' inability to see beyond short-term ....., long-termism means that ....., produced a variant of this argument: firms will enjoy sustained growth if they favour ..... There is nothing to justify the use of "**not merely rhetoric"** in blank (2).
The highlighted sentence would best fit in blank (3) as the sentences preceding blank (3) highlight the rhetoric reference to long-terminism while the succeeding sentence (.....actually drawing up plans to give long-term investors or share-holders) justifies how long-terminism does not have a merely rhetoric basis but is practically applicable.
In blank (4), the highlighted sentence would leave the thoughtflow incomplete. Ans: (3)

Solutions for questions 5 to 8:

5. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It talks about an art competition at the author's school. Sentence 4 is followed by sentence 3. "each of us did a painting of the view" in sentence 3 links with "art competition at school" in sentence 4. Sentence 3 is followed by sentence 5. "the top of Portsdown Hill in Portsmouth ……. painting of the view" is followed by "Portsmouth's little terraced houses, Portchester Castle, the boats in the harbor, the islands in the distance" in sentence 5. Sentence 1 concludes the para. Hence, 4351. Sentence 2 is a standalone sentence which is out of scope.
Ans: (4351)

6. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. Sentence 4 (discovering how to employ antitoxins to treat diphtheria) expands on "not a new idea" given in sentence 2. Sentence 4 has the full name (Emil von Behring). Sentence 4 is followed by sentence 1 which does not have the full name. It only mentions "Von Behring". The pronoun 'them' in sentence 1 refers to "antitoxins". Sentence 1 explains that Emil von Behring discovered how to employ antitoxins to treat diphtheria. Sentence 3 concludes the paragraph. It talks about the application of serum therapy in treating various diseases. So, 2413. Sentence 5 can be a part of another paragraph. It needs a precedent and further elaboration.
Ans: (2413)

7. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. Sentences 4 and 1 form a mandatory pair. "that historical insight" in sentence 1 links with "Understanding past climates is crucial to understanding future ones" as given in sentence 4. Sentence 1 (fossil foraminifera) is

followed by "Forams, as they are known, …." in sentence 5. Sentence 2 concludes the paragraph. "grow shells made of calcium carbonate" in sentence 5 is followed by "shells often sink to the seabed, where they accumulate …… transformed into rock" in sentence 2. So, 4152. Sentence 3 is the odd sentence out as it talks about living forams and those fossilized in rocks, which will need a precedent and further elaboration. Ans: (4152)

8. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. Sentence 5 is followed by sentence 1. The pronoun "they" in sentence 1 points to "politicians who led the charge for Britain to quit the European Union" mentioned in sentence 5. "fallen by the wayside" in sentence 5 links with "were as good as their word" in sentence 1. "referendum triumph …… the politicians who led the charge for Britain to **quit** the European Union" " in sentence 5 links with "They campaigned to **Leave**" in sentence 1. So sentence 1 follows sentence 5. Sentence 3 (the last of the prominent Leavers) provides additional details and follows sentence 1. Sentence 2 concludes the para. "steering Britain towards the EU's exit doors" in sentence 2 reiterates "led the charge for Britain to quit the European Union" mentioned earlier in sentence 5. Also "campaigned to Remain" in the conclusion sentence 2 contrasts "They campaigned to Leave" in sentence 1. Hence 5132. Sentence 4 is the odd sentence out as "effortless victory presents a tactical problem" needs further elaboration. It can be a part of another paragraph.
Ans: (5132)

Solutions for questions 9 to 12:

9. The word 'founder' fits in sentence v. Used as a verb here, 'founder' means 'fail or sink'.
The word 'husband' fits in sentence ii. Here it means 'to use economically'.
The word 'purchase' fits in sentence i and sentence iii. In sentence i, 'purchase' is a verb and means 'to acquire something by paying for it'. In sentence iii, 'purchase' can be used as a noun to indicate 'firm contact or grip'.
The word 'season' fits in sentence iv. It refers to adding spices to food.
Since the word 'purchase' fits in a maximum of two sentences, the correct answer is 2. Ans: (2)

10. The word 'history' does not fit the blank in any sentence.
'Dissonance' fits the blank in sentence (v).
'Surface' fits the blanks in sentences (i), (ii) and (iii).
'Facts' fits the blank in sentence (iv).
Since the word 'surface' fits in a maximum of three sentences, the correct answer is 3. Ans: (3)

11. The word 'failed' does not fit the blank in any sentence.
The word 'Inside' fits the blanks in sentences (ii) and (iv).
The word 'unique' fits the blank in sentence (iii).
The word 'converse' fits the blanks in sentences (i) and (v).
In sentence (i), 'converse' acts as a noun and refers to a situation, object or statement that is just the opposite of another. In sentence (v), 'converse' is a verb which means to engage in conversation.
Since the words 'inside' and 'converse' each fit in a maximum of two sentences, the correct answer is 2.
Ans: (2)

12. The word 'Accuracy' fits the blanks in sentences (iii) and (v).
'Value' fits the blank in sentence (ii).
'Changes' fits the blank in sentence (iv).
'Rest' fits the blank in sentence (i).
Since the word 'Accuracy' fits in a maximum of two sentences, the correct answer is 2. Ans: (2)

Solutions for questions 13 to 15:

13. The author does not talk about Westerners in general. He mentions only the Indians across the world. Thus choice A is invalid. According to the first statement, Indians in India and abroad are equally willing to retain their identity as Indians. Thus the comparison in choice B is nullified. The author doesn't make any suggestion, he simply relates the facts. So choice C is refuted. It is mentioned that the Indians abroad still retain a sense of affiliation and companionship with India and Indians. This suggests that they have not renounced their identity as Indians. Choice D is the answer. Choice (D)

14. Refer to the last two sentences of the given paragraph. The videotape shows that his beard had not grown much since our last glimpse of him, in the emailed pictures with his hands in chains and the gun to his head. So for nearly six weeks, we have been living on faint hope and false promises. From the last two sentences of the paragraph, we can say that Mr. Foley had been murdered shortly after the world saw his emailed pictures taken while he was in captivity. This makes choice B correct. Choice A (murdered on the very day .....) is extreme. Choice C again cannot be deduced from the paragraph. In any case, it is besides the point. The para tells us that the final videotape shows that his beard had not grown much since our last glimpse of him. Choice D is out of scope. Choice (B)

15. The author does not describe the concepts in descending order. Thus choice D is eliminated. The author does not seek to present three probable solutions for a problem. So choice B is invalid. Choice C is incorrect as no comparative analysis is presented. Only choice A captures the thoughtflow of the para as the concepts of tarka, vitarka and kutarka are enumerated. Definitions along with some examples are also given. Choice (A)

Solutions for question 16:

16. The sentence implies that the priest would like to believe that the river has a certain positive quality which unfortunately it doesn't have. Therefore the pilgrims seek a better spot. The words given in the first column (for the first blank) are all nouns. Only 'untaintedness' which hints at 'purity' gives the correct meaning. 'irreproachableness' is used to refer to a person. It means 'freedom from immorality'. 'Absoluteness' means (the quality of being unchangeable and is out of context. Hence (2)).
The pilgrims aren't too willing to bathe in the river. 'Reluctant' is the word that fits in the second blank. 'Hustled' cannot fit the second blank. Hustled means 'hurried'; to push one's way; to bustle. 'Fastidious' is also out of context. 'Fastidious' means very attentive to and concerned about accuracy and detail. Though 'fastidious' can also mean 'very concerned about matters of cleanliness', it needs to be followed by 'about'. (eg. fastidious about bathing in the river or fastidious about getting one's body dirty etc). Hence (4).
Since the pilgrims are seeking another spot, 'eviscerating' doesn't make sense. 'eviscerating' means to remove the contents of. It is clear that the blank needs an adjective to describe what the river is found lacking in. 'undefiled' which means 'immaculate' or 'pure' is the correct word. 'Uncluttered' which means 'not having too many objects, details'; 'orderly' does not provide the sense of 'purity' that the third blank requires. Hence (9).
Since words labelled 2, 4 and 9 correctly fill the blanks in the text, the correct answer is 249. Ans: (249)

Solutions for questions 17 to 20:

17. Part (1) needs "Scattered **across**" and not "Scattered into". Part (2) needs the superlative degree of comparison: **most** radical land reforms ……. Part (3) is error-free. Part (4) needs "stemmed from" and not "stemmed in". In part (5), the word "top down" should be hyphenated (top-down).
Choice (D)

18. In part (1), the adverb 'quickly' is misplaced. The part should read: it **quickly** became clear that the cold war was over. Part (2) needs the definite article 'the' in two places. The part should read: **The** West German government's priority was freedom for **the** East Germans, …… Parts (3) and (4) are error-free. In part (5), the adverb 'vaguely' needs to be replaced with the adjective 'vague'.
Choice (C)

19. In part (1), 'brought' needs to be replaced with 'bought'. In part (2), "if he were pleased' is incorrect and needs to be replaced with 'whether he was pleased." Part (3) is error-free. Part (4) needs the indefinite article 'a' before the noun 'team'. Part (5) needs "workers **up** to speed ….."

Choice (A)

20. Part (1) would need the past perfect tense: security forces **had** killed ……. In part (2), "headed off" is incorrect. Part (2) would need: headed **to** his village. Part (3) needs the construction: too ….. to. It should read: "**too** dense to hold prayers ….." Part (4) is grammatically incorrect. The sentence should read: Over the next few days, angry protests spread throughout the valley. Part (5) is error-free.

Choice (B)

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

SECTION – II
SUB-SECTION: DI

Solutions for questions 1 to 4:

In 2008, the number of units manufactured (in '000) = 24
Number of units in inventory at the end of the year = 11
Number of units sold = 24 – 11 = 13
In 2009, number of units manufactured = 15
Number of units in inventory = 8
Number of units sold = 15 + 11 – 8 = 18 (since to have an inventory of 8 at the end of this year, the bolts manufactured this year and the bolts in the inventory will be sold).

Similarly, we can calculate for the other years. The following table provides the number of bolts manufactured, number of bolts sold and the number of units in inventory for each year:

Year	Manufactured	Sold	Inventory
2008	24	13	11
2009	15	18	8
2010	26	19	15
2011	11	9	17
2012	8	16	9
2013	18	16	11
2014	25	21	15
2015	21	16	20

1. The maximum number of bolts was sold in 2014.

Choice (D)

2. The maximum difference between the number of bolts manufactured and sold in any year is 11000 (in 2008).

Choice (A)

3. Total number of bolts sold by the company = 13 + 18 + 19 + 9 + 16 + 16 + 21 + 16 = 128
(This can also be calculated by adding the manufactured bolts from 2008 to 2015 and subtracting the inventory at the end of 2015 from this value). Choice (B)

4. The number of bolts sold was greater than the number of bolts manufactured in two years, 2009 and 2012.

Ans: (2)

Solutions for questions 5 to 8:

Let *a*, *b*, *c*… represent the answer sheets of A, B, C… respectively.
Since the order is given, we can start with the first answer sheet, i.e., *a*. There will be no answer sheets on top of this as it is the first one.
B's answer sheet also has no answer sheets on top. Hence, B would have scored higher than A and *a* would have been at the bottom.
There is 1 answer sheet on top of C's. Hence, *c* would have been below B but above A. The sequence of sheets in the stack will now be *b-c-a* (from top to bottom).
d has two sheets on top. Hence, the sequence will now be *b-c-d-a*.
e has 0 sheets on top. Hence, *e* will be at the top. The sequence will now *e-b-c-d-a*.
There are 5 sheets on top of *f*. Hence, the sequence will be *e-b-c-d-a-f*.
There is only one sheet on top of *g*. Hence, the sequence will be *e-g-b-c-d-a-f*.
There are 2 sheets on top of *h*. Hence, the sequence will be *e-g-h-b-c-d-a-f*.
There are 5 sheets on top of *i*. The sequence will be *e-g-h-b-c-i-d-a-f*.
There are 4 sheets on top of *j*. The sequence will be *e-g-h-b-j-c-i-d-a-f*.
There are no sheets on top of *k*. Hence, the sequence will be *k-e-g-h-b-j-c-i-d-a-f*.
There are 4 sheets on top of l. Hence, the sequence will be *k-e-g-h-l-b-j-c-i-d-a-f*.
There are 9 sheets on top of *m*. Hence, the sequence will be *k-e-g-h-l-b-j-c-i-m-d-a-f*.
There are 5 sheets on top of *n*. Hence, the sequence will be *k-e-g-h-l-n-b-j-c-i-m-d-a-f*.
There are 6 sheets on top of *o*. Hence, the sequence will be *k-e-g-h-l-n-o-b-j-c-i-m-d-a-f*.
There are 4 sheets on top of *p*. Hence, the final sequence will be *k-e-g-h-p-l-n-o-b-j-c-i-m-d-a-f*.

5. N scored the seventh highest marks. Choice (B)

6. The answer sheet of C would have been fifth from the bottom of the stack. Choice (A)

7. The answer sheets of B, C, I, M would have been fourth from the bottom. Hence, the answer is none of the above.

Choice (D)

8. If n ($n \geq 6$) represents the order in which an answer sheet is inserted into the stack (i.e., column 1), the given condition will hold if the number of sheets on top of it, represented by column 3, is equal to (n – 6). By observing the table, we can see that this condition holds for G, H and J. Hence, the answer is 3. Choice (C)

Solutions for questions 9 to 12:

Given that the number of hours for which each car was parked is an integer. Car 1 paid ₹24. Hence, this can only be a Hatchback (otherwise the number of hours would not be an integer).

Car 2 was charged ₹90. It can be either an SUV or a sedan.
Similarly, Car 3 can be an SUV or a Hatchback.
In this manner, we can arrive at the possibilities for each car. This is presented in the table below:

Car	Type
Car 1	Hatchback
Car 2	Sedan/SUV
Car 3	SUV
Car 4	Hatchback/Sedan
Car 5	SUV
Car 6	Sedan
Car 7	SUV
Car 8	Hatchback/SUV
Car 9	Sedan
Car 10	Sedan/SUV

By observing the above table, we can see that Car 4 and Car 8 have to be hatchbacks. This is because there are 3 hatchbacks. Car 2 and Car 10 can be Sedan or SUV in any order. The following table presents the type of each car and the time for which it was parked:

Car	Type	Hours
Car 1	Hatchback	2
Car 2	Sedan/SUV	6/5
Car 3	SUV	3
Car 4	Hatchback	5
Car 5	SUV	3
Car 6	Sedan	2
Car 7	SUV	3
Car 8	Hatchback	6
Car 9	Sedan	2
Car 10	SUV/Sedan	5/6

9. Car 4 was parked for 5 hours. Ans: (5)

10. Car 4 was parked for the longest duration.
Choice (D)

11. $x = 13$; $y = 10$; $z = 14$. Hence, $z > x > y$.
Choice (B)

12. Even with the sum of the durations, we cannot determine which among Car 2 and Car 10 is a Sedan and an SUV. Hence, the number of cars for which their type can be uniquely determined will be 8. Ans: (8)

Solutions for questions 13 to 16:

13. The following table presents the e-mails received before 15th May categorized as Purchases or Updates:

Sender Name	Type	Mail Size (in MB)	Date Sent
Farhan	Purchases	5	06-05-2016
Achyut	Updates	2	08-05-2016
Akanksh	Purchases	14	12-05-2016
Akash	Updates	18	13-05-2016

The required sum = 39 MB. Ans: (39)

14. Total size of e-mails categorized as Purchases
= 5 + 14 + 11 + 23 + 12 = 65
Total size of e-mails categorized as Promos = 20 + 16 + 24 = 60
Total size of e-mails categorized as Social
= 15 + 10 + 14 + 5 + 21 = 65
Total size of e-mails categorized as Trips
= 10 + 15 + 30 + 8 + 15 = 78
Total size of e-mails categorized as Updates
= 2 + 18 + 20 + 29 = 69
Total size of e-mails categorized as Finance
= 12 + 20 + 25 + 36 = 93
The maximum size is for the category Finance.
Choice (D)

15. By observation, we can check all mails that arrive on or before 11th. This is presented in the following table:

Sender Name	Type	Mail Size (in MB)	Date Sent
Abhijeet	Promos	20	01-05-2016
Abhiroop	Social	10	10-05-2016
Achyut	Updates	2	08-05-2016
Balu	Trips	10	04-05-2016
Farhan	Purchases	5	06-05-2016
Kalyan	Social	15	02-05-2016

The sum of this is 62 MB.
For the rest of the choices, we only need to find the mails received on the additional days.
On 12th, he received 1 mail of size 14 MB. Total size of e-mails until 12th = 62 + 14 = 76 MB
On 13th, 14th and 15th, he received 3 mails of sizes18, 12 and 16 MB. Total size of e-mails until 15th
= 76 + 18 + 12 + 16 = 122 MB.
(We need not evaluate choice D since the condition is satisfied for this choice)
On 16th, 17th and 18th, he received 2 mails of size 24 and 11 MB. Total size of e-mails until 18th
= 122 + 24 + 11 = 157 MB.
Hence, on 15th May, the given condition is satisfied.
Choice (C)

16. Total size of e-mails in the category Social = 65
Total size of all e-mails = 430
Required angle = $\frac{65}{430} \times 360 = 54.4°$ Choice (B)

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

SUB-SECTION: LR

Solutions for questions 1 to 4:

Given that he bumped into the bicycle before he bumped into the bus (from (i)). From (vi), he could not have bumped into the Truck first. Further, he must have bumped into the truck before he bumped into the bicycle and the bus. Hence, he must have bumped into the Truck 2nd or 3rd. If the truck was the third vehicle that he bumped into, he would have bumped into the Bus last. From (iii) and (v), we can conclude that the Bus cannot be the last vehicle that he bumped into. Hence, he must have bumped into the Truck 2nd and Bicycle, 3rd, and Bus, 4th. The first vehicle that he bumped into cannot be the tractor. Hence, the first vehicle will be the Bike and the last vehicle will be the Tractor.

The Side Mirror would have been damaged when he bumped into the Tractor. The Front Bumper could not have been damaged by bumping into the Bicycle or the bus. Hence, the Front Bumper would have been damaged when he bumped into the Bike. The Door and the Headlight would have been damaged when he bumped into the Bicycle and the bus in any order.

The following table gives the order in which he bumped into vehicles and the parts that were damaged:

Order	Vehicle	Part
1	Bike	Front Bumper
2	Truck	Rear Bumper
3	Bicycle	Door/Headlight
4	Bus	Headlight/Door
5	Tractor	Side Mirror

1. The first vehicle that he bumped into was the Bike. Choice (B)

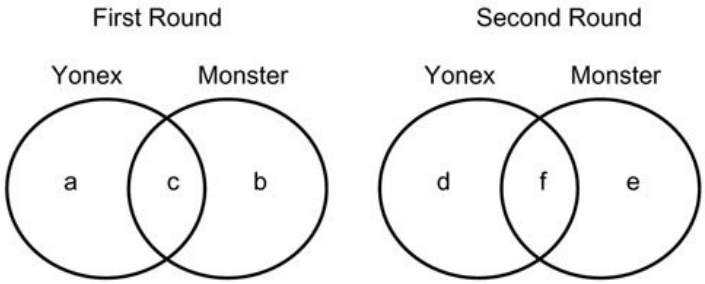
2. He damaged the Side Mirror when he bumped into the Tractor. Choice (D)

3. He would have damaged the Headlight by bumping into the Bus. Choice (C)

4. He damaged one part, Front Bumper, before he damaged the Rear Bumper. Choice (B)

Solutions for questions 5 to 8:

Let the following Venn diagrams represent the number of players:



From (i), $a = 2b$
From (ii), $c = f + 13$
From (iii), $b = e + f$
From (iv), $a = d + 4$
Also, 20 people played only in the first round. Of these 20 players, 13 had deals from both Yonex and Monster and 4 had deal only with Yonex. The remaining 3 must have deal only with Monster.
Hence, $b = e + 3$
From (iii), $e + 3 = e + f \Rightarrow f = 3$.
From (ii), $c = 16$
Since $a + b + c = 100$, $2b + b + 16 = 100$ (from (i)).
$b = 28$ and $a = 56$. Hence, $d = 52$ and $e = 25$.

5. In the second round, 25 players had a sponsorship deal only with Monster. Ans: (25)

6. Required value = $e + f - c = 12$ Ans: (12)

7. Option A: $f + e = 28$
Option B: $b = 28$
Option C: $f = 3$
Option D: 52
Hence, option D is the highest. Choice (D)

8. Required value = $d + f = 55$. Ans: (55)

Solutions for questions 9 to 12:

Given that there are seven people across three generations and no person is a widow or a widower. Further, from (v), none of the persons in the first generation have any siblings. Hence, there must be one married couple in the first generation. They can have one or two children (from (i)). If the couple in the first generation have two children, one of their children must have married and this couple can have two children. If the couple in the first generation have one child, this child must have married and he/she should have three children which violates (i).

Hence, the couple in the first generation has two children. One of these children married and this couple has two children.

From (iii), D has a son-in law. This is possible only if D belongs to the first generation.

Further, from (ii), F has an uncle. This is possible only if F is the child of the couple from the second generation. This implies that D (from the first generation) has a son (since F has an uncle) who is not married.

The daughter of E lives in Delhi. If E belongs to the first generation (i.e., E and D are a couple), E's daughter would belong to the second generation and this daughter would be married. D's son-in-law in this case would be in Delhi (since a married couple stays in the same city). This will violate (iii).

Hence, E belongs to the second generation. E's daughter lives in Delhi. From the information given in the question, we can also say that the two married couples live in two different cities and the other three people live in the same city. Since F is also the child of E, F, F's uncle and the sibling of F live in Delhi. From (ii), B must be the sibling of F. Therefore, H, B and F's uncle live in Delhi.

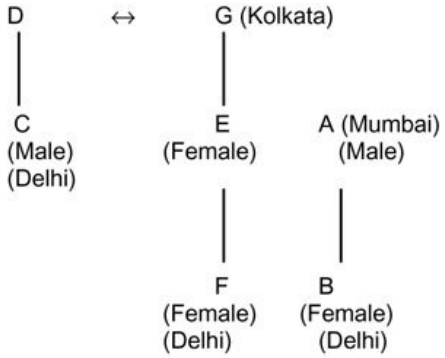
Since D has a son-in law, D must have a daughter and a son (uncle of F).

Therefore, A must be the son-in-law of D, husband of E and the father of two children of same gender.

Given that E has a daughter. Hence, both the children of A and E (i.e., F and B) must be female. G must be the spouse of D. Between G and D, we do not know who is male and who is female. Since G does not live in Mumbai, A and E live in Mumbai, G and D live in Kolkata. Their son must be C.

To summarize, D and G are married to each other and they live in Kolkata. They have one son, C, and one daughter, E. E is married to A and both of them live in Mumbai. E and A have two daughters, F and B. F, B and C live in Delhi.

We can represent the family tree as follows:



9. There are 4 females in the family. Choice (C)

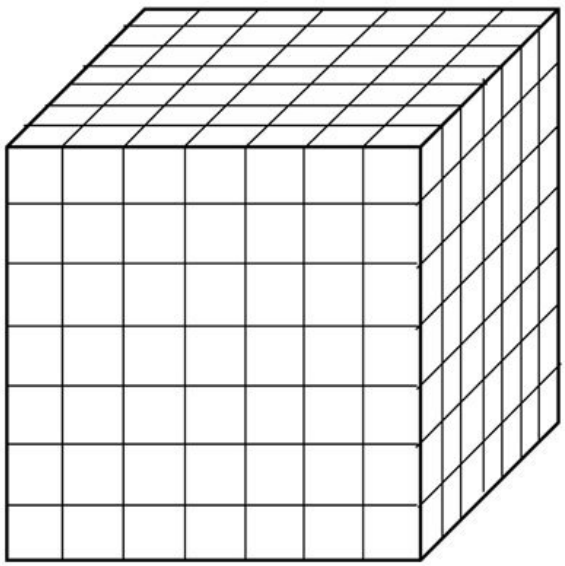
10. C and E are siblings. Choice (D)

11. Between D and G, one is a grandfather and the other is a grandmother. However, we cannot determine which one is the grandfather and which one is the grandmother. Hence, the answer cannot be determined. Choice (D)

12. A and C are brothers-in-law. Choice (B)

Solutions for questions 13 to 16:

Let the following cube represent the 7 × 7 × 7 cube:



13. The number of unit cubes which will have three faces painted will be the eight unit cubes at the eight corners. The other unit cubes along the edge of the cube (excluding the corner cubes) will be painted on two sides.
Hence, there will be five cubes along each edge which will be painted on two faces (excluding the unit cubes at the corners). Since there are 12 edges to a cube, there will be $12 \times 5 = 60$ unit cubes which are painted on two faces.
Ans: (60)

14. The cubes at each of the corners will have exactly three faces painted. Hence, there will be 8 cubes with three faces painted. Ans: (8)

15. The following diagram represents the cut mentioned in the question:
All the unit cubes which are along the diagonal will be cut. There will be $7 \times 7 = 49$ cubes which will be cut. However, the unit cubes at which form the front and the back faces will be painted. Also, the unit cubes along the edges will also be painted. Hence, there will only be $49 - 24 = 25$ cubes which are cut but unpainted. Choice (A)

16. Number of unit cubes which have exactly two face painted blue = 60
Number of unit cubes which have exactly three faces painted blue = 8
Of these cubes, the number of cubes which are cut will be the ones on the four corners (two in the front and two at the back). Also, ten cubes which are along the edge (along which the cut is made) should also be excluded. Hence, a total of 60 + 8 – 14 = 54 will have at least two faces painted blue and will be uncut. Choice (D)

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

SECTION – III: QA

Solutions for questions 1 to 34:

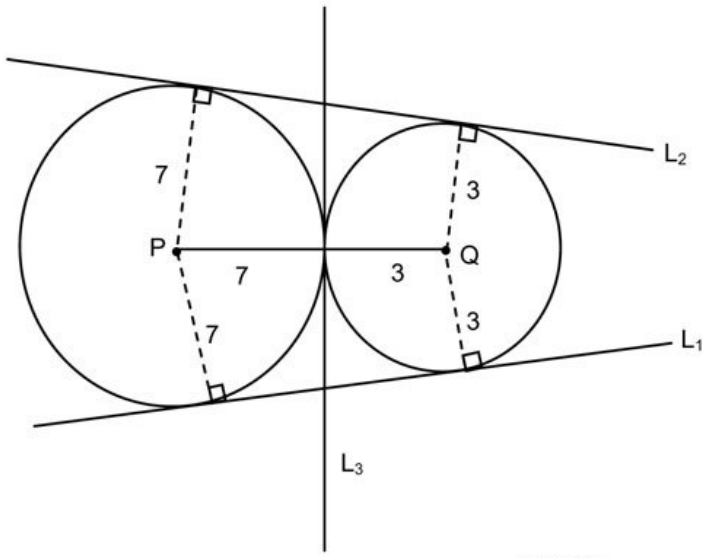
1. $11 - \sqrt{72} = 11 - 2\sqrt{18} = (3 - \sqrt{2})^2$

Similarly, $11 + \sqrt{72} = 11 + 2\sqrt{18} = (3 + \sqrt{2})^2$

$\therefore \sqrt{11 - \sqrt{72}} + \sqrt{11 + \sqrt{72}} = (3 - \sqrt{2}) + (3 + \sqrt{2}) = 6$

Alternative Solution:
The given expression can also be evaluated using the online calculator provided and each answer choice can then be evaluated and compared to identify the correct answer. Choice (C)

2. The set of all possible lines that are 7 cm from P will be all the possible tangents that can be drawn to the circle of radius 7 cm, centered at P.
Similarly, the set of all possible lines that are 3 cm from Q will be all the possible tangents that can be drawn to the circle of radius 3 cm, centered at Q.
Also, since distance between the two centres, i.e., P and Q = 10 cm, which is equal to the sum of the two radii, the circles would be exactly touching each other externally.
The question now becomes equivalent to finding the number of common tangents to these two circles, of radii 7 cm and 3 cm, touching externally.
As shown in the figure below, there are three such lines: L_1, L_2 and L_3



Ans: (3)

3. $51 + 52 + \ldots + N = 5985$.
No. of terms in the above series is $N - 50$.

$\therefore (N - 50)\ \frac{(51 + N)}{2} = 5985$

$\Rightarrow (N - 50)(N + 51) = 11970$

$\Rightarrow N^2 + N = 14520$. Choice (B)

4. Let the present ages of Raghu and his son be R years and x years respectively.

	Raghu	son	Given
Present age	R	x	
n years ago	$R - n$	$x - n$	$R - n = 3(x - n)$
After n years	$R + n$	$x + n$	$R + n = 2(x + n)$

Equating R, we get

$3x - 2n = 2x + n$

$\Rightarrow x = 3n$

$\therefore R = 2(3n) + n = 7n$

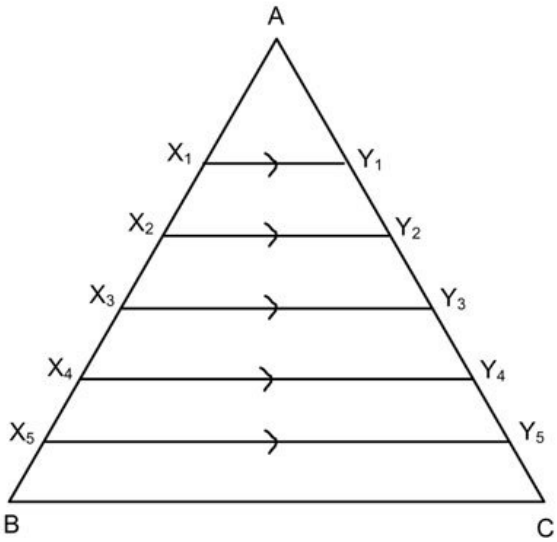
Therefore the ratio of the present ages of Raghu and his son is 7 : 3

Alternative Solution:
Let the age of Raghu and his son n years go be $3s$ and s respectively. Now, n years hence, i.e., $2n$ years later, Raghu is twice as old as his son.

$\therefore 3s + 2n = 2(s + 2n) \Rightarrow s = 2n$.

Present ages of Raghu and his son will be in the ratio $(3s + n) : (s + n)$, i.e., $(3(2n) + n) : (2n + n) = 7n : 3n$
i.e., 7 : 3. Choice (C)

5.



Let us denote the triangle by ABC where BC is the base and measures 6 cm.
Let the five parallel lines (intercepted by AB and AC) be denoted by X_1Y_1, X_2Y_2, X_3Y_3, X_4Y_4 and X_5Y_5 respectively and let the area of $\Delta AX_1Y_1 = a$ (say)
Given, area of quadrilaterals $X_1Y_1Y_2X_2 = X_2Y_2Y_3X_3 = X_3Y_3Y_4X_4 = X_4Y_4Y_5X_5 = X_5Y_5CB = a$
$\therefore$ Area of $\Delta AX_1Y_1 = a$
Area of $\Delta AX_2Y_2 = 2a$
Area of $\Delta AX_3Y_3 = 3a$
Area of $\Delta AX_4Y_4 = 4a$
Area of $\Delta AX_5Y_5 = 5a$
Area of $\Delta ABC = 6a$

Now, since all the above triangles are similar

$$\frac{\text{Area of } \Delta AX_1Y_1}{\text{Area of } \Delta ABC} = \frac{a}{6a} = \frac{(X_1Y_1)^2}{(BC)^2}$$

Since $X_1Y_1 = L_1$, we get $L_1^2 = \frac{(BC)^2}{6}$

Proceeding similarly

$L_2^2 = (BC)^2 \times \frac{2}{6}$

$L_3^2 = (BC)^2 \times \frac{3}{6}$

$L_4^2 = (BC)^2 \times \frac{4}{6}$

$L_5^2 = (BC)^2 \times \frac{5}{6}$

$\therefore (L_1)^2 + (L_2)^2 + (L_3)^2 + (L_4)^2 + (L_5)^2$

$= (BC)^2 \left[\frac{1}{6} + \frac{2}{6} + \frac{3}{6} + \frac{4}{6} + \frac{5}{6}\right]$

$= 36 \times \frac{15}{6} = 90$ Ans: (90)

6. Let the population of the village in 2013 be denoted by p.
Therefore the population of the village in 2014 was $p + 600$ and that in 2015 was $\frac{95}{100}(p + 600)$

It is given that $p - \frac{95}{100}(p + 600) = 150$

$\Rightarrow 5p - 95 \times 600 = 15000$
$\therefore p = 14400$
$\therefore$ The population of the village in 2014 = 14400 +600
= 15000

The required percentage = $\frac{14400}{15000} \times 100 = 96\%$

Choice (C)

7. To find the total number of such four-digit numbers, we select any four digits from the ten digits which can be done in 10_{C_4} ways.

Now, these four digits can be arranged in only one way such that the thousands digit, the hundreds digit, the tens digit and the units digit are in descending order. Therefore the total number of such four-digit numbers = $10_{C_4} = 210$.

Ans: (210)

8. The total no of ways in which he can pick the three tickets
$= 10_{C_3} = 120$.

The favorable number of ways
= 120 – number of ways that none of the tickets is numbered with either an odd or prime.
= 120 – number of ways that all three tickets are from among 4, 6, 8 and 10.
$= 120 - 4_{C_3} = 120 - 4 = 116$. Ans: (116)

9. The given expression can be re-written as

$$E = 1|x - 1| + 2\left|x - \frac{1}{2}\right| + 3\left|x - \frac{1}{3}\right| + 4\left|x - \frac{1}{4}\right| + \ldots\ldots + 20\left|x - \frac{1}{20}\right|$$

We can check that all the zeros occur at $\frac{1}{n}$, where n is any natural number from 1 to 20.

Let us consider that the minimum value of E occurs at $x = \frac{1}{t}$. This is analogous to considering that there are $1 + 2 + 3 + \ldots + 20$, i.e., 210 points on the number line. We need to select a point such that the sum of the distances of this point from all the 210 points will be a minimum. Thus, we need to take the median of these 210 points, i.e., any point between the 105th point and the 106th point. If we move to the left of the 105th the point or to the right of the 106th point, the sum of the distances will increase.

Now, the 105th point will be $1 + 2 + 3 + \ldots\ldots + 14$
$= \frac{14 \times 15}{2} = 105$

Thus the 105th point is $\frac{1}{14}$ and the 106th point is $\frac{1}{15}$. The expression, E will be minimum if we take x as any of these two values, i.e., at $x = \frac{1}{14}$ or $x = \frac{1}{15}$ (or any value in between). Choice (C)

10. Let the number of strawberries and cherries used by her be denoted by x and y respectively.

	Strawberries	Blueberries	Cherries	Grapes
Number of fruits	x	$2x$	y	$3y$

As she used a total of 20 fruits,
$3x + 4y = 20$ ------ (1)
We can check that the only solution to the above equation is $x = 4$ and $y = 2$.

Therefore, the number of strawberries used was 4.
Choice (B)

11. If $3x^2 + ax - 3x + 12 = 0$ has real and equal roots,
$(a - 3)^2 - 4\,(3)\,(12) = 0$
$\Rightarrow a - 3 = \pm 12$
$\therefore a = 15$ or $a = -9$.
Therefore the difference between the maximum and minimum possible values of $a = 15 - (-9) = 24$
Choice (D)

12. Any number of the form 2 × (odd no) will have an equal number of even and odd factors.
Say $N = 2(3^x\,5^y\,7^z)$
Number of odd factors = No. of factors of $3^x\,5^y\,7^z$
$= (x + 1)(y + 1)(z + 1)$
Total number of factors = $(1 + 1)\,(x + 1)\,(y + 1)(z + 1)$
$\therefore$ No. of even factors = $(x + 1)\,(y + 1)(z + 1)$
Sum of the odd factors = $(3^0 + 3^1 + \ldots + 3^x)\,(5^0 + \ldots + 5^y)\,(7^0 + \ldots + 7^z)$
Sum of the even factors = $(2)(3^0 + 3^1 + \ldots + 3^x)\,(5^0 + \ldots + 5^y)\,(7^0 + \ldots + 7^z)$

$\therefore$ Sum of the odd factors is $\frac{1}{2}$ the sum of the even factors.

$\therefore x = 50\%$

Alternative solution 1:
Let the number have one odd factor (1) and one even factor (2). Hence, the number is 2. The sum of all odd factors = 1 and sum of all even factors = 2. Hence, $x = \frac{1}{2}$ = 50%.

Alternative solution 2:
If $N = 2^a \times$ (odd number), i.e., if the highest power of 2 in N is 'a', then the number of even factors of N will be 'a' times the number of odd factors of N. This is since each odd factor of N can be multiplied by any power of 2 from 2^1 to 2^a to obtain a corresponding even factor of N.

From the question, since number of even factors equals the number of odd factors, we can conclude that $N = 2^1 \times$ (odd number), i.e., for every odd factor (say 'f') there is a single corresponding even factor, '$2 \times f$'. Which means that sum of all even factors = 2 × (sum of all odd factors). Hence, sum of all odd factors will be 50% of the sum of all the even factors. Ans: (50)

13. It is given that, $(57)_x = (75)_y$
$\Rightarrow 5x + 7 = 7y + 5$ ----- (1)
$\Rightarrow 5x = 7y - 2$
$5x = 5y + 2y - 2$
As L.H.S is divisible by 5, R.H.S must also be divisible by 5.
$\therefore 2y - 2$ must be divisible by 5.
Again, y must be more than 7.
The values of y satisfying the condition that $2y - 2$ is divisible by 5 are as follows: 1, 6, 11, ……
As y must be greater than 7, minimum possible value of y is 11.
Substituting y = 11 in equation (1), we get
$5x + 7 = 7(11) + 5$
$\Rightarrow x = 15$
therefore the minimum difference between x and y is
$15 - 11 = 4$
The next set of (x, y) will be $(15 + 7, 11 + 5)$, $(15 + 2 \times 7, 11 + 2 \times 5)$….. and the difference will continuously increase and become 6, 8, 10…… Choice (B)

14. It is given that $a^{a^{a^{\cdot^{\cdot^{\cdot}}}}} = 4$

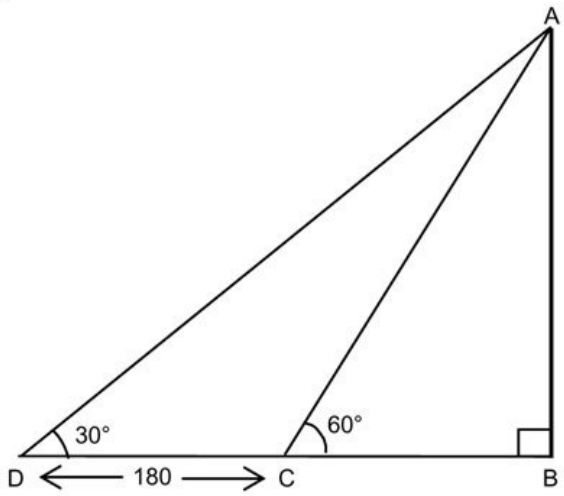
$\Rightarrow a^4 = 4 \left[\because a^{a^{a^{\cdot^{\cdot^{\cdot}}}}} = 4\right]$

$\therefore a = 4^{\frac{1}{4}} = \sqrt{2}$ Choice (A)

15. It is given that,
$(4 + x + x^2)^8 = a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots\ldots + a_{16}x^{16}$
Putting $x = 1$, we get
$6^8 = a_0 + a_1 + a_2 + \ldots\ldots a_{15} + a_{16}$ ------- (1)
Again putting $x = -1$, we get
$4^8 = a_0 - a_1 + a_2 - a_3 + \ldots\ldots a_{15} + a_{16}$ ----- (2)
Subtracting equation (2) from equation (1), we get,
$2(a_1 + a_3 + a_5 + \ldots\ldots + a_{15}) = 6^8 - 4^8$
$\therefore a_1 + a_3 + a_5 + \ldots\ldots\ldots + a_{15}$

$= \dfrac{6^8 - 4^8}{2} = 807040$ Ans: (807040)

16.



Let us denote the tower by AB and the river by BC, as shown in the figure above.
Kamlesh moved (from C to D) away from the river by 180 m, which is denoted by CD.

In ΔABC, $\tan 60° = \dfrac{AB}{BC}$

$\Rightarrow BC = \dfrac{AB}{\sqrt{3}}$ ----- (1)

In ΔABD, $\tan 30° = \dfrac{AB}{BC + 180}$

$\Rightarrow BC + 180 = AB\sqrt{3}$ ------ (2)

$\therefore$ Substituting $BC = \dfrac{AB}{\sqrt{3}}$ in equation (2), we get

$BC + 180 = (BC\sqrt{3})\sqrt{3}$

$\Rightarrow BC = 90$ m
Therefore, the width of the river is 90 m. Choice (A)

17. Let $f(x) = ax^2 + bx + c$
It is given that $f(4) = 4f(1)$
$\Rightarrow 16a + 4b + c = 4(a + b + c)$
$\Rightarrow c = 4a$ ----- (1)
Further, since 3 is one of the roots,
$f(3) = 0$
$\Rightarrow 9a + 3b + c = 0$
Putting $c = 4a$, (from (1)),
we get $9a + 3b + 4a = 0$

$b = -\dfrac{13}{3}a$

The quadratic equation is therefore
$ax^2 + bx + c = 0$

i.e., $ax^2 - \dfrac{13}{3}ax + 4a = 0$

$\Rightarrow a(3x^2 - 13x + 12) = 0$
$\Rightarrow a(3x - 4)(x - 3) = 0.$

Hence, the other root $\alpha = \dfrac{4}{3}$,

and $12\alpha = 12 \times \dfrac{4}{3} = 16.$

Alternative Solution 1:
Once we arrive at $c = 4a$ (i.e., eq (1) in above solution), we can see that $\dfrac{c}{a} = 4$ (i.e., product of roots $(\alpha \times \beta) = 4$).
Hence, $3\alpha = 4 \Rightarrow 12\alpha = 16$.

Alternative Solution 2:
Let the function be expressed as $f(x) = k(x - \alpha)(x - 3)$.
Since $f(4) = 4f(1)$, $k(4 - \alpha)(4 - 3) = 4k(1 - \alpha)(1 - 3)$
$\Rightarrow 4k - k\alpha = 8k\alpha - 8k$
$\Rightarrow 9\alpha = 12$, i.e., $12\alpha = 16$. Ans: (16)

18. The unbiased die when rolled four times, the four numbers so obtained will form an increasing arithmetic progression only when the numbers are 1,2,3,4 or 2,3,4,5 or 3,4,5,6 (showing up in any order).
Now, if the four numbers so obtained are 1, 2, 3 and 4, we will get a total of 4! or 24 ways [$\because$ 1,2,3 and 4 can occur in the four throws in 4! ways]

Similarly, if the four numbers are 2, 3, 4, 5 or 3, 4, 5, 6, we will get 24 ways for each such set of four numbers.
Therefore, the favourable number of outcomes = 3 (24) = 72
The total number of outcomes = $(6)^4 = 1296$.

Thus, the required probability = $\dfrac{72}{1296} = \dfrac{1}{18}$

Choice (A)

19. Let the five integers be denoted by a, b, c and e respectively.

It is given that $\frac{a+b+c+d}{4}+e=41$ ----- (1)

$\frac{a+b+c+e}{4}+d=44$ ----- (2)

$\frac{a+b+d+e}{4}+c=50$ ----- (3)

$\frac{a+c+d+e}{4}+b=56$ ----- (4)

$\frac{b+c+d+e}{4}+a=65$ ----- (5)

Adding the five equations given above, we get
$2(a + b + c + d + e) = 256$
$\Rightarrow a + b + c + d + e = 128$
Substituting $128 - e$ for $a + b + c + d$ in equation (1), we get

$\frac{(128-e)}{4}+e = 41 \Rightarrow e=\frac{(41)\times 4-128}{3}$

$\Rightarrow e = 12$

Similarly, we get $d=\frac{(44)\times 4-128}{3}=16$

and $c=\frac{(50)\times 4-128}{3}=24$

and $d=\frac{(56)\times 4-128}{3}=32$

and $a=\frac{(65)\times 4-128}{3}=44$

Among the choices given, one of the integers is 44.

Choice (B)

20. $h(2)=\frac{2}{2-1}=2$

$\Rightarrow f\left(h\left(2\right)\right)=f\left(2\right)=\frac{1}{2-1}=1$

$\therefore f(h(2)) = 1$ Choice (A)

21. Milk : Water = 5 : 2

$\frac{\text{Milk}}{\text{Total}}=\frac{5}{7}$

The ratio of milk to total when the volume is increased by 25%

$\frac{\text{Milk}}{\text{Total}}=\frac{5}{7+\frac{1}{4}(7)}=\frac{5}{7\times\frac{5}{4}}=\frac{4}{7}$

When 20% of this solution is replaced with water, the milk content will decrease by 20% but total volume will remain constant.

$\left(\frac{\text{Milk}}{\text{Total}}\right)_{\text{final}}=\frac{4\times\frac{4}{5}}{7}=\frac{16}{35}$

Final ratio of milk and water is 16 : (35 – 16), i.e., 16 : 19.

Choice (A)

22. $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+.....+\frac{1}{101}-\frac{1}{102}$

$=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{102}-2\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+....+\frac{1}{102}\right)$

$=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{102}-\left(1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+..+\frac{1}{51}\right)$

$=\frac{1}{52}+\frac{1}{53}+\frac{1}{54}+.....+\frac{1}{102}$ Choice (B)

23. The difference between the total CI and the total SI in 2 years $=\frac{Pr^2}{100^2}=\frac{6.25}{100}P$

$\Rightarrow r^2 = 625$
$\Rightarrow r = 25\%$
At 25% per annum, let the number of years taken for a sum to quadruple under SI be n.

$\therefore p+np\frac{25}{100}=4p$

$\Rightarrow n\frac{p}{4}=3p$

$\Rightarrow n = 12$
Therefore, the sum under SI will quadruple in 12 years.

Choice (A)

24. Let the measure of the third side be x, where x is a natural number.
From the triangle inequality, sum of any two sides must be greater than the third side.
The three sides are 6, 10 and x
We have two cases:
Case I: x is the longest side
$\therefore 6 + 10 > x \Rightarrow x < 16$
Case II: 10 is the longest side
$\therefore 6 + x > 10 \Rightarrow x > 4$
Therefore, the possible values of x are $4 < x < 16$, i.e., there are 11 possible values for the third side (x = 5, 6, 7….14, 15). Ans: (11)

25. Putting $x = y = 1$
$f(1 + 1) = f(1) + f(1)$
$\Rightarrow f(2) = 2f(1)$
Similarly, by putting $x = 2$ and $y = 1$, we get
$f(2 + 1) = f(2) + f(1)$
$f(3) = 2f(1) + f(1) = 3f(1)$
Proceeding similarly, we get $f(n) = n f(1)$

$\therefore f(10) = 10f(1) = \frac{1}{8} \therefore f(1)=\frac{1}{80}$

Now, $f(1) + f(3) + f(5) + ….+ f(19)$
$= f(1) [1 + 3 + 5 + … + 19]$

$= 100 f(1) = 100 \times \frac{1}{80}=\frac{5}{4}$

Alternative Solution:
$f(1) + f(19) = f(3) + f(17) = ….= f(9) + f(11) = f(20) = f(10) + f(10) = 2(f(10))$

Hence, required sum $= 5 \times 2 (f(10)) = 5 \times 2 \times \frac{1}{8}=\frac{5}{4}$.

Choice (B)

26. ${}^{100}C_{50}=\frac{100!}{50!\,50!}$

To find the number of trailing zeroes in ${}^{100}C_{50}$, we need to find the number of trailing zeroes in 100! and those in 50!

Highest power of 5 in 50! $=\left[\frac{50}{5}\right]+\left[\frac{50}{5^2}\right]=10+2=12$

The highest power of 2 in 50! will be definitely greater than that of 5.
Thus 50! has 12 trailing zeroes
$\therefore$(50!)(50!) will have 24 trailing zeroes.
Proceeding similarly, we find 100! will also have 24 trialing zeroes.

$\therefore \frac{100!}{(50!)(50!)}$ will have no trailing zeroes. Ans: (0)

27. Net Speed of the boat upstream = v
Net Speed of the boat downstream = $4v$

Time taken Upstream = $\frac{d}{v}$

Time take Downstream = $\frac{d}{4v}$

Total time = $\frac{d}{v}+\frac{d}{4v} = 2\times 60$ minutes (given)

$\Rightarrow \frac{5d}{4v} = 120 \Rightarrow$ difference of time = $\frac{3d}{4v}=\left(\frac{5d}{4v}\right)\times\frac{3}{5}$

$=120\times\frac{3}{5}=72$

Therefore, the boat took 72 minutes more while travelling upstream than what it took to travel downstream.

Choice (D)

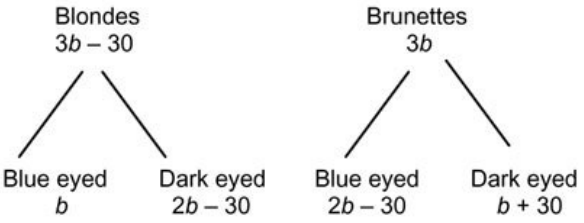
28. $((2 * 3) * 3) = 2^3 * 3 = 3^8 = 6561$
$((3 * 2) * 2) = 2^3 * 2 = 2^8 = 256$
$\therefore$ required sum = 6561 + 256 = 6817. Ans: (6817)

29. The nine consecutive even numbers ending with y are as follows:
$y - 16$, $y - 14$, …. up to $y - 2$, y
Their average will be the middle value i.e., $y - 8$.
It is given that, $y - 8 = x$
Now, the average of 17 consecutive natural numbers starting with x (i.e., $y - 8$) will be the 9th number starting with x, out of $y - 8$, $y - 7$, $y - 1$, y, $y + 1$….$y + 7$, $y + 8$.
Hence the required answer is y.

Alternative Solution:
Considering a simple case of nine consecutive even numbers, say from 2 to 18, we get x = average = 10 and y = 18. Now, the average of 17 consecutive natural numbers, starting from x, i.e., 10, upto 26, we get average $= \left(\frac{10+26}{2}\right) = 18$, (i.e., y itself). Only option (B) fits.

Choice (B)

30. Let us denote the number of blue eyed blondes by b. Therefore the total number of brunettes = $3b$ and the number of dark eyed brunettes = $b + 30$



Again, it is given that among the brunettes,
$b + 30 > 2b - 30$
$\Rightarrow b < 60$
Therefore the maximum value that b can take is 59 and the maximum value of the total number of students in the college = $6b - 30 = 6(59) - 30 = 324$ Ans: (324)

31. The given quadratic $h = 60t - 5t^2$ achieves a maximum 'h' when the object reaches the maximum height, after which the object falls back to the ground, thereby covering a total distance of exactly twice the maximum height reached.
We can determine the maximum value of h i.e., the maximum value of $-5t^2 + 60t$ as follows:

$-5t^2 + 60t = -5(t - 6)^2 + 180$. This will be a maximum of 180, when the square term is zero (i.e., at $t = 6$).

$\therefore$ Maximum height reached by the object = 180 m
Therefore, the total distance covered by the object before it reaches the ground is $2 \times (180) = 360$ m.

Ans: (360)

32. Let the initial number of type-I and type-II bacteria be denoted by a and b respectively.
As type-I bacteria doubled every 4 minutes, so at the end of 20 minutes we would get $2^{\left(\frac{20}{4}\right)}\times(a)=2^5\times(a)=32a$ bacteria.

The number of type-II bacteria at the end of 20 minutes would be $3^{\left(\frac{20}{5}\right)}\times(b)=3^5\times(b)=81b$.
It is given that,
$32a + 81b = 2000$
$\Rightarrow 81b = 2000 - 32a$
$\Rightarrow 81b = 16(125 - 2a)$
Therefore $81b$ is a multiple of 16, which implies that b is a multiple of 16.
Therefore the minimum possible value of b is 16.
Hence, $32a + 81(16) = 2000$
$\Rightarrow 32a = 704$
$\therefore a = 22$

The next multiple of 16 is 32, but 81×32 gives 2592 which is more than 2000.
$\therefore a = 22$ and $b = 16$
Thus, the initial difference between the number of bacteria of the two types taken is 6. Choice (B)

33. Let the no. of chocolates bought by Linga Reddy be N
$N = 6a + 5$ and $N = 5b + 4$.
(Here $6 - 5 = 5 - 4 = 1$).
Hence, N must be of the form $N = 30k - 1$
It is given that $30k - 1$ is divisible by 11, i.e., $30k = 11P + 1$.
By observation, P must end with a '9', i.e., 9 or 19 or 29…..
We can see that P = 19 is the least possible value.
$\therefore$ the minimum value of k is 7
Therefore he bought $30 \times 7 - 1 = 209$ chocolates.

Ans: (209)

34. It is given that $y = \frac{x+1}{x-1}$

We can go by the options and check which of them lie on the graph of the given relation.

From option (A), putting $x = 2$, we get, $y = \frac{2+1}{2-1} = 3$

So (2, 3) lies on the graph.

From option (B), putting $x = \frac{1}{2}$, we get, $y = \frac{\frac{1}{2}+1}{\frac{1}{2}-1} = -3$

So $(\frac{1}{2}, -3)$ lies on the graph.

From option (C), putting $x = 3$, we get, $y = \frac{3+1}{3-1} = 2$

$\therefore$ (3, 4) does not lie on the graph.
We need not check for option (D). Choice (C)

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