

(Key and Solutions for AIMCAT1710)

Key

SECTION – I
SUB-SECTION: RC

1. A	5. B	9. A	13. D	17. B
2. C	6. D	10. B	14. 36	18. C
3. C	7. B	11. A	15. B	19. B
4. B	8. B	12. C	16. A	20. B

SUB-SECTION: VA

1. 1	5. 5	9. 25143	13. 3	17. C
2. 4	6. 4	10. 15324	14. 4	18. B
3. 3	7. 13	11. 42153	15. 2	19. D
4. 5	8. 25	12. 51324	16. 1	20. C

SECTION – II
SUB-SECTION: DI

1. B	3. B	5. D	7. 3	9. 500	11. C
2. 14	4. D	6. A	8. 10	10. 3910	12. A

SUB-SECTION: LR

1. B	3. 2	5. C	7. A	9. A	11. D
2. C	4. D	6. B	8. D	10. C	12. C

SECTION – III: QA

1. D	10. C	19. B
2. 1527	11. C	20. B
3. D	12. D	21. B
4. 250	13. D	22. 4
5. B	14. C	23. 210
6. D	15. C	24. 26
7. 14	16. 5	25. 105
8. 10	17. A	26. D
9. 3	18. A	

Solutions

SECTION – I
SUB-SECTION: RC

Solutions for questions 1 to 5:

Number of words and Explanatory notes for RC:

Number of words: 575

1. The passage talks about the primary motive for filtering Internet content in various countries in the fifth paragraph.

Option A: The passage mentions that Saudi Arabia heavily censors social content and in China and Syria, focus is more on filtering political topics. Hence, this option is the correct answer.

Option B: The passage mentions that political filtering in Saudi Arabia has "less scope and depth" but in China, it is more extensive. Hence, this option is incorrect as it states the opposite of what is mentioned in the passage.

Option C: While social content is heavily filtered in Saudi Arabia, we cannot infer from the passage whether China filters any social content or not. Hence, we cannot conclude from the passage that social content is not filtered in China. Therefore, this is not the correct answer.

Option D: The passage compares filtering social content and political content in China and Saudi Arabia. However, the passage does not compare Internet filtering (which can include filtering of websites related to other topics) between the two countries. Hence, we cannot conclude this option to be true.

Therefore, the correct answer is option A.

Choice (A)

2. The passage talks about internet filtering in authoritative regimes and states that "Politically motivated filtering is characteristic of authoritarian and repressive regimes".

Option A: While politically motivated filtering is usually present in authoritative regimes, we cannot say that this is present in all authoritative regimes. The passage talks about Russia and Algeria where the author(s) "have not uncovered filtering of the Internet". Hence, this option is incorrect.

Option B: The passage does not mention that threats to national security arise in such regimes. Further, the passage mentions that some countries "filter Web sites associated with political opposition groups". Hence, this is not the correct answer.

Option C: The passage mentions that Internet filtering is characteristic of authoritative regimes and also provides a number of countries with authoritative regimes where Internet is filtered. Hence, this option is the correct answer.

Option D: According to the passage, in Russia and Algeria, the author says that filtering of internet has not been uncovered. But, when you consider the overall context of the penultimate para, then there isn't enough to indicate that the author means 'the few' (implying a small number of countries) as given in choice D (..... among the few countries). How many other countries have or don't have internet filtering has not been indicated in the passage. Hence, this option is not the correct answer.

Therefore, the correct answer is option C.

Choice (C)

3. The first paragraph of the passage talks about Internet filtering in Thailand and Bahrain. In Thailand, internet filtering was carried out on websites which were "critical of the military coup". In Bahrain, Internet filtering was carried out before the elections to weaken political opposition.

Option A: In Thailand, it can be said that internet filtering was done with political motives. However, in Bahrain, we cannot say that filtering was carried out due to national security. Hence, this option is incorrect.

Option B: The passage mentions that websites critical of military coup were filtered. But we cannot infer from the passage whether this opinion was popular or unpopular. Hence, this cannot be the correct answer.

Option C: We can say that filtering in Thailand was carried out to prevent the spreading of negative opinion about the new regime. Hence, Internet filtering was carried out to manage the perception about the new regime. In Bahrain, filtering was done to further the political agenda of the ruling party. Hence, this is the correct answer.

Option D: In Thailand, the new regime filtered Internet content whereas in Bahrain, content was filtered before the elections. Hence, this option is incorrect.

Therefore, the correct answer is option C.

Choice (C)

4. In Saudi Arabia, the primary motive is social rather than political. Hence, this is not correct.

In Syria, the primary motive is political. Hence, this is correctly matched.

In South Korea, threat to national security is the primary reason. Hence, this is also correct.

In Bahrain, political motive is primary. Hence, this is incorrect.

In Iran, "pervasive filtering of both political and social material" exists. Of these two, we cannot determine which is the more important motive. Hence, this is incorrect.

Therefore, only in two cases, the motive is correctly matched.

Choice (B)

5. Option A: According to the passage, protecting Intellectual Property rights is an important driver in North America and Western Europe. However, we cannot infer from the passage, whether this is the primary reason for internet filtering in these regions. Hence, this is not the correct answer.

Option B: From the passage, we can infer that separate countries have separate objectives in regulating the

internet. The passage mentions that "in the forty countries that were tested in 2006, this is not a major objective of filtering". We can therefore infer that within a country, there could be objectives of internet filtering – one major objective and other minor objectives. Therefore, this is the correct answer.

Option C: The passage does not compare the importance of various motives for filtering the internet. Hence, we cannot conclude the statement given in this option.

Option D: The passage mentions that "Protecting intellectual property rights is another important driver of Internet content regulation, particularly in Western Europe and North America." However, this is not enough to conclude that Internet filtering of this type happens only in these regions. Further, it is tricky equating 'important driver' with 'major objective'. The para is - *Protecting intellectual property rights is another important driver of Internet content regulation, particularly in Western Europe and North America. However, in the forty countries that were tested in 2006, this is not a major objective of filtering.* In saying 'another important driver' the author clearly implies that there are other important drivers, even in North America and Western Europe. So, even there, it may or may not be the 'major objective'. So, you can't tell, from that statement, of the probable mix in the survey.

Therefore, the correct answer is option B.

Choice (B)

Solutions for questions 6 to 10:

Number of words and Explanatory notes for RC:

Number of words: 580

6. The passage talks about the study of Peter Noble and his colleagues regarding the activity of genes after death. In the course of the passage, the author presents various applications of the findings of the study.

Option A: The first paragraph of the passage mentions that "Researchers may be able to parlay this postmortem activity into better ways of preserving donated organs for transplantation". Hence, the findings of this study will help in studying the ways of preserving organs for transplantation.

Option B: The first paragraph and the sixth paragraph of the passage talks about how this research may translate into "more accurate methods of determining when murder victims were killed". Hence, this option is also an application of the study.

Option C: The last paragraph of the passage mentions that "The patterns of gene activity that the researchers observed may represent what happens when the complex network of interacting genes that normally keeps an organism functioning unwinds". It also provides an example in which genes which control other genes when turned off result in post mortem gene activity. Hence, this option is also an application and is not the correct answer.

Option D: The passage does talk about the effect of death. In the last paragraph, Noble says that "The headline of this study is that we can probably get a lot of information about life by studying death." However, the passage does not mention anything about increasing our lifespan. Hence, this is not mentioned in the passage and is the correct answer.

Therefore, the correct answer is option D.

Choice (D)

7. The passage talks about various features and applications of the study conducted by Noble and his colleagues.

Option A: The third paragraph of the passage mentions that "scientists analyzing blood and liver tissue from human cadavers had previously noted the postmortem activity of a few genes". Hence, we cannot say that Noble and his colleagues were the first to identify the activity of genes after death. Hence, this option is incorrect.

Option B: The passage mentions that "Although scientists analyzing blood and liver tissue from human cadavers had previously noted the postmortem activity of a few genes, Noble and colleagues systematically evaluated more than

1000." From this, we can infer that Noble and his colleagues were probably the first to systematically study more than 1000 genes. Hence, this is the correct answer.

Option C: While the passage mentions that the team "found that several genes that promote cancer became more active", we cannot infer from the passage, whether they were first to investigate this link. Hence, this option is not the correct answer.

Option D: The passage does not talk about the metaphysical aspect of their research except when introducing their topic of research (in the first paragraph). Hence, this is not the correct answer.

Therefore, the correct answer is option B.

Choice (B)

8. The passage mentions the behavior of various postmortem genes after death.

Option A: The passage mentions that the researchers found that "hundreds of genes ramped up". However, the passage does not describe the behavior of any postmortem genes in which their activity decreases immediately after death and then increases before shutting off. Hence, this is not the correct answer.

Option B: According to the passage, "most of these genes upped their activity in the first 24 hours after the animals expired and then tapered off". Further, the passage mentions that the genes "ramped up" their activity. From this we can infer that they became more active than they were before death. This is especially true in the case of developmental genes which are not active after the embryo stage. Hence, this option is correct.

Option C: The passage does not provide any example of such a gene where the activity decreases gradually before shutting off. Hence, this is not the correct answer.

Option D: The main characteristic of postmortem gene is that they remain active after death. This option cannot be correct as the defining characteristic of postmortem genes is contradicted. Hence, this is not the correct answer.

Therefore, the correct answer is option B.

Choice (B)

9. The passage provides various reasons why different types of genes remain active after death.

Option A: The last paragraph of the passage mentions that "Some genes may turn on, for example, because other genes that normally help kept them silent have shut off". Hence, turning off of genes that suppress other genes is one of the reasons mentioned in the passage. Hence, this is the correct answer.

Option B: The passage does not talk about the deterioration of cells after death. Hence, this option is incorrect.

Option C: While the passage mentions that "several genes that promote cancer became more active", it does not provide a reason why this happens. Hence, the reason mentioned in this option does not flow from the passage and is not the correct answer.

Option D: The passage mentions that "cellular conditions in newly dead corpses resemble those in embryos". However, it does not specifically state that the inactive nature of cells is similar in corpses and embryos. We also cannot infer from the passage whether cells are inactive in embryos. Hence, this option is incorrect.

Therefore, the correct answer is option A.

Choice (A)

10. Consider the relevant paragraph – *In an accompanying paper, Noble and two colleagues demonstrated another possible use for gene activity measurements, showing that they can provide better estimates of the time of death. Those results impress forensic scientist David Carter of Chaminade University of Honolulu. Although making a time of death estimate is crucial for many criminal investigations, "we are not very good at it," he says. Such estimates often rely on evidence that isn't directly connected to the body, such as the last calls or texts on the victim's cellphone. Noble and his colleagues, Carter says, have "established a technique that has a great deal of potential to help death investigation."*

Let's put this into points –

- currently the estimates often rely on evidence such as last calls etc.

- such estimates, in the opinion of Carter the forensic scientist, leaves his tribe "not very good at it. You can infer from this that last calls etc, which is what **they rely on**, are **not very reliable** evidence. Now, there is not enough for us to be able to infer that "not very good at it" necessarily means that they are always inaccurate. It could mean that they may be accurate at times (fortunately, perhaps), but they have no certainty of being accurate.

- Noble shows that gene activity measurement can provide accurate estimates.

- We are told that Carter (a forensic scientist who realises the limitations of his current methods) is impressed by this. He actually opines that the technique has a great deal of potential to help death investigations (ie. by providing good estimates of time of death). You can infer from this that he feels that the new technique is better than what he currently uses, in that the certainty of accuracy is greater than with current methods.

All this adds up to more than just 'more accuracy' – it adds up to the feeling that here's something they can rely on with more hope and confidence, **therefore 'more reliability'**. So, choice B is the answer.

Options A & C: Choices A and C are, actually, 2 ways of presenting the same thing – the idea of more accuracy. Choice C is extreme because of the superlative "most accurate".

Option D: While the passage mentions that the accurate time of death can be found, we cannot infer that the exact time of death can be estimated. Hence, this is not the correct answer. Therefore, the correct answer is option B

Choice (B)

Solutions for questions 11 to 15:

Number of words and Explanatory notes for RC:

Number of words: 674

11. The author begins the paragraph by stating that public places like gas stations and airports are similar. He then extends the thought to an individual unit of coca cola and states that even a bottle of coca-cola is similar to another bottle. So the theme 'uniformity' runs throughout the paragraph. The penultimate sentence ends on a negative tone, "uniformity ofphysical environment has outraged intellectuals." This negative criticism of uniformization is best explained through an example in choice A.

Option B: Choice B is a new line of thought – how super-industrialism can affect society for example. Also 'shocking ignorance' along with the given penultimate sentence (...long outraged...) does not make a good match. So choice B is incorrect.

Option C: Choice C is also wrong as an ending sentence as it does not carry forward the thought expressed in the penultimate sentence.

Option D: Choice D, without adequate substantiation, throws in new terms like "surfeit" (excess choice, in this case). Choice D moves far from the theme of 'similarity' or 'uniformity'. So choice D is incorrect.

Choice (A)

12. Refer to the fourth para. Philip Morris, for example, sold a single major brand of cigarettes for twenty-one years. Since 1954 by contrast, it has introduced six new brands and so many options with respect to size, filter and menthol that the smoker now has a choice among sixteen different variations. This fact would be trivial, were it not duplicated in virtually every major product field.

Option A: The author does not use the examples of cigarettes to show that the business of cigarettes has grown since 1954. He uses the example of cigarettes to tell us that, before 1954, the company sold a single brand of cigarettes but after 1954, six new brands were introduced

with many options. The second part of choice A is out of scope. So choice A is not the answer.

Option B: Choice B again is out of scope and is not a reason for the author's use of the examples of cigarettes.

Option C: Philip Morris has introduced six new brands and so many options with respect to size, filter and menthol that the smoker now has a choice among sixteen different variations. This fact would be trivial, were it not duplicated in virtually every major product field Companies, in other words, are discovering wide variations in consumer wants and are adapting their production lines to accommodate them. Hence choice C is the answer.

Option D: Choice D is not the answer. The word 'trivial' is used in another context. This fact (that the smoker now has a choice among sixteen different variations) would be trivial, were it not duplicated in virtually every major product field.

Choice (C)

13. For the society of the future will offer not a restricted, standardised flow of goods, but the greatest variety of *unstandardised* goods and services any society has even seen. We are moving not towards a further extension of material standardisation, but towards its dialectical negation. The author has mentioned many examples to support his point in para 4.

Example (a): Gasoline? Until a few years ago, the American motorist took his pick of either 'regular' or 'premium'. Today he drives up to a Sunoco pump and is asked to choose among eight different blends and mixes. So gasoline has been mentioned as an example by the author and is not the answer.

Example (b): Between 1950 and 1963, even the variety of pet foods increased from fifty-eight to eighty-one. So "cat food" will come under this category and is not the answer.

Example (c): The author has not specifically mentioned "variety of packed chips" to illustrate his point. Hence example (c) is the answer.

Example (d): Between 1950 and 1963, the number of different baking mixes and flour increased from eighty-four to 200. Hence example (d) has been mentioned by the author and is not the answer.

Example (e): In the field of office decor and furniture, the same process is at work. There are ten times the new styles and colours there were a decade ago. So example (e) has been mentioned by the author and is not the answer.

Example (f): The author has not made a mention of different varieties of 'cement'. Hence example (f) is the answer.

Hence the correct answers are (c) and (f).

Choice (D)

14. Refer to the last three paragraphs of the passage.

Statement 1: Consumers have more money to lavish on their specialized wants. Hence statement 1 is true and is not the answer.

Statement 2: Statement 2 is true from the penultimate sentence of the last paragraph: Yet the array of goods they offer the consumer is incomparably more diverse than any corner shop could afford to stock.

Statement 3: Statement 3 cannot be inferred from the last three paras and is the answer.

Statement 4: By wiping out thousands of little 'mom and pop' shops they have without doubt contributed to uniformity in the architectural environment. Yet the array of goods they offer the consumer is incomparably more diverse than any corner shop could afford to stock. Thus at the very moment that they encourage architectural sameness, they foster gastronomic diversity. Hence we can say that similarity of supermarkets belies the diversity they offer. Statement 4 is true and is not the answer.

Statement 5: Statement 5 can be inferred to be true from the line in para 4: 'There are ten times the new styles and colours there were a decade ago,' says John A. Saunders, president of General Fireproofing Company, a major manufacturer in the field. 'Every architect wants his own shade of green. Hence Statement 5 is true and is not the answer.

Statement 6: Statement 6 cannot be ascertained from the passage. It is in fact incorrect. Hence statement 6 is the answer.

Hence statements 3 and 6 cannot be inferred from the last three paras.

Ans: (36)

15. Option A: The author begins the penultimate paragraph with the line: Our social critics who are technologically naive fail to understand this. It is only primitive technology that imposes standardisation. But the primary concern of the author in the last two paras is not to prove that social critics are not technologically competent. So choice A is incorrect.
- Option B: Automated equipment permits the production of a wide variety of products in short runs at almost "mass-production" costs. Many engineers and business experts foresee the day when diversity will cost no more than uniformity. Hence choice B is correct.

Option C: Choice C is not the primary concern of the author. Choice C is out of scope and is incorrect.

Option D: In the penultimate paragraph, the author mentions that automation, in contrast, frees the path to endless, blinding, mind-numbing diversity. The rigid uniformity and long runs of identical products which characterise our traditional mass-production plants are becoming less important. But the author's intention in the last two paras is not to say that the advantages of automation outweigh the benefits of traditional methods. Hence choice D is not the answer.

Choice (B)

Solutions for questions 16 to 20:

Number of words and Explanatory notes for RC:

Number of words: 697

16. Robert Harrison was a professor of Italian literature at Stanford and a scholar of romance studies. So (a) is correct.

He hosts the radio talk show Entitled Opinions (about Life and Literature) on KZSU, the campus radio station. So (b) is true.

Robert Harrison has authored a new book titled Juvenescence: A Cultural History of Our Age. So (c) is correct.

Harrison identified and explored the cultural forces that have helped turn our society into the "youngest" society on earth. So (e) is possible.

There are no lines or clues in the passage to indicate that Robert Harrison is a religious leader or a psychologist.

Choice (A)

17. Harrison described his latest research as a "cultural exploration of how youth and aging have interacted and evolved from antiquity to today. People in our society are getting younger even as they continue to age. We are also aging within the larger framework of a culture whose history predates us and will outlast us. Later in the text, Harrison also uses two figures (Lolita and Molloy) to answer the question of how old we are in our age of juvenescence. He explains that the term juvenescence has two meanings, either in positive terms of cultural rejuvenation or, on the other hand, of juvenilization. He also brings in the term 'neoteny' at the end of the passage. This makes choice B the answer and all other choices incorrect.

Choice (B)

18. Refer to para 6. The process of juvenescence that got underway in the postwar period "has unleashed extraordinary youthful energies in our species and represents one of the momentous revolutions in human cultural history."

Option A: Choice A is a mere restatement. For the first time in human history, the young have become a model of emulation for the older population, rather than the other way around. Choice A is not an inference from para 6.

Option B: Choice B may be true but not according to the paragraph.

Option C: Refer to para 6. "The process of juvenescence that got underway in the postwar period, he observed, has unleashed extraordinary youthful energies in our species and represents one of the momentous revolutions in human cultural history." Hence choice C is correct.

Option D: Choice D is out of scope. Choice (C)

19. Harrison described his latest research as a "cultural exploration of how youth and aging have interacted and evolved from antiquity to today." Refer to para 5. Drawing on literature, philosophy, evolutionary science and other sources, Harrison identified and explored the cultural forces that have helped turn our society into the "youngest" society on earth. The young have become a model of emulation for the older population. This makes choice B correct. The other choices are far-fetched.

Choice (B)

20. Option A: The term juvenescence has two meanings, either in positive terms of cultural rejuvenation or, on the other hand, of juvenilization (in negative terms). Juvenilization is characterized by the loss of cultural memory and a shallowing of our historical age. The average citizen of the developed world today enjoys the luxury of remaining childishly innocent with respect to the instruments that he or she operates, consumes and otherwise depends on daily. **When one looks at the author's statement - It is hard to say whether we are on the cusp of a wholesale rejuvenation of human culture or whether we are tumbling into a dangerous and irresponsible juvenility.** - one understands that the author isn't sure whether the era is one of irresponsibility or one of renewal. Hence choice A is not correct.

Option B: It is hard to say whether we are on the cusp of a wholesale rejuvenation of human culture or whether we are tumbling into a dangerous and irresponsible juvenility." Robert Harrison is ambivalent about where we are culturally in this age of ours. Hence his tone is one of ambivalence. Hence choice B is true.

Option C: Choice C is wishful thinking and is incorrect. The term "neoteny" in the passage refers to adults retaining juvenile traits in a cultural vacuum.

Option D: Choice D is incorrect. We cannot say that Juvenilization is similar to rejuvenation in all aspects except cultural memory. The passage only says that unlike rejuvenation, juvenilization is characterized by the loss of cultural memory and a shallowing of our historical age.

Choice (B)

usage, 'rendered homeless' is more appropriate than 'made homeless'. We should write: **Hundreds of thousands** of people were rendered homeless Ans: (1)

2. In part 1, there is need for the indefinite article. The part should read: An unobserved particle is a wisp of reality, a shimmer of existence.

In part 2, the preposition 'with' is incorrect. The part should read: it is vague both by definition and by nature.

Part 3 has an error of punctuation. The part should read: Then it becomes a particle proper, it can be put into words, it is a thing with a place.

Part 4 is error-free.

In part 5, "only" is a limiting modifier. Its current position in the sentence makes the sentence incorrect. Part 5 should read: Only by looking at things, observing them, measuring them

Ans: (4)

3. In sentence 1, "Serengeti plain" needs to be preceded by the definite article 'the'.

In part 2, the word 'almost' is misplaced. "almost" is modifying the adjective 'all'. The part should read: the source of almost all your wealth.

Part 3 is error-free.

Part 4 has an error of punctuation. There has to be a comma placed after the word "literally". The part should read: literally, umbilical cord

In part 5, the verb 'was' needs to be changed to 'is'. The part should read: Anyone who's asked is obliged to help.....

Ans: (3)

4. In part 1, the noun "Americas" needs to be preceded by the definite article 'the'.

In part 2, there is an error of subject-verb agreement. The singular subject "Plant and animal DNA" needs a singular verb "squashes". So "squash" in sentence 2 is incorrect.

Part 3 has an error of tense. Part 3 needs "receded" in place of "had receded".

In part 4, "nearly" needs to be placed before "1000 years". The part should read: That's nearly 1,000 years

Part 5 has no errors.

Ans: (5)

Solutions for questions 5 to 8:

5. In sentence 1, "in the clear" is an idiom which means "to be innocent" or "not subject to suspicion or accusations of guilt".

In sentence 2, "cleared out" is a phrasal verb which means "to leave, usually quickly".

In sentence 3, "to keep clear" means "free from entanglement or contact".

In sentence 4, "cleared the fence" refers to "jump, leap or vault the fence".

Sentence 5 has an incorrect usage of the word "clear". "clear off" is not correct. We need to say: To help clear the air, the HR Manager held a meeting of all employees and explained the new policy changes in detail. "clear the air" means to dispel differences and/ or emotional tensions.

Ans: (5)

6. In sentence 1, "lit on" means to come upon by chance or accident.

In sentence 2, "go light on" means "to use, acquire, or consume in small or moderate amounts."

In sentence 3, "made light of" means "to treat as insignificant or trifling".

Sentence 4 has an incorrect usage of the word "light". The correct idiom should be: acted according to their own lights which means "acted according to their individual opinions, choices, or standards".

In sentence 5, "light at the end of the tunnel" means to hope for the ending of a difficult or unpleasant situation.

Ans: (4)

7. Sentence 1 is incorrect – it should be from "under their feet". This means to anticipate someone's action or argument and thus make it irrelevant or meaningless.

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

SUB-SECTION: VA

Solutions for questions 1 to 4:

1. Part 1 is error-free.

In part 2, "it's" needs to be replaced with the possessive pronoun "its" in both places. The part should read: Its epicenter was east of Gorkha District at Barpak, Gorkha, and its hypocenter was at a depth

In part 3, the definite article 'the' is not required before "Mount Everest". Further, there's an error of punctuation (absence of commas). The sentence should read:the deadliest day, on the mountain, in history.

In part 4, "Langtang valley" needs to be preceded by the definite article 'the'.

In part 5, there is an error of tense. The remaining sentences are in the simple past tense. Also "hundred" and "thousand" are incorrect. Further, in terms of standard

In sentence 2, the idiom "to be back on one's own ground" means to be in a situation where one has knowledge or competence. "covered new ground" means an idiom "to make progress or address an area of reference or discussion."

The usage of the word 'ground' is also incorrect in sentence (3). This should read: The fresher needed to learn the business from the ground **up**. This implies that he has to learn the ropes completely, from the most basic level to the highest level of the business.

In sentence 4, "stood his ground" is an idiom which means to maintain one's position or to be steadfast.

In sentence 5, the idiom "broke new ground" means to do something original or innovative (something not done before).

Ans: (13)

8. The idiom "hit the nail on the head" in sentence 1 means to be absolutely correct.

The usage of the word 'hit' is incorrect in sentence 2. We can say "It finally hit **on** him that this was the treasure that he was looking for." This means to arise suddenly in the mind, occur to someone.

The idiom "hit the high points" in sentence 3 means to direct attention to the most important points or places.

The idiom "score a hit with" in sentence 4 means to make a favorable impression on someone.

The usage of the word 'hit' is also incorrect in sentence 5. We should say: The union leader hit **out** at his critics who were not happy with his performance.

Ans: (25)

Solutions for questions 9 to 12:

9. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. It tells us what synergy refers to, in the context of management and in relation to teamwork. Sentence 5 further expands on the term 'synergy'. "combined effort of **individuals** as participants of the team" in sentence 2 links with "organization's **parts** interact to produce a joint effect" that is greater than the sum of the **parts** acting alone". So sentence 5 follows sentence 2. Sentence 1 then goes on to list the two types of synergy. Sentence 1 is followed by sentence 4 which talks about the positive effects of positive synergy. Sentence 4 is then followed by sentence 3 which talks about the negative effects of negative synergy. Sentence 3 concludes the paragraph. So, 25143.

Ans: (25143)

10. 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: The best Eskimo carvings of all ages Sentence 5 follows sentence 1. "powerful ability to reach across" and "communicate directly with us" in sentence 1 links with "the more we look the more life we perceive within them" in sentence 5. Also "arctic carvings" in sentence 5 refer to "Eskimo carvings" in sentence 1. Sentence 5 is followed by sentence 3. "We discover" in sentence 3 can only come after "The more we look and perceive" in sentence 5. Also "discover subtle living forms" in sentence 3 links with "the more life we perceive" in sentence 5. So, 153. Sentence 2 (We then realize) follows after the discovery mentioned in sentence 3. 2 is an opinionated statement: not the cold sculptures of a frozen world. Sentences 2 and 4 form a mandatory pair. "Instead they reveal passionate feelings vital people well aware life around them" in sentence 4 contrasts "cold sculptures of a frozen world" given in sentence 2. So, 15324.

Ans: (15324)

11. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It provides the background of the paragraph:

The University of Michigan opened its new Computer Center. It also gives details about the year of establishment and the venue. Sentence 4 is followed by sentence 2 which talks about the university's enormous mainframe computers being in the middle of a vast white room. Sentence 1 follows sentence 2. "computers stood in the middle of a vast white room" in sentence 2 is linked with "Off to the side were dozens of key-punch machines (computer terminals)" in sentence 1. Sentence 5 follows sentence 1. "all this" in sentence 5 refers to the details mentioned in sentences 2 and 1. Sentence 3 summarizes the discussion and concludes the paragraph. A teenager named Bill Joy is introduced in the last sentence. "that white room" in sentence 3 point to "vast white room" mentioned earlier in sentence 2.

Ans: (42153)

12. The paragraph begins with the question posed in sentence 5. Sentence 1 continues as a reply to that question. Sentence 3 mentions the first reason for the question posed in sentence 5. We are told that the book *Divine Secrets of the Ya-Ya Sisterhood* was about relationships and it spoke to people. The second reason for the question is mentioned in sentence 2 (Secondly, the author actress herself acted it out, playing each character with such skill that she turned her readings into performances). Sentence 4 with the contrast conjunction "but" then clarifies on the most important factor (actually a tribute to the Power of Context, more specifically, to one specific aspect of context) which resulted in the book being a success. Sentence 4 concludes the paragraph.

Ans: (51324)

Solutions for questions 13 to 16:

13. On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that begins the paragraph. Epidemics are an example of geometric progression. "this kind of progression" in sentence 4 links with "another example of geometric progression" and "grown from a single sheet of paper all the way to the sun in fifty steps" in sentence 2. Sentence 4 is followed by sentence 1. "the end result – the effect – seems far out of proportion to the cause" in sentence 4 links with "this expectation about proportionality" in sentence 1. "We need to prepare ourselves" in sentence 5 is a course of action which follows "we have to abandon this expectation about proportionality" in sentence 1. So, 2415. Sentence 3 is the odd sentence out as it needs a precedent and more substantiation.

Ans: (3)

14. On a careful reading of the sentences, it can be observed that sentence 5 is a general sentence that begins the paragraph. It establishes the background: experiences of Victor Frankl. Sentences 5 and 2 form a mandatory pair. "lecturing to his students after his release" in sentence 5 links with "He would describe himself in the classroom, in his mind's eye, and give his students the lessons he was learning" in sentence 2. "during his very torture" in sentence 2 points to "in the midst of his experiences" in sentence 5. Sentence 1 (Through a series of such disciplines – mental, emotional, and moral –) continues after sentence 2 (in the classroom, in his mind's eye, and teach his students). Sentence 1 is followed by sentence 3. "his small, embryonic freedom grew larger and larger" in sentence 1 links with "he had more freedom, more internal power to exercise his options" in sentence 3. So, 5213. Sentence 4 is the odd man out as it just mentions information about Frankl but does not talk about the experience of Victor Frankl in the death camps.

Ans: (4)

15. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It mention the person's name Eliyahu Goldratt, the title of the book *The Goal* and mentions an important breakthrough described as "the theory of constraints". Sentence 4 is followed by sentence 1. The theory of constraints introduced in sentence 4 is explained in

sentence 1. Sentence 5 exemplifies the theory of constraints. Also "determines how fast you will get to your destination" in sentence 5 links with "determines how fast you get to where you want to go" in sentence 1. Sentence 3 concludes the paragraph. "determine the speed of your entire journey" in sentence 3 links with "determines how fast you will get to your destination" in sentence 5. Also "The speed at which you will pass through this bottleneck" in sentence 3 points to "this bottleneck or choke point becomes the constraint" in sentence 5. So, 4153. Sentence 2 does not fit in with the remaining sentences which discuss and exemplify the theory of constraints.

Ans: (2)

16. On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It introduces the background: cinematic representation of the new Germany (during the first decade after unification). "East and West Germans mutually ignored each other" in sentence 4 is further explained in sentences 3 and 5. Sentence 4 is followed by sentence 3 (West Germans are largely absent). Sentence 3 is followed by sentence 5 (East Germans are equally absent). "equally absent" in sentence 5 has to succeed "largely absent" in sentence 3. Sentence 2 follows sentence 5 as it talks about an exception (where East and West Germans did not mutually ignore each other). "possibly signals the emergence of a unified German film culture" in the conclusion sentence 2 mirrors the time period "first decade after unification" mentioned in the introduction sentence 4. So, 4352. Sentence 1 runs tangent to the paragraph as it does not talk about cinematic representation of the new Germany i.e. West Germans and East Germans in films. Hence sentence 1 is the odd sentence out.

Ans: (1)

Solutions for questions 17 to 20:

17. An additional understanding of a situation that can be derived through reasoning is called an inference. An unstated premise or missing link between the existing premises and the conclusion is called an assumption.

Option A: Choice A is not sufficient to infer that the birds will not come to peck at the grapes. It just mentions 'a boy' which would mean at least one out of possibly more than one boy in the painting. It does not discuss whether the boy in the painting was real enough.... Choice A is not an assumption.

Option B: Choice B is not the assumption of Zeuxis. It is more of a likely conclusion.

Option C: Choice C (**A** realistic looking **boy** in the painting **should** scare the birds) is the assumption of Zeuxis. That is why he painted the boy the second time. But when the birds, once again, tried to peck the grapes, he was extremely displeased, and inferred that he "must have painted the boy with less skill".

Option D: Choice D may serve as a far-fetched inference but it is not an assumption of Zeuxis. Choice (C)

Note: Some of the inferences from the given argument are:-

- 1) Grapes are a favourite food of birds.
- 2) Spatial illusion was not applied commonly before that time.
- 3) In terms of illusion, Parrhasius displayed better skills than Zeuxis.
- 4) The levels at which Parrhasius performed were different from that of Zeuxis.

18. Choice A is not related to the argument's conclusion and does not help explain the situation.

Choice B would affect the vision of the wearer as well as the market potential and revenues of Adaptive Spectacles. One may have to visit the optometrist. Choice B will help explain why Adaptive Spectacles did not create a dent in the market.

Choice C is not a limitation. It is not negative in tone. It does not explain the fact that Adaptive Spectacles could not create a dent in the market.

Choice D weakens the last sentence of the paragraph and is not the answer.

Choice (B)

19. Choice A without a contrast conjunction like 'but', 'yet' and 'however' cannot be the blank sentence. It does not link with the previous sentence: "legislators, judges and police mediate and calmly resolve tussles before they escalate." Choice B runs tangent to the paragraph and does not help in plugging the thoughtflow. The comparison between Maryland and New York is a distractor.

Choice C cannot find a place in the blank. It needs a precedent (Reading the 163-page report on the DOJ's 14-month investigation) and more substantiation. It can be placed as the introduction sentence of the paragraph which follows the given paragraph.

The first part of choice D i.e. "Society is supposed to work on this principle" connects with the previous line: "Locke wrote, legislators, judges and police mediate and calmly resolve tussles before they escalate." The second part of choice D i.e. "..... though in reality, officials are known to occasionally veer from their role as honest, impartial defenders of the public good" links with "police department has strayed from its mission of protecting the people" mentioned in the last sentence of the paragraph.

Choice (D)

20. The argument is that social software can be used for business performance improvement. So to improve it, the options must show how social software can add to business performance improvement. Choice A does not strengthen the argument since it says how social software should be used, not how it is useful. Choice B is incorrect since it talks about why its benefits are not known and not its benefits. Choice C shows how employees can benefit from using social software thus strengthening the argument. Choice D indirectly casts doubts on social software instead of supporting it.

Choice (C)

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

SECTION – II SUB-SECTION: DI

Solutions for questions 1 to 4:

Let the following table represent the Export Value between the three countries:

To From \	A	B	C
A	0	a	b
B	c	0	d
C	e	f	0

From the table given in the question, we get

$$a + b = 39 \quad \dots(1)$$

$$c + d = 41 \quad \dots(2)$$

$$e + f = 29 \quad \dots(3)$$

$$c + e = 30 \quad \dots(4)$$

$$a + f = 31 \quad \dots(5)$$

$$b + d = 48 \quad \dots(6)$$

Further, it is given that $b - e = 13$

$$(4) - (2) + (6) \text{ gives } c + e - c - d + b + d = 30 - 41 + 48$$

$$\Rightarrow e + b = 37$$

Hence, $e = 12$ and $b = 25$. All the other values can be calculated from this and the following table presents these values:

To From	A	B	C
A	0	14	25
B	18	0	23
C	12	17	0

1. Net Export of C with respect to B = $17 - 23 = -\$6$ mn
Choice (B)

2. Value of exports from A to B = \$14 mn.
Ans: (14)

3. The highest total trade is for B, C (\$40 mn).
Choice (B)

4. Among the given options, the exports from A to B is the lowest.
Choice (D)

Solutions for questions 5 to 8:

From the given table, we can calculate the number of matches won, lost and drawn by each team. The following table provides this info:

Team	Wins	Losses	Draws	Points
A	3	2	0	9
B	2	2	1	7
C	1	4	0	3
D	0	4	1	1
E	3	1	1	10
F	4	0	1	13

The top four teams will be F (13 points), E (10 points), A (9 points) and B (7 points). In the Knockout stage, F will play against B and E will play against A.

The Goals scored by and against F in the League stage are 21 and 11 respectively.

The Goals scored by and against E in the League stage are 10 and 8 respectively.

The Goals scored by and against A in the League stage are 15 and 11 respectively.

The Goals scored by and against B in the League stage are 13 and 13 respectively.

From the second table, Goals for and against F in the Knockout stage are 1 and 2 respectively.

Goals for and against E in the Knockout stage are 2 and 1 respectively.

Goals for and against A in the Knockout stage are 1 and 1 respectively.

Goals for and against B in the Knockout stage are 2 and 2 respectively.

F played against B in the Semi-finals.

If B was eliminated in this match, the score in this match must be 2-2. This is not possible since F scored only 1 goal. Hence, F was eliminated and B went to the finals. In this match, F would have scored 1 goal and B would have scored 2 goals.

In the match against E and A, E could not have been eliminated (since it must have scored 2 goals against 1 in this match and be eliminated which is not possible). Hence, in this match, A and E would have scored 1 goal each and E would have advanced to the Finals because it had a higher number of points in the League stage.

Hence, the finals would be between B and E in which E scored 1 goal and B, 0 goals. Hence, E is the winner of the tournament.

5. E was the winner of the tournament. Choice (D)

6. The two teams (E and B) together scored only 1 goal in the finals.
Choice (A)

7. Two matches were drawn in the League stage and 1 match was drawn in the Knockout stage. Hence, a total of 3 matches were drawn in the tournament. Ans: (3)

8. E scored 10 points at the end of the league stage.
Ans: (10)

Solutions for questions 9 to 12:

9. Plant C will manufacture only when the required number of units are more than 240 i.e., on Day 3, Day 7, Day 8, Day 9 and Day 10.

Number of units manufactured by Plant C will be on Day 3 = $270 - 240 = 30$

on Day 7 = 120 (since more than 360 are to be manufactured)

on Day 8 = $350 - 240 = 110$

on Day 9 = 120

on Day 10 = 120

Total number of units = $30 + 120 + 110 + 120 + 120 = 500$.

Ans: (500)

10. The total Fixed cost depends upon the number of plants used. Plant A will be used on all the 10 days. Plant B will be used on 9 days. Plant C will be used on 5 days. Plant D will be used on 3 days.

\therefore Total Fixed cost = $10 \times 150 + 9 \times 180 + 5 \times 110 + 3 \times 80 = ₹3,910$.
Ans: (3910)

11. If the same number of plants are used on any two days, then the Fixed cost as a percentage of Variable cost will be lower when more number of units are manufactured.

On Day 3 and Day 8, three plants will be used. But since more number of units are manufactured on Day 8, the required percentage will be lower on Day 8.

Similarly, between Day 4 and Day 6, Day 4 will have the lower percentage.

Required percentage on Day 8

$$= \frac{150 + 180 + 110}{6 \times 120 + 5 \times 120 + 7 \times 110} = \frac{440}{11 \times 120 + 770} = 21.05\%$$

Required percentage on Day 4

$$= \frac{150 + 180}{6 \times 120 + 5 \times 40} = \frac{330}{920} > 30\%$$

Hence, the percentage is the lowest on Day 8.
Choice (C)

12. We have calculated the total Fixed Cost in the previous question.

To find the total Variable cost, we need to find the number of units manufactured by each plant across the ten days.

Total units manufactured by Plant A = $120 \times 9 + 80 = 1160$

Total units manufactured by Plant B = $120 \times 5 + 60 + 90 + 40 + 30 = 820$

Total units manufactured by Plant C = 500 (from previous question)

Total units manufactured by Plant D = $30 + 90 + 50 = 170$

Total Variable Cost = $1160 \times 6 + 820 \times 5 + 500 \times 7 + 170 \times 8 = 15920$

Total Cost = $15920 + 3910 = 19830$

Total Cost per unit

$$= \frac{19830}{1160 + 820 + 500 + 170} = \frac{19830}{2650} = 7.48$$

Choice (A)

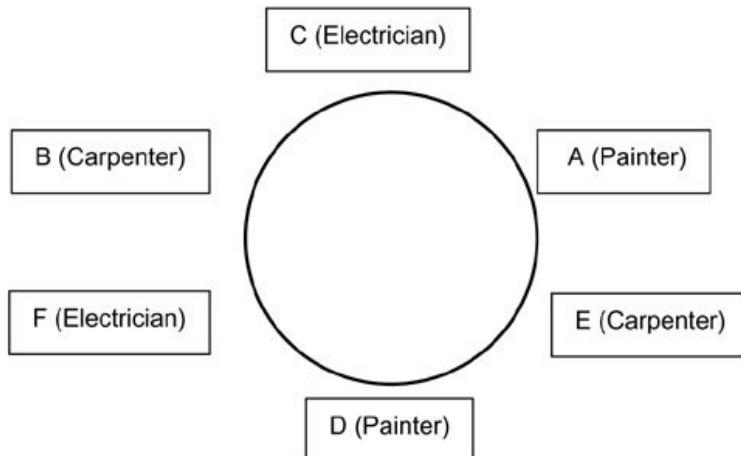
Difficulty level wise summary - Section II	
Sub Section: DI	
Level of Difficulty	Questions
Very Easy	-
Easy	1, 2, 3, 4, 5, 6, 7, 8
Medium	9, 10, 11, 12
Difficult	-
Very Difficult	-

SUB-SECTION: LR

Solutions for questions 1 to 4:

Given that C and D are opposite each other. Also, from (iii), E is to the left of A. A can be sitting to the left of D or A can be sitting to the left of C. If A is sitting to the left of D, D will be sitting to the right of A, who is a painter. In this case, D is sitting to the right of a painter and will violate condition (iii). Hence, A is sitting to the left of C and E is sitting to the left of A. From (ii), B is not adjacent to D. Hence, B is sitting to the right of C and opposite E. Hence, E will be a carpenter from (ii). F will be to the left of D and will be an electrician. From (i), A is sitting adjacent to an electrician. Hence, C is an electrician and B will be a carpenter. Hence, D will be a painter (since there are two of each profession).

The arrangement is given in the diagram below:



- | | | |
|--|------------|--|
| 1. D is a painter. | Choice (B) | 3. The given condition is satisfied for two people, E and B.
Ans: (2) |
| 2. The person sitting opposite E is a carpenter. | Choice (C) | 4. B and E are sitting opposite each other. Choice (D) |

Solutions for questions 5 to 8:

From (vi), D is the third heaviest and D's rank by height can be 1/2/3. But it cannot be 1 because from (iii), B is taller than D. Also, it cannot be 3 from (ii) since D's rank by weight is 3. Hence, D's rank by height will be 2.

From (iii), B's rank by height will be 1.

From (iv), E's rank by height will be 4/5/6 and his rank by weight will be 1/2/4.

From (iii), C's rank by height cannot be 6. Since he is shorter than E, his rank by height can only be 5. E's rank by height will be 4. E's rank by weight cannot be 4 (from (ii)). Also from (vi), E's rank cannot be 1. Hence, E's rank by weight will be 2.

From (vi), F's rank by height will be 3 and A's rank will be 6.

A and B cannot be the heaviest (from (i) and (ii)). C cannot be the heaviest (from (iii)). Hence, F has to be the heaviest. Also, A and B cannot be the lightest (from (i) and (ii)). Hence, C will be the lightest. The rank by weight of A and B can be 4 or 5 in any order.

The following table provides this information:

Person	Rank By Weight	Rank by Height
A	4/5	6
B	5/4	1
C	6	5
D	3	2
E	2	4
F	1	3

- | | | |
|-------------------------------------|------------|--|
| 5. F is the heaviest among the six. | Choice (C) | 7. B's rank by weight will be 4. A will be the fifth heaviest.
Choice (A) |
| 6. B is lighter than D. | Choice (B) | 8. The sum of the ranks is the highest for C. Choice (D) |

Solutions for questions 9 to 12:

From (ii), Tarun plays Basketball. From (iv), Yasar endorses Gatorade. From (v), Unnath plays Hockey and Varun is from Spain and wears a green shirt.

From (vi), Varun cannot play Cricket (since he wears a Green shirt). Yasar also cannot play Cricket (since he cannot endorse ESPN). Hence, Wasim must play Cricket and endorse ESPN.

From (iv), Yasar does not play Badminton. Hence, Yasar plays Tennis and Varun plays Badminton.

From (i), Unnath does not endorse Nike (since he plays Hockey). From (ii), Tarun does not endorse Under Armour.

From (vi), the person from France cannot be Tarun (since he cannot endorse Under Armour) and it also cannot be Varun (he is from Spain) or Wasim (he endorses ESPN) or Yasar (he endorses Gatorade). Hence, Unnath must be from France, wears Blue shirt and endorses Under Armour. From (iv), the person who endorses New Balance wears a White shirt. This can only be Tarun. Varun endorses Nike.

From (ii), Yasar is from Belgium and from (iii), Wasim is not from Germany (since he plays Cricket). Hence, Wasim must be from England and Tarun must be from Germany. Since Wasim cannot be wearing a Red shirt, Yasar will wear a Red shirt and Wasim, a Yellow shirt.

The following table presents the distribution:

Person	Country	Brand	Sport	Colour
Tarun	Germany	New Balance	Basketball	White
Unnath	France	Under Armour	Hockey	Blue
Varun	Spain	Nike	Badminton	Green
Wasim	England	ESPN	Cricket	Yellow
Yasar	Belgium	Gatorade	Tennis	Red

9. Tarun is from Germany. Choice (A)
10. The person who plays Tennis (Yasar) endorses Gatorade. Choice (C)
11. The person from England (Wasim) wears a Yellow shirt. Choice (D)
12. The person who plays Hockey (Unnath) is from France. Choice (C)
3. It is given that, $\sqrt{2^6 + 2^6 + 2^6 + \dots n \text{ times}} = 1000$. Squaring both sides, we get,
 $n(2^6) = 10^6$
 $\Rightarrow n = \frac{10^6}{2^6} = 5^6 = 15625$ Choice (D)

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

SECTION – III: QA

Solutions for questions 1 to 26:

1. Let $a = b^2 = c^3 = d^4 = k$.

$$\therefore a = k, b = k^{\frac{1}{2}}, c = k^{\frac{1}{3}}, \text{ and } d = k^{\frac{1}{4}}$$

$$abc = (k) \left(k^{\frac{1}{2}} \right) \left(k^{\frac{1}{3}} \right) \left(k^{\frac{1}{4}} \right) = k^{\frac{25}{12}}$$

$$(bc)^2 = \left(k^{\frac{1}{2}} k^{\frac{1}{3}} \right)^2 = \left[k \left(\frac{5}{6} \right) \right]^2 = k^{\frac{5}{6} \times 2} = k^{\frac{5}{3}}$$

$$\log \left[k \left(\frac{5}{3} \right) \right] \left[k^{\left(\frac{25}{12} \right)} \right] = \frac{\left(\frac{25}{12} \right)}{\left(\frac{5}{3} \right)} = \frac{5}{4}$$

Choice (D)

2. To type all the page numbers, he needs to press the keys only once for single digit numbers, twice for two-digit numbers and thrice for three-digit numbers and four times for four-digit numbers.

	No. of values	No. of digits
Single digit numbers	9	9
Two-digit numbers	90	180
Three-digit numbers	900	2700

$$\text{Remaining number of digits} = 5001 - (2700 + 180 + 9) \\ = 2112$$

$$\therefore \text{Number of four digits numbers} = \frac{2112}{4} = 528$$

Thus the total number of pages in the book is $9 + 90 + 900 + 528 = 1527$ Ans: (1527)

4. Let the cost price of each ml of milk be ₹1.
 \therefore the selling price of each ml of diluted milk = ₹1.2
 Let the initial quantity of milk he purchased be 1000 ml
 CP of 1000 ml of milk = ₹1000.
 Let the quantity of water added be x ml
 Now, $(1000 + x) (1.2) = 1.5(1000)$
 $1000 + x = 1250$
 $\therefore x = 250 \text{ ml}$
 Therefore, he adds 250 ml of water to every litre of milk.
 Ans: (250)

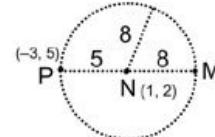
5. Let the initial price of the commodity be $5k$

	Initial	Price	Consumption	Expenditure
		5k	100	500k
	Final	6k	?	540k

$$\text{Now } 6k(?) = 540k \\ \therefore \text{the final consumption} = 90$$

Therefore the percentage reduction in the consumption is 10% Choice (B)

6.



M lies on the circumference of a circle whose centre is at N = (1, 2)

The distance between P (-3, 5) and N (1, 2) is $\sqrt{(-3 - 1)^2 + (5 - 2)^2} = 5 \text{ units}$

The distance between M and P will be the maximum when M lies on the line joining N and P, with N lying between M and P. The maximum distance is $8 + 5 = 13$.

Choice (D)

7. First we need to arrange the numbers in ascending order . i.e 1,5, 7,13,31,33,35
 Number of items, $n = 7$

$$\text{The first quartile, } Q_1 = \left(\frac{n+1}{4} \right)^{\text{th}} \text{ item} = \left(\frac{7+1}{4} \right)^{\text{th}} \text{ item} \\ = 5$$

$$\text{The third quartile, } Q_3 = 3 \left(\frac{n+1}{4} \right)^{\text{th}} \text{ item}$$

$$= 3 \left(\frac{7+1}{4} \right)^{\text{th}} \text{ item} = 33$$

$$\text{The quartile deviation} = \frac{Q_3 - Q_1}{2} = \frac{33 - 5}{2} = 14$$

Ans: (14)

8. $\tan 60^\circ = \sqrt{3}$ and $\tan 120^\circ = -\sqrt{3}$
 $\tan \theta + \tan(\theta + 60^\circ) + \tan(\theta + 120^\circ)$
 $= \tan \theta + \frac{\tan \theta + \sqrt{3}}{1 - \sqrt{3} \tan \theta} + \frac{\tan \theta - \sqrt{3}}{1 + \sqrt{3} \tan \theta}$
 $= \tan \theta +$
 $\frac{(\tan \theta + \sqrt{3})(1 + \sqrt{3} \tan \theta) + (\tan \theta - \sqrt{3})(1 - \sqrt{3} \tan \theta)}{1 - 3 \tan^2 \theta}$
 $= \tan \theta + \frac{8 \tan \theta}{1 - 3 \tan^2 \theta}$
 $= \frac{9 \tan \theta - 3 \tan^3 \theta}{1 - 3 \tan^2 \theta}$

Now $\tan 3\theta = \tan(\theta + 2\theta) = \frac{\tan \theta + \tan 2\theta}{1 - \tan \theta \tan 2\theta}$

$$= \frac{\tan \theta + \frac{2 \tan \theta}{1 - \tan^2 \theta}}{1 - \tan \theta \cdot \frac{2 \tan \theta}{1 - \tan^2 \theta}} = \frac{3 \tan \theta - \tan^3 \theta}{1 - 3 \tan^2 \theta}$$

Now $\frac{9 \tan \theta - 3 \tan^3 \theta}{1 - 3 \tan^2 \theta} = 3 \frac{(3 \tan \theta - \tan^3 \theta)}{1 - 3 \tan^2 \theta} = 3 \tan 3\theta$.

We are given that $3 \tan 3\theta = \sqrt{3}$

$$\therefore \tan 3\theta = \frac{1}{\sqrt{3}} = \tan 30^\circ$$

$$\therefore \theta = 10^\circ$$

Since $\tan 3\theta$ is periodic, $\theta = 70^\circ, 130^\circ$ and so on are other valid solutions to the equation, but given $0^\circ < \theta < 65^\circ$, only $\theta = 10^\circ$ is possible.

Alternative Solution:

Since $0^\circ < \theta < 65^\circ$, and the R.H.S. has $\sqrt{3}$, we can guess that the angle θ is $30^\circ, 60^\circ$ or related to them in some way. We can observe that 30° and 60° do not satisfy. We can check for other related values also using the scientific calculator.

Trying $\frac{30^\circ}{2}$, and $\frac{30^\circ}{3}$ using the calculator, we can see that 10° satisfies. Ans: (10)

9. Let the number of one rupee and two rupee coins used be denoted by x and y respectively. Therefore the number of five rupee coins

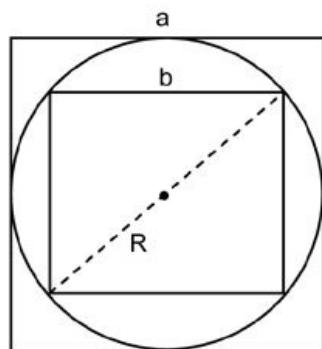
Now will be $27 - x - y$

$$x + 2y + 5(27 - x - y) = 100 \\ \Rightarrow 4x + 3y = 35 \quad (1)$$

This equation has only three solutions (since $x, y \geq 1$), i.e., $(2, 9), (5, 5)$ and $(8, 1)$.

Therefore one can pay ₹100 using coins in the given denominations in exactly three ways Ans: (3)

10.



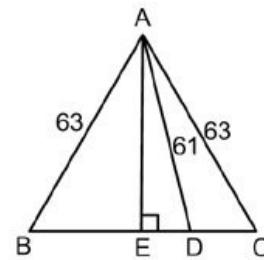
Let us denote the side of the outer and the inner square by a and b respectively. Let R be the radius of the circle. Side of the outer square = Diameter of the circle = Diagonal of the inner square

$$\therefore a = 2R = b\sqrt{2}$$

$$\therefore \frac{a}{b} = \frac{\sqrt{2}}{1}.$$

Choice (C)

11.



We drop a perpendicular from A to BC which meets BC at E where $BE = EC$ (Since $\triangle ABC$ is an isosceles triangle)

$$\text{Now } AE^2 = AC^2 - EC^2 \text{ and } AE^2 = AD^2 - ED^2$$

$$\text{Equating } AE^2, \text{ we get}$$

$$AC^2 - EC^2 = AD^2 - ED^2$$

$$AC^2 - AD^2 = EC^2 - ED^2$$

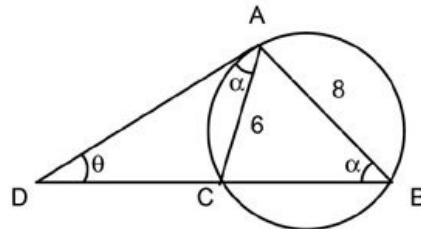
$$63^2 - 61^2 = (EC - ED)(EC + ED)$$

$$(2)(124) = (DC)(BD) \text{ (Since } EC = BE\text{)}$$

$$= 248.$$

Choice (C)

12.



$\triangle ABD$ is similar to $\triangle ACD$

$$\angle ADB = \angle ADC,$$

$\angle ABC = \angle DAC$, (Alternate segment theorem), and

$$\angle ACD = \angle BAD$$

$$\therefore \frac{AD}{CD} = \frac{AB}{AC} = \frac{BD}{AD} = \frac{8}{6} = \frac{4}{3}$$

$$\therefore \frac{\text{Area of } \triangle ABD}{\text{Area of } \triangle ACD} = \left(\frac{4}{3}\right)^2$$

$$= \frac{16}{9} \quad (\because \text{Ratio of Areas of similar triangles} = \text{square of Ratio of sides})$$

$$\Rightarrow \frac{\text{Area of } \triangle ACD}{\text{Area of } \triangle ABD} = \frac{9}{16}$$

$$\Rightarrow \frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle ABD} = 1 - \frac{9}{16} = \frac{7}{16}$$

$$\therefore \frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle ACD} = \frac{7}{9}$$

Choice (D)

13. Let m and n be the roots of the given equation.

$$\text{Sum of the roots, } m + n = p$$

$$\text{Product of the roots, } mn = 2p$$

$$(m - n)^2 = (m + n)^2 - 4mn$$

$$(3)^2 = p^2 - 4(2p)$$

$$p^2 - 8p - 9 = 0$$

$$(p + 1)(p - 9) = 0$$

Since both the roots are positive so

$$p \neq -1$$

$$\therefore \text{The equation is } x^2 - 9x + 18 = 0.$$

The equation whose roots are 2 more than the roots of the above equation is given by

$$(x-2)^2 - 9(x-2) + 18 = 0$$

$$x^2 - 4x + 4 - 9x + 18 + 18 = 0$$

$$x^2 - 13x + 40 = 0$$

Alternative Solution:

The equation whose roots are 2 more than the roots of $x^2 - px + 2p = 0$ will be $(x-2)^2 - p(x-2) + 2p = 0$
i.e., $x^2 - x(4+p) + 4(p+1) = 0$.

Now, checking for Choice (A) and comparing the constant terms, if $4(p+1) = 4 \Rightarrow p = 0$, for which the coefficient of x does not satisfy.

Similarly, trying the other choices, only choice (D) satisfies.
Choice (D)

14. It is given that,

$$\begin{aligned} f(x-1) &= g(x+1) \\ f(x-1) &= 2(x-1)^2 - 1 \\ g(x+1) &= (x+1)^2 - (x+1) + 1 \\ \Rightarrow 2(x-1)^2 - 1 &= (x+1)^2 - (x+1) + 1 \\ \Rightarrow 2(x^2 - 2x + 1) - 1 &= x^2 + 2x + 1 - x - 1 + 1 \\ \Rightarrow 2x^2 - 4x + 1 &= x^2 + x + 1 \\ \Rightarrow x(x-5) &= 0 \\ \Rightarrow x = 0 \text{ or } x &= 5 \end{aligned}$$

Therefore for two integral values of x , the given criterion is satisfied.
Choice (C)

15. If a zero is appended to the extreme right of an octal number, the number gets multiplied by 8
 \therefore If N was the original number

The present value of the number is $\frac{N \times 8}{25}$

Therefore the percentage reduction in the value of the number is $\frac{17}{25} \times 100 = 68\%$
Choice (C)

16. Let the two numbers be denoted by ha and hb whose HCF is h and LCM is hab .

(Here, a and b are coprime to each other)

Now, $ha + hb + hab = 89$

$h(a+b+ab) = 89$

There are two possibilities:

- I. $h = 1 \quad a + b + ab = 89$
II. $h = 89 \quad a + b + ab = 1$

Since a and b each have a minimum value of 1, the second possibility can be ruled out.

Therefore $h = 1$ and $a + b + ab = 89$.

Adding 1 to both sides, we get

$$1 + a + b + ab = 90$$

$$(a+1)(b+1) = 90$$

$a+1$	$b+1$	a	b
1	90	0	89
2	45	1	44
3	30	2	29
5	18	4	17
6	15	5	14
9	10	8	9

Thus we have 5 such pairs (1, 44); (2, 29); (4, 17); (5, 14) and (8, 9)

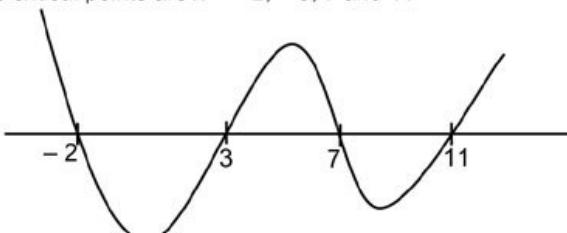
Ans: (5)

17. $f(x) = \sqrt{(x+2)(x-3)(x-7)(x-11)}$

As $f(x)$ is a real valued function,

$$(x+2)(x-3)(x-7)(x-11) \geq 0$$

The critical points are $x = -2, +3, 7$ and 11



Therefore the integral values of x that do not give real values for $f(x)$ lie in the range $(-2, 3) \cup (7, 11)$

The values are $x = -1, 0, 1, 2, 8, 9$ and 10

Thus there are 7 such values.
Choice (A)

18.

A	B
Efficiency ratio	1 : 4
Time ratio	4 : 1
Time taken	$4t$ t (Difference $3t = 15$)

Therefore A takes 20 days and B takes 5 days to complete the work. They will together complete the work in

$$\frac{1}{\frac{1}{20} + \frac{1}{5}} = 4 \text{ days.}$$

Choice (A)

19. Let us denote the speed of B by u m/s.

$$\text{Therefore the speed of A} = \frac{4}{3} u \text{ m/s}$$

In 16 seconds, B will cover $\left(\frac{4u}{3} - u\right) \times 16$ m more than A

$$\text{It is given that, } 16 \cdot \frac{u}{3} = 24$$

$$\Rightarrow u = \frac{9}{2} \text{ m/s}$$

$$\therefore \text{the speed of A is } \frac{4}{3} \times \frac{9}{2} \text{ m/s or } 6 \text{ m/s}$$

$$\text{Time taken to cover 240 m by A} = \frac{240}{6} = 40 \text{ s}$$

$$\text{Time taken by B to cover } (240 - 24) \text{ m} = \frac{\frac{216}{9}}{2} = 48 \text{ s.}$$

Thus, A will beat B by 8 seconds

Choice (B)

20. $32 < 45 < 64$

$$\therefore \log_2 32 < \log_2 45 < \log_2 64$$

$$\log_2 2^5 < \log_2 45 < \log_2 2^6$$

$$5 < \log_2 45 < 6$$

But, we need to find N, where $\log_2 N = 5.5$

$$\Rightarrow N = 2^{5.5} = 2^{\frac{11}{2}} = (2048)^{\frac{1}{2}}$$

Now, $2025 < 2048 < 2116$

$$(2025)^{\frac{1}{2}} < (2048)^{\frac{1}{2}} < (2116)^{\frac{1}{2}}$$

$$45 < 2048^{\frac{1}{2}} < 46$$

$\therefore \log_2 45 < 5.5$

Again, 45 cannot be expressed as 2 to the power of a rational number, since, if it were rational,

$$\log_2 45 = \frac{m}{n}, \text{ then } 2^{\left(\frac{m}{n}\right)} = 45$$

$\Rightarrow 2^m = 45^n$, which means that an odd number equals an even number, which is not possible.

Hence, $\log_2 45$ is an irrational number, less than 5.5.

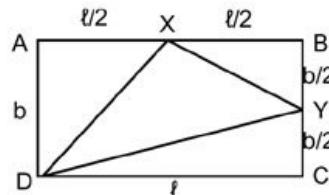
Alternative Solution:

This question can also be solved directly using the online calculator, by evaluating the expression $\frac{\log 45}{\log 2}$

(i.e., $\log_2 45$) and observing that it is equal to $\approx 5.49\dots$ and will be (observably) non-terminating.

Choice (B)

21. Let the length and breadth of the rectangle be ℓ and b respectively.



Area of $\triangle DXY$ = (Area of the rectangle) – (Area of the three triangles)

$$= \ell b - \left(\left(\frac{1}{2} b \times \frac{\ell}{2} \right) + \left(\frac{1}{2} \frac{\ell}{2} b \right) + \left(\frac{1}{2} \ell \times \frac{b}{2} \right) \right)$$

$$= \ell b - \frac{5}{8} \ell b = \frac{3}{8} \ell b$$

$$\therefore \frac{\text{Area of the } \triangle DXY}{\text{Area of the rectangle}} = \frac{\frac{3}{8} \ell b}{\ell b} = \frac{3}{8}$$

Choice (B)

22. Any number of the form $2^2(3^0 5^0 \dots n^0)$ will have the sum of its odd factors as $(3^0 + 3^1 + \dots 3^k)(5^0 + 5^1 + \dots 5^l) \dots (n^0 + n^1 + \dots n^m)$, where n is an odd number.

The sum of its even factors will be

$$(2^1 + 2^2)(3^0 + 3^1 + \dots 3^x)(5^0 + 5^1 + \dots 5^y) \dots (n^0 + n^1 + \dots n^z)$$

i.e. 6(sum of its odd factors)

So the number is of the form 4(odd). The remainder when such a number is divided by 8 is 4.

Alternative Solution:

It can be inferred from the question that the number is even. Hence, the remainder when an even number is divided by 8 can only be one of 0, 2, 4 and 6. Now, these remainders themselves can be taken, one at a time, to be the given number and checked if the other condition that the sum of all the odd factors is one-sixth of the sum of all the even factors is satisfied.

If the remainder is 0, the number can be 8. The only odd factor is 1 and the even factors are 2, 4, 8. The condition is not satisfied.

If the number is 2, the only odd factor is 1 and even factor is 2. The condition is not satisfied.

If the number is 4, the only odd factor is 1 and the even factors are 2, 4. The condition is satisfied.

If the number is 6, the odd factors are 1, 3 and even factors are 2, 6. The condition is not satisfied.

Hence, the number can be 4, i.e., the remainder when the number is divided by 8 must be 4. Ans: (4)

23. Let the distance covered by car and bike be represented by x and y respectively.

$$\therefore \frac{x}{60} + \frac{y}{45} = 4 \quad \text{--- (1)}$$

$$\text{and } \frac{x}{45} + \frac{y}{60} = 4 \frac{1}{6} \quad \text{--- (2)}$$

$(1) \times \frac{4}{3} - (2)$ gives $d_2 = 90$ km, which when substituted in

(1) gives $d_1 = 120$ km.

$$\Rightarrow d_1 + d_2 = 210 \text{ km.}$$

Ans: (210)

24. It is given that,

$$a = k, b + \frac{k_2}{b}, \text{ where } k_1 \text{ and } k_2 \text{ are constants.}$$

Substituting the values given for a and b , we get

$$16 = k_1 + k_2 \quad \text{--- (1)}$$

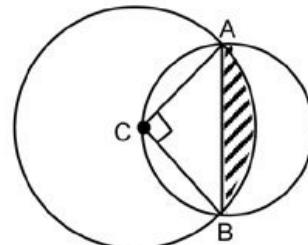
$$16 = 3k_1 + \frac{k_2}{3} \quad \text{--- (2)}$$

Solving equations (1) and (2) simultaneously, we get $k_1 = 4$ and $k_2 = 12$

$$\text{Again, if } b = 6, \text{ we get } a = 4 \left(6\right) + \frac{12}{6} = 26$$

Ans: (26)

25.



As $\angle ACB = 90^\circ$, AB is the diameter of the smaller circle. Again $AC = BC = \text{Radius of the larger circle} = r$

$$\therefore AB = \sqrt{AC^2 + BC^2} = \sqrt{r^2 + r^2} = r\sqrt{2} = 14$$

$$\therefore r = 7\sqrt{2}$$

Area of the shaded region = Area of the sector CAB – Area of the $\triangle CAB$

$$= \frac{1}{4}\pi r^2 - \frac{1}{2}(r)^2$$

$$= \frac{1}{4} \times \frac{22}{7} \times (7\sqrt{2})^2 - \frac{1}{2} (7\sqrt{2})^2 = 77 - 49 = 28$$

Area of the region common to both the circles = Area of the shaded region + $\frac{1}{2}$ (Area of the smaller circle)

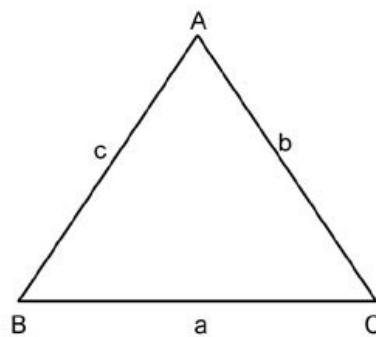
$$= 28 + \frac{1}{2}\pi(7)^2$$

$$= 28 + \frac{1}{2} \times \frac{22}{7} (7 \times 7)$$

$$= 28 + 77 = 105 \text{ sq cm.}$$

Ans: (105)

26.



By the sine rule, we get

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

$$\therefore \frac{a}{b} = \frac{\sin A}{\sin B}$$

It is given that, $\frac{a}{b} = \frac{\cos B}{\cos A}$

$$\therefore \frac{\sin A}{\sin B} = \frac{\cos B}{\cos A} \Rightarrow \sin A \cos A = \sin B \cos B$$

$$\Rightarrow \sin 2A = \sin 2B [\because \sin A \cos A = \frac{1}{2} \sin 2A]$$

$$\Rightarrow 2A = 2B \text{ or } 2A = 180^\circ - 2B$$

i.e. $A = B$ or $A + B = 90^\circ$

Therefore the triangle is either an isosceles triangle or it is a right angled triangle. Choice (D)

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