

1. Q-P is a crucial link as the negative perception in Q is contradicted by the positive perception in P. Hence, eliminate options 2 and 4.

P-S-6 form a link as they throw light on the outlook of the optimists on the world of cinema.

These two links are present in option 3 only. So we can eliminate options 1 and 5.

Hence, the correct answer is **option 3**.

2. "Infantile" means 'displaying or suggesting a lack of maturity'.

"Charlatan" means 'person who pretends to special knowledge or skill that he or she does not possess'.

"Imbecile" means 'a very foolish or stupid person'.

"Awful" means 'very bad or unpleasant'.

All the four words indicate a sense of disapproval or express a negative opinion.

So we can eliminate options 1, 2, 3 and 5.

"Childlike" means 'having the *good* qualities, such as innocence, associated with a child'. Having good qualities indicates a sense of approval and expresses a positive opinion.

Hence, the correct answer is **option 4**.

3. The paragraph discusses the distinction between the critics and the reviewers.

Sentence II ought to follow III, as III is contradicted by II. The key to finding this link lies in the phrase "but not close enough" in III. So, eliminate options 3, 4 and 5.

IV and V form a crucial link as they discuss the negative perception of the critics. The key to finding this link lies in the word "theatre". Eliminate option 1.

Hence, the correct answer is **option 2**.

4. The passage given talks about the inception of the universe with respect to religious beliefs. The last sentence of the passage states that although our senses perceive the universe to be eternal, this is not actually the case. Thus, an option complementing the last sentence is required.

Option 1 mentions that the universe has a limited lifespan and thus, continues the idea mentioned in the last sentence (of the universe not being eternal). Option 1 completes the paragraph in an apt manner.

Option 2 is illogical as it would contradict the last sentence.

Option 3 repeats the idea mentioned in the last sentence, as most of the religions believe that the universe has not been in existence forever.

Option 4 presents an irrelevant data, and can be eliminated.

Option 5 contradicts the gist of the passage, which states that the universe was (born) created due to a sudden spontaneous activity.

Hence, the correct answer is **option 1**.

5. The passage says that modern quantum mechanics began with two different mathematical formulations which initially seemed dissimilar but later on proved to be mathematically equivalent. This idea is precisely captured in option 2 which says that they were destined to complement one another and were later synthesized into a single theory.

Eliminate options 1, 3, 4 and 5.

Hence, the correct answer is **option 2**.

6. The question presented asks which of the options would weaken the argument most. The argument presented is, "Ranu is an ordinary sports-person". The reasoning behind this is that she has performed badly in two university sprint events. The option that negates this reasoning would be an ideal choice.

Option 1 supports the argument and can be eliminated.

Option 2 nullifies the argument in a straightforward manner, as it states that Ranu is a "national shot-put champion" and it can be inferred from this that she cannot be expected to perform extraordinarily well in sprint events.

Option 3 negates the premise presented in the statement, but does not necessarily weaken the argument.

Options 4 and 5 have a certain amount of ambiguity, as it might be possible that Ranu's college did not have good sprinters. They do not directly deal with the argument in the passage, which talk about university sprint events.

Hence, the correct answer is **option 2**.

7. "Eminent" meaning "famous and respected within a particular sphere." clearly fits sentence i describing a famous speaker.

"Immanent" means "existing or operating within" clearly fits sentence ii describing the person's belief in a certain type of justice.

"Imminent" meaning "about to happen" clearly fits sentence iii describing the expected rain.

"Eminence" meaning "fame or acknowledged superiority within a particular sphere" clearly fits sentence iv expressing the attainments of the persons in the audience.

The above combination is stated in option 3. So, eliminate options 1, 2, 4 and 5.

Hence, the correct answer is **option 3**.

8. "Calamitous" means 'Causing or involving calamity'.

"Catastrophic" means 'involving or causing sudden great damage or suffering'.

"Cataclysmic" means 'causing sudden and violent upheaval'.

Rest of the words are invalid since they have unrelated meanings. So, eliminate options 1, 2, 3 and 5.

Hence, the correct answer is **option 4**.

9. The sentence says that it is speculated that the accused is faking his separation from criminal activities. However, the repeated requests from the counsel to validate the speculations using a lie detector are being rejected by the court.

"Inferred" correctly fits the first blank indicating the speculation.

"Faked" correctly fits the second blank given the tone of the passage.

"Separation" correctly fits the third blank expressing the central idea of the passage.

"Demeanour" correctly fits the fourth blank indicating the accused conducting himself with the bearing of a sanyasi.

"Proscribed" meaning "forbid, especially by law" correctly fits the fifth blank justifying the usage of "despite" in the sentence to bring out two contrasting ideas.

Thus, eliminate options 1, 2, 4 and 5.

Hence, the correct answer is **option 3**.

10. Statement 1 presents a premise and statement 2 presents a rare example.

Option 1 cannot be concluded as statement 2 is a rare occurrence. It does not invalidate statement 1.

The two statements cannot be termed contradictory as the data mentioned in statement 2 mentions that "Murali did not work as hard as his friends, but still secured the first rank.". From this, it cannot be inferred that Murali did not work hard at all. Thus, statement 2 can be said to be in sync with the premise presented in statement 1. Eliminate option 2.

Likewise, it cannot be confirmed that Murali did in fact work hard. Thus, option 3 can be eliminated. Statement 2 although a rare occurrence cannot be termed as irrelevant, since it does pertain to what is discussed in statement 1. Eliminate option 4.

Option 5 can be affirmed as statement 1 will still hold valid even if statement 2 is valid, as statement 2 is a rare occurrence.

Hence, the correct answer is **option 5**.

11. The passage talks about how dreams may seem strange and unrelated to any actual happening, but have a direct relation to an activity in the waking state. The first two sentences say that dreams are the clearly apparent visible manifestation of a hidden or obscure psychic cause. Option 5, which mentions that "overt" or 'plainly apparent' effects (dreams in this case) can have "covert" or 'not openly displayed' causes ("the psychic activities of the waking state" in this case), is close to the idea expressed in these two sentences.

Eliminate options 1, 2 and 3, which incorrectly attribute the qualities of overtness and covertness to the causes and effects.

Option 4 gives a proverb that bears no relation to the idea expressed in the two sentences of the passage. It is in fact somewhat contradictory to the main idea, as the proverb implies that outer effects or appearances are not related to inner hidden qualities. The passage says that there is in fact a relationship between hidden psychic forces and the outwardly apparent effects. Eliminate option 4.

Hence, the correct answer is **option 5**.

12. The last paragraph of the passage describes how the prisoner exchanged places with the corpse of his friend.

Eliminate options 1, 2, 3 and 4.

Hence, the correct answer is **option 5**.

13. In paragraph 3, the protagonist recoils from the idea of despair and begins to desire for life; he gives up on the idea of dying. Until now he has suffered so much that he feels that it would have been better if he had died years ago. The phrase "sarcasm of destiny" basically implies that the life chances of the protagonist are not in his control in any way; the external force of destiny has control over whether he lives or dies. This supports option 2.

Option 1 may not always be valid.

Option 3 is illogical; destiny is not an actual entity which is capable of 'struggling'.

Option 4 can be ruled out, as it tries to imply that the prisoner is more powerful than destiny and can mock it. This is not substantiated by the passage.

Option 5 can be eliminated, as destiny cannot be considered as the "enemy" - it is merely an external force which the protagonist has no control over.

Eliminate options 1, 3, 4 and 5.

Hence, the correct answer is **option 2**.

14. The idea of suicide in paragraph 1 indicates depression.

The author's willingness to face his struggles and win back the happiness which he was deprived of, suggests his daring.

Option 2 is close, but "hope" does not describe his later mood; he does not become hopeful about his situation but decides to actively do something to change it.

Eliminate options 1, 2, 4 and 5.

Hence, the correct answer is **option 3**.

15. "Counterpane" refers to a "bed", since it is a form of bedspread.

"Dungeon" refers to a "cell".

"Guillotine" refers to an "execution", since it is a machine used for beheading people.

"Shroud" refers to a "burial", since it is a garment in which a dead person is wrapped.

Hence, the correct answer is **option 1**.

16. A nursery student is someone who is at an early stage of learning. Based on the excerpt from the last paragraph of the passage "In early stages of learning, neural circuits are activated piecemeal, incompletely and weakly", it can be deduced that for a nursery student learning will "comprise piecemeal ideas and disconnected concepts". Thus, option 1 can be concluded.

Options 2 and 5 cannot be affirmed, as a pleasant or happy experience pertaining to learning is subjective and cannot be generalised.

Option 3 can be eliminated on the basis that the passage fails to mention that new connections between neurons causes complex behaviour.

Option 4 is speculative, as the passage does not mention explicitly nor provide any inference about the data mentioned in the option.

Hence, the correct answer is **option 1**.

17. Statement I can be negated on the basis of the information provided in the penultimate sentence of the first paragraph.

Statements II and III can be affirmed on the basis of the data provided in the third paragraph of the passage.

Statements IV and V negate the data given in the passage that "the brain receives inputs amongst itself, through neurons and facilitates learning, which is also termed as neuro chemical communication".

Thus, only statements II and III follow.

Hence, the correct answer is **option 2**.

18. The central idea of the passage states that in the early stages of learning, incomplete

and weak neural connections are established. With more time and experience, these connections become stronger and learning is more mature. Thus, it can be said that learning is a slow process and it requires the learner to establish new connections gradually over a period of time to facilitate effective learning.

The proverb listed in option 1 means that a specific thing occurs to a person when the person is ready for it.

The meaning of the proverb mentioned in option 2 is that a person's personality develops when he is a child.

The proverb mentioned in option 3 states that if the end result is desirable then the journey itself is desirable.

The meaning of the proverb mentioned in option 4 is that someone who is used to doing things a certain way cannot change.

The meaning of the proverb "many a mickle makes a muckle" is that 'small things when combined together make for something big'. This suits the overall idea of the passage.

Hence, the correct answer is **option 5**.

19. The central idea of the passage states that in the early stages of learning new neural connections are established which are incomplete and weak. With time, these connections become stronger and learning is more mature. Thus, it can be said that learning is a slow process wherein the learner establishes new connections gradually to facilitate effective learning.

Based on the above summary it can be concluded that the one who spends more time to learn paragliding will be better at it. Option 1 can be eliminated as there is no evidence that the son has practised more than his father.

Option 2 is true as the father has spent more time learning paragliding and will be better at it, as he is older than his son and started at the same time (age) as his son.

Option 3 defies logic in lieu with the data mentioned in the passage.

Option 4 goes against the explanation presented above and is illogical.

Option 5 cannot be concluded due to insufficient evidence.

Hence, the correct answer is **option 2**.

20. The passage describes orchids as children who will wilt if not provided proper care and attention, but will bloom spectacularly with greenhouse care. The sentence metaphorically compares orchid children with flowers and uses the term "greenhouse", which means a place favourable for flowers to bloom. Thus, it can be inferred that orchid children are likely to be more happy if provided with proper care and attention, and become sad and depressed due to lack of attention.

The question presented asks what the passage "suggests" about orchids.

Option 1 straightforwardly mentions "insufficient number" and can be eliminated as it is explicitly mentioned in the passage.

Likewise, option 2 bluntly mentions "greenhouse" without its metaphorical meaning i.e. 'a comfortable surrounding'.

Option 3 is speculative and the passage provides no evidence for this.

Option 4 presents another metaphor in the form of "anaesthetised conditions", which can be inferred to mean 'a suitable condition'. The word "thrive" is significant, because the passage states time and again that orchids bloom spectacularly under the right conditions.

Option 5 negates the data presented in the 4th paragraph of the passage.

Hence, the correct answer is **option 4**.

21. The passage mentions that people having a risk allele are vulnerable to problems; the data mentioned in option 1 jumps to a conclusion preposterously and can be eliminated.

Paragraph 4 of the passage states that orchids do well only if provided a certain atmosphere. Thus, the data presented in option 2 will not always be valid.

According to the data presented in paragraph 4, option 3 is valid only for dandelions and not orchids.

As mentioned in the first sentence of the second paragraph, "Researchers have identified ... trying experiences later in

life”, the data mentioned in option 4 can be affirmed.

Option 5 makes a very strong point, the data for which cannot be inferred from the passage.

Hence, the correct answer is **option 4**.

22. The meaning of the word “diathesis” means 'a hereditary or acquired susceptibility of the body to one or more diseases'.

Thus from the given options only option 1 “susceptible to disease” can be affirmed.

Hence, the correct answer is **option 1**.

23. The passage describes a “dandelion” as someone who would thrive irrespective of the kind of upbringing he gets, and an “orchid” as someone who would wane easily if not given proper care and attention, but would thrive in suitable conditions. Besides this, the passage also mentions that genes play a role in determining children typology. Genes and environment therefore play a combined role in deciding whether a person is normal or not.

The question only mentions the environments in which both individuals have been brought up. Genes have not been brought into the picture at all. Therefore, we cannot draw any conclusion as to whether the two individuals are orchids or dandelions.

Hence, the correct answer is **option 5**.

24. The fourth line of the passage states explicitly that, “markets fail for pure public goods”.

Based on the “Note” provided below the passage, it can be inferred that option 3 is a public good, while options 1, 2 and 4 are private goods.

Thus, it can be safely concluded that a market for option 3 “air” would not be efficient.

Hence, the correct answer is **option 3**.

25. Option 1 cannot be concluded from the passage. Although it has been stated that “However, markets fail ... public intervention is thus needed”, this is only under the specific condition of markets failing for “*pure public goods*”, not otherwise. So public intervention cannot be

considered as the “panacea” or ultimate solution for market failure.

Option 2 can be concluded from “Implicitly, market competition ... problems.” Eliminate option 2.

Option 3 can be concluded from “Voting mechanisms are ... raised.” Eliminate option 3.

Option 4 can be concluded from “... the incentive problem of acquiring the private information ... for public goods.”.

Option 5 can be concluded from “When the monopoly has ... problem.”. The sentence says that when the natural monopoly is faced with problems, it is regulated by the regulatory commission and hence a solution can be expected.

Hence, the correct answer is **option 1**.

26. Market failures can be viewed as scenarios where individuals' pursuit of pure self-interest leads to results that are not efficient – that can be improved upon from the societal point of view.

The scenario stated in statement 1 is a type of market failure where consumers and producers may fail to take into account the effects of their actions on third-parties who suffer as a result of the actions of consumers and producers attempting to pursue their own self interests.

Hence, eliminate options 2, 4 and 5.

Statement 2 suggests a method of reducing the problem stated in statement 1.

“Corroborates” meaning 'confirms or gives support to' in option A does not qualify the purpose of statement 2 and its relationship with statement 1. So, eliminate option 1.

Statement 2 gives the mitigation of the problem expressed in statement 1.

Option 3 correctly captures the relationship between the two statements.

Hence, the correct answer is **option 3**.

27. The first paragraph of the passage talks about creative thinking and the process of brainstorming in a group of people. The second paragraph describes the problems that individuals generally face in idea generation and explains how these problems are circumvented whilst brainstorming as a group. It basically elaborates on the reasons why

brainstorming in a group works so well and gives its advantages. This is best put forth in option 5.

The second paragraph gives no examples of brainstorming. Eliminate option 1.

The second paragraph in no way gives a contradictory view to the one presented in the first paragraph. Eliminate options 2 and 3.

The second paragraph does not give a complementary view to the first paragraph – it explains its advantages. Eliminate option 4.

Hence, the correct answer is **option 5**.

28. The main argument in the second paragraph of the passage is that when individuals try to come up with ideas on their own, they do not fare as well as they do during idea generation in a group of people. Idea generation is smoother when multiple perspectives are involved.

Option 1 is irrelevant to the main argument.

Option 2 reverses the logic of the argument- it says that a single individual should *give* multiple inputs; the argument in the paragraph is that an individual should *accept* multiple inputs from others.

Option 3 is not directly related to the argument. It talks about team work in sports, but there are several other factors involved here like amount of support given, playing conditions, skill, training etc. Also, this should be a concept not restricted to India alone.

Option 4 is parallel to the reasoning in the second paragraph; it says that multiple inputs from various departments of a company should be utilized for idea generation.

Option 5 is incorrect; even small firms can operate on the principle of accepting multiple ideas. It is not the number of people that matters, it is merely the multiplicity of perspectives.

Hence, the correct answer is **option 4**.

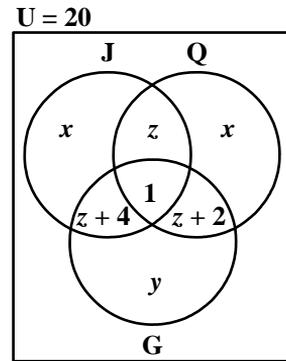
29. Let QJ type electives, only Grade-oriented electives and only Quantitative-oriented electives be z, y and x respectively.

Note: $y > x$

\therefore Number of QG type electives = $z + 2$

\therefore Number of JG type electives = $z + 4$

The given data can be represented in the form of the following Venn diagram,



Thus, the following equation is obtained,

$$3z + 2x + y = 13$$

$$(x, z \geq 1 \text{ and } y \geq 2)$$

For $z = 1$, $2x + y = 10$ and possible values of (x, y) : (1, 8), (2, 6) and (3, 4).

For $z = 2$, $2x + y = 7$ and possible values of (x, y) : (1, 5) and (2, 3).

For $z = 3$, $2x + y = 4$ and possible values of (x, y) : (1, 2).

$$\text{Now, } G = 2z + y + 7$$

$$\text{If } z = 1, G = 17, 15, 13$$

$$\text{If } z = 2, G = 16, 14$$

$$\text{If } z = 3, G = 15$$

Only 5 unique values of G are possible i.e. 13, 14, 15, 16 and 17.

Hence, **option 2**.

30. Electives common between Simran and Raj are JG type electives. i.e., $(z + 4)$

Referring to the previous solution, as $x = 3$, $3z + y = 7$

As $y \geq 2$, the only possible integer solution to $3z + y = 7$ is $(z, y) \equiv (1, 4)$

Thus, a maximum of 5 electives can be common between Simran and Raj, without compromising their preferences.

Hence, **option 3**.

31. As $y = 2$, x has to be 1.

From the answer to the first question of the set, substituting values of y and x in $3z + 2x + y = 13$, we get $z = 3$.

Vijay prefers J-type and avoids Q-type. Raj prefers G-type followed by Q-type.

If Vijay opts for all 7 JG electives or 7JG electives and 1 J-type elective, and Raj opts for 2 G-type and 5 GQ electives or 2 G-type,

5 GQ electives and 1 Q-type electives, they can completely avoid each other.

Hence, **option 1**.

32. Since the mail says that Dipangshu's performance is under scrutiny, it is imperative for him to conduct himself cautiously in front of his boss. In order to do so, his first step should be to perform well in the tasks assigned to him. Getting demoralized by the letter and performing badly will not help him simplify things.

Hence, option 5 best explains his decision to focus on his job. So, eliminate options 1, 2, 3 and 4.

Hence, the correct answer is **option 5**.

33. Option 1 is too risky as he cannot be sure if his position in the company is safe. Hence, he cannot rely on his discussion with Mr. Patel. The passage further mentions that Mr. Patel had not allowed him to even speak. Also, applying simultaneously for other jobs won't ensure the certainty of securing a worthy job. Eliminate option 1.

Option 2 is a poor decision as the offer had opened the door for quitting the current company with a job in hand. Eliminate option 2.

Option 3 is a hasty course of action as the passage mentions that he cannot think of a life without a job. Eliminate option 3.

Option 4 is not a wise approach as demanding a salary hike based on which he would accept the job offer, holds the chance of driving away the only feasible opportunity he had.

Option 5 is a rational move, as accepting the offer with a request for a 10% salary hike will increase his chances of acquiring a worthy job after quitting his current job.

Hence, the correct answer is **option 5**.

34. Since there has been a misunderstanding between Mr John and Dipangshu, it is best to straighten out things between the two.

In order to do so, Mr Patel should communicate Dipangshu's plan of quitting the job to Mr John and make him realize his mistake of undermining Dipangshu's spirit which has led the organization on the path of losing a bright employee. Eliminate options 2 and 5.

His next move should be to talk to Dipangshu and explain his worth to the organization with a view to changing his mind. Eliminate options 1 and 3.

Once the two are on the same page, arranging a meeting between Mr. John, Dipangshu and himself would help Mr. Patel reach a solution. This sequence is present in option 4.

Eliminate options 1, 2, 3 and 5.

Hence, the correct answer is **option 4**.

35. From the options presented, the alternative which casts the biggest shadow of doubt over the technology investment would be an ideal choice.

Option 1 states that investing is only justified if the returns are more than the investment. The passage suggests that the investment if successful will offer an abundant return, but if unsuccessful would cause a substantial loss for the company.

Options 2 and 3 support technology investment and thus, indirectly support Mr. Arbit's enthusiasm.

Similarly option 4 is pro technology investment and can be eliminated.

Option 5 directly supports Mr. Arbit's enthusiasm and invalidates Mr. Boring's scepticism as the technology investment has a certain risk factor.

Hence, the correct answer is **option 1**.

36. Option 1 cannot be affirmed as it generalises the idea of investing in risky technology. The other competitors mentioned might be better prepared to face the risks involved as compared to Mr. Arbit and Mr. Boring.

Option 2 presents an already mentioned aspect of the technology investment, which is mentioned in the passage.

The data mentioned in option 3 states that the risk of the technology investment becoming unsuccessful is only 15%. Thus, option 3 would most reduce the uncertainties for the partners.

The fact that the R&D team of ITS is working on reducing risks for the technology does not imply the R&D team will be successful in doing so.

Option 5 invalidates the prime purpose presented in the question of reducing uncertainties.

Hence, the correct answer is **option 3**.

37. Forgone Earnings (F) = Earnings with new technology – Earnings without new technology

Let X = (Earnings without new technology for 5 years),

Let Y and Z be A's and B's respective earnings with new technology.

$$F_A = Y - X$$

$$F_B = Z - X$$

$$F_A - F_B = Y - Z$$

Both A and B use the new technology in the first 2 years. For the last 3 years, only A uses the technology.

Y = (Earnings with new technology for first 2 years) + (Earnings with new technology for last 3 years)

Z = (Earnings with new technology for first 2 years) + (Earnings without new technology for last 3 years)

$\therefore Y - Z$ = (Earnings with new technology for last 3 years) – (Earnings without new technology for last 3 years)

Earnings of the third year, with (or without) new technology, are placed at compound interest for 2 years. Similarly, earnings of the fourth year are placed at C.I. for 1 year and earnings of the last year do not earn any interest.

$$\therefore Y - Z = [(150 \times 1.1^2 + 150 \times 1.1 + 150) - (50 \times 1.1^2 + 50 \times 1.1 + 50)] \times 1000 \text{ million}$$

$$= [(100) \times 1.1^2 + (100) \times 1.1 + 100] \times 1000 \text{ million}$$

$$= 331000 \text{ million}$$

Hence, **option 2**.

38. Let the total sales volume be 100. Let the sales volumes from India and outside India be 49 and 51 respectively. Let the sales from generic drugs and patented drugs be 51 and 49 respectively. These values satisfy all the given conditions.

Solving by options,

Option 1:

If the sales volume of patented drugs in India is 43% of 49, the sales volume of generic drugs in India will be 57% (> 43%) of 49.

Also, (57% of 49) is an acceptable value for sales of generic drugs in India, as it will not exceed the total sales of generic drugs i.e. 51.

Hence, option 1 is eliminated.

Option 2:

If the sales volume of generic drugs in foreign countries is 24% of 51, the sales volume of patented drugs abroad will be 76% of 51 i.e. 38.76. Correspondingly, the sales volumes of patented drugs in India will be (49 – 38.76) i.e. 10.24, which is 20.9% (< 24%) of total sales in India i.e., 49.

Hence, option 2 is eliminated.

Option 3:

If the sales volume of patented drugs in India is 54% of 49, the sales volume of generic drugs in India becomes 46% of 49 i.e. 22.54. Correspondingly, the sales volumes of generic drugs abroad will be (51 – 22.54) i.e. 28.46, which is 55.8% (> 54%) of 51.

Hence, option 3 cannot be eliminated.

Option 4:

If the sales volume of patented drugs in India is 29% of 49, the sales volume of generic drugs in India becomes 71% of 49 i.e. 34.79. Correspondingly, the sales volumes of generic drugs abroad will be (51 – 34.79) i.e. 16.21, which is 31.8% (> 29%) of 51.

Hence, option 4 cannot be eliminated.

Option 5:

If the sales volume of generic drugs in India is 60% of 49, the sales volume of patented drugs in India becomes 40% of 49 i.e. 19.6. Correspondingly, the sales volumes of patented drugs abroad will be (49 – 19.6) i.e. 29.4, which is 57.6% (< 60%) of 51.

Hence, option 5 is eliminated.

Again considering option 3,

Let the sales volumes from India and outside India be 30 and 70 respectively. The rest of the values remain the same.

If the sales volume of patented drugs in India is 54% of 30, the sales volume of generic drugs in India becomes 46% of 30 i.e. 13.8. Correspondingly, the sales volumes of generic drugs abroad will be

(51 - 13.8) i.e. 37.2, which is 53.1% (< 54%) of 70.

Hence, option 3 is eliminated.

Hence, **option 4**.

- 39.** The question mentions that the sales of LSP in India are bleak and it faces stiff competition from foreign and local players, except in rural areas where it has high cough syrup sales. In the light of such a background the company intends to improve sales in the long term.

Statement I is the best option from the perspective of the company. Hence, it is the most appropriate course of action.

The next immediate step the company can take to improve business in the long term is to cut operating costs; the process may be time consuming but is an efficient one in the long term aspect of the country's operation.

As the issue of teenagers abusing cough syrups as sedatives is an ethical issue, increase in the sales of cough syrup will be beneficial to the company but not the teenagers. Hence, it can create trouble for the company in the long run. So, statement II is least appropriate.

The motive behind sending more medical representatives to rural areas is unclear from the question. It can either be to create awareness regarding the ill effects of substance abuse or to sell more number of cough syrups. Hence, statement IV is ruled out.

Thus, the correct descending order of the statements is I, III, and II.

Hence, the correct answer is **option 1**.

- 40.** Option 1 sidetracks the issue of the couple's desire to be together, considering the fact that they are expecting their first child.

Option 3 does not work in the favour of the organization. Since company needs a more competent person for the job in Luxembourg immediately, it might put the company's future at stake. Eliminate 3. Same explanation applies to option 5. Hence, eliminate option 5.

Although option 4 looks compelling, it is not reasonable, as pay was never an issue for the couple. It will be unethical on the

part of the company to compromise Mrs. Jose's job with a hike in Mr. Jose's salary. Eliminate option 4.

Option 2 comes forth as the most appropriate solution taking into account all the issues.

Hence, the correct answer is **option 2**.

- 41.** Given the reputation and popularity of Mrs Khan, sabotaging her professional life to focus on personal life would be an unwise decision. So, statement I is not a valid course of action. Hence, eliminate options 1, 2 and 3.

Statement II is also not a valid course of action, since it is similar to statement I in that it involves Mrs. Khan sabotaging her professional life. So we can eliminate option 4.

Statement IV is uncertain as there is no guarantee of getting a job in the US. Her career may be compromised.

Requesting Mr. Khan to find a job in India is an appropriate action as it will save Mrs. Khan's career in India. This way they can both stay together in India. Statement III is justified.

Statement V also makes for an appropriate course of action. Mrs. Khan can also request LSP India for a similar position in LSP USA without disrupting her ongoing career.

Hence, the correct answer is **option 5**.

- 42.** The question stem asks for the set of options that would support Ram's argument of "not" using organic vegetables. All the options except II strongly support Ram's argument stating the drawbacks of using organic vegetables in Panipat.

Statement II does not support Ram's argument as it says "provided the business is prepared to face the consequences"; from this, one cannot ascertain whether the consequences will turn out bad and in favour of not using organic vegetables.

So, eliminate options 1, 2, 4 and 5.

Hence, the correct answer is **option 3**.

- 43.** It can be inferred from the businessmen's statements that none of them has any harsh or strong opinion about Ram's approach of not using organic vegetables. Thus, according to the businessmen,

substituting organic vegetables at the Panipat branch is not required.

Options 1 and 5 would unnecessarily complicate things as Kishan would take more time to get himself acquainted to the Panipat branch, also it is not guaranteed that it would yield the desired results for Mohan. Eliminate options 1 and 5.

The passage states that giving a free hand to Ram might have long term negative consequences. However, option 2 doesn't take this into consideration. Eliminate option 2.

Ram has already established the Panipat branch and he is the ideal person to carry out future operations there. Bringing him back to Connaught place will complicate things and serve no purpose. Eliminate option 3.

If the name of the Panipat branch is changed to 'Ram's' instead of 'Mohan's', then the identity of the business in Panipat will be linked to Ram. Thus, option 4 satisfies all the opinions expressed by the four businessmen.

Hence, the correct answer is **option 4**.

44. If an awareness campaign related to organic vegetables is generated in Panipat it can malign the reputation of the Panipat branch as it was previously not using organic vegetables.

As Mohan is an experienced person and is the one responsible for taking the Connaught Place branch to where it is today, he is the best candidate to run the Panipat branch as he is likely to generate the required sales whilst also maintaining the quality of food.

Closing down the Panipat branch would be a silly idea, as the place is already established and generates revenue.

Sending Kishan to the Panipat branch is a bad idea as he would take more time to get himself acquainted to the place. Mohan has already established the place and is the better person between the two brothers to carry out the operations there.

Option 5 can be eliminated for the same reason presented above to eliminate option 4.

Hence, the correct answer is **option 2**.

45. If the percentile for formula based questions and application based questions would be combined, students might maximise their score merely by attempting formula based questions. This is undesirable.

We can rule out proposal I.

Statement II is quite strong a stance, and would force students to attempt questions from both sections. However, students may attempt close to zero application based questions.

Statement III gives additional incentive to attempt 'application-based problems'. Another advantage is that it might avoid the extreme outcomes of students attempting very few questions from 'application-based problems'. A combination of proposals II and III would be ideal.

As it is already mentioned in the passage that even students with an entrepreneurial mindset avoid application based questions in order to score better, the college will not be able to identify students with an entrepreneurial mindset if they decide to not disclose the higher weightage of marks allotted to application based questions. Also, it is an unfair course of action. Hence, statement IV is not valid.

Hence, the correct answer is **option 4**.

46. If Balaji already knows that solving application based problems takes more time, he can focus more on formula based problems and achieve the required cut-off percentile.

Similarly, if Balaji knows that the chances of making silly mistakes in application based questions is low, he can plan to attempt those questions towards the end of the exam, where the chances of making silly mistakes is higher due to stress.

Statements III and VI are unrelated to the issue presented in the question.

Knowing that options for formula based questions are tricky, Balaji can avoid attempting those questions.

By knowing that the popular idiom "practice makes a man perfect" is applicable to formula based questions, he can decide whether to attempt such

questions or to avoid them, based on his capability.

Thus, only statements I, II, IV and V are valid for the question presented.

Hence, the correct answer is **option 5**.

47. Taking no action against Mr. Loyal would not affect either party as he is not directly involved in the murder case.

Suspending Mr. Prodigal from the party would upset Mr. Loyal as it is common knowledge that the latter has a soft spot for Mr. Prodigal, and it might (remote possibility) lead to Mr. Loyal separating from the party.

Expelling Mr. Loyal from the party would obviously affect him as his political repute might be affected. The NPP party will also be affected as it is stated in the passage that Mr. Loyal's followers would part along with him. This entire situation would benefit the opposition party.

Banning Mr. Loyal from party premises till the court case is cleared will affect both parties, but the situation will not be as grave as compared to option 3.

Initiating an internal inquiry may not affect any of the parties as the information of an internal inquiry can be kept away from Mr. Loyal.

Thus, the strongest possibility of both the parties getting adversely affected is presented in option 3. Option 4 is close but can be eliminated on the basis that the effect of Mr. Prodigal's suspension from the party would not directly affect Mr. Loyal, who may still continue with the party.

Hence, the correct answer is **option 3**.

48. Maintaining a status-quo, i.e. taking no action at all, would convey a wrong message to the public and the media; it can have a negative impact on the party's future.

Expelling Mr. Prodigal is certain to upset Mr. Loyal, as the fact that he has a weakness for his son is common knowledge.

If an internal inquiry is set against Mr. Prodigal, it may upset Mr. Loyal. The party cannot afford the risk of losing Mr. Loyal as he is an asset to the party.

The safest bet for the party would be to temporarily dismiss Mr. Prodigal, and take him back if he is acquitted of the murder charge. This course of action would not only help the party gain some brownie points with the public and media, but will also not upset Mr. Loyal as much as the other alternatives can.

Option 5 if implemented will definitely affect the party in an adverse manner, as Mr. Loyal is an asset to them.

Hence, the correct answer is **option 4**.

49. Argument I rules out the party's intention of nominating Mr. Loyal in the upcoming election making way for Mr. Opportunist. Hence, it makes for a strong argument supporting the claim of Mr. Opportunist. Hence, eliminate options 3, 4 and 5.

Argument III simply rephrases the argument stated in option II; it is a weak line of reasoning. So, eliminate option 1.

Argument IV is a strong reason as to why it would be a good idea to nominate Mr. Opportunist.

Hence, the correct answer is **option 2**.

50. All the options except 1 seem incongruous with respect to the information provided in the passage.

Option 1 is most feasible and will give a boost to Mr. Loyal's political career. Joining another party would do no harm to his career, given his popularity among voters as well as the support of opposition party. So, eliminate options 2, 3, 4 and 5.

Hence, the correct answer is **option 1**.

51. From the given suggestions, the foremost step should be to locate the places where IIB can start implementing its measures to curb carbon footprints which is stated in suggestion V.

Organizing a seminar to create awareness regarding a sustainable future is an indirect means of increasing awareness. Similarly, introducing a compulsory course is also not an effective way of educating the students.

The next logical step should therefore be to implement an actual strategy to reduce carbon footprints. Solar panel operated lights and environmentally-friendly

buildings are practical and effective ways to reduce carbon footprints.

Thus, rule out options 1, 2, 4 and 5.

Option 3 is the best answer as it contains concrete actions.

Hence, the correct answer is **option 3**.

52. Number of terms = $(100 - 64)/2 + 1 = 19$

Sum = $n/2 (a + a_n)$

= $19/2 \times (-64 - 100) = -1558$

Hence **option 2**.

53. Let Manufacturing Cost = Rs. 100

M.R.P = Rs. 155

Discount = 10%

S.P (of retailer) = $155 \times 0.9 = \text{Rs. } 139.5$

Profit% (of retailer) = 23%

S.P. (of manufacturer) = $139.5 \times (100/123)$

= Rs. 113

Profit % (of manufacturer) = 13%

Hence, **option 4**.

54. Required Probability = $1 - P(\text{receiving no gift})$

$P(\text{receiving no gift}) = 0.4 \times 0.2 \times 0.1 \times 0.5 = 0.0040$

$1 - P(\text{receiving no gift}) = 0.996$

Hence, **option 5**.

55. Had the rectangle not been folded, the overlapping part would have been a square of side 6.

While unfolding, the increase in area

= Area of the triangle = $\frac{1}{2} \times 6 \times 6 = 18$

Area of the given figure = 144 square meters

\therefore Area of unfolded rectangle = $144 + 18$

= 162 square meters

Hence, **option 3**.

56. From the graph, observe that at $y = 0$, $x = -19$

Only $x = 2y^2 + 3y - 19$ satisfies the above criteria.

Hence, **option 5**.

57. Flat surface area of the cylinder = $2 \times \pi \times 7^2 = 98 \pi \text{ cm}^2$

Volume of the cylinder = $\pi \times 7^2 \times 10 = 490 \pi \text{ cm}^3$

Volume of cone A = $(3/7) \times 490 \pi = 210 \pi \text{ cm}^3 = (1/3) \times \text{flat surface area of cone A} \times 10$

Flat surface area of cone A = $63 \pi \text{ cm}^2$

Volume of cone B = $(4/7) \times 490 \pi = 280 \pi \text{ cm}^3 = (1/3) \times \text{flat surface area of cone B} \times 10$

Flat surface area of cone B = $84 \pi \text{ cm}^2$

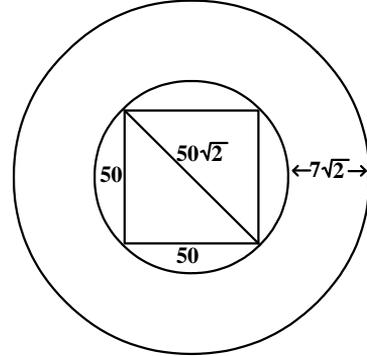
Total flat surface area of cones

= $(63 + 84) \pi = 147 \pi \text{ cm}^2$

Percentage change in the flat surface area = $(147 - 98)/98 \times 100 = 50\%$

Hence, **option 4**.

58.



Radius of inner circle = $\frac{1}{2} \times \text{diagonal of the square} = 25\sqrt{2} \text{ cm}$

Radius of outer circle = Radius of inner circle + width of the road = $32\sqrt{2} \text{ cm}$

50% of the area of the road

= $\frac{1}{2} \times \pi \times [(32\sqrt{2})^2 - (25\sqrt{2})^2]$

= 1254 cm^2

Cost = $1254 \times 100 = \text{Rs. } 125,400$

Hence, **option 2**.

59. In 864 units of M,

$X = 5/9 \times 864 = 480 \text{ units}$

$Y = 864 - 480 = 384 \text{ units}$

B in 480 units of X = $3/4 \times 480 = 360 \text{ units}$

B in 384 units of Y = $2/3 \times 384 = 256 \text{ units}$

Total units of B = $360 + 256 = 616$

Concentration of B in the final mixture is 50%

Thus, water in the final mixture = $(2 \times 616) - 864 = 368 \text{ units}$.

Hence, **option 2**.

60. (13.5, 16) and (5.5, 7.5) are adjacent points of the parallelogram and (17.5, 23.5) is the point of intersection of two diagonals of the parallelogram.

Property: Diagonals of a parallelogram bisect each other.

Distance between (17.5, 23.5) and (5.5, 7.5):

$$\sqrt{(17.5 - 5.5)^2 + (23.5 - 7.5)^2} = 20$$

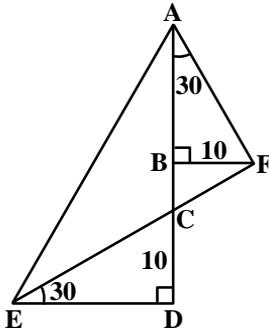
Length of diagonal that passes through (17.5, 23.5) and (5.5, 7.5) = $20 \times 2 = 40$ cm
Distance between (17.5, 23.5) and (13.5, 16):

$$\sqrt{(17.5 - 13.5)^2 + (23.5 - 16)^2} = 8.5$$

Length of diagonal that passes through (17.5, 23.5) and (13.5, 16) = $8.5 \times 2 = 17$ cm

Hence, **option 4**.

61.



$$m\angle ECD = m\angle BCF = 60^\circ$$

$$\text{Also, } m\angle AFB = 60^\circ, m\angle BFC = 30^\circ$$

$$\therefore m\angle AFC = 90^\circ$$

In a $30^\circ - 60^\circ - 90^\circ$ triangle, sides are in the ratio $1 : \sqrt{3} : 2$.

$$\text{So, in } \triangle EDC, ED = 10\sqrt{3} \text{ units}$$

$$\text{Also, in } \triangle FBC, BF = 10 \text{ units}$$

$$\Rightarrow FC = \frac{20}{\sqrt{3}} \text{ units and } BC = \frac{10}{\sqrt{3}} \text{ units}$$

In $\triangle AFC$,

$$FC = \frac{20}{\sqrt{3}} \text{ units} \Rightarrow AC = \frac{40}{\sqrt{3}} \text{ units}$$

$$\therefore AD = \left(10 + \frac{40}{\sqrt{3}}\right) \text{ units}$$

$$A(\triangle ADE) = \frac{1}{2} \times 10\sqrt{3} \times \left(10 + \frac{40}{\sqrt{3}}\right)$$

$$= 50(\sqrt{3} + 4) \text{ sq. units}$$

Hence, **option 4**.

62. Substitute $x = 0$ in $f(x^2 - 1) = x^4 - 7x^2 + k_1$

$$\Rightarrow f(-1) = k_1 \quad \dots (i)$$

Substitute $x = 1$ in $f(x^3 - 2) = x^6 - 9x^3 + k_2$

$$\Rightarrow f(-1) = 1 - 9 + k_2 \quad \dots (ii)$$

From (i) and (ii), $k_1 = -8 + k_2$

$$\therefore k_2 - k_1 = 8$$

Hence, **option 3**.

63. Let P be the principal.

By the given conditions,

$$P \times \left(1 + \frac{r}{100}\right)^3 - P = 10000$$

$$P \times \left(1 + \frac{r}{100}\right)^6 - P = 25000$$

$$\text{Let } \left(1 + \frac{r}{100}\right)^3 = X$$

Thus,

$$P(X - 1) = 10000 \quad \dots (i)$$

$$P(X^2 - 1) = 25000 \quad \dots (ii)$$

Dividing (ii) by (i),

$$X + 1 = 5/2$$

$$\therefore X = 3/2$$

Substituting value of X in (i), we get

$$P = \text{Rs. } 20,000$$

Hence, **option 3**.

64.

Income Slab	Minimum tax	Maximum tax
≤ 500	0	0
> 500 to ≤ 2000	> 0	≤ 75 (= 1500×0.05)
> 2000 to ≤ 5000	> 75	≤ 375 (= $75 + 3000 \times 0.1$)
> 5000 to < 10000	> 375	< 1125 (= $375 + 5000 \times 0.15$)

Total tax will be minimum if income of 5 persons is not more than 500 and income of 4 persons is minimum and also in the range (500, 2000]. Total tax will be maximum if income of 5 persons is maximum possible and income of 4 persons is maximum in the range (2000, 5000].

$$\text{Minimum tax} > (5 \times 0) + (4 \times 0) + (3 \times 75) + (3 \times 375) = \text{Rs. } 1350$$

$$\text{Maximum tax range} < (3 \times 0) + (3 \times 75) + (4 \times 375) + (5 \times 1125) = \text{Rs. } 7350$$

Hence, **option 1**.

65. Let $a + b + c = X$

We need to find the maximum value of:

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

$\frac{2d}{X - d}$ is maximum when d is maximum

and X is minimum possible.

$$\therefore d = 25 \text{ and } X = 26$$

The highest possible value of the given expression = $1 + (2 \times 25) = 51$

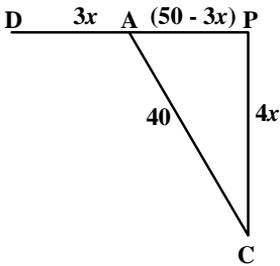
Hence, **option 3**.

66. Scenario 1: Devanand walks East at a constant speed of 3 km per hour and Pradeep towards South at a constant speed of 4 km per hour,

Let the two walk for x hours.

Distance travelled by Devanand and Pradeep is $3x$ km and $4x$ km respectively.

Thus, we have



$$\therefore (AP)^2 + (PC)^2 = (50 - 3x)^2 + (4x)^2 = 40^2$$

Solving this, we get $x = 6$

Thus, after 6 hours, the minimum distance between the two would be 40 km.

The distance between the two will increase in other two scenarios.

Hence, **option 1**.

67. Three integers are not known.

Using Statement I:

Average of four smallest integers

$$= (6 + 8 + 12 + 13)/4 = 39/4$$

\therefore Average of four largest integers

$$= \frac{39}{4} + 13 \frac{1}{4} = \frac{92}{4}$$

In order to get the largest possible integer, two of the three unknown integers must be lowest possible i.e., 16 and 17.

So, the largest possible integer

$$= 92 - 22 - 20 - 17 = 33$$

Statement I can answer the question independently.

Using Statement II:

Sum of 11 integers = $11 \times 16 = 176$

Sum of the given integers = 110

\therefore Sum of three unknown integers = 66

In order to get the largest possible integer, two of the three unknown integers must be lowest possible i.e., 16 and 17.

So, the largest possible integer

$$= 66 - 16 - 17 = 33$$

Statement II also answers the question independently.

Hence, **option 5**.

68. $f(1) = 4$

$$f(2) = f(1+1) = f(1 \times 1) = f(1) = 4 \dots$$

Assume that $f(n - 1) = 4$

$$f(n) = f(1 + (n - 1)) = f(1 \times (n - 1)) = f(n - 1) = 4$$

Thus, by induction principle, $f(n)$

= 4, for all n .

$$\therefore f(1003) = k = 4$$

Hence, **option 5**.

69. LCM (3, 4, 5, 6) = 60

From (i), numbers are of the form $60k + 2$.

From (ii), numbers are of the form $11m$.

$$11m = 60k + 2 = 55k + (5k + 2)$$

11 divides $(5k + 2)$

Units digit of $(5k + 2)$ is 2 or 7

So, values of $(5k + 2)$ are $11 \times 2, 11 \times 7, 11 \times 12, 11 \times 17, 11 \times 22, 11 \times 27, \dots$ and so on.

We need to find the 6th number of the ascending series.

$$\therefore 5k + 2 = 11 \times 27 \Rightarrow k = 59$$

$$\text{The required number} = 60 \times 59 + 2 = 3542$$

Hence, **option 3**.

70. Let $m\angle DAB = \theta \Rightarrow m\angle BCD = 2\theta$

$\square PBCD$ is a parallelogram.

$\therefore m\angle DPB = 2\theta$

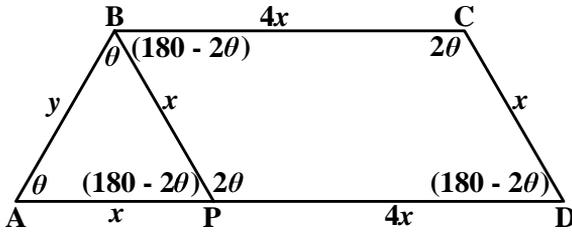
$m\angle PBC = m\angle PDC = (180 - 2\theta)$

$\angle DPB$ is an exterior angle of ΔPAB .

\therefore By exterior angle theorem, $m\angle PBA = \theta$

as, $m\angle DAB = \theta$

Thus, in ΔPAB , $PA = PB$



$\therefore m\angle ABC = \theta + (180 - 2\theta) = 180 - \theta$

According to the given conditions, $10x + y = 1120$ and $10x = 1000$

Solving the two equations, we get $x = 100$ and $y = 120$

$\sin(180 - \theta) = \sin \theta$

Applying sine rule to ΔPAB ,

$$\frac{100}{\sin \theta} = \frac{120}{\sin(180 - 2\theta)}$$

$$\frac{100}{\sin \theta} = \frac{120}{\sin 2\theta} \dots (i)$$

$\sin 2\theta = 2 \times \sin \theta \times \cos \theta$

\therefore (i) becomes

$$\frac{100}{\sin \theta} = \frac{120}{2 \times \sin \theta \times \cos \theta}$$

$$\therefore \cos \theta = \frac{3}{5} \Rightarrow \sin \theta = \frac{4}{5}$$

$$\therefore \sin \angle ABC = \sin(180 - \theta) = \sin \theta = \frac{4}{5}$$

Hence, **option 1**.

71. Maximum marks = 30

Marks scored if exactly 29 questions were answered correctly.

Case (1): One question is incorrectly answered.

Case (1a): A question of 1 mark is answered incorrectly.

Total marks = $30 - 1 - 0.25 = 28.75$

Case (1b): A question of 2 marks is answered incorrectly.

Total marks = $30 - 2 - 0.33 = 27.67$

Case (2): One question is not answered.

Case (2a): A question of 1 mark is not answered.

Total marks = $30 - 1 - 0.5 = 28.5$

Case (2b): A question of 2 marks is not answered.

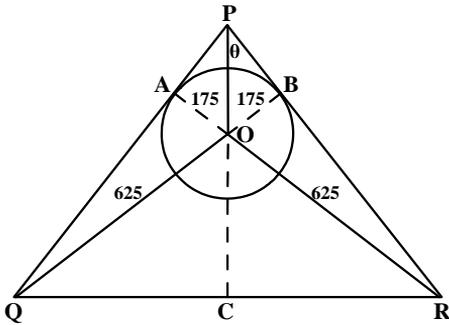
Total marks = $30 - 2 - 0.5 = 27.5$

If these marks are arranged in descending order, (27.5) comes in the fifth place.

i.e., the rank of a student, who scores a total of 27.5 marks, would be 5.

Hence, **option 1**.

72.



$OA \perp PQ, OB \perp PR$

$OP = OQ = OR = 625 \text{ cm}$

In ΔOAQ , $OA = 175 \text{ cm}$ and $OQ = 625 \text{ cm}$
 $\Rightarrow AQ = 600 \text{ cm}$

Similarly, $PA = PB = RB = 600 \text{ cm}$

ΔPQR is an isosceles triangle and $PQ = PR = 1200 \text{ cm}$

So, $PC \perp QR$

In ΔPBO and ΔPCR ,

$\angle OPB \cong \angle RPC$... (Common angle)

$\angle PBO \cong \angle PCR$... (Right angle)

$\Delta PBO \sim \Delta PCR$... (AA test of similarity)

$$\therefore \frac{PB}{PC} = \frac{BO}{CR} = \frac{PO}{PR}$$

$$\therefore \frac{600}{PC} = \frac{175}{CR} = \frac{625}{1200}$$

$$\therefore PC = 1152 \text{ cm and } CR = 336 \text{ cm}$$

$$\therefore QR = 672 \text{ cm}$$

$$A(\Delta PQR) = \frac{1}{2} \times 672 \times 1152 = 387072 \text{ cm}^2$$

Hence, **option 2**.

73. M and N are positive integers such that $M > N$

$$\therefore M! - N! = abc\dots 999000$$

$$\therefore [M(M-1)(M-2)\dots N!] - N!$$

$$= abc\dots 999000$$

$$\therefore N! \{ [M(M-1)(M-2)\dots] - 1 \}$$

$$= abc\dots 999000$$

Let the term in the square bracket be x .

Since M is a positive integer, the term in the square brackets i.e., x is also a positive integer, and hence, $(x-1)$ is also a positive integer.

$$\therefore N!(x-1) = abc\dots 999000$$

$$\therefore (x-1) = \frac{abc\dots 999000}{N!}$$

Hence, the maximum number of zeroes in $N!$ is 3.

$\therefore N! \leq 19$ (because from 20! onwards, each factorial has atleast 4 zeroes)

Now, there are 4 possible ranges for N :

1) $N = 0$ to 4 (no zeroes in $N!$)

2) $N = 5$ to 9 (1 zero in $N!$)

3) $N = 10$ to 14 (2 zeroes in $N!$)

4) $N = 15$ to 19 (3 zeroes in $N!$)

Consider case 3, where there are 2 zeroes in $N!$

Since $N!(x-1) = abc\dots 999000$, the third zero on the LHS should come from $(x-1)$.

For this, x has to be of the form $pqr\dots 1$ i.e., x has to be an odd number.

Now, there are two possibilities:

1) $M = N + 1$

$$\text{Here, } M! - N! = (M \times N!) - N! = N!(M - 1)$$

In this case, $M = x$

Since $N = 10$ to 14 and $M - 1$ should end in 0, $M = 11$ and $N = 10$

$$\text{Hence, } M(M - N) = 11(11 - 10) = 11$$

This does not tally with any of the options.

Hence, $M \neq N + 1$

2) There is at least one integer between M and N

Hence, x comprises a series of consecutive integers (at least two as explained above) multiplied with each other. So, there has to be at least one even number in this series. Hence, x can never be odd.

Hence, the third zero on the LHS can never come from $(x-1)$.

Hence, there cannot be 2 zeroes in $N!$. Similarly, it can be proved that there cannot be 1 zero or no zeroes in $N!$.

Hence, $N!$ has three zeroes i.e. $15 \leq N \leq 19$

Now, $M(M - N) = M^2 - NM$ can take four of the five given values.

Hence, there are five possible equations - one for each option.

Consider option 1: $M^2 - NM - 150 = 0$

Here, for $N = 15$ to 19, see if there exists a value of $M (> N)$ that gives positive integral roots in this equation.

For $N = 19$, the equation becomes

$$M^2 - 19M - 150 = 0 \text{ i.e. } M = 25 \text{ or } M = -6.$$

Here, $M = 25$ is valid.

Similarly, consider each option.

Option 3:

For $N = 17$, the equation becomes

$$M^2 - 17M - 200 = 0 \text{ i.e. } M = 25 \text{ or } M = -8.$$

Here, $M = 25$ is valid.

Option 4:

For $N = 16$, the equation becomes

$$M^2 - 16M - 225 = 0 \text{ i.e. } M = 25 \text{ or } M = -9.$$

Here, $M = 25$ is valid.

Option 5:

For $N = 17$, the equation becomes

$$M^2 - 17M - 234 = 0 \text{ i.e. } M = 26 \text{ or } M = -9.$$

Here, $M = 26$ is valid.

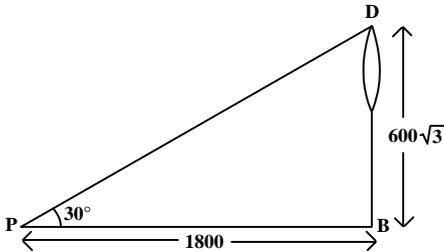
However, no value of N from 15 to 19 gives an integral solution for M in $M^2 - NM - 180 = 0$

Hence, $M(M - N)$ can never be 180.

Hence, **option 2**.

Note: There is a logical flaw in this question as the difference of two factorials can never end in 999000. The actual question should have had the last six digits as abc000.

74.



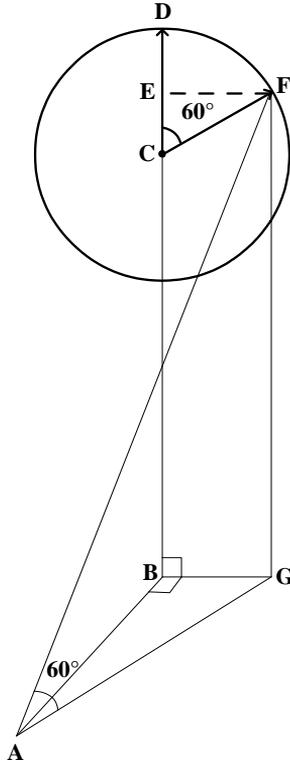
At 5.00 p.m., position of the person be P

PB = 1800 (Given)

$m\angle DPB = 30^\circ$

$$\Rightarrow DB = 1800 \tan 30^\circ = 600\sqrt{3}$$

At 5.10 p.m. the minute hand of the clock moves by 60°



$$DC = CF = 200\sqrt{3} \text{ m (Given)}$$

$\triangle FEC$ is $30^\circ-60^\circ-90^\circ$ triangle.

So, $EC = 100\sqrt{3}$ m and $EF = 300$ m

$$DE = DC - EC = 200\sqrt{3} - 100\sqrt{3} = 100\sqrt{3} \text{ m}$$

$$FG = DB - DE = 600\sqrt{3} - 100\sqrt{3} = 500\sqrt{3} \text{ m}$$

In $\triangle AFG$, $m\angle FAG = 60^\circ$ and $FG = 500\sqrt{3}$ m

By theorem of $30^\circ-60^\circ-90^\circ$ triangle,

$$AG = 500 \text{ m}$$

$$BG = EF = 300 \text{ m}$$

In $\triangle ABG$, $AG = 500$ m and $BG = 300$ m

$$\Rightarrow AB = 400 \text{ m}$$

$$PA = PB - AB = 1800 - 400 = 1400 \text{ m} = 1.4 \text{ km}$$

Time taken = 10 minutes = $(1/6)$ hours

$$\text{Speed} = 1.4 \times 6 = 8.4 \text{ km/hr}$$

Hence, **option 4**.

75. Let the capacity of the tank be $24x$ litres.

Pipes A and B fill $3x$ and $2x$ litres per hour while pipe C empties $6x$ litres in an hour.

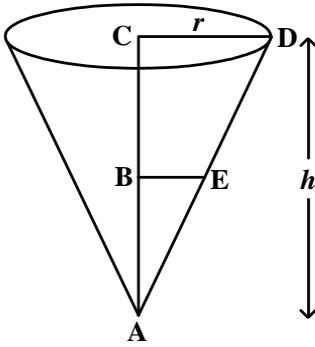
Let radius of the cone be r and height be h .

$$\frac{1}{3}\pi r^2 h = 24x$$

$$\therefore \pi r^2 h = 72x$$

For first 19 hours, water inside the cone

$$= 24x + 57x + 38x - 114x = 5x \text{ litres}$$



$$\triangle ABE \sim \triangle ACD$$

$$\text{If } AC = 2AB, CD = 2BE$$

$$\therefore BE = r/2 \text{ and } AB = h/2$$

After 50% reduction in the height of the water, volume

$$= \frac{1}{3} \pi (r/2)^2 (h/2) = \frac{\pi r^2 h}{24} = \frac{72x}{24} = 3x$$

Option 1: Pipe A was open for 19 hours.

i.e., B and C were open for 1 more hour.

$$\therefore 2x - 6x = -4x$$

The cone will have $5x - 4x = x$ litres of water.

\therefore Option 1 is eliminated.

Option 2: Pipe A was open for 19 hours 30 minutes.

i.e., B and C were open for 1 more hour and A for 30 more minutes.

$$\therefore 2x - 6x + 1.5x = -2.5x$$

The cone will have $5x - 2.5x = 2.5x$ litres of water

\therefore Option 2 is eliminated.

Option 3: Pipe B was open for 19 hours 30 minutes.

i.e., A and C were open for 1 more hour and B for 30 more minutes.

$$\therefore 3x - 6x + 1x = -2x$$

The cone will have $5x - 2x = 3x$ litres of water.

\therefore Option 3 would be the possible option.

Hence, **option 3.**

76. Units digit of the number must be 0.

Let $100x + 10y$ is the number such that $x > y$.

New number obtained by changing the digits is also divisible by 10.

So, only x and y are to be interchanged

$$\therefore \text{New number is of the form} = 100y + 10x$$

$$\text{Difference} = 90x - 90y = 90(x - y)$$

For the difference to be divisible by 4, $(x - y)$ has to be divisible by 4.

$$(x - y) = 4 \text{ or } 8$$

$$\text{So, } y = 1 \text{ to } 5$$

For $y = 1$ to 5 , $x = (1+4)$ to $(5+4)$ i.e., 5 to 9

One more possibility for $y = 1$ is $x = 9$.

Thus, in all 6 numbers satisfy the given conditions.

Hence, **option 2.**

77. Observe the options.

Either E or B can have the highest gain in vote share.

Let E_G and B_G represent the gain in vote shares of E and B from 2005 and 2010.

$$E_G = \left(\frac{49250}{985000} - \frac{30800}{880000} \right) \times 100 = 1.5$$

$$B_G = \left(\frac{241325}{985000} - \frac{154000}{880000} \right) \times 100 = 7$$

Since $E_G < B_G$, options 1, 2 and 3 are eliminated.

Either A or D can have the lowest gain in vote share.

$$A_G = \left(\frac{364450}{985000} - \frac{343200}{880000} \right) \times 100 = -2$$

$$D_G = \left(\frac{54175}{985000} - \frac{48400}{880000} \right) \times 100 = 0$$

Since $A_G < D_G$

Hence, option 5 is eliminated.

Hence, **option 4.**

78. Number of "natural tweets" for B, C, D and E are:

$$\text{Party B: } (100 - 30.4 - 29.7)\% \text{ of } 108128 = 0.399 \times 108128$$

$$\text{Party C: } (100 - 32.5 - 26.6)\% \text{ of } 96620 = 0.409 \times 96620 = (0.399 + 0.01) \times 96620$$

$$\text{Party D: } (100 - 30.6 - 36.1)\% \text{ of } 41524 = 0.333 \times 41524$$

$$\text{Party E: } (100 - 21.6 - 41.0)\% \text{ of } 32724 = 0.374 \times 32724$$

Both the total number of tweets and the percentage of neutral tweets of B and C are greater than those of D and E. Hence, options 3 and 4 are eliminated.

Among B and C, number for party B is more than C.

$$\text{Number of neutral tweets of B} \approx 0.4 \times 108128 = 43251.2$$

Parties classified under 'Other Parties' have a total of 15000 tweets, which is significantly lower than the total number of

tweets of the rest of the parties. Thus, 'Other Parties' cannot have the maximum number of neutral tweets even if all 15000 tweets are neutral. Hence, option 5 is eliminated.

Hence, **option 1**.

79. E secured less than 2% i.e. (0% to 2%) of the total votes in the year 2000.

The following table represents the individual vote shares and the gain in vote shares of parties A to E,

Parties	Vote Share		Gain in Vote Share
	2000	2010	2000 - 2010
A	42	37	-5
B	17	24.5	7.5
C	25	16.5	-8.5
D	3.5	5.5	2
E	0 to 2	5	3 to 5
Others	12.5	11.5	-1

The values 2% and 7.5% already exist in the table.

E's gain in vote share can have any value from 3% to 5%. The values 3.5% and 4.5% may exist within this range.

However, it is not possible to obtain 2.5% as the gain in vote share for any party.

Hence, **option 2**.

80. The following table represents the vote shares and tweet shares of parties B to E and 'Other Parties' in 2010,

Parties	Vote Share	Tweet Share	Difference
B	24.5	25.4	0.9
C	16.5	22.7	6.2
D	5.5	9.8	4.3
E	5	7.7	2.7
Others	11.5	3.5	8.0

Hence, **option 5**.

81. Observe the radar chart and consider any employee randomly, say employee 2 (E2). The effectiveness score of E2 in Survey 1 is 5 and Survey 2 is between 9 and 10. The scores for all employees for both the surveys can be similarly summarized as follows,

Employee	Effectiveness Score	
	Survey 1	Survey 2
E1	9	8 to 9
E2	5	9 to 10
E3	4 to 5	> 7
E4	< 9	5 to 6
E5	8	> 6
E6	< 7	< 8
E7	> 7	> 4

Observe the graph of "Days of Training Undergone" (X axis) vs "Employee Effectiveness Scores" (Y axis), and try to identify each employee. E2 can be identified by finding a triangular mark (corresponding to survey 1) against a score of 5 and a cross (corresponding to survey 2) between scores of 9 and 10. Similarly, each employee can be identified in this graph.

The same logic also applies to the graph on "Bonus Received" (X axis) versus "Employee Effectiveness Scores" (Y axis).

Again, consider the graphs on training and bonus. Observe that E2 has spent 10 and 21 days in training; and received approximately 27.5 lacs and 22 lacs bonus, based on surveys 1 and 2 respectively.

Similarly, the training and bonus figures for each employee can be found as shown below:

Employee	Effectiveness Score		Training(2 days)		Bonus (Rs lacs)	
	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2
E1	9	8 to 9	17	27	32	35.5
E2	5	9 to 10	10	21	27.5	22
E3	4 to 5	> 7	12	15	15.5	13
E4	< 9	5 to 6	18	9	20.5	18
E5	8	> 6	20	18	18	30.5
E6	< 7	< 8	15	13	23	26
E7	> 7	> 4	13	25	12	17

Only E4 and E5 underwent more than 17 days of training in Survey 1, and their respective bonuses (as per Survey 1) are 20.5 and 18 lacs. Hence, their average bonus for Survey 1 is 19.25 lacs.

Hence, **option 4**.

82. E1, E4, E5 and E7 have effectiveness scores more than 7 in Survey 1. Out of these, E4 and E7 had bonuses below 20 lacs in Survey 2.

Hence, **option 1**.

83. The number of days of training of E2, E3 and E6 increased from Survey 1 to Survey 2. Out of these, the bonuses of E2 and E3 decreased.

Hence, **option 2**.

84. The number of days of training of E2, E3 and E6 increased from Survey 1 to Survey 2. Out of these, the employee effective scores of E2 and E3 increased by at least 1.0 rating.

Hence, **option 1**.