



CAT 2023

SLOT

3

CAT 2023 SLOT 3 VARC

DIRECTIONS for the question: The passage below is accompanied by a set of questions. Choose the best answer to each question.

Steven Pinker's new book, "Rationality: What It is, Why it Seems Scarce, Why It Matters," offers a pragmatic dose of measured optimism, presenting rationality as a fragile but achievable ideal in personal and civic life. . . . Pinker's ambition to illuminate such a crucial topic offers the welcome prospect of a return to sanity. . . . It's no small achievement to make formal logic, game theory, statistics and Bayesian reasoning delightful topics full of charm and relevance.

It's also plausible to believe that a wider application of the rational tools he analyzes would improve the world in important ways. His primer on statistics and scientific uncertainty is particularly timely and should be required reading before consuming any news about the [COVID] pandemic. More broadly, he argues that less media coverage of shocking but vanishingly rare events, from shark attacks to adverse vaccine reactions, would help prevent dangerous overreactions, fatalism and the diversion of finite resources away from solvable but less-dramatic issues, like malnutrition in the developing world.

It's a reasonable critique, and Pinker is not the first to make it. But analyzing the political economy of journalism — its funding structures, ownership concentration and increasing reliance on social media shares — would have given a fuller picture of why so much coverage is so misguided and what we might do about it.

Pinker's main focus is the sort of conscious, sequential reasoning that can track the steps in a geometric proof or an argument in formal logic. Skill in this domain maps directly onto the navigation of many real-world problems, and Pinker shows how greater mastery of the tools of rationality can improve decision-making in medical, legal, financial and many other contexts in which we must act on uncertain and shifting information. . . .

Despite the undeniable power of the sort of rationality he describes, many of the deepest insights in the history of science, math, music and art strike their originators in moments of epiphany. From the 19th century chemist Friedrich August Kekulé's discovery of the structure of benzene to any of Mozart's symphonies, much extraordinary human achievement is not a product of conscious, sequential reasoning. Even Plato's Socrates — who anticipated many of Pinker's points by nearly 2,500 years, showing the virtue of knowing what you do not know and examining all premises in arguments, not simply trusting speakers' authority or charisma — attributed many of his most profound insights to dreams and visions. Conscious reasoning is helpful in sorting the wheat from the chaff, but it would be interesting to consider the hidden aquifers that make much of the grain grow in the first place.

The role of moral and ethical education in promoting rational behavior is also underexplored. Pinker recognizes that rationality "is not just a cognitive virtue but a moral one." But this profoundly important point, one subtly explored by ancient Greek philosophers like Plato and Aristotle, doesn't really get developed. This is a shame, since possessing the right sort of moral character is arguably a precondition for using rationality in beneficial ways.

Question No. : 1

The author endorses Pinker's views on the importance of logical reasoning as it:

- A) focuses public attention on real issues like development rather than sensational events.
- B) provides a moral compass for resolving important ethical dilemmas.
- C) helps people to gain expertise in statistics and other scientific disciplines.
- D) equips people with the ability to tackle challenging practical problems.

Question No. : 2

According to the author, for Pinker as well as the ancient Greek philosophers, rational thinking involves all of the following EXCEPT:

- A) the belief that the ability to reason logically encompasses an ethical and moral dimension.
- B) an awareness of underlying assumptions in an argument and gaps in one's own knowledge.
- C) arriving at independent conclusions irrespective of who is presenting the argument.
- D) the primacy of conscious sequential reasoning as the basis for seminal human achievements.

Question No. : 3

The author refers to the ancient Greek philosophers to:

- A) indicate the various similarities between their thinking and Pinker's conclusions.
- B) reveal gaps in Pinker's discussion of the importance of ethical considerations in rational behaviour.
- C) highlight the influence of their thinking on the development of Pinker's arguments.
- D) show how dreams and visions have for centuries influenced subconscious behaviour and path breaking inventions.

Question No. : 4

The author mentions Kekulé's discovery of the structure of benzene and Mozart's symphonies to illustrate the point that:

- A) unlike the sciences, human achievements in other fields are a mix of logical reasoning and spontaneous epiphanies.

B) great innovations across various fields can stem from flashes of intuition and are not always propelled by logical thinking.

C) it is not just the creative arts, but also scientific fields that have benefitted from flashes of creativity.

D) Pinker's conclusions on sequential reasoning are belied by European achievements which, in the past, were more rooted in unconscious bursts of genius.

DIRECTIONS for the question:The passage below is accompanied by a set of questions. Choose the best answer to each question.

In 2006, the Met [art museum in the US] agreed to return the Euphronios krater, a masterpiece Greek urn that had been a museum draw since 1972. In 2007, the Getty [art museum in the US] agreed to return 40 objects to Italy, including a marble Aphrodite, in the midst of looting scandals. And in December, Sotheby's and a private owner agreed to return an ancient Khmer statue of a warrior, pulled from auction two years before, to Cambodia.

Cultural property, or patrimony, laws limit the transfer of cultural property outside the source country's territory, including outright export prohibitions and national ownership laws. Most art historians, archaeologists, museum officials and policymakers portray cultural property laws in general as invaluable tools for counteracting the ugly legacy of Western cultural imperialism.

During the late 19th and early 20th century — an era former Met director Thomas Hoving called “the age of piracy” — American and European art museums acquired antiquities by hook or by crook, from grave robbers or souvenir collectors, bounty from digs and ancient sites in impoverished but art-rich source countries. Patrimony laws were intended to protect future archaeological discoveries against Western imperialist designs. . . .

I surveyed 90 countries with one or more archaeological sites on UNESCO's World Heritage Site list, and my study shows that in most cases the number of discovered sites diminishes sharply after a country passes a cultural property law. There are 222 archaeological sites listed for those 90 countries. When you look into the history of the sites, you see that all but 21 were discovered before the passage of cultural property laws. . . .

Strict cultural patrimony laws are popular in most countries. But the downside may be that they reduce incentives for foreign governments, non governmental organizations and educational institutions to invest in overseas exploration because their efforts will not necessarily be rewarded by opportunities to hold, display and study what is uncovered. To the extent that source countries can fund their own archaeological projects, artifacts and sites may still be discovered. . . . The survey has far-reaching implications. It suggests that source countries, particularly in the developing world, should narrow their cultural property laws so that they can reap the benefits of new archaeological discoveries, which typically increase tourism and enhance cultural pride. This does not mean these nations should abolish restrictions on foreign excavation and foreign claims to artifacts.

China provides an interesting alternative approach for source nations eager for foreign archaeological investment. From 1935 to 2003, China had a restrictive cultural property law that prohibited foreign ownership of Chinese cultural artifacts. In those years, China's most significant archaeological discovery occurred by chance, in 1974, when peasant farmers accidentally uncovered ranks of buried terra cotta warriors, which are part of Emperor Qin's spectacular tomb system.

In 2003, the Chinese government switched course, dropping its cultural property law and embracing collaborative international archaeological research. Since then, China has nominated 11 archaeological sites for inclusion in the World Heritage Site list, including eight in 2013, the most ever for China.

Question No. : 5

Which one of the following statements, if true, would undermine the central idea of the passage?

- A) Museums established in economically deprived archaeologically-rich source countries can display the antiques discovered there.
- B) Affluent archaeologically-rich source countries can afford to carry out their own excavations.
- C) UNESCO finances archaeological research in poor, but archaeologically-rich source countries.
- D) Western countries will have to apologise to countries for looting their cultural property in the past century.

Question No. : 6

Which one of the following statements best expresses the paradox of patrimony laws?

- A) They were aimed at protecting cultural property, but instead reduced new archaeological discoveries.
- B) They were aimed at protecting cultural property, but instead reduced business for auctioneers like Sotheby's.
- C) They were intended to protect cultural property, but instead resulted in the withholding of national treasure from museums.
- D) They were intended to protect cultural property, but instead resulted in the neglect of historical sites.

Question No. : 7

It can be inferred from the passage that archaeological sites are considered important by some source countries because they:

- A) give a boost to the tourism sector.
- B) are subject to strict patrimony laws.
- C) generate funds for future discoveries.
- D) are a symbol of Western imperialism.

Question No. : 8

From the passage we can infer that the author is likely to advise poor, but archaeologically-rich source countries to do all of the following, EXCEPT:

- A) allow foreign countries to analyse and exhibit the archaeological finds made in the source country.
- B) adopt China's strategy of dropping its cultural property laws and carrying out archaeological research through international collaboration.
- C) fund institutes in other countries to undertake archaeological exploration in the source country reaping the benefits of cutting-edge techniques.
- D) to find ways to motivate other countries to finance archaeological explorations in their country.

DIRECTIONS for the question: The passage below is accompanied by a set of questions. Choose the best answer to each question.

Understanding romantic aesthetics is not a simple undertaking for reasons that are internal to the nature of the subject. Distinguished scholars, such as Arthur Lovejoy, Northrop Frye and Isaiah Berlin, have remarked on the notorious challenges facing any attempt to define romanticism. Lovejoy, for example, claimed that romanticism is "the scandal of literary history and criticism" . . . The main difficulty in studying the romantics, according to him, is the lack of any "single real entity, or type of entity" that the concept "romanticism" designates. Lovejoy concluded, "the word 'romantic' has come to mean so many things that, by itself, it means nothing" ...

The more specific task of characterizing romantic aesthetics adds to these difficulties an air of paradox. Conventionally, "aesthetics" refers to a theory concerning beauty and art or the branch of philosophy that studies these topics. However, many of the romantics rejected the identification of aesthetics with a circumscribed domain of human life that is separated from the practical and theoretical domains of life. The most characteristic romantic commitment

is to the idea that the character of art and beauty and of our engagement with them should shape all aspects of human life. Being fundamental to human existence, beauty and art should be a central ingredient not only in a philosophical or artistic life, but also in the lives of ordinary men and women. Another challenge for any attempt to characterize romantic aesthetics lies in the fact that most of the romantics were poets and artists whose views of art and beauty are, for the most part, to be found not in developed theoretical accounts, but in fragments, aphorisms and poems, which are often more elusive and suggestive than conclusive.

Nevertheless, in spite of these challenges the task of characterizing romantic aesthetics is neither impossible nor undesirable, as numerous thinkers responding to Lovejoy's radical skepticism have noted. While warning against a reductive definition of romanticism, Berlin, for example, still heralded the need for a general characterization: "[Although] one does have a certain sympathy with Lovejoy's despair...[he is] in this instance mistaken. There was a romantic movement...and it is important to discover what it is" ...

Recent attempts to characterize romanticism and to stress its contemporary relevance follow this path. Instead of overlooking the undeniable differences between the variety of romanticisms of different nations that Lovejoy had stressed, such studies attempt to characterize romanticism, not in terms of a single definition, a specific time, or a specific place, but in terms of "particular philosophical questions and concerns" ...

While the German, British and French romantics are all considered, the central protagonists in the following are the German romantics. Two reasons explain this focus: first, because it has paved the way for the other romanticisms, German romanticism has a pride of place among the different national romanticisms . . . Second, the aesthetic outlook that was developed in Germany roughly between 1796 and 1801-02 — the period that corresponds to the heyday of what is known as "Early Romanticism" . . . — offers the most philosophical expression of romanticism since it is grounded primarily in the epistemological, metaphysical, ethical, and political concerns that the German romantics discerned in the aftermath of Kant's philosophy.

Question No. : 9

Which one of the following statements is NOT supported by the passage?

- A) Characterising romantic aesthetics is both possible and desirable, despite the challenges involved.
- B) Romantic aesthetics are primarily expressed through fragments, aphorisms, and poems.
- C) Recent studies on romanticism seek to refute the differences between national romanticisms.
- D) Many romantics rejected the idea of aesthetics as a domain separate from other aspects of life.

Question No. : 10

According to the passage, recent studies on romanticism avoid “a single definition, a specific time, or a specific place” because they:

- A) prefer to focus on the fundamental concerns of the romantics.
- B) seek to discredit Lovejoy’s scepticism regarding romanticism.
- C) understand that the variety of romanticisms renders a general analysis impossible.
- D) prefer to highlight the paradox of romantic aesthetics as a concept.

Question No. : 11

The main difficulty in studying romanticism is the:

- A) controversial and scandalous history of romantic literature.
- B) elusive and suggestive nature of romantic aesthetics.
- C) absence of written accounts by romantic poets and artists.
- D) lack of clear conceptual contours of the domain.

Question No. : 12

According to the romantics, aesthetics:

- A) should be confined to a specific domain separate from the practical and theoretical aspects of life.
- B) permeates all aspects of human life, philosophical and mundane.
- C) is primarily the concern of philosophers and artists, rather than of ordinary people.
- D) is widely considered to be irrelevant to human existence.

DIRECTIONS for the question: The passage below is accompanied by a set of questions. Choose the best answer to each question.

The biggest challenge [The Nutmeg’s Curse by Ghosh] throws down is to the prevailing understanding of when the climate crisis started. Most of us have accepted . . . that it started with the widespread use of coal at the beginning of the Industrial Age in the 18th century and worsened with the mass adoption of oil and natural gas in the 20th, Ghosh takes this history at least three centuries back, to the start of European colonialism in the 15th century.

He [starts] the book with a 1621 massacre by Dutch invaders determined to impose a monopoly on nutmeg cultivation and trade in the Banda islands in today's Indonesia. Not only do the Dutch systematically depopulate the islands through genocide, they also try their best to bring nutmeg cultivation into plantation mode. These are the two points to which Ghosh returns through examples from around the world. One, how European colonialists decimated not only indigenous populations but also indigenous understanding of the relationship between humans and Earth. Two, how this was an invasion not only of humans but of the Earth itself, and how this continues to the present day by looking at nature as a 'resource' to exploit. . .

We know we are facing more frequent and more severe heatwaves, storms, floods, droughts and wildfires due to climate change. We know our expansion through deforestation, dam building, canal cutting — in short, terraforming, the word Ghosh uses — has brought us repeated disasters . . . Are these the responses of an angry Gaia who has finally had enough? By using the word 'curse' in the title, the author makes it clear that he thinks so. use the pronoun 'who' knowingly, because Ghosh has quoted many non-European sources to enquire into the relationship between humans and the world around them so that he can question the prevalent way of looking at Earth as an inert object to be exploited to the maximum.

As Ghosh's text, notes and bibliography show once more, none of this is new. There have always been challenges to the way European colonialists looked at other civilisations and at Earth. It is just that the invaders and their myriad backers in the fields of economics, politics, anthropology, philosophy, literature, technology, physics, chemistry, biology have dominated global intellectual discourse. . . .

There are other points of view that we can hear today if we listen hard enough. Those observing global climate negotiations know about the Latin American way of looking at Earth as Pachamama (Earth Mother). They also know how such a framing is just provided lip service and is ignored in the substantive portions of the negotiations. In *The Nutmeg's Curse*, Ghosh explains why. He shows the extent of the vested interest in the oil economy — not only for oil-exporting countries, but also for a superpower like the US that controls oil drilling, oil prices and oil movement around the world. Many of us know power utilities are sabotaging decentralised solar power generation today because it hits their revenues and control. And how the other points of view are so often drowned out.

Question No. : 13

On the basis of information in the passage, which one of the following is NOT a reason for the failure of policies seeking to address climate change?

- A) The marginalised status of non-European ways of looking at nature and the environment.
- B) The greed of organisations benefiting from non-renewable energy resources.
- C) The global dominance of oil economies and international politics built around it.
- D) The decentralised characteristic of renewable energy resources like solar power.

Question No. : 14

Which one of the following, if true, would make the reviewer's choice of the pronoun “who” for Gala Inappropriate?

- A) There is a direct cause—effect relationship between human activities and global climate change.
- B) Ghosh’s book has a different title: “The Nutmeg’s Revenge”.
- C) Modern western science discovers new evidence for the Earth being an inanimate object.
- D) Non-European societies have perceived the Earth as a non-living source of all resources.

Question No. : 15

Which one of the following best explains the primary purpose of the discussion of the colonisation of the Banda Islands In “The Nutmeg’s Curse”?

- A) To illustrate how systemic violence against the colonized constituted the cornerstone of colonialism.
- B) To illustrate the first instance in history when the processes responsible for climate change were initiated.
- C) To illustrate how colonialism represented and perpetuated the mindset that has led to climate change.
- D) To illustrate the role played by the cultivation of certain crops in the plantation mode in contributing to climate change.

Question No. : 16

All of the following can be inferred from the reviewer's discussion of “The Nutmeg’s Curse”, EXCEPT:

- A) the history of climate change is deeply intertwined with the history of colonialism.
- B) the contemporary dominant perception of nature and the environment was put in place by processes of colonialism.
- C) environmental preservation policy makers can learn a lot from non-European and/or pre-colonial societies.
- D) academic discourses have always served the function of raising awareness about environmental preservation.

Question No. : 17

DIRECTIONS for the question: There is a sentence missing in the paragraph below. Look at the paragraph and decide in which blank (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: For theoretical purposes, arguments may be considered as freestanding entities, abstracted from their contexts of use in actual human activities.

Paragraph: ____ (A)____. An argument can be defined as a complex symbolic structure where some parts, known as the premises, offer support to another part, the conclusion. Alternatively, an argument can be viewed as a complex speech act consisting of one or more acts of premising (which assert propositions in favor of the conclusion), an act of concluding, and a stated or implicit marker (“hence”, “therefore”) that indicates that the conclusion follows from the premises. ____ (B)____. The relation of support between premises and conclusion can be cashed out in different ways: the premises may guarantee the truth of the conclusion, or make its truth more probable; the premises may imply the conclusion; the premises may make the conclusion more acceptable (or assertible). ____ (C)____. But depending on one’s explanatory goals, there is also much to be gained from considering arguments as they in fact occur in human communicative practices. (D).

- A) Blank A
- B) Blank B
- C) Blank C
- D) Blank D

Question No. : 18

DIRECTIONS for the question: There is a sentence missing in the paragraph below. Look at the paragraph and decide in which blank (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: Beyond undermining the monopoly of the State on the use of force, armed conflict also creates an environment that can enable organized crime to prosper.

Paragraph: ____ (1)____. Linkages between illicit arms, organized crime, and armed conflict can reinforce one another while also escalating and prolonging violence and eroding governance. ____ (2)____. Financial gains from crime can lengthen or intensify armed conflicts by creating revenue streams for non-State armed groups (NSAGs). ____ (3)____. In this context, when hostilities cease and parties to a conflict move towards a peaceful resolution, the widespread availability of surplus arms and ammunition can contribute to a situation of ‘criminalized peace’ that obstructs sustainable peace building efforts. (4)____.

- A) Blank A

B) Blank B

C) Blank C

D) Blank D

Question No. : 19

DIRECTIONS for the question: Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph.

Identify the odd sentence and key in the number of that sentence as your answer.

1. Although hard skills have traditionally ruled the roost, some companies are moving away from choosing prospective hires based on technical abilities alone.
2. Companies are shaking off the old definition of an ideal candidate and ditching the idea of looking for the singularly perfect candidate altogether.
3. Now, some job descriptions are frequently asking for candidates to demonstrate soft skills, such as leadership or teamwork.
4. That's not to say that practical know-how is no longer required - some jobs still call for highly specific expertise
5. The move towards prioritising soft skills "is a natural response to three years of the pandemic" says a senior recruiter at Cenlar FSB.

Question No. : 20

DIRECTIONS for the question: Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. Boa Senior, who lived through the 2004 tsunami, the Japanese occupation and diseases brought by British settlers, was the last native of the island chain who was fluent in Bo.
2. The indigenous population has been steadily collapsing since the island chain was colonized by British settlers in 1858 and used for most of the following 100 years as a colonial penal colony.
3. Taking its name from a now-extinct tribe, Bo is one of the 10 Great Andamanese languages, which are thought to date back to pre-Neolithic human settlement of south-east Asia.

4. The last speaker of an ancient tribal language has died in the Andaman Islands, breaking a 65,000-year link to one of the world's oldest cultures.

5. Though the language has been closely studied by researchers of linguistic history, Boa Senior spent the last few years of her life unable to converse with anyone in her mother tongue.

Question No. : 21

DIRECTIONS for the question: The question consists of four statements labelled 1, 2, 3 and 4, which when logically ordered, form a coherent paragraph. Rearrange the statements to construct a coherent paragraph and then type your answer in the box provided.

1. Veena Sahajwalla, a materials scientist at the University of New South Wales, believes there is a new way of solving this problem.

2. Her vision is for automated drones and robots to pick out components, put them into a small furnace and smelt them at specific temperatures to extract the metals one by one before they are sent off to manufacturers for reuse.

3. E-waste contains huge quantities of valuable metals, ceramics and plastics that could be salvaged and recycled, although currently not enough of it is.

4. She plans to build microfactories that can tease apart the tangle of materials in mobile phones, computers and other e-waste.

Question No. : 22

DIRECTIONS for the question: The question consists of four statements labelled 1, 2, 3 and 4, which when logically ordered, form a coherent paragraph. Rearrange the statements to construct a coherent paragraph and then type your answer in the box provided.

1. Centuries later formal learning is still mostly based on reading, even with the widespread use of other possible education-affecting technologies such as film, radio, and television.

2. One of the immediate and recognisable impacts of the printing press was on how people learned; in the scribal culture it primarily involved listening, so memorization was paramount.

3. The transformation of learners from listeners to readers was a complex social and cultural phenomenon, and it was not until the industrial era that the concept of universal literacy took root.

4. The printing press shifted the learning process, as listening and memorization gradually gave way to reading and learning no longer required the presence of a mentor; it could be done privately.

Question No. : 23

DIRECTIONS for the question: The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

The weight of society's expectations is hardly a new phenomenon but it has become particularly draining over recent decades, perhaps because expectations themselves are so multifarious and contradictory. The perfectionism of the 1950s was rooted in the norms of mass culture and captured in famous advertising images of the ideal white American family that now seem self-satirising. In that era, perfectionism meant seamlessly conforming to values, behaviour and appearance: chiselled confidence for men, demure graciousness for women. The perfectionist was under pressure to look like everyone else, only more so. The perfectionists of today, by contrast, feel an obligation to stand out through their idiosyncratic style and wit if they are to gain a foothold in the attention economy.

- A) The desire to attract attention is so deep-rooted in individual consciousness that people are willing to go to any lengths to achieve it.
- B) Though long-standing, the pressure to appear perfect and thereby attract attention, has evolved over time from one of conformism to one of non-conformism.
- C) The image of perfectionism is reflected in and perpetuated by the media; and people do their best to adhere to these ideals.
- D) The pressure to appear perfect has been the cause of tension and conflict because the idea itself has been in a state of flux and hard to define.

Question No. : 24

DIRECTIONS for the question: The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Gradually, life for the island's birds is improving. Antarctic prions and white-headed petrels, which also nest in burrows, had managed to cling on in some sites while pests were on the island. Their numbers are now increasing. "It's fantastic and so exciting," Shaw says. As birds return to breed, they also poo. This adds nutrients to the soil, which in turn helps the plants to grow back stronger. Tall plants then help burrowing birds hide from predatory skuas. "It's this wonderful feedback loop," Shaw says. Today, the "pretty paddock" that Houghton first experienced has been transformed. "The tussock is over your head, and you're dodging all these penguin tunnels," she says. The orchids and tiny herb that had been protected by fencing have started turning up all over the place.

- A) In the absence of pests, life on the island is now protected, and there has been a revival of a variety of birds and plants.

B) There is a huge positive transformation of the ecosystem of the island when brought under environmental protection.

C) There is an increasing number of predatory birds and plants on the island despite the presence of pests which is a positive development.

D) Flowering plants, herbs and birds are now being protected on this wonderful Antarctic island.

CAT 2023 SLOT 3 DILR

DIRECTIONS for the question: Read the information given below and answer the question that follows.

An air conditioner (AC) company has four dealers — D1, D2, D3 and D4 in a city. It is evaluating sales performances of these dealers. The company sells two variants of ACs — Window and Split. Both these variants can be either Inverter type or Non-inverter type. It is known that of the total number of ACs sold in the city, 25% were of Window variant, while the rest were of Split variant. Among the Inverter ACs sold, 20% were of Window variant.

The following information is also known:

1. Every dealer sold at least two window ACs.
2. D1 sold 13 inverter ACs, while D3 sold 5 Non-inverter ACs.
3. A total of six Window Non-inverter ACs and 36 Split Inverter ACs were sold in the city.
4. The number of Split ACs sold by D1 was twice the number of Window ACs sold by it.
5. D3 and D4 sold an equal number of Window ACs and this number was one-third of the number of similar ACs sold by D2.
6. D2 and D3 were the only ones who sold Window Non-inverter ACs. The number of these ACs sold by D2 was twice the number of these ACs sold by D3.
7. D3 and D4 sold an equal number of Split Inverter ACs. This number was half the number of similar ACs sold by D2.

Question No. : 1

How many Split Inverter ACs did D2 sell? (in numerical value)

Question No. : 2

What percentage of ACs sold were of Non-Inverter type? (in numerical value)

Question No. : 3

What was the total number of ACs sold by D2 and D4? (in numerical value)

Question No. : 4

Which of the following statements is necessarily false?

- A) D1 and D3 together sold more ACs as compared to D2 and D4 together.
- B) D4 sold more Split ACs as compared to D3.
- C) D2 sold the highest number of ACs.
- D) D1 and D3 sold an equal number of Split ACs.

Question No. : 5

If D3 and D4 sold an equal number of ACs, then what was the number of Non-Inverter ACs sold by D2?

- A) 5
- B) 7
- C) 6
- D) 4

DIRECTIONS for the question: Read the information given below and answer the question that follows.

There are only three female students — Amala, Koli and Rini — and only three male students — Biman, Mathew and Shyamal — in a course. The course has two evaluation components, a project and a test. The aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

The projects are done in groups of two, with each group consisting of a female and a male student. Both the group members obtain the same score in the project.

The following additional facts are known about the scores in the project and the test.

1. The minimum, maximum and the average of both project and test scores were identical — 40, 80 and 60, respectively.
2. The test scores of the students were all multiples of 10; four of them were distinct and the remaining two were equal to the average test scores.
3. Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Yet Amala had the highest aggregate score.
4. Shyamal scored the second highest in the test. He scored two more than Koli, but two less than Amala in the aggregate.

5. Biman scored the second lowest in the test and the lowest in the aggregate.

6. Mathew scored more than Rini in the project, but less than her in the test.

Question No. : 6

What was Rini's score in the project? (in numerical value)

Question No. : 7

What was the weight of the test component?

A) 0.50

B) 0.60

C) 0.40

D) 0.75

Question No. : 8

What was the maximum aggregate score obtained by the students?

A) 68

B) 80

C) 66

D) 62

Question No. : 9

What was Mathew's score in the test? (in numerical value)

Question No. : 10

Which of the following pairs of students were part of the same project team?

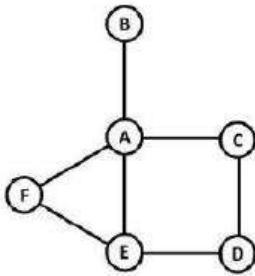
i) Amala and Biman

ii) Koli and Mathew

- A) Both (i) and (ii)
- B) Only (ii)
- C) Neither (i) nor (ii)
- D) Only (i)

DIRECTIONS for the question: Read the information given below and answer the question that follows.

A, B, C, D, E and F are the six police stations in an area, which are connected by streets as shown below. Four teams - Team 1, Team 2, Team 3 and Team 4 - patrol these streets continuously between 09:00 hrs and 12:00 hrs each day.



The teams need 30 minutes to cross a street connecting one police station to another. All four teams start from Station A at 09:00 hrs and must return to Station A by 12:00 hrs. They can also pass via Station A at any point on their journeys.

The following facts are known.

1. None of the streets has more than one team traveling along it in any direction at any point in time.
2. Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs.
3. Teams 1 and 3 are the only ones in station E at 10:30 hrs.
4. Teams 1 and 4 are the only ones in stations B and E respectively at 11:30 hrs.
5. Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.
6. Team 4 never passes through Stations B, D or F.

Question No. : 11

Which one among the following stations is visited the largest number of times?

- A) Station F
- B) Station C
- C) Station D
- D) Station E

Question No. : 12

How many times do the teams pass through Station B in a day? (in numerical value)

Question No. : 13

Which team patrols the street connecting Stations D and E at 10:15 hrs?

- A) Team 3
- B) Team 4
- C) Team 2
- D) Team 1

Question No. : 14

How many times does Team 4 pass through Station E in a day? (in numerical value)

Question No. : 15

How many teams pass through Station C in a day?

- A) 4
- B) 1
- C) 2
- D) 3

DIRECTIONS for the question: Read the information given below and answer the question that follows.

In a coaching class, some students register online, and some others register offline. No student registers both online and offline; hence the total registration number is the sum of online and offline registrations. The following facts and table pertain to these registration numbers for the five months — January to May of 2023. The table shows the minimum, maximum, median registration numbers of these five months, separately for online, offline and total number of registrations. The following additional facts are known.

1. In every month, both online and offline registration numbers were multiples of 10.
2. In January, the number of offline registrations was twice that of online registrations.
3. In April, the number of online registrations was twice that of offline registrations.
4. The number of online registrations in March was the same as the number of offline registrations in February.
5. The number of online registrations was the largest in May.

	Minimum	Maximum	Median
Online	40	100	80
Offline	30	80	50
Total	110	130	120

Question No. : 16

What was the total number of registrations in April? (in numerical value)

Question No. : 17

What was the number of online registrations in January? (in numerical value)

Question No. : 18

Which of the following statements can be true?

- I. The number of offline registrations was the smallest In May.
 - II. The total number of registrations was the smallest in February.
- A) Only I
- B) Neither I nor II

- C) Only II
- D) Both I and II

Question No. : 19

What best can be concluded about the number of offline registrations in February?

- A) 50 or 80
- B) 30 or 50 or 80
- C) 50
- D) 80

Question No. : 20

Which pair of months definitely had the same total number of registrations?

- I. January and April
- II. February and May
- A) Neither I nor II
- B) Only II
- C) Both I and II
- D) Only I

CAT 2023 SLOT 3 QUANT

Question No. : 1

DIRECTIONS for the question : Solve the following question and mark the best possible option.

For a real number x , if $\frac{1}{2}, \frac{\log_3(2^x - 9)}{\log_3 4}$, and $\frac{\log_5\left(2^x + \frac{17}{2}\right)}{\log_5 4}$ are in an arithmetic progression, then the common difference is

- A) $\log_4\left(\frac{7}{2}\right)$
- B) $\log_4\left(\frac{3}{2}\right)$
- C) $\log_4\left(\frac{23}{2}\right)$
- D) $\log_4 7$

Question No. : 2

DIRECTIONS for the question: Solve the following question and mark the best possible option.

If x is the possible real number such that $x^8 + (1/x)^8 = 47$, Then the value of $x^9 + (1/x)^9$ is

- A) $30\sqrt{5}$
- B) $34\sqrt{5}$
- C) $40\sqrt{5}$
- D) $36\sqrt{5}$

Question No. : 3

DIRECTIONS for the question: Solve the following question and mark the best possible option.

For some real numbers a and b , the system of equations $x + y = 4$ and $(a + 5)x + (b^2 - 15)y = 8b$ has infinitely many solutions for x and y . Then, the maximum possible value of ab is

- A) 25
- B) 33
- C) 55
- D) 15

Question No. : 4

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Let n and m be two positive integers such that there are exactly 41 integers greater than $8m$ and less than $8n$, which can be expressed as powers of 2. Then, the smallest possible value of $n + m$ is

- A) 16
- B) 44
- C) 14
- D) 42

Question No. : 5

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Let n be any natural number such that $5^{n-1} < 3^{n+1}$. Then, the least integer value of m that satisfies $3^{n+1} < 2^{n+m}$ for each such n , is (in numerical value)

Question No. : 6

DIRECTIONS for the question: Solve the following question and mark the best possible option.

A quadratic equation $x^2 + bx + c = 0$ has two real roots. If the difference between the reciprocals of the roots is $1/3$ and the sum of the reciprocals of the squares of the roots is $5/9$, then the largest possible value of $(b + c)$ is (in numerical value).

Question No. : 7

DIRECTIONS for the question: Solve the following question and mark the best possible option.

The sum of the first two natural numbers, each having 15 factors (including 1 and the number itself), is (in numerical value)

Question No. : 8

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Anil mixes cocoa with sugar in the ratio 3 : 2 to prepare mixture A, and coffee with sugar in the ratio 7 : 3 to prepare mixture B. He combines mixtures A and B in the ratio 2 : 3 to make a new mixture C. If he mixes C with an equal amount of milk to make a drink, then the percentage of sugar in this drink will be

- A) 17
- B) 24
- C) 16
- D) 21

Question No. : 9

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Rahul, Rakshita and Gurmeet, working together, would have taken more than 7 days to finish a job. On the other hand, Rahul and Gurmeet, working together would have taken less than 15 days to finish the job. However, they all worked together for 6 days, followed by Rakshita, who worked alone for 3 more days to finish the job. If Rakshita had worked alone on the job then the number of days she would have taken to finish the job, cannot be

- A) 17
- B) 16
- C) 21
- D) 20

Question No. : 10

DIRECTION for the question: Solve the following question and mark the best possible option.

The population of a town in 2020 was 100000. The population decreased by $y\%$ from the year 2020 to 2021, and increased by $x\%$ from the year 2021 to 2022, where x and y are two natural numbers. If population in 2022 was greater than the population in 2020 and the difference between x and y is 10, then the lowest possible population of the town in 2021 was

- A) 72000
- B) 75000
- C) 74000
- D) 73000

Question No. : 11

DIRECTIONS for the question: Solve the following question and mark the best possible option.

A merchant purchases a cloth at a rate of Rs.100 per meter and receives 5 cm length of cloth free for every 100 cm length of cloth purchased by him. He sells the same cloth at a rate of Rs.110 per meter but cheats his customers by giving 95 cm length of cloth for every 100 cm length of cloth purchased by the customers. If the merchant provides a 5% discount, the resulting profit earned by him is

- A) 15.5%
- B) 4.2%
- C) 9.7%

D) 16%

Question No. : 12

DIRECTIONS for the question: Solve the following question and mark the best possible option.

There are three persons A, B and C in a room. If a person D joins the room, the average weight of the persons in the room reduces by x kg. Instead of D, if person E joins the room, the average weight of the persons in the room increases by $2x$ kg. If the weight of E is 12 kg more than that of D, then the value of x is

A) 2

B) 1

C) 0.5

D) 1.5

Question No. : 13

DIRECTIONS for the question: Solve the following question and mark the best possible option.

A boat takes 2 hours to travel downstream a river from port A to port B, and 3 hours to return to port A. Another boat takes a total of 6 hours to travel from port B to port A and return to port B. If the speeds of the boats and the river are constant, then the time, in hours, taken by the slower boat to travel from port A to port B is

A) $3(\sqrt{5}-1)$

B) $12(\sqrt{5}-2)$

C) $3(3+\sqrt{5})$

D) $3(3-\sqrt{5})$

Question No. : 14

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Gautam and Suhani, working together, can finish a job in 20 days. If Gautam does only 60% of his usual work on a day, Suhani must do 150% of her usual work on that day to exactly make up for it. Then, the number of days required by the faster worker to complete the job working alone is (in numerical value)

Question No. : 15

DIRECTIONS for the question: Solve the following question and mark the best possible option.

The number of coins collected per week by two coin-collectors A and B are In the ratio 3 : 4. If the total number of coins collected by A in 5 weeks is a multiple of 7, and the total number of coins collected by B in 3 weeks is a multiple of 24, then the minimum possible number of coins collected by A in one week is (in numerical value)

Question No. : 16

DIRECTIONS for the question: Solve the following question and mark the best possible option.

A fruit seller has a stock of mangoes, bananas and apples with at least one fruit of each type. At the beginning of a day, the number of mangoes make up 40% of his stock. That day, he sells half of the mangoes, 96 bananas and 40% of the apples. At the end of the day, he ends up selling 50% of the fruits. The smallest possible total number of fruits in the stock at the beginning of the day is (in numerical value)

Question No. : 17

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Let $\triangle ABC$ be an isosceles triangle such that AB and AC are of equal length. AD is the altitude from A on BC and BE is the altitude from B on AC. If AD and BE intersect at O such that $\angle AOB = 105^\circ$, then AD/BE equals

- A) $\cos 15^\circ$
- B) $2 \sin 15^\circ$
- C) $2 \cos 15^\circ$
- D) $\sin 15^\circ$

Question No. : 18

DIRECTIONS for the question: Solve the following question and mark the best possible option.

A rectangle with the largest possible area is drawn inside a semicircle of radius 2 cm. Then, the ratio of the lengths of the largest to the smallest side of this rectangle is

- A) $\sqrt{5}:1$
- B) $2:1$
- C) $\sqrt{2}:1$
- D) $1 : 1$

Question No. : 19

DIRECTIONS for the question: Solve the following question and mark the best possible option.

In a regular polygon, any interior angle exceeds the exterior angle by 120 degrees. Then, the number of diagonals of this polygon is (in numerical value)

Question No. : 20

DIRECTIONS for the question: Solve the following question and mark the best possible option.

The value of $1 + \left(1 + \frac{1}{3}\right)\frac{1}{4} + \left(1 + \frac{1}{3} + \frac{1}{9}\right)\frac{1}{16} + \left(1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27}\right)\frac{1}{64} + \dots$, is

- A) 27/12
- B) 15/8
- C) 16/11
- D) 15/13

Question No. : 21

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Let $a_n = 46 + 8n$ and $b_n = 98 + 4n$ be two sequences for natural numbers $n \leq 100$. Then, the sum of all terms common to both the sequences is

- A) 15000
- B) 14900
- C) 14602
- D) 14798

Question No. : 22

DIRECTIONS for the question: Solve the following question and mark the best possible option.

Suppose $f(x, y)$ is a real valued function such that $f(3x + 2y, 2x - 5y) = 19x$, for all real numbers x and y . The value of x for which $f(x, 2x) = 27$, is (in numerical value)

Solutions

VARC

1. Correct Answer:- D

The passage emphasizes Pinker's focus on how rationality improves decision-making in various real-world contexts.

- 1 is incorrect because the passage doesn't specifically link Pinker's views to public attention on development issues.
- 2 is incorrect as the passage suggests that Pinker doesn't fully develop the ethical dimensions of rationality.
- 3 is incorrect because, although Pinker discusses statistics, the passage doesn't limit his views on rationality to gaining expertise in scientific disciplines.

2. Correct Answer:- D

The passage suggests that Pinker's focus on conscious reasoning contrasts with the role of epiphanies in significant achievements, a point not fully aligned with ancient philosophers.

- 1 is incorrect to eliminate because both Pinker and the philosophers recognize an ethical dimension to rationality.
- 2 is incorrect to eliminate as awareness of assumptions and knowledge gaps is central to both Pinker's and the philosophers' views.
- 3 is incorrect to eliminate because independent conclusions regardless of speaker authority are in line with both Pinker's and the philosophers' rational approach.

3. Correct Answer:- B

The author highlights that Pinker's treatment of the moral aspects of rationality is less developed compared to ancient philosophers.

- 1 is incorrect because the author doesn't focus on similarities but rather on Pinker's lack of depth compared to the philosophers.
- 3 is incorrect because there's no explicit mention of the philosophers' influence on Pinker's arguments.
- 4 is incorrect as the reference to philosophers is more about ethical and rational thinking, not about dreams and visions.

4. Correct Answer:- B

These examples are used to show that significant achievements can arise from intuitive insights, not just conscious reasoning.

- 1 is incorrect because the passage doesn't make a distinction between sciences and other fields in the context of these achievements.
- 3 is incorrect as it focuses narrowly on scientific fields, whereas the passage discusses broader domains including music and arts.
- 4 is incorrect because the passage doesn't suggest that European achievements contradict Pinker's views; rather, it highlights the role of intuition alongside reasoning.

5. Correct Answer:- C

The central idea is that strict cultural property laws diminish archaeological discoveries. If UNESCO finances research, it counters the negative impact of these laws.

- 1 is incorrect because museums in source countries displaying antiques align with the passage's emphasis on cultural property laws.
- 2 is incorrect as it doesn't undermine the central idea; the passage focuses on poor countries.
- 4 is incorrect because apologies from Western countries don't directly address the issue of reduced archaeological discoveries.

6. Correct Answer:- A

The paradox in the passage is that while patrimony laws were meant to protect artifacts, they led to fewer discoveries.

- 2 is incorrect as it focuses on auctioneers, which is not the central paradox discussed.
- 3 is incorrect because the withholding of treasures from museums is not the paradox addressed.
- 4 is incorrect as it suggests neglect of historical sites, which is not the main issue presented in the passage.

7. Correct Answer:- A

The passage mentions that new archaeological discoveries typically increase tourism and enhance cultural pride.

- 2 is incorrect as it's the strictness of the laws, not the laws themselves, that's a concern.
- 3 is incorrect because generating funds for future discoveries isn't directly stated as a reason for their importance.
- 4 is incorrect as Western imperialism is not cited as a reason for their importance in the passage.

8. Correct Answer:- C

The author advocates for collaborative international archaeological research but does not suggest allowing foreign countries to exhibit artifacts found in the source countries.

Option A) allowing foreign countries to analyze and exhibit archaeological finds could be inferred as a recommended strategy, as it aligns with the idea of international collaboration and sharing the benefits of discoveries.

Option B) is inappropriate because the author praises China's approach of dropping restrictive laws and engaging in international collaboration.

Option C) funding institutes in other countries to undertake archaeological exploration in the source country, reaping the benefits of cutting-edge techniques, does not directly align with the author's recommendations. The passage suggests easing restrictions to encourage foreign investment and collaboration but does not specifically recommend funding foreign institutions to conduct the exploration. The focus is more on modifying laws to enable and encourage international collaboration and investment directly within the source countries, rather than funding external entities to carry out the work.

Option D) is incorrect to eliminate because it aligns with the author's suggestion to incentivize foreign investment in archaeological explorations.

9. Correct Answer:- C

The passage mentions that recent studies do not overlook the differences between national romanticisms but characterize them in terms of philosophical questions and concerns.

- 1 is incorrect to eliminate as the passage supports the idea that characterizing romantic aesthetics is both possible and desirable.

- 2 is incorrect to eliminate because the passage states that romantic aesthetics are often expressed through fragments, aphorisms, and poems.

- 4 is incorrect to eliminate as the passage mentions that many romantics rejected the idea of aesthetics as a separate domain.

10. Correct Answer:- A

The passage suggests that recent studies characterize romanticism in terms of "particular philosophical questions and concerns" rather than a single definition or specific time/place.

- 2 is incorrect because discrediting Lovejoy's skepticism is not the stated reason for their approach.
- 3 is incorrect as the passage doesn't suggest that a general analysis is impossible.
- 4 is incorrect because the passage does not indicate that recent studies prefer to highlight the paradox of romantic aesthetics.

11. Correct Answer:- D

The passage quotes Lovejoy, who pointed out the difficulty due to the lack of a "single real entity, or type of entity" that romanticism designates, indicating unclear conceptual contours.

- 1 is incorrect because the passage doesn't describe the history of romantic literature as controversial or scandalous.
- 2 is incorrect because the elusive nature of romantic aesthetics is a challenge, but not the main difficulty.
- 3 is incorrect as the passage does not suggest the absence of written accounts as the main difficulty.

12. Correct Answer:- B

The passage states that the most characteristic romantic commitment is the idea that the character of art and beauty should shape all aspects of human life.

- 1 is incorrect because the passage explicitly states that many romantics rejected this view.
- 3 is incorrect as the passage suggests that beauty and art should be central in the lives of ordinary people, not just philosophers and artists.
- 4 is incorrect because the passage does not suggest that aesthetics is considered irrelevant to human existence.

13. Correct Answer:- D

The passage does not suggest that the decentralized nature of renewable resources like solar power is a reason for the failure of climate change policies. Instead, it points to power utilities sabotaging decentralized solar power for their own interests.

- 1 is incorrect to eliminate because the marginalization of non-European perspectives is mentioned as a contributing factor to policy failures.
- 2 is incorrect to eliminate as it's mentioned that greed benefiting from non-renewable resources is a challenge.
- 3 is incorrect to eliminate because the global dominance of oil economies is discussed as a significant hurdle.

14. Correct Answer:- D

The use of the pronoun “who” for Gaia reflects a view of the Earth as a living entity, which is aligned with Ghosh’s incorporation of non-European perspectives on the Earth. If it were true that non-European societies predominantly perceived the Earth as a non-living resource, this would contradict the basis for using a pronoun that implies personification, making its use inappropriate.

- 1 is incorrect because establishing a cause-effect relationship between human activities and climate change aligns with personifying the Earth, not contradicting it.
- 2 is incorrect as the title of Ghosh’s book is irrelevant to the appropriateness of the pronoun for Gaia.
- 3 is incorrect because new evidence from modern western science about the Earth being inanimate does not directly relate to the use of the pronoun in the context of Ghosh’s focus on non-European perspectives.

15. Correct Answer:- C

The passage suggests that the colonization of the Banda Islands by the Dutch is used by Ghosh as an example of how European colonialism's view of Earth as a resource to exploit contributed to the current climate crisis.

- 1 is incorrect because systemic violence is not the main focus of the discussion in the context of climate change.
- 2 is incorrect as the passage does not imply that this was the first historical instance of climate change processes.
- 4 is incorrect because the passage does not primarily focus on the role of crop cultivation in contributing to climate change.

16. Correct Answer:- D

The passage suggests that academic discourses have often supported the viewpoints of colonialists and their backers, rather than consistently raising awareness about environmental preservation.

- 1 is incorrect to eliminate as the passage implies a connection between colonialism and climate change.
- 2 is incorrect to eliminate because the passage suggests that contemporary perceptions of nature are rooted in colonialist processes.
- 3 is incorrect to eliminate as it's implied that there is much to learn from non-European and pre-colonial societies regarding environmental policy.

17. Correct Answer:- C

The sentence fits best at position (C). The paragraph initially discusses how an argument can be defined and how the relation of support between premises and conclusion works. After these theoretical definitions and views, the sentence at C provides a contrasting perspective by suggesting a shift from theoretical abstraction to considering arguments within the context of actual human activities. It serves as a transitional statement that bridges the more abstract, theoretical discussion of arguments with their practical, real-world applications, as mentioned in the final sentence of the paragraph.

- (A) is incorrect because the beginning of the paragraph is already defining an argument, and the missing sentence would be out of context as an introduction.
- (B) is incorrect because it continues the theoretical discussion on how premises support conclusions, and the missing sentence introduces a different perspective.
- (D) is incorrect as it is the conclusion of the paragraph where the focus shifts to the practical applications of arguments in human communication, and the sentence would be out of place here.

18. Correct Answer:- C

Explanation:- The paragraph introduces the interconnected nature of different elements and their collective impact on violence and governance. It further Delves into how criminal activities can financially fuel armed conflicts, supporting NSAGs. Finally Concluding with the aftermath of conflicts, discussing the surplus arms and the challenges in achieving sustainable peace. The right placement of the given sentence should be 3rd blank as the sentence Expands on the consequences of armed conflicts by highlighting how they weaken state control and foster an environment conducive to organized crime. This can be seen as a continuation of the idea that armed conflicts provide financial streams to NSAGs, indicating a broader socio-political impact.

19. Correct Answer:- 2

The sentence fits best at position (C). The paragraph initially discusses how an argument can be defined and how the relation of support between premises and conclusion works. After these theoretical definitions and views, the sentence at C provides a contrasting perspective by suggesting a shift from theoretical abstraction to considering arguments within the context of actual human activities. It serves as a transitional statement that bridges the more

abstract, theoretical discussion of arguments with their practical, real-world applications, as mentioned in the final sentence of the paragraph.

- (A) is incorrect because the beginning of the paragraph is already defining an argument, and the missing sentence would be out of context as an introduction.

- (B) is incorrect because it continues the theoretical discussion on how premises support conclusions, and the missing sentence introduces a different perspective.

- (D) is incorrect as it is the conclusion of the paragraph where the focus shifts to the practical applications of arguments in human communication, and the sentence would be out of place here.

20. Correct Answer:- 2

Sentence 2, while related to the broader theme of indigenous populations and their decline, is more focused on the historical context of colonization and its impact on the indigenous population as a whole, rather than specifically on the Bo language or its speakers. Therefore, the odd sentence should be 2

It addresses the broader historical context of the decline of the indigenous population due to colonization, which, although related, does not directly tie into the specific narrative about the Bo language and its last speaker, which is the central theme in the other sentences.

21. Correct Answer:- 3142

The correct sequence is 3-1-4-2

3rd sentence sets the stage by introducing the issue of e-waste and its potential for recycling. It identifies the problem, making it a natural starting point for the paragraph. 1st sentence introduces Veena Sahajwalla and her belief in a new solution to this problem. This builds on the context provided in sentence 3. 4th sentence describes Sahajwalla's specific plan to address the e-waste problem, which logically follows her introduction and her belief in a new solution. 2nd sentence provides the detailed method of how Sahajwalla's plan (introduced in sentence 4) will be executed, making it an appropriate conclusion to the paragraph.

In this sequence, the paragraph flows logically from identifying the broader issue (e-waste recycling), to introducing an expert who believes in a new solution, to outlining her specific plan, and finally detailing the execution of that plan.

22. Correct Answer:- 2431

The correct sequence is: 2-4-3-1

- Start with sentence 2, which sets the historical context of learning methods before the printing press. Continue with sentence 4, which describes the direct impact of the printing press on learning. Follow with sentence 3, which elaborates on the broader cultural shift to reading and literacy. Conclude with sentence 1, which brings the discussion to the present day, showing the lasting influence of these historical changes.

23. Correct Answer:- B

The passage discusses how societal expectations of perfectionism have shifted over time. In the 1950s, perfectionism was about conforming to the mass culture's norms, while contemporary perfectionism involves standing out through individuality. This summary effectively encapsulates this evolution from conformism to non-conformism. The essence is captured by 2nd option only. 1 is incorrect because it oversimplifies the passage's focus on perfectionism as a means to attract attention, which is not the main point. 3 is incorrect as it focuses solely on the role of media in reflecting and perpetuating perfectionism, while the passage discusses a broader societal shift in the concept of perfectionism. 4 is incorrect because it emphasizes the tension and conflict arising from the changing definition of perfectionism, which isn't the central focus of the passage. The passage is more about the evolution of what constitutes perfectionism rather than the conflicts it causes.

24. Correct Answer:- A

Option 1 effectively encapsulates the main idea of the passage, which is the improvement in the island's ecosystem, particularly the increase in bird populations and plant growth, following the reduction or absence of pests. It covers both the revival of birds and the positive impact on the plant life. 2 is incorrect because it overemphasizes the aspect of environmental protection without specifically mentioning the crucial role of the absence of pests, which is a key point in the passage. 3 is incorrect as it inaccurately suggests an increase in predatory birds due to pests, which contradicts the passage's focus on the recovery of the ecosystem after the reduction of pests. 4 is incorrect because it narrows the focus to only the protection of plants and birds, missing the broader ecological improvement and the interconnectedness of various elements in the ecosystem described in the passage.

DILR

1. Correct Answer:- 14

Let us assume, A is the total number of AC's sold

⇒ From the information that the total number of ACs sold in the city, 25% were of Window variant

⇒ Window AC's = $A/4$ and Split AC's = $3A/4$

Now, let us assume B is the total number of inverter ACs

⇒ From the information that among the Inverter ACs sold, 20% were of Window variant.

⇒ Window Inverter AC's = $B/5$ and Window Non-Inverter AC's = $4B/5$

TABLE (A)			
Split($3A/4$)		Window ($A/4$)	
Inv ($4B/5$)	Non - Inv	Inv ($B/5$)	Non - Inv

From - Condition-3

⇒ $A/4 - B/5 = 6$ and $4B/5 = 36 \Rightarrow B = 46$ and $A = 60$.

Total=60			
Split($3A/4$)		Window ($A/4$)	
Inv ($4B/5$)	Non - Inv	Inv ($B/5$)	Non - Inv

Now, from condition-6

a) D1 & D4 sold "0" window Non-inverter ACs ⇒ D2 & D3 sold 6 window non-inverter ACs, it is given that D2 sold twice as many as D3 ⇒ D2 sold 4 and D3 sold 2 ACs of this type.

From condition-2

b) Let us assume, D1 sold "x" window inverter ACs ⇒ Number of split inverter ACs sold is $13-x$ From condition-4

c) Number of split ACs sold by D1 will be "2x"

From condition-5

d) Let us assume 'y' is the number of window ACs sold by D3 & D4 ⇒ D2 sold $3y$ ACs of this type. From condition-7

e) Let us assume 'z' is the number of split inverter ACs sold by D3 and D4 ⇒ D2 sold $2z$ ACs of this type. Let us use a, b, c, d, and e make a table:

D1 Total =

Split=		Window =	
Inv=13-x	Non - Inv	Inv=x	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=x	Non - Inv= 4
D3 Total =			
Split=		Window =y	
Inv=z	Non - Inv=3	Inv=	Non - Inv= 2
D4 Total =			
Split=		Window =y	
Inv=z	Non - Inv=	Inv=	Non - Inv=0

We know that the total number of window ACs is 15

$\Rightarrow x + 3y + y + y = 15 \Rightarrow x + 5y = 15$, also x and y should be greater than or equal to 2 from condition - 1

$\Rightarrow x = 5$ and $y = 2$ is the only solution.

Filling this in the table:

D1 Total =			
Split=		Window =5	
Inv=8	Non - Inv	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=		Window =2	
Inv=z	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=z	Non - Inv=	Inv=2	Non - Inv=0

Now, Number of split inverter ACs is 36

$\Rightarrow 8 + 2z + z + z = 36 \Rightarrow 4z = 28 \Rightarrow z = 7$.

Filling this and using (5), the number of split AC's sold by D1 is $2*5 = 10$.

D1 Total =15			
Split=10		Window =5	
Inv=8	Non - Inv=2	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=14	Non - Inv=	Inv=2	Non - Inv= 4
D3 Total =			
Split=10		Window =2	
Inv=7	Non - Inv=3	Inv=	Non - Inv= 2
D4 Total			

Split		Window =2	
Inv=7	Non – Inv=	Inv=2	Non – Inv=0

From the table, we see that 14 split inverter ACs are sold.

2. Correct Answer:- 25

Let us assume, A is the total number of AC's sold

⇒ From the information that the total number of ACs sold in the city, 25% were of Window variant

⇒ Window AC's = $A/4$ and Split AC's = $3A/4$

Now, let us assume B is the total number of inverter ACs

⇒ From the information that among the Inverter ACs sold, 20% were of Window variant.

⇒ Window Inverter AC's = $B/5$ and Window Non-Inverter AC's = $4B/5$

TABLE (A)			
Split($3A/4$)		Window ($A/4$)	
Inv ($4B/5$)	Non - Inv	Inv ($B/5$)	Non – Inv

From - Condition-3

⇒ $A/4 - B/5 = 6$ and $4B/5 = 36 \Rightarrow B = 46$ and $A = 60$.

Total=60			
Split=45		Window =15	
Inv=36	Non – Inv=9	Inv=9	Non – Inv=6

Now, from condition-6

a) D1 & D4 sold "0" window Non-inverter ACs ⇒ D2 & D3 sold 6 window non-inverter ACs, it is given that D2 sold twice as many as D3 ⇒ D2 sold 4 and D3 sold 2 ACs of this type.

From condition-2

b) Let us assume, D1 sold "x" window inverter ACs ⇒ Number of split inverter ACs sold is $13-x$ From condition-4

c) Number of split ACs sold by D1 will be "2x"

From condition-5

d) Let us assume 'y' is the number of window ACs sold by D3 & D4 ⇒ D2 sold $3y$ ACs of this type. From condition-7

e) Let us assume 'z' is the number of split inverter ACs sold by D3 and D4 $\Rightarrow$ D2 sold 2z ACs of this type. Let us use a, b, c, d, and e make a table:

D1 Total =			
Split=		Window =	
Inv=13-x	Non - Inv	Inv=x	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=x	Non - Inv= 4
D3 Total =			
Split=		Window =y	
Inv=z	Non - Inv=3	Inv=	Non - Inv= 2
D4 Total =			
Split=		Window =y	
Inv=z	Non - Inv=	Inv=	Non - Inv=0

We know that the total number of window ACs is 15

$\Rightarrow x + 3y + y + y = 15 \Rightarrow x + 5y = 15$, also x and y should be greater than or equal to 2 from condition - 1

$\Rightarrow x = 5$ and $y = 2$ is the only solution.

Filling this in the table:

D1 Total =			
Split=		Window =5	
Inv=8	Non - Inv	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=		Window =2	
Inv=z	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=z	Non - Inv=	Inv=2	Non - Inv=0

Now, Number of split inverter ACs is 36

$\Rightarrow 8 + 2z + z + z = 36 \Rightarrow 4z = 28 \Rightarrow z = 7$.

Filling this and using (5), the number of split AC's sold by D1 is $2 \times 5 = 10$.

D1 Total =15			
Split=10		Window =5	
Inv=8	Non - Inv=2	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=14	Non - Inv=	Inv=2	Non - Inv= 4

D3 Total =			
Split=10		Window =2	
Inv=7	Non - Inv=3	Inv=	Non - Inv= 2
D4 Total			
Split		Window =2	
Inv=7	Non - Inv=	Inv=2	Non - Inv=0

From this table, we see that total number of non-inverter ACs is $9 + 6 = 15$.

Required percentage is 15 out of 60 $\Rightarrow 25\%$.

3. Correct Answer:- 33

Let us assume, A is the total number of AC's sold

$\Rightarrow$ From the information that the total number of ACs sold in the city, 25% were of Window variant

$\Rightarrow$ Window AC's = $A/4$ and Split AC's = $3A/4$

Now, let us assume B is the total number of inverter ACs

$\Rightarrow$ From the information that among the Inverter ACs sold, 20% were of Window variant.

$\Rightarrow$ Window Inverter AC's = $B/5$ and Window Non-Inverter AC's = $4B/5$

TABLE (A)			
Split($3A/4$)		Window ($A/4$)	
Inv ($4B/5$)	Non - Inv	Inv ($B/5$)	Non - Inv

From - Condition-3

$\Rightarrow A/4 - B/5 = 6$ and $4B/5 = 36 \Rightarrow B = 46$ and $A = 60$.

Total=60			
Split=45		Window =15	
Inv=36	Non - Inv=9	Inv=9	Non - Inv=6

Now, from condition-6

a) D1 & D4 sold "0" window Non-inverter ACs $\Rightarrow$ D2 & D3 sold 6 window non-inverter ACs, it is given that D2 sold twice as many as D3 $\Rightarrow$ D2 sold 4 and D3 sold 2 ACs of this type.

From condition-2

b) Let us assume, D1 sold "x" window inverter ACs $\Rightarrow$ Number of split inverter ACs sold is $13-x$ From condition-4

c) Number of split ACs sold by D1 will be "2x"

From condition-5

d) Let us assume 'y' is the number of window ACs sold by D3 & D4 $\Rightarrow$ D2 sold 3y ACs of this type. From condition-7

e) Let us assume 'z' is the number of split inverter ACs sold by D3 and D4 $\Rightarrow$ D2 sold 2z ACs of this type. Let us use a, b, c, d, and e make a table:

D1 Total =			
Split=		Window =x	
Inv=13-x	Non - Inv	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=	Non - Inv= 4
D3 Total =			
Split=		Window =y	
Inv=z	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =y	
Inv=z	Non - Inv=	Inv=2	Non - Inv=0

We know that the total number of window ACs is 15

$\Rightarrow x + 3y + y + y = 15 \Rightarrow x + 5y = 15$, also x and y should be greater than or equal to 2 from condition - 1

$\Rightarrow x = 5$ and $y = 2$ is the only solution.

Filling this in the table:

D1 Total =			
Split=		Window =5	
Inv=8	Non - Inv	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=		Window =2	
Inv=z	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=z	Non - Inv=	Inv=2	Non - Inv=0

Now, Number of split inverter ACs is 36

$\Rightarrow 8 + 2z + z + z = 36 \Rightarrow 4z = 28 \Rightarrow z = 7$.

Filling this and using (5), the number of split AC's sold by D1 is $2*5 = 10$.

D1 Total =15

Split=10		Window =5	
Inv=8	Non - Inv=2	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=14	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=10		Window =2	
Inv=7	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=7	Non - Inv=	Inv=2	Non - Inv=0

Total number of ACs sold by D2 and D4 = $60 - D1 - D3 = 60 - 15 - 12 = 33$.

4. Correct Answer:- A

Let us assume, A is the total number of AC's sold

⇒ From the information that the total number of ACs sold in the city, 25% were of Window variant

⇒ Window AC's = $A/4$ and Split AC's = $3A/4$

Now, let us assume B is the total number of inverter ACs

⇒ From the information that among the Inverter ACs sold, 20% were of Window variant.

⇒ Window Inverter AC's = $B/5$ and Window Non-Inverter AC's = $4B/5$

TABLE (A)			
Split($3A/4$)		Window ($A/4$)	
Inv ($4B/5$)	Non - Inv	Inv ($B/5$)	Non - Inv

From - Condition-3

⇒ $A/4 - B/5 = 6$ and $4B/5 = 36 \Rightarrow B = 46$ and $A = 60$.

Total=60			
Split=45		Window =15	
Inv=36	Non - Inv=9	Inv=9	Non - Inv=6

Now, from condition-6

a) D1 & D4 sold "0" window Non-inverter ACs ⇒ D2 & D3 sold 6 window non-inverter ACs, it is given that D2 sold twice as many as D3 ⇒ D2 sold 4 and D3 sold 2 ACs of this type.

From condition-2

b) Let us assume, D1 sold "x" window inverter ACs ⇒ Number of split inverter ACs sold is $13-x$ From condition-4

c) Number of split ACs sold by D1 will be "2x"

From condition-5

d) Let us assume 'y' is the number of window ACs sold by D3 & D4 $\Rightarrow$ D2 sold 3y ACs of this type. From condition-7

e) Let us assume 'z' is the number of split inverter ACs sold by D3 and D4 $\Rightarrow$ D2 sold 2z ACs of this type. Let us use a, b, c, d, and e make a table:

D1 Total =			
Split=		Window =	
Inv=13-x	Non - Inv	Inv=x	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=x	Non - Inv= 4
D3 Total =			
Split=		Window =y	
Inv=z	Non - Inv=3	Inv=	Non - Inv= 2
D4 Total =			
Split=		Window =y	
Inv=z	Non - Inv=	Inv=	Non - Inv=0

We know that the total number of window ACs is 15

$\Rightarrow x + 3y + y + y = 15 \Rightarrow x + 5y = 15$, also x and y should be greater than or equal to 2 from condition - 1

$\Rightarrow x = 5$ and $y = 2$ is the only solution.

Filling this in the table:

D1 Total =			
Split=		Window =5	
Inv=8	Non - Inv	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =6	
Inv=2z	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=		Window =2	
Inv=z	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=z	Non - Inv=	Inv=2	Non - Inv=0

Now, Number of split inverter ACs is 36

$\Rightarrow 8 + 2z + z + z = 36 \Rightarrow 4z = 28 \Rightarrow z = 7$.

Filling this and using (5), the number of split AC's sold by D1 is $2 \times 5 = 10$.

D1 Total =15			
Split=10		Window =5	
Inv=8	Non - Inv=2	Inv=5	Non - Inv=0

D2 Total =			
Split=		Window =3y	
Inv=14	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=10		Window =2	
Inv=7	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=7	Non - Inv=	Inv=2	Non - Inv=0

We see that D1 & D3 sold 27 ACs together which is less than $60 - 27 = 33$ sold by D2 & D4.

⇒ Option – A is definitely false.

5. Correct Answer:- A

Let us assume, A is the total number of AC's sold

⇒ From the information that the total number of ACs sold in the city, 25% were of Window variant

⇒ Window AC's = $A/4$ and Split AC's = $3A/4$

Now, let us assume B is the total number of inverter ACs

⇒ From the information that among the Inverter ACs sold, 20% were of Window variant.

⇒ Window Inverter AC's = $B/5$ and Window Non-Inverter AC's = $4B/5$

TABLE (A)			
Split($3A/4$)		Window ($A/4$)	
Inv ($4B/5$)	Non - Inv	Inv ($B/5$)	Non - Inv

From - Condition-3

⇒ $A/4 - B/5 = 6$ and $4B/5 = 36$ ⇒ $B = 46$ and $A = 60$.

Total=60			
Split=45		Window =15	
Inv=36	Non - Inv=9	Inv=9	Non - Inv=6

Now, from condition-6

a) D1 & D4 sold "0" window Non-inverter ACs ⇒ D2 & D3 sold 6 window non-inverter ACs, it is given that D2 sold twice as many as D3 ⇒ D2 sold 4 and D3 sold 2 ACs of this type.

From condition-2

b) Let us assume, D1 sold "x" window inverter ACs ⇒ Number of split inverter ACs sold is $13-x$ From condition-4

c) Number of split ACs sold by D1 will be "2x"

From condition-5

d) Let us assume 'y' is the number of window ACs sold by D3 & D4 $\Rightarrow$ D2 sold 3y ACs of this type. From condition-7

e) Let us assume 'z' is the number of split inverter ACs sold by D3 and D4 $\Rightarrow$ D2 sold 2z ACs of this type. Let us use a, b, c, d, and e make a table:

D1 Total =			
Split=		Window =	
Inv=13-x	Non - Inv	Inv=x	Non - Inv=0
D2 Total =			
Split=		Window =3y	
Inv=2z	Non - Inv	Inv=x	Non - Inv= 4
D3 Total =			
Split=		Window =y	
Inv=z	Non - Inv=3	Inv=	Non - Inv= 2
D4 Total =			
Split=		Window =y	
Inv=z	Non - Inv=	Inv=	Non - Inv=0

We know that the total number of window ACs is 15

$\Rightarrow x + 3y + y + y = 15 \Rightarrow x + 5y = 15$, also x and y should be greater than or equal to 2 from condition - 1

$\Rightarrow x = 5$ and $y = 2$ is the only solution.

Filling this in the table:

D1 Total =			
Split=		Window =5	
Inv=8	Non - Inv	Inv=5	Non - Inv=0
D2 Total =			
Split=		Window =6	
Inv=2z	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=		Window =2	
Inv=z	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=z	Non - Inv=	Inv=2	Non - Inv=0

Now, Number of split inverter ACs is 36

$\Rightarrow 8 + 2z + z + z = 36 \Rightarrow 4z = 28 \Rightarrow z = 7$.

Filling this and using (5), the number of split AC's sold by D1 is $2 \times 5 = 10$.

D1 Total =15			
Split=10		Window =5	
Inv=8	Non - Inv=2	Inv=5	Non - Inv=0

D2 Total =			
Split=		Window =3y	
Inv=14	Non - Inv	Inv=2	Non - Inv= 4
D3 Total =			
Split=10		Window =2	
Inv=7	Non - Inv=3	Inv=0	Non - Inv= 2
D4 Total =			
Split=		Window =2	
Inv=7	Non - Inv=	Inv=2	Non - Inv=0

Number of non-inverter ACs sold is $1 + 4 = 5$

6. Correct Answer:- 60

It is given that there are only three female students - Amala, Koli, and Rini - and only three male students - Biman, Mathew, and Shyamal - in a course.

It is also known that the aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

Let the project score component be x , which implies the test score component will be $(1-x)$. The projects are done in groups of two, with each group consisting of a female and a male student, which implies there are three groups for the project. It is also known that both the group members obtain the same score in the project. The score obtained in the project is 40, 60, and 80, respectively.

Therefore, we can say that each female student will consist of a different group, and no two male students or female students will be in the same group.

For the test scores, there are six scores given for six students among which four are distinct and the remaining two are average scores, which is 60. It is also known that the maximum score possible is 80, and the minimum score is 40.

Hence, the distinct scores are 80, 70, 50, and 40 (since all the test scores are multiple of 10), and the remaining two scores are 60, and 60, respectively.

From point 3, we know that Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Hence, we can say the score obtained by Amala in the project is 80, and the score obtained by Koli is 40, which implies the score obtained by Rini in the project is 60. Now, Koli scored 20 more than Amala in the test, which implies the score obtained by Koli can be either 80, 70, or 60.

The score obtained by them is given below:

Students	Test Scores	Project Scores
Amala	40/50/60	80
Koli	60/70/80	40
Rini		60
Biman		
Mathew		
Shyamal		

It is known that Amala had the highest aggregate score, and Shyamal scored the second highest on the test. He scored two more than Koli, but two less than Amala in the aggregate.

Hence, the score obtained by Shyamal in the test is 70, which implies Koli can't score 70 in the test $\Rightarrow$ Amala can't score 50 in the test.

Students	Test Scores	Project Scores
Amala	40/60	80
Koli	60/80	40
Rini		60
Biman		
Mathew		
Shyamal	70	

It is given that Shyamal scored two more than Koli, but two less than Amala in the aggregate. Hence, the aggregate score of Amala is 4 more than Koli. It is also known that Amala had the highest aggregate score.

Case 1: The test score of Amala is 40

Students	Test Scores	Project Scores	Aggregate Scores
Amala	40	80	$40(1-x)+80x$
Koli	60	40	$60(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $40(1 - x) + 80x = 60(1 - x) + 40x + 4$

$$\Rightarrow 60x = 24$$

$$\Rightarrow x = 0.4$$

Hence, the aggregate score obtained by Amala is $40(1 - 0.4) + 80 * 0.4 = 56$

The minimum aggregate score of Shyamal is $70(1 - 0.4) + 40 * 0.4 = 58$, which is greater than Amala.

Hence, Case 1 is not possible.

Hence, the table is given below:

Students	Test Scores	Project Scores	Aggregate Scores
Amala	60	80	$60(1-x)+80x$
Koli	80	40	$80(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $60(1 - x) + 80x = 80(1 - x) + 40x + 4$

$$\Rightarrow 60 + 20x = 84 - 40x$$

$$\Rightarrow 60x = 24 \Rightarrow x = 0.4$$

Hence, the aggregate score of Amala is $60(1 - 0.4) + 80 * 0.4 = 68$, which implies the aggregate score of Shyamal is $(68 - 2) = 66$

Hence, the score obtained by Shyamal in Project is $\{66 - 70*(0.6)\}/0.4 = 60$.

It is also known that Biman scored second lowest in the test, which implies the score of Biman in the test is 50, and he scored the lowest in the aggregate. It is also known that Mathew scored more than Rini in the project, but less than her in the test. Hence, Mathew scored 80 in the project (since Rini scored 60 in the project), and Biman scored 40 in the project.

Similarly, Rini Scored more than Mathew on the test, which implies the score obtained by Rini is 60, and the score obtained by Mathew is 40 in the test.

Hence, the final table will look like this:

Students	Test Scores (T)	Project Scores (P)	Aggregate Score (T * 0.6 + P* 0.4)	Project Pair
Amala	60	80	68	Amala, Mathew
Koli	80	40	64	Koli, Biman
Rini	60	60	60	Rini, Shyamal
Biman	50	40	46	Biman, Koli
Mathew	40	80	56	Mathew, Amala
Shyamal	70	60	66	Shyamal, Rini

Hence, the score obtained by Rini in the project is 60

7. Correct Answer:- B

It is given that there are only three female students - Amala, Koli, and Rini - and only three male students - Biman, Mathew, and Shyamal - in a course.

It is also known that the aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

Let the project score component be x , which implies the test score component will be $(1-x)$. The projects are done in groups of two, with each group consisting of a female and a male student, which implies there are three groups for the project. It is also known that both the group members obtain the same score in the project. The score obtained in the project is 40, 60, and 80, respectively.

Therefore, we can say that each female student will consist of a different group, and no two male students or female students will be in the same group.

For the test scores, there are six scores given for six students among which four are distinct and the remaining two are average scores, which is 60. It is also known that the maximum score possible is 80, and the minimum score is 40.

Hence, the distinct scores are 80, 70, 50, and 40 (since all the test scores are multiple of 10), and the remaining two scores are 60, and 60, respectively.

From point 3, we know that Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Hence, we can say the score obtained by Amala in the project is 80, and the score obtained by Koli is 40, which implies the score obtained by Rini in the project is 60. Now, Koli scored 20 more than Amala in the test, which implies the score obtained by Koli can be either 80, 70, or 60.

The score obtained by them is given below:

Students	Test Scores	Project Scores
Amala	40/50/60	80
Koli	60/70/80	40
Rini		60
Biman		
Mathew		
Shyamal		

It is known that Amala had the highest aggregate score, and Shyamal scored the second highest on the test. He scored two more than Koli, but two less than Amala in the aggregate.

Hence, the score obtained by Shyamal in the test is 70, which implies Koli can't score 70 in the test $\Rightarrow$ Amala can't score 50 in the test.

Students	Test Scores	Project Scores
Amala	40/60	80
Koli	60/80	40
Rini		60
Biman		
Mathew		
Shyamal	70	

It is given that Shyamal scored two more than Koli, but two less than Amala in the aggregate. Hence, the aggregate score of Amala is 4 more than Koli. It is also known that Amala had the highest aggregate score.

Case 1: The test score of Amala is 40

Students	Test Scores	Project Scores	Aggregate Scores
Amala	40	80	$40(1-x)+80x$
Koli	60	40	$60(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $40(1-x) + 80x = 60(1-x) + 40x + 4$

$$\Rightarrow 60x = 24$$

$$\Rightarrow x = 0.4$$

Hence, the aggregate score obtained by Amala is $40(1 - 0.4) + 80 * 0.4 = 56$

The minimum aggregate score of Shyamal is $70(1 - 0.4) + 40 * 0.4 = 58$, which is greater than Amala.

Hence, Case 1 is not possible.

Hence, the table is given below:

Students	Test Scores	Project Scores	Aggregate Scores
Amala	60	80	$60(1-x)+80x$
Koli	80	40	$80(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $60(1 - x) + 80x = 80(1 - x) + 40x + 4$

$$\Rightarrow 60 + 20x = 84 - 40x$$

$$\Rightarrow 60x = 24 \Rightarrow x = 0.4$$

Hence, the aggregate score of Amala is $60(1 - 0.4) + 80 * 0.4 = 68$, which implies the aggregate score of Shyamal is $(68 - 2) = 66$

Hence, the score obtained by Shyamal in Project is $\{66 - 70*(0.6)\}/0.4 = 60$.

It is also known that Biman scored second lowest in the test, which implies the score of Biman in the test is 50, and he scored the lowest in the aggregate. It is also known that Mathew scored more than Rini in the project, but less than her in the test. Hence, Mathew scored 80 in the project (since Rini scored 60 in the project), and Biman scored 40 in the project.

Similarly, Rini Scored more than Mathew on the test, which implies the score obtained by Rini is 60, and the score obtained by Mathew is 40 in the test.

Hence, the final table will look like this:

Students	Test Scores (T)	Project Scores (P)	Aggregate Score (T * 0.6 + P* 0.4)	Project Pair
Amala	60	80	68	Amala, Mathew
Koli	80	40	64	Koli, Biman
Rini	60	60	60	Rini, Shyamal
Biman	50	40	46	Biman, Koli
Mathew	40	80	56	Mathew, Amala
Shyamal	70	60	66	Shyamal, Rini

Hence, the weight of the test component is 0.60

The correct option is B

8. Correct Answer:- A

It is given that there are only three female students - Amala, Koli, and Rini - and only three male students - Biman, Mathew, and Shyamal - in a course.

It is also known that the aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

Let the project score component be x , which implies the test score component will be $(1-x)$. The projects are done in groups of two, with each group consisting of a female and a male student, which implies there are three groups for the project. It is also known that both the group members obtain the same score in the project. The score obtained in the project is 40, 60, and 80, respectively.

Therefore, we can say that each female student will consist of a different group, and no two male students or female students will be in the same group.

For the test scores, there are six scores given for six students among which four are distinct and the remaining two are average scores, which is 60. It is also known that the maximum score possible is 80, and the minimum score is 40.

Hence, the distinct scores are 80, 70, 50, and 40 (since all the test scores are multiple of 10), and the remaining two scores are 60, and 60, respectively.

From point 3, we know that Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Hence, we can say the score obtained by Amala in the project is 80, and the score obtained by Koli is 40, which implies the score obtained by Rini in the project is 60. Now, Koli scored 20 more than Amala in the test, which implies the score obtained by Koli can be either 80, 70, or 60.

The score obtained by them is given below:

Students	Test Scores	Project Scores
Amala	40/50/60	80
Koli	60/70/80	40
Rini		60
Biman		
Mathew		
Shyamal		

It is known that Amala had the highest aggregate score, and Shyamal scored the second highest on the test. He scored two more than Koli, but two less than Amala in the aggregate.

Hence, the score obtained by Shyamal in the test is 70, which implies Koli can't score 70 in the test $\Rightarrow$ Amala can't score 50 in the test.

Students	Test Scores	Project Scores
Amala	40/60	80
Koli	60/80	40
Rini		60

Biman		
Mathew		
Shyamal	70	

It is given that Shyamal scored two more than Koli, but two less than Amala in the aggregate. Hence, the aggregate score of Amala is 4 more than Koli. It is also known that Amala had the highest aggregate score.

Case 1: The test score of Amala is 40

Students	Test Scores	Project Scores	Aggregate Scores
Amala	40	80	$40(1-x)+80x$
Koli	60	40	$60(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $40(1-x) + 80x = 60(1-x) + 40x + 4$

$$\Rightarrow 60x = 24$$

$$\Rightarrow x = 0.4$$

Hence, the aggregate score obtained by Amala is $40(1 - 0.4) + 80 * 0.4 = 56$

The minimum aggregate score of Shyamal is $70(1 - 0.4) + 40 * 0.4 = 58$, which is greater than Amala.

Hence, Case 1 is not possible.

Hence, the table is given below:

Students	Test Scores	Project Scores	Aggregate Scores
Amala	60	80	$60(1-x)+80x$
Koli	80	40	$80(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $60(1-x) + 80x = 80(1-x) + 40x + 4$

$$\Rightarrow 60 + 20x = 84 - 40x$$

$$\Rightarrow 60x = 24 \Rightarrow x = 0.4$$

Hence, the aggregate score of Amala is $60(1 - 0.4) + 80 * 0.4 = 68$, which implies the aggregate score of Shyamal is $(68 - 2) = 66$

Hence, the score obtained by Shyamal in Project is $\{66 - 70*(0.6)\}/0.4 = 60$.

It is also known that Biman scored second lowest in the test, which implies the score of Biman in the test is 50, and he scored the lowest in the aggregate. It is also known that Mathew scored more than Rini in the project, but less than her in the test. Hence, Mathew scored 80 in the project (since Rini scored 60 in the project), and Biman scored 40 in the project.

Similarly, Rini Scored more than Mathew on the test, which implies the score obtained by Rini is 60, and the score obtained by Mathew is 40 in the test.

Hence, the final table will look like this:

Students	Test Scores (T)	Project Scores (P)	Aggregate Score ($T * 0.6 + P * 0.4$)	Project Pair
Amala	60	80	68	Amala, Mathew
Koli	80	40	64	Koli, Biman
Rini	60	60	60	Rini, Shyamal
Biman	50	40	46	Biman, Koli
Mathew	40	80	56	Mathew, Amala
Shyamal	70	60	66	Shyamal, Rini

Hence, the maximum aggregate score obtained is 68. The correct option is A

9. Correct Answer:- 40

It is given that there are only three female students - Amala, Koli, and Rini - and only three male students - Biman, Mathew, and Shyamal - in a course.

It is also known that the aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

Let the project score component be x , which implies the test score component will be $(1-x)$. The projects are done in groups of two, with each group consisting of a female and a male student, which implies there are three groups for the project. It is also known that both the group members obtain the same score in the project. The score obtained in the project is 40, 60, and 80, respectively.

Therefore, we can say that each female student will consist of a different group, and no two male students or female students will be in the same group.

For the test scores, there are six scores given for six students among which four are distinct and the remaining two are average scores, which is 60. It is also known that the maximum score possible is 80, and the minimum score is 40.

Hence, the distinct scores are 80, 70, 50, and 40 (since all the test scores are multiple of 10), and the remaining two scores are 60, and 60, respectively.

From point 3, we know that Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Hence, we can say the score obtained by Amala in the project is 80, and the score obtained by Koli is 40, which implies the score obtained by Rini in the project is 60. Now, Koli scored 20 more than Amala in the test, which implies the score obtained by Koli can be either 80, 70, or 60.

The score obtained by them is given below:

Students	Test Scores	Project Scores
Amala	40/50/60	80
Koli	60/70/80	40
Rini		60
Biman		
Mathew		
Shyamal		

It is known that Amala had the highest aggregate score, and Shyamal scored the second highest on the test. He scored two more than Koli, but two less than Amala in the aggregate.

Hence, the score obtained by Shyamal in the test is 70, which implies Koli can't score 70 in the test $\Rightarrow$ Amala can't score 50 in the test.

Students	Test Scores	Project Scores
Amala	40/60	80
Koli	60/80	40
Rini		60
Biman		
Mathew		
Shyamal	70	

It is given that Shyamal scored two more than Koli, but two less than Amala in the aggregate. Hence, the aggregate score of Amala is 4 more than Koli. It is also known that Amala had the highest aggregate score.

Case 1: The test score of Amala is 40

Students	Test Scores	Project Scores	Aggregate Scores
Amala	40	80	$40(1-x)+80x$
Koli	60	40	$60(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $40(1-x) + 80x = 60(1-x) + 40x + 4$

$$\Rightarrow 60x = 24$$

$$\Rightarrow x = 0.4$$

Hence, the aggregate score obtained by Amala is $40(1 - 0.4) + 80 * 0.4 = 56$

The minimum aggregate score of Shyamal is $70(1 - 0.4) + 40 * 0.4 = 58$, which is greater than Amala.

Hence, Case 1 is not possible.

Hence, the table is given below:

Students	Test Scores	Project Scores	Aggregate Scores
Amala	60	80	$60(1-x)+80x$

Koli	80	40	$80(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $60(1 - x) + 80x = 80(1 - x) + 40x + 4$

$$\Rightarrow 60 + 20x = 84 - 40x$$

$$\Rightarrow 60x = 24 \Rightarrow x = 0.4$$

Hence, the aggregate score of Amala is $60(1 - 0.4) + 80 * 0.4 = 68$, which implies the aggregate score of Shyamal is $(68 - 2) = 66$

Hence, the score obtained by Shyamal in Project is $\{66 - 70*(0.6)\}/0.4 = 60$.

It is also known that Biman scored second lowest in the test, which implies the score of Biman in the test is 50, and he scored the lowest in the aggregate. It is also known that Mathew scored more than Rini in the project, but less than her in the test. Hence, Mathew scored 80 in the project (since Rini scored 60 in the project), and Biman scored 40 in the project.

Similarly, Rini Scored more than Mathew on the test, which implies the score obtained by Rini is 60, and the score obtained by Mathew is 40 in the test.

Hence, the final table will look like this:

Students	Test Scores (T)	Project Scores (P)	Aggregate Score ($T * 0.6 + P * 0.4$)	Project Pair
Amala	60	80	68	Amala, Mathew
Koli	80	40	64	Koli, Biman
Rini	60	60	60	Rini, Shyamal
Biman	50	40	46	Biman, Koli
Mathew	40	80	56	Mathew, Amala
Shyamal	70	60	66	Shyamal, Rini

Hence, the score obtained by Mathew in the test is 40

10. Correct Answer:- C

It is given that there are only three female students - Amala, Koli, and Rini - and only three male students - Biman, Mathew, and Shyamal - in a course.

It is also known that the aggregate score in the course is a weighted average of the two components, with the weights being positive and adding to 1.

Let the project score component be x , which implies the test score component will be $(1-x)$. The projects are done in groups of two, with each group consisting of a female and a male student, which implies there are three groups for the project. It is also known that both the group members obtain the same score in the project. The score obtained in the project is 40, 60, and 80, respectively.

Therefore, we can say that each female student will consist of a different group, and no two male students or female students will be in the same group.

For the test scores, there are six scores given for six students among which four are distinct and the remaining two are average scores, which is 60. It is also known that the maximum score possible is 80, and the minimum score is 40.

Hence, the distinct scores are 80, 70, 50, and 40 (since all the test scores are multiple of 10), and the remaining two scores are 60, and 60, respectively.

From point 3, we know that Amala's score in the project was double that of Koli in the same, but Koli scored 20 more than Amala in the test. Hence, we can say the score obtained by Amala in the project is 80, and the score obtained by Koli is 40, which implies the score obtained by Rini in the project is 60. Now, Koli scored 20 more than Amala in the test, which implies the score obtained by Koli can be either 80, 70, or 60.

The score obtained by them is given below:

Students	Test Scores	Project Scores
Amala	40/50/60	80
Koli	60/70/80	40
Rini		60
Biman		
Mathew		
Shyamal		

It is known that Amala had the highest aggregate score, and Shyamal scored the second highest on the test. He scored two more than Koli, but two less than Amala in the aggregate.

Hence, the score obtained by Shyamal in the test is 70, which implies Koli can't score 70 in the test $\Rightarrow$ Amala can't score 50 in the test.

Students	Test Scores	Project Scores
Amala	40/60	80
Koli	60/80	40
Rini		60
Biman		
Mathew		
Shyamal	70	

It is given that Shyamal scored two more than Koli, but two less than Amala in the aggregate. Hence, the aggregate score of Amala is 4 more than Koli. It is also known that Amala had the highest aggregate score.

Case 1: The test score of Amala is 40

Students	Test Scores	Project Scores	Aggregate Scores
Amala	40	80	$40(1-x)+80x$
Koli	60	40	$60(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $40(1 - x) + 80x = 60(1 - x) + 40x + 4$

$$\Rightarrow 60x = 24$$

$$\Rightarrow x = 0.4$$

Hence, the aggregate score obtained by Amala is $40(1 - 0.4) + 80 * 0.4 = 56$

The minimum aggregate score of Shyamal is $70(1 - 0.4) + 40 * 0.4 = 58$, which is greater than Amala.

Hence, Case 1 is not possible.

Hence, the table is given below:

Students	Test Scores	Project Scores	Aggregate Scores
Amala	60	80	$60(1-x)+80x$
Koli	80	40	$80(1-x)+40x$
Rini		60	
Biman			
Mathew			
Shyamal	70		

Therefore, $60(1 - x) + 80x = 80(1 - x) + 40x + 4$

$$\Rightarrow 60 + 20x = 84 - 40x$$

$$\Rightarrow 60x = 24 \Rightarrow x = 0.4$$

Hence, the aggregate score of Amala is $60(1 - 0.4) + 80 * 0.4 = 68$, which implies the aggregate score of Shyamal is $(68 - 2) = 66$

Hence, the score obtained by Shyamal in Project is $\{66 - 70*(0.6)\}/0.4 = 60$.

It is also known that Biman scored second lowest in the test, which implies the score of Biman in the test is 50, and he scored the lowest in the aggregate. It is also known that Mathew scored more than Rini in the project, but less than her in the test. Hence, Mathew scored 80 in the project (since Rini scored 60 in the project), and Biman scored 40 in the project.

Similarly, Rini Scored more than Mathew on the test, which implies the score obtained by Rini is 60, and the score obtained by Mathew is 40 in the test.

Hence, the final table will look like this:

Students	Test Scores (T)	Project Scores (P)	Aggregate Score (T * 0.6 + P* 0.4)	Project Pair
Amala	60	80	68	Amala, Mathew
Koli	80	40	64	Koli, Biman
Rini	60	60	60	Rini, Shyamal
Biman	50	40	46	Biman, Koli
Mathew	40	80	56	Mathew, Amala
Shyamal	70	60	66	Shyamal, Rini

From the table, we can see that (Amala, Mathew), (Koli, Biman), and (Shyama, Rini) are the three groups for the project.

Hence, the correct option is C

11. Correct Answer:- D

It is given that none of the streets has more than one team traveling along it in any direction at any point in time (point 1), which implies at 9.00 hrs, all 4 teams have chosen different roots from the starting point.

It is also known that Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs, and Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.

It is only possible when Team 2 traveled (A – E) via F, and Team 3 reached station D via station C.

It is also known that Teams 1 and 3 are the only ones in Station E at 10:30 hrs, and Team 4 never passes through Stations B, D, or F. Hence, Team 1 must have chosen the (A – B) root at the starting point, and Team 4 has chosen the (A – E) root at 9.00 hrs.

Hence, Team 1 will reach B at 9.30, and come to A at 10.00 hrs. After that, they will go to E at 10.30 hrs.

Since Team 4 never passes through stations B, D, or F. Team 4 only can pass through stations A, E, and C. Hence, the roots of team 4 to reach station E at 11.30 will be (A – E – A – C – A – E) or (A – E – A – E – A – E).

Since team 1 is already traveling to E from A at 10.00 hrs, at that time team 4 can't choose the same route. Hence, the final route for team 4 to reach E at 11.30 is (A – E – A – C – A – E), and at 12.00 hrs, team 4 will come back to station A.

Hence, the complete route diagram for team 4 is (A – E – A – C – A – E – A)

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E			
2	A	F	E				
3	A	C	D				
4	A	E	A	C	A	E	A

We can see that team 1 is at station E at 10.30 hrs, and they will reach station B at 11.30 hrs, which is only possible when they travel to B via A.

Hence, the complete route diagram for team 1 is (A – B – A – E – A – B – A). It is also known that Teams 1 and 3 are the only ones in station E at 10:30 hrs.

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E				
3	A	C	D	E			
4	A	E	A	C	A	E	A

The only possible root for Team 2 at 10.00 hrs is from E to F since they can't choose E to D because Team 3 is already on this route. Since team 3 has to reach A at 12.00. The only possible combination for team 3 is E – D – C – A

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F			
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

Now the roots for team 2 going back to A is from F at 10.30 hrs (F – A – F – A) or (F – E – F – A).

Hence, the final table is given below:

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F	A/E	F	A
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

From the table, we can see that among the options station E is visited the largest number of times.

12. Correct Answer:- 2

It is given that none of the streets has more than one team traveling along it in any direction at any point in time (point 1), which implies at 9.00 hrs, all 4 teams have chosen different roots from the starting point.

It is also known that Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs, and Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.

It is only possible when Team 2 traveled (A – E) via F, and Team 3 reached station D via station C.

It is also known that Teams 1 and 3 are the only ones in Station E at 10:30 hrs, and Team 4 never passes through Stations B, D, or F. Hence, Team 1 must have chosen the (A – B) root at the starting point, and Team 4 has chosen the (A – E) root at 9.00 hrs.

Hence, Team 1 will reach B at 9.30, and come to A at 10.00 hrs. After that, they will go to E at 10.30 hrs.

Since Team 4 never passes through stations B, D, or F. Team 4 only can pass through stations A, E, and C. Hence, the roots of team 4 to reach station E at 11.30 will be (A – E – A – C – A – E) or (A – E – A – E – A – E).

Since team 1 is already traveling to E from A at 10.00 hrs, at that time team 4 can't choose the same route. Hence, the final route for team 4 to reach E at 11.30 is (A – E – A – C – A – E), and at 12.00 hrs, team 4 will come back to station A.

Hence, the complete route diagram for team 4 is (A – E – A – C – A – E – A)

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E			
2	A	F	E				
3	A	C	D				
4	A	E	A	C	A	E	A

We can see that team 1 is at station E at 10.30 hrs, and they will reach station B at 11.30 hrs, which is only possible when they travel to B via A.

Hence, the complete route diagram for team 1 is (A – B – A – E – A – B – A). It is also known that Teams 1 and 3 are the only ones in station E at 10:30 hrs.

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E				
3	A	C	D	E			
4	A	E	A	C	A	E	A

The only possible root for Team 2 at 10.00 hrs is from E to F since they can't choose E to D because Team 3 is already on this route. Since team 3 has to reach A at 12.00. The only possible combination for team 3 is E – D – C – A

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F			
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

Now the roots for team 2 going back to A is from F at 10.30 hrs (F – A – F – A) or (F – E – F – A).

Hence, the final table is given below:

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F	A/E	F	A
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

From the table, we can see that the teams have passed through B 2 times in this given period.

13. Correct Answer:- A

It is given that none of the streets has more than one team traveling along it in any direction at any point in time (point 1), which implies at 9.00 hrs, all 4 teams have chosen different roots from the starting point.

It is also known that Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs, and Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.

It is only possible when Team 2 traveled (A – E) via F, and Team 3 reached station D via station C.

It is also known that Teams 1 and 3 are the only ones in Station E at 10:30 hrs, and Team 4 never passes through Stations B, D, or F. Hence, Team 1 must have chosen the (A – B) root at the starting point, and Team 4 has chosen the (A – E) root at 9.00 hrs.

Hence, Team 1 will reach B at 9.30, and come to A at 10.00 hrs. After that, they will go to E at 10.30 hrs.

Since Team 4 never passes through stations B, D, or F. Team 4 only can pass through stations A, E, and C. Hence, the roots of team 4 to reach station E at 11.30 will be (A – E – A – C – A – E) or (A – E – A – E – A – E).

Since team 1 is already traveling to E from A at 10.00 hrs, at that time team 4 can't choose the same route. Hence, the final route for team 4 to reach E at 11.30 is (A – E – A – C – A – E), and at 12.00 hrs, team 4 will come back to station A.

Hence, the complete route diagram for team 4 is (A – E – A – C – A – E – A)

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E			
2	A	F	E				
3	A	C	D				
4	A	E	A	C	A	E	A

We can see that team 1 is at station E at 10.30 hrs, and they will reach station B at 11.30 hrs, which is only possible when they travel to B via A.

Hence, the complete route diagram for team 1 is (A – B – A – E – A – B – A). It is also known that Teams 1 and 3 are the only ones in station E at 10:30 hrs.

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E				
3	A	C	D	E			
4	A	E	A	C	A	E	A

The only possible root for Team 2 at 10.00 hrs is from E to F since they can't choose E to D because Team 3 is already on this route. Since team 3 has to reach A at 12.00. The only possible combination for team 3 is E – D – C – A

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F			
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

Now the roots for team 2 going back to A is from F at 10.30 hrs (F – A – F – A) or (F – E – F – A).

Hence, the final table is given below:

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F	A/E	F	A
3	A	C	D	E	D	C	A

4	A	E	A	C	A	E	A
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From the table, we can see that at 10.15 hrs, team 3 is travelling from station D to station E.

The correct option is A.

14. Correct Answer:- 2

It is given that none of the streets has more than one team traveling along it in any direction at any point in time (point 1), which implies at 9.00 hrs, all 4 teams have chosen different roots from the starting point.

It is also known that Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs, and Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.

It is only possible when Team 2 traveled (A – E) via F, and Team 3 reached station D via station C.

It is also known that Teams 1 and 3 are the only ones in Station E at 10:30 hrs, and Team 4 never passes through Stations B, D, or F. Hence, Team 1 must have chosen the (A – B) root at the starting point, and Team 4 has chosen the (A – E) root at 9.00 hrs.

Hence, Team 1 will reach B at 9.30, and come to A at 10.00 hrs. After that, they will go to E at 10.30 hrs.

Since Team 4 never passes through stations B, D, or F. Team 4 only can pass through stations A, E, and C. Hence, the roots of team 4 to reach station E at 11.30 will be (A – E – A – C – A – E) or (A – E – A – E – A – E).

Since team 1 is already traveling to E from A at 10.00 hrs, at that time team 4 can't choose the same route. Hence, the final route for team 4 to reach E at 11.30 is (A – E – A – C – A – E), and at 12.00 hrs, team 4 will come back to station A.

Hence, the complete route diagram for team 4 is (A – E – A – C – A – E – A)

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E			
2	A	F	E				
3	A	C	D				
4	A	E	A	C	A	E	A

We can see that team 1 is at station E at 10.30 hrs, and they will reach station B at 11.30 hrs, which is only possible when they travel to B via A.

Hence, the complete route diagram for team 1 is (A – B – A – E – A – B – A). It is also known that Teams 1 and 3 are the only ones in station E at 10:30 hrs.

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E				
3	A	C	D	E			
4	A	E	A	C	A	E	A

The only possible root for Team 2 at 10.00 hrs is from E to F since they can't choose E to D because Team 3 is already on this route. Since team 3 has to reach A at 12.00. The only possible combination for team 3 is E – D – C – A

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F			
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

Now the roots for team 2 going back to A is from F at 10.30 hrs (F – A – F – A) or (F – E – F – A).

Hence, the final table is given below:

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F	A/E	F	A
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

From the table, we can see that team 4 passed station E 2 times in a day

15. Correct Answer:- C

It is given that none of the streets has more than one team traveling along it in any direction at any point in time (point 1), which implies at 9.00 hrs, all 4 teams have chosen different roots from the starting point.

It is also known that Teams 2 and 3 are the only ones in stations E and D respectively at 10:00 hrs, and Team 1 and Team 4 are the only teams that patrol the street connecting stations A and E.

It is only possible when Team 2 traveled (A – E) via F, and Team 3 reached station D via station C.

It is also known that Teams 1 and 3 are the only ones in Station E at 10:30 hrs, and Team 4 never passes through Stations B, D, or F. Hence, Team 1 must have chosen the (A – B) root at the starting point, and Team 4 has chosen the (A – E) root at 9.00 hrs.

Hence, Team 1 will reach B at 9.30, and come to A at 10.00 hrs. After that, they will go to E at 10.30 hrs.

Since Team 4 never passes through stations B, D, or F. Team 4 only can pass through stations A, E, and C. Hence, the roots of team 4 to reach station E at 11.30 will be (A – E – A – C – A – E) or (A – E – A – E – A – E).

Since team 1 is already traveling to E from A at 10.00 hrs, at that time team 4 can't choose the same route. Hence, the final route for team 4 to reach E at 11.30 is (A – E – A – C – A – E), and at 12.00 hrs, team 4 will come back to station A.

Hence, the complete route diagram for team 4 is (A – E – A – C – A – E – A)

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E			
2	A	F	E				
3	A	C	D				
4	A	E	A	C	A	E	A

We can see that team 1 is at station E at 10.30 hrs, and they will reach station B at 11.30 hrs, which is only possible when they travel to B via A.

Hence, the complete route diagram for team 1 is (A – B – A – E – A – B – A). It is also known that Teams 1 and 3 are the only ones in station E at 10:30 hrs.

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E				
3	A	C	D	E			
4	A	E	A	C	A	E	A

The only possible root for Team 2 at 10.00 hrs is from E to F since they can't choose E to D because Team 3 is already on this route. Since team 3 has to reach A at 12.00. The only possible combination for team 3 is E – D – C – A

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F			
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

Now the roots for team 2 going back to A is from F at 10.30 hrs (F – A – F – A) or (F – E – F – A).

Hence, the final table is given below:

Team	9.00	9.30	10.00	10.30	11.00	11.30	12.00
1	A	B	A	E	A	B	A
2	A	F	E	F	A/E	F	A
3	A	C	D	E	D	C	A
4	A	E	A	C	A	E	A

From the table, we can see that 2 teams (teams 3 and 4) have passed through station C on the given day.

The correct option is C

16. Correct Answer:- 120

Given that in every month, both online and offline registration numbers were multiples of 10. From (2), in Jan, the number of offline registrations was twice that of online registrations.

$\Rightarrow$ If x is number of online registrations $\Rightarrow 2x$ is the number of offline registrations $\Rightarrow 3x$ is the total number of registrations.

According to the data given in the table $\Rightarrow 3x$ should lie between the minimum and maximum total number of registrations. $\Rightarrow x = 40$ (as x should also be a multiple of 10)

$\Rightarrow$ In Jan $\Rightarrow (40, 80)$ are the online and offline registrations respectively.

Similarly from (3) $\Rightarrow$ In Apr (80, 40) are the online and offline registrations respectively.

From – 5, the number of online registrations is highest in May $\Rightarrow$ In may there are 100 online registrations. The lowest possible number of offline registrations is 30 and maximum possible total registrations is 130 $\Rightarrow$ In May (100, 30) are the online and offline registrations respectively.

Let us assume, 'x' to be the number of offline registrations in May = number of online registrations in March.

Let us capture all this data in a table:

Month	Online	Offline	Total
Jan	40	80	120
Feb	y	x	
Mar	x	z	
Apr	80	40	120
May	100	30	130

From the table given in the question, 50 is the median for Offline data

$\Rightarrow$ x should lie between 50 and 80 (included)

For 80 to be the median for the online data $\Rightarrow$ y lie between 80 and 100 (included).

Now, consider Feb $\Rightarrow$ Minimum value of $y + x = 80 + 50 = 130$ (which is the maximum value possible of the total possible registrations)

$\Rightarrow x = 50$ and $y = 80$

Since, 110 is the minimum number of total registrations, the only possibility is in March $\Rightarrow 50 + z = 110 \Rightarrow z = 60$.

Now, filling the complete table we get,

Month	Online	Offline	Total
Jan	40	80	120
Feb	80	50	130
Mar	50	60	110
Apr	80	40	120
May	100	30	130

The total number of registrations in April is 120.

17. Correct Answer:- 40

Given that in every month, both online and offline registration numbers were multiples of 10. From (2), in Jan, the number of offline registrations was twice that of online registrations.

$\Rightarrow$ If x is number of online registrations $\Rightarrow 2x$ is the number of offline registrations $\Rightarrow 3x$ is the total number of registrations.

According to the data given in the table $\Rightarrow 3x$ should lie between the minimum and maximum total number of registrations. $\Rightarrow x = 40$ (as x should also be a multiple of 10)

$\Rightarrow$ In Jan $\Rightarrow (40, 80)$ are the online and offline registrations respectively.

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Mar	x	z	
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From the table given in the question, 50 is the median for Offline data

$\Rightarrow x$ should lie between 50 and 80 (included)

For 80 to be the median for the online data $\Rightarrow y$ lie between 80 and 100 (included).

Now, consider Feb $\Rightarrow$ Minimum value of $y + x = 80 + 50 = 130$ (which is the maximum value possible of the total possible registrations)

$\Rightarrow x = 50$ and $y = 80$

Since, 110 is the minimum number of total registrations, the only possibility is in March $\Rightarrow 50 + z = 110 \Rightarrow z = 60$.

Now, filling the complete table we get,

Month	Online	Offline	Total
Jan	40	80	120
Feb	80	50	130
Mar	50	60	110
Apr	80	40	120
May	100	30	130

The number of online registrations in Jan is 40.

18. Correct Answer:- A

Given that in every month, both online and offline registration numbers were multiples of 10. From (2), in Jan, the number of offline registrations was twice that of online registrations.

$\Rightarrow$ If x is number of online registrations $\Rightarrow 2x$ is the number of offline registrations $\Rightarrow 3x$ is the total number of registrations.

According to the data given in the table $\Rightarrow 3x$ should lie between the minimum and maximum total number of registrations. $\Rightarrow x = 40$ (as x should also be a multiple of 10)

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Now, consider Feb $\Rightarrow$ Minimum value of $y + x = 80 + 50 = 130$ (which is the maximum value possible of the total possible registrations)

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Since, 110 is the minimum number of total registrations, the only possibility is in March $\Rightarrow 50 + z = 110 \Rightarrow z = 60$.

Now, filling the complete table we get,

Month	Online	Offline	Total
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Feb	80	50	130
Mar	50	60	110
Apr	80	40	120

May	100	30	130
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1) In May, there are 30 offline registrations (smallest) $\Rightarrow$ True

2) In Mar, we have smallest number of total registrations $\Rightarrow$ False.

19. Correct Answer:- C

Given that in every month, both online and offline registration numbers were multiples of 10. From (2), in Jan, the number of offline registrations was twice that of online registrations.

$\Rightarrow$ If x is number of online registrations $\Rightarrow 2x$ is the number of offline registrations $\Rightarrow 3x$ is the total number of registrations.

According to the data given in the table $\Rightarrow 3x$ should lie between the minimum and maximum total number of registrations. $\Rightarrow x = 40$ (as x should also be a multiple of 10)

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Now, consider Feb $\Rightarrow$ Minimum value of $y + x = 80 + 50 = 130$ (which is the maximum value possible of the total possible registrations)

$\Rightarrow x = 50$ and $y = 80$

Since, 110 is the minimum number of total registrations, the only possibility is in March $\Rightarrow 50 + z = 110 \Rightarrow z = 60$.

Now, filling the complete table we get,

Month	Online	Offline	Total
Jan	40	80	120
Feb	80	50	130
Mar	50	60	110
Apr	80	40	120
May	100	30	130

The number of offline registrations in Feb is 50.

20. Correct Answer:- C

Given that in every month, both online and offline registration numbers were multiples of 10. From (2), in Jan, the number of offline registrations was twice that of online registrations.

$\Rightarrow$ If x is number of online registrations $\Rightarrow 2x$ is the number of offline registrations $\Rightarrow 3x$ is the total number of registrations.

According to the data given in the table $\Rightarrow 3x$ should lie between the minimum and maximum total number of registrations. $\Rightarrow x = 40$ (as x should also be a multiple of 10)

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$\Rightarrow x = 50$ and $y = 80$

Since, 110 is the minimum number of total registrations, the only possibility is in March $\Rightarrow 50 + z = 110 \Rightarrow z = 60$.

Now, filling the complete table we get,

Month	Online	Offline	Total
Jan	40	80	120
Feb	80	50	130
Mar	50	60	110
Apr	80	40	120
May	100	30	130

Total registrations in Jan = Apr = 120 and Feb = May = 130.

QUANT

1. Correct Answer:- A

Using Base Change rule in this question, we can say that $\frac{\log_3(2^x - 9)}{\log_3 4}$ can be written as

$\log_4(2^x - 9)$ and $\frac{\log_5(2^x + \frac{17}{2})}{\log_5 4}$ can be written as $\log_4(2^x + \frac{17}{2})$.

Also $\frac{1}{2}$ can be written as $\log_4 2$. So we get the new terms as $\log_4 2$, $\log_4(2^x - 9)$ and $\log_4(2^x + \frac{17}{2})$.

Using the concept of AP, we get $2 \times \log_4(2^x - 9) = \log_4 2 + \log_4(2^x + \frac{17}{2})$.

$$\Rightarrow \log_4(2^x - 9)^2 = \log_4[2(2^x + \frac{17}{2})] \Rightarrow (2^x - 9)^2 = 2 \cdot 2^x + 17.$$

If we put $2^x = y$, we get $y^2 - 18y + 81 = 2y + 17 \Rightarrow y^2 - 20y + 64 = 0 \Rightarrow (y - 4)(y - 16) = 0$
 $\Rightarrow y = 4$ or $16 \Rightarrow x = 2$ or 4 .

But $x = 2$ is not valid because then $(2^x - 9)$ will become negative. Hence $x = 4$ is the right solution.

So terms will be $\log_4 2$, $\log_4 7$, $\log_4(\frac{49}{2})$.

$$\Rightarrow \text{common difference} = \log_4 7 - \log_4 2 = \log_4(\frac{7}{2}).$$

2.

Correct Answer:- B

$$x^8 + \frac{1}{x^8} = 47. \text{ Let us put } x^4 = a \Rightarrow a^2 + \frac{1}{a^2} = 47$$

$$\text{Now } (a + \frac{1}{a})^2 = a^2 + \frac{1}{a^2} + 2 \Rightarrow (a + \frac{1}{a})^2 = 49 \Rightarrow a + \frac{1}{a} = 7 \Rightarrow x^4 + \frac{1}{x^4} = 7$$

$$\text{Put } x^2 = b \Rightarrow b^2 + \frac{1}{b^2} = 47. \text{ Now } (b + \frac{1}{b})^2 = b^2 + \frac{1}{b^2} + 2 \Rightarrow (b + \frac{1}{b})^2 = 9$$

$$\Rightarrow b + \frac{1}{b} = 3 \Rightarrow x^2 + \frac{1}{x^2} = 3.$$

$$\text{Also } (x + \frac{1}{x})^2 = x^2 + \frac{1}{x^2} + 2 \Rightarrow (x + \frac{1}{x})^2 = 5 \Rightarrow x + \frac{1}{x} = \sqrt{5}$$

$$\text{Now } (x + \frac{1}{x})^3 = x^3 + \frac{1}{x^3} + 3(x + \frac{1}{x}) \Rightarrow 5\sqrt{5} = x^3 + \frac{1}{x^3} + 3\sqrt{5} \Rightarrow x^3 + \frac{1}{x^3} = 2\sqrt{5}$$

$$\text{Let's put } x^3 = d \Rightarrow d + \frac{1}{d} = 2\sqrt{5}.$$

$$\text{Now } x^9 + \frac{1}{x^9} = d^3 + \frac{1}{d^3} \text{ is to be calculated.}$$

$$(d + \frac{1}{d})^3 = d^3 + \frac{1}{d^3} + 3(d + \frac{1}{d}) \Rightarrow 40\sqrt{5} = d^3 + \frac{1}{d^3} + 6\sqrt{5} \Rightarrow d^3 + \frac{1}{d^3} = 34\sqrt{5}$$

$$\Rightarrow x^9 + \frac{1}{x^9} = 34\sqrt{5}$$

n:-

3. Correct Answer:- B

$x + y = 4$ and $(a + 5)x + (b^2 - 15)y = 8b$ have infinitely many solutions for x and y .

$$\text{Hence } \frac{a+5}{1} = \frac{b^2-15}{1} = \frac{8b}{4}$$

$$\text{So } b^2 - 15 = 2b \Rightarrow b^2 - 2b - 15 = 0$$

$$\Rightarrow (b-5)(b+3) = 0 \Rightarrow b = 5 \text{ or } -3.$$

$$\text{Also } a + 5 = 2b \Rightarrow a + 5 = 10 \text{ or } a + 5 = -6 \Rightarrow a = -11 \text{ or } 5.$$

Maximum value of ab will be when we take $a = -11$ and $b = -3$.

So maximum product = 33.

4. Correct Answer:- A

$8^m = 2^{3m}$ and $8^n = 2^{3n}$. Smallest value of $n + m$ is asked. So we will take m as 1 $\Rightarrow 2^{3m} = 23$.

Since there are 41 integers between 8^m and 8^n , so they would be $2^4, 2^5, \dots$ till 2^{44} .

So 2^{3n} should be $2^{45} \Rightarrow n = 15$. Hence minimum value of $n + m$ is $1 + 15 = 16$.

5. Correct Answer:- 5

Explanation:- $5^{n-1} < 3^{n+1}$. n can take values from 1 to 5 because if $n = 6$, then we get $5^5 < 3^7$ which is wrong as 3125 is greater than 2187. Hence maximum value of n is 5. If we take $n = 5$, we get $3^{5+1} < 2^{5+m} \Rightarrow 729 < 2^{5+m} \Rightarrow m$ has to minimum 5 so that we get $729 < 2^{10}$ or $729 < 1024$.

Hence answer is 5.

6. Correct Answer:- 9

Explanation:- $x^2 + bx + c = 0$. Let its roots be m and n . Hence $m + n = -b$ and $mn = c$.

$$\text{Also } \frac{1}{n} - \frac{1}{m} = \frac{1}{3} \text{ and } \frac{1}{n^2} + \frac{1}{m^2} = \frac{5}{9}$$

$$\text{Now } \left(\frac{1}{n} - \frac{1}{m}\right)^2 = \frac{1}{n^2} + \frac{1}{m^2} - \frac{2}{mn} \Rightarrow \frac{1}{9} = \frac{5}{9} - \frac{2}{mn} \Rightarrow mn = \frac{9}{2}$$

$$\left(\frac{1}{n} + \frac{1}{m}\right)^2 = \frac{1}{n^2} + \frac{1}{m^2} + \frac{2}{mn} \Rightarrow \frac{5}{9} + \frac{4}{9} = 1$$

$$\Rightarrow \frac{1}{n} + \frac{1}{m} = 1 \Rightarrow \frac{m+n}{mn} = 1 \Rightarrow m+n = \frac{9}{2} \Rightarrow b = -\frac{9}{2}$$

$$\text{or } \frac{1}{n} + \frac{1}{m} = -1 \Rightarrow \frac{m+n}{mn} = -1 \Rightarrow m+n = -\frac{9}{2} \Rightarrow b = \frac{9}{2} \Rightarrow b+c = \frac{9}{2} + \frac{9}{2} = 9$$

7. Correct Answer:- 468

Number of factors in number $N = a^p \times b^q \times c^r \dots$ where a, b and c are prime numbers.

As numbers have 15 factors $\Rightarrow a^2 \times b^4$ form is possible only. $\Rightarrow 3^2 \times 2^4 = 144$ and $2^2 \times 3^4 = 324$ are the two numbers. Hence their sum = $144 + 324 = 468$.

8. Correct Answer:- A

Ratio of cocoa : sugar is 3 : 2 and ratio of coffee : sugar is 7 : 3.

Total 5 litres of A has 3 litres of cocoa and 2 litres of sugar

Total 10 litres of B has 7 litres of coffee and 3 litres of sugar

Since A and B are mixed in the ratio 2 : 3, so total 15 litres will be divided in this ratio. Hence we take 6 litres of A and 9 litres of B.

Quantity of cocoa will be $\frac{3}{5} \times 6 = 3.6$ Litres (from A)

Quantity of sugar will be $\frac{2}{5} \times 6 = 2.4$ Litres (from A)

Quantity of coffee will be $\frac{7}{10} \times 9 = 6.3$ Litres (from B)

Quantity of sugar will be $\frac{3}{10} \times 9 = 2.7$ Litres (from B)

Total mixture = $15 + 15 = 30$ litres. Mixture C will have 3.6 litres cocoa, 6.3 litres coffee and $2.4 + 2.7 = 5.1$ litres of sugar.

Hence Required percentage = $5.1/30 \times 100 = 17\%$

9. Correct Answer:- C

Suppose Rahul takes a days, Rakshita takes b days and Gurmeet takes c days.

As per the question, $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} < \frac{1}{7}$ (1) and $\frac{1}{a} + \frac{1}{c} > \frac{1}{15}$ (2).

Also it is given that $6\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right) + \frac{3}{b} = 1$ (3).

Putting the values from equation (1) and (2), we get $6\left(<\frac{1}{7}\right) + \frac{3}{b} = 1 \Rightarrow \frac{3}{b} = 1 - \left(<\frac{1}{7}\right) \Rightarrow$

$\frac{3}{b} > \frac{1}{7} \Rightarrow b < 21$. Also $\frac{9}{b} + \left(>\frac{6}{15}\right) = 1 \Rightarrow \frac{9}{b} = 1 - \left(>\frac{6}{15}\right) \Rightarrow \frac{9}{b} < \frac{9}{15} \Rightarrow b > 15$.

Hence b can be 16, 17 and 20. So 21 is not possible.

10. Correct Answer:- D

Population in 2020 = 100000

It is given that there is $y\%$ decrease in population from 2020 to 2021 and $x\%$ increase in population from 2021 to 2022. Also it is given that population of 2022 is greater than population of 2020.

This means x is greater than y because had it been $x = y$, even then population of 2022 would have been less the population of 2020.

Difference between x and y is 10. Minimum population in 2021 is to be calculated by options::

Option (1) which is 72000 $\Rightarrow y = 28$ and $x = 38 \Rightarrow$ Population in 2022 = $72000 \times 1.38 = 99360$. Hence it is possible.

Option (2) which is 75000 $\Rightarrow y = 25$ and $x = 35 \Rightarrow$ Population in 2022 = $75000 \times 1.35 = 101250$. Hence it is possible.

Option (3) which is 74000 $\Rightarrow y = 26$ and $x = 36 \Rightarrow$ Population in 2022 = $74000 \times 1.36 = 100640$. Hence it is possible.

Option (4) which is 73000 $\Rightarrow y = 27$ and $x = 37 \Rightarrow$ Population in 2022 = $73000 \times 1.37 = 100010$. Since 100010 is minimum of all $\Rightarrow 73000$ is the answer.

11. Correct Answer:- A

CP of cloth = 100 per metre. SP of cloth = 110 per metre. But he gets 5 cm free for 100 cm and also gives 95 cm instead of 100 cm.

So he gets $\frac{5}{100}$ and $\frac{5}{95}$ extra $\Rightarrow \frac{1}{20}$ and $\frac{1}{19}$. So SP = $110 \times (1 + \frac{1}{20})(1 + \frac{1}{19})$

But he gives 5% discount $\Rightarrow$ Net SP = $110 \times \frac{21}{20} \times \frac{20}{19} \times \frac{95}{100} = 115.5$.

So profit = 15.5%

12. Correct Answer:- B

Let the average of A, B and C = $a \Rightarrow A + B + C = 3a$(1)

Also $\frac{A+B+C+D}{4} = a - x$ (2) and $\frac{A+B+C+E}{4} = a + 2x$ (3)

It is given that $E - D = 12 \Rightarrow 3a + D = 4a - 4x \Rightarrow D = a - 4x$. Also $3a + E = 4a + 8x$

$\Rightarrow E = a + 8x$. As $E - D = 12$, so $a + 8x - a + 4x = 12 \Rightarrow x = 1$.

13. Correct Answer:- D

Let x be the speed of 1st boat in still water and y be the speed of river $\Rightarrow$ speed of d/s = $x + y$ and speed of u/s = $x - y$. As per the question, $(x + y)2 = (x - y)3 \Rightarrow x + y : x - y = 3 : 2$. Hence the ratio of speed of d/s : speed of u/s = $3 : 2 \Rightarrow x + y = 3$ and $x - y = 2 \Rightarrow x = 2.5$ and $y = 0.5$ or $x = 5$ and $y = 1 \Rightarrow$ Distance = $(5 + 1)2 = 12$ km.

$$\text{Let the speed of the other boat} = a \Rightarrow \frac{12}{a-1} + \frac{12}{a+1} = 6 \Rightarrow a^2 - 1 = 4a \Rightarrow a^2 - 4a - 1 = 0$$

$$\Rightarrow a = \frac{4 \pm 2\sqrt{5}}{2} = 2 + \sqrt{5}$$

Hence speed of slower boat = $2 + \sqrt{5}$.

Time taken by slower boat to reach from A to B is

$$\frac{12}{2 + \sqrt{5} + 1} = \frac{12}{3 + \sqrt{5}} \times \frac{3 - \sqrt{5}}{3 - \sqrt{5}} = \frac{36 - 12\sqrt{5}}{4} = 9 - 3\sqrt{5} = 3(3 - \sqrt{5})$$

14. Correct Answer:- 36

Let us assume the efficiency of Gautam as G and efficiency of Suhani as S .

Hence we get the equation as $(G + S)20 = (0.6G + 1.5S)20 \Rightarrow 4G = 5S \Rightarrow G : S = 5 : 4$.

So ratio of time taken by G and S will be in the ratio $4 : 5$.

Lets assume Gautam takes $4x$ days and Suhani takes $5x$ days to complete the work

$$1/4x + 1/5x = 1/20 \Rightarrow x = 9$$

Hence faster worker takes 36 days to complete the work.

15. Correct Answer:- 42

$A : B = 3 : 4$. Let us take collection/week of A as $3x$ and B as $4x$

$\Rightarrow$ In 5 weeks, A collected $3x \times 5 = 15x$ which is a multiple of 7.

In 3 weeks, B collected $4x \times 3 = 12x$ which is a multiple of 24 $\Rightarrow x$ is an even multiple of 7

$\Rightarrow$ Lowest possible value of x is 14.

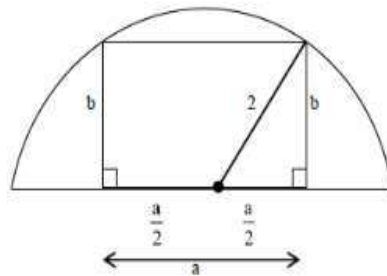
So number of coins collections by A in one week is $3x = 3 \times 14 = 42$.

16. Correct Answer:- 340

Let M be the number of mangoes, B be the number of bananas and A be the number of apples.

So as per the question, $M = 0.4 (M + B + A) \Rightarrow 5M = 2M + 2B + 2A \Rightarrow 3M = 2B + 2A \dots (1)$.

18. Correct Answer:- B



Explanation:-

Let length of the rectangle be a and breadth be b .

So we get the equation as $2^2 = b^2 + \left(\frac{a}{2}\right)^2$

$$\Rightarrow \frac{a^2}{4} + b^2 = 4 \dots\dots\dots (1).$$

Area of rectangle = ab which can be written as twice of

Geometric Mean of $\frac{a^2}{4}$ and b^2 which is equal to $2\sqrt{\frac{a^2}{4} \times b^2}$

For maximum area, equality condition of AM and GM should be satisfied

$$\Rightarrow \frac{\frac{a^2}{4} + b^2}{2} = \sqrt{\frac{a^2}{4} \times b^2} \Rightarrow \frac{a^2}{4} + b^2 = 2\sqrt{\frac{a^2}{4} \times b^2}$$

Squaring both sides,

$$\left(\frac{a^2}{4} + b^2\right)^2 = 4\left(\frac{a^2 \times b^2}{4}\right) \Rightarrow \frac{a^2}{16} + b^4 + \frac{2a^2b^2}{4} = a^2b^2 \Rightarrow \frac{a^2}{16} + b^4 = \frac{a^2b^2}{2}$$

$$\Rightarrow a^4 + 16b^4 = 8a^2b^2 \Rightarrow a^4 - 8a^2b^2 + 16b^4 = 0 \Rightarrow (a^2 - 4b^2)^2 = 0 \Rightarrow a^2 = 4b^2.$$

$$\text{Hence } \frac{a^2}{b^2} = 4 \Rightarrow \frac{a}{b} = 2 \Rightarrow a : b = 2 : 1$$

19. Correct Answer: 54

Let the number of sides be n .

$$\text{Hence, } 180 - 360/n - 360/n = 120 \Rightarrow 720/n = 60 \Rightarrow n = 12.$$

$$\text{No. of diagonals} = nC_2 - n, \text{ putting } n = 12, \text{ we get } 12C_2 - 12 = 66 - 12 = 54.$$

20. Correct Answer:- C

Given sequence is $1 + (1 + \frac{1}{3})\frac{1}{4} + (1 + \frac{1}{3} + \frac{1}{9})\frac{1}{16} + (1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27})\frac{1}{64} + \dots$

Which can be written as

$$1(1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \dots) + \frac{1}{3}(\frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \dots) + \frac{1}{9}(\frac{1}{16} + \frac{1}{64} + \frac{1}{256} + \dots)$$

Explanation:-

These are 3 different infinite GPs whose sums will be the first 3 terms of the final GP whose sum is required.

Hence 1st three terms of the final GP are $S_1 = \frac{1}{1 - \frac{1}{4}} = \frac{4}{3}$.

$$S_2 = \frac{1}{3} \left(\frac{\frac{1}{4}}{1 - \frac{1}{4}} \right) = \frac{1}{9} \text{ and } S_3 = \frac{1}{9} \left(\frac{\frac{1}{16}}{1 - \frac{1}{4}} \right) = \frac{1}{108}$$

Hence final sequence becomes $\frac{4}{3} + \frac{1}{9} + \frac{1}{108} + \dots$

It is an infinite GP with 1st term $\frac{4}{3}$ and $r = \frac{1}{12}$

$$\Rightarrow \text{Final answer} = \frac{\frac{4}{3}}{1 - \frac{1}{12}} = \frac{4}{3} \times \frac{12}{11} = \frac{16}{11}$$

21. Correct Answer:- B

$$a_n = 46 + 8n, b_n = 98 + 4n.$$

Putting the values of n as 1, 2, 3..... in the 1st sequence we get values as 54, 62, 70.....

Putting the values of n as 1, 2, 3..... in the 2nd sequence we get values as 102, 106, 110, 114.....

So the common terms to both the sequences is 102, 110, 118.....

But last term in the 1st sequence is 846 when we put n = 100 and last term in the 2nd sequence is 498 when we put n = 100.

Also the common sequence is 102, 110..... is of the form $8k + 6$. Hence last number of this form in this sequence is 494.

So we get the final sequence as 102, 110, 118,494. Number of terms in this sequence: $102 + (n - 1) 8 = 494 \Rightarrow n = 50$. Sum of these terms = $50/2 (102 + 494) = 14900$.

22. H Correct Answer:- 3

Given that $f(3x+2y, 2x-5y) = 19x$.

Multiplying 1st function by 5 and 2nd function by 2, we get $15x + 10y$ and $4x - 10y$.

Now on adding these 2 functions, we get $15x + 10y + 4x - 10y = 19x$.

Using the same operation for $f(x, 2x)$, we get $5x + 2(2x) = 27 \Rightarrow 9x = 27 \Rightarrow x = 3$