

CAT 2020

SHIFT-2

QUESTION
PAPER

Time: 120 Mins

Total Marks: 228

Important Instructions

- (i) Total Number of Questions: 76
- (ii) Number of Question in Verbal Ability and Reading Comprehension (VARC): 26
- (iii) Number of Question in Data Interpretation and Logical Reasoning (DILR): 24
- (iv) Number of Question in Quantitative Ability (QA): 26
- (v) 40 Minutes are allotted to attempt each section
- (vi) 4 answer options for each MCQ type question
- (vii) Answers are typed in the given space on the computer screen for Non-MCQ.
- (viii) For each correct answer: + 3 marks
- (ix) Negative marking (Applicable for wrong answers in MCQs): - 1 mark

Verbal Ability and Reading Comprehension (VARC)

Passage 1

Directions (Q. 1 to 5): Read the following passage carefully and answer the questions that follows.

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

In a low-carbon world, renewable energy technologies are hot business. For investors looking to redirect funds, wind turbines and solar panels, among other technologies, seem a straightforward choice. But renewables need to be further scrutinized before being championed as forging a path toward a low-carbon future. Both the direct and indirect impacts of renewable energy must be examined to ensure that a climate-smart future does not intensify social and environmental harm. As renewable energy production requires land, water, and labor, among other inputs, it imposes costs on people and the environment. Hydropower projects, for instance, have led to community dispossession and exclusion ... Renewable energy supply chains are also intertwined with mining, and their technologies contribute to growing levels of electronic waste. . . Furthermore, although renewable energy can be produced and distributed through small-scale, local systems, such an approach might not generate the high returns on investment needed to attract capital. Although an emerging sector, renewables are enmeshed in long-standing resource extraction through their dependence on minerals and metals... Scholars document the negative consequences of mining ... even for mining operations that commit to socially responsible practices[:] “many of the world’s largest reservoirs of minerals like cobalt, copper, lithium, [and] rare earth minerals—the ones needed for renewable technologies—”are found in fragile states and under communities of marginalized peoples in Africa, Asia, and Latin America.” Since the demand for metals and minerals will increase substantially in a renewable-powered future . . . this intensification could exacerbate the existing consequences of extractive activities.

Among the connections between climate change and waste, O’Neill . . . highlights that “devices developed to reduce our carbon footprint, such as lithium batteries for hybrid and electric cars or solar panels[,] become potentially dangerous electronic waste at the end of their productive life.” The disposal of toxic waste has long perpetuated social injustice through the flows of waste to the Global South and to marginalized communities in the Global North . . .

While renewable energy is a more recent addition to financial portfolios, investments in the sector must be considered in light of our understanding of capital accumulation. As agricultural finance reveals, the concentration of control of corporate activity facilitates profit generation. For some climate activists, the promise of renewables rests on their ability not only to reduce emissions but also to provide distributed, democratized access to energy . . . But Burke and Stephens . . . caution that “renewable energy systems offer a possibility but not a certainty for more democratic energy futures.” Small-scale, distributed forms of energy are only highly profitable to institutional investors if control is consolidated somewhere in the financial chain. Renewable energy can be produced at the household or neighborhood level. However, such small-scale, localized production is unlikely to generate high returns for investors. For financial growth to be sustained and expanded by the renewable sector, production and trade in renewable energy technologies will need to be highly concentrated, and large asset management firms will likely drive those developments.

- Q. 1.** Which one of the following statements best captures the main argument of the last paragraph of the passage?
1. Renewable energy produced at the household or neighbourhood level is more efficient than mass-produced forms of energy.
 2. The development of the renewable energy sector is a double-edged sword.
 3. Renewable energy systems are not democratic unless they are corporate-controlled.
 4. Most forms of renewable energy are not profitable investments for institutional investors.
- Q. 2.** All of the following statements, if true, could be seen as supporting the arguments in the passage, EXCEPT:
1. Marginalised people in Africa, Asia and Latin America have often been the main sufferers of corporate mineral extraction projects.
 2. The example of agricultural finance helps us to see how to concentrate corporate activity in the renewable energy sector.
 3. The possible negative impacts of renewable energy need to be studied before it can be offered as a financial investment opportunity.
 4. One reason for the perpetuation of social injustice lies in the problem of the disposal of toxic waste.
- Q. 3.** Which one of the following statements, if false, could be seen as best supporting the arguments in the passage?
1. Renewable energy systems are as expensive as non-renewable energy systems.
 2. Renewable energy systems have little or no environmental impact.
 3. Renewable energy systems are not as profitable as non-renewable energy systems.
 4. The production and distribution of renewable energy through small-scale, local systems is not economically sustainable.
- Q. 4.** Based on the passage, we can infer that the author would be most supportive of which one of the following practices?
1. Encouragement for the development of more environment-friendly carbon-based fuels.
 2. The study of the coexistence of marginalised people with their environments.
 3. The localised, small-scale development of renewable energy systems.
 4. More stringent global policies and regulations to ensure a more just system of toxic waste disposal.
- Q. 5.** Which one of the following statements, if true, could be an accurate inference from the first paragraph of the passage?
1. The author has reservations about the consequences of non-renewable energy systems.
 2. The author’s only reservation is about the profitability of renewable energy systems.
 3. The author has reservations about the consequences of renewable energy systems.
 4. The author does not think renewable energy systems can be as efficient as non-renewable energy systems.

Passage 2

Directions (Q. 6 to 10): Read the following passage carefully and answer the questions that follows.

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

The claims advanced here may be condensed into two assertions: [first, that visual] culture is what images, acts of seeing, and attendant intellectual, emotional, and perceptual sensibilities do to build, maintain, or transform the worlds in which people live. [And second, that the] study of visual culture is the analysis and interpretation of images and the ways of seeing (or gazes) that configure the agents, practices, conceptualities, and institutions that put images to work. . . .

Accordingly, the study of visual culture should be characterized by several concerns. First, scholars of visual culture need to examine any and all imagery — high and low, art and nonart. . . They must not restrict themselves to objects of a particular beauty or aesthetic value. Indeed, any kind of imagery may be found to offer up evidence of the visual construction of reality. . .

Second, the study of visual culture must scrutinize visual practice as much as images themselves, asking what images do when they are put to use. If scholars engaged in this enterprise inquire what makes an image beautiful or why this image or that constitutes a masterpiece or a work of genius, they should do so with the purpose of investigating an artist's or a work's contribution to the experience of beauty, taste, value, or genius. No amount of social analysis can account fully for the existence of Michelangelo or Leonardo. They were unique creators of images that changed the way their contemporaries thought and felt and have continued to shape the history of art, artists, museums, feeling and aesthetic value. But study of the critical, artistic, and popular reception of works by such artists as Michelangelo and Leonardo can shed important light on the meaning of these artists and their works for many different people. And the history of meaning-making has a great deal to do with how scholars as well as lay audiences today understand these artists and their achievements.

Third, scholars studying visual culture might properly focus their interpretative work on lifeworlds by examining images, practices, visual technologies, taste, and artistic style as constitutive of social relations. The task is to understand how artifacts contribute to the construction of a world. . . . Important methodological implications follow: ethnography and reception studies become productive forms of gathering information, since these move beyond the image as a closed and fixed meaning-event. . .

Fourth, scholars may learn a great deal when they scrutinize the constituents of vision, that is, the structures of perception as a physiological process as well as the epistemological frameworks informing a system of visual representation. Vision is a socially and a biologically constructed operation, depending on the design of the human body and how it engages the interpretive devices developed by a culture in order to see intelligibly. . . . Seeing . . . operates on the foundation of covenants with images that establish the conditions for meaningful visual experience.

Finally, the scholar of visual culture seeks to regard images as evidence for explanation, not as epiphenomena.

Q. 6. Which set of keywords below most closely captures the arguments of the passage?

1. Scholars, Social Analysis, Michelangelo and Leonardo, Interpretive Devices.
2. Imagery, Visual Practices, Lifeworlds, Structures of Perception.
3. Visual Construction of Reality, Work of Genius, Ethnography, Epiphenomena.
4. Visual Culture, Aesthetic Value, Lay Audience, Visual Experience.

Q. 7. All of the following statements may be considered valid inferences from the passage, EXCEPT :

1. Artifacts are meaningful precisely because they help to construct the meanings of the world for us.

2. Visual culture is not just about how we see, but also about how our visual practices can impact and change the world.

3. Understanding the structures of perception is an important part of understanding how visual cultures work.

4. Studying visual culture requires institutional structures without which the structures of perception cannot be analysed.

Q. 8. Which one of the following best describes the word "epiphenomena" in the last sentence of the passage?

1. Overarching collections of images.

2. Phenomena amenable to analysis.

3. Visual phenomena of epic proportions.

4. Phenomena supplemental to the evidence.

Q. 9. “No amount of social analysis can account fully for the existence of Michelangelo or Leonardo.” In light of the passage, which one of the following interpretations of this sentence is the most accurate?

1. Michelangelo or Leonardo cannot be subjected to social analysis because of their genius.
2. No analyses exist of Michelangelo’s or Leonardo’s social accounts.
3. Social analytical accounts of people like Michelangelo or Leonardo cannot explain their genius.
4. Socially existing beings cannot be analysed, unlike the art of Michelangelo or Leonardo which can.

Q. 10. “Seeing . . . operates on the foundation of covenants with images that establish

the conditions for meaningful visual experience.” In light of the passage, which one of the following statements best conveys the meaning of this sentence?

1. Sight as a meaningful visual experience is possible when there is a foundational condition established in images of covenants.
2. The way we experience sight is through images operated on by meaningful covenants.
3. Images are meaningful visual experiences when they have a foundation of covenants seeing them.
4. Sight becomes a meaningful visual experience because of covenants of meaningfulness that we establish with the images we see.

Passage 3

Directions (Q. 11 to 14): Read the following passage carefully and answer the questions that follows.

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

Aggression is any behavior that is directed toward injuring, harming, or inflicting pain on another living being or group of beings. Generally, the victim(s) of aggression must wish to avoid such behavior in order for it to be considered true aggression. Aggression is also categorized according to its ultimate intent. Hostile aggression is an aggressive act that results from anger, and is intended to inflict pain or injury because of that anger. Instrumental aggression is an aggressive act that is regarded as a means to an end other than pain or injury. For example, an enemy combatant may be subjected to torture in order to extract useful intelligence, though those inflicting the torture may have no real feelings of anger or animosity toward their subject. The concept of aggression is very broad, and includes many categories of behavior (e.g., verbal, aggression, street crime, child abuse, spouse abuse, group conflict, war, etc.). A number of theories and models of aggression have arisen to explain these diverse forms of behavior, and these theories/models tend to be categorized according to their specific focus. The most common system of categorization groups the various approaches to aggression into three separate areas, based upon the three key variables that are present whenever any aggressive act or set of acts is committed. The first variable is the aggressor him/herself. The second is the social situation or circumstance in which the aggressive act(s) occur. The third variable is the target or victim of aggression.

Regarding theories and research on the aggressor, the fundamental focus is on the factors that lead an individual (or group) to commit aggressive acts. At the most basic level, some argue that aggressive urges and actions are the result of inborn, biological factors. Sigmund Freud (1930) proposed that all individuals are born with a death instinct that predisposes us to a variety of aggressive behaviors, including suicide (self directed aggression) and mental illness (possibly due to an unhealthy or unnatural suppression of aggressive urges). Other influential perspectives supporting a biological basis for aggression conclude that humans evolved with an abnormally low neural inhibition of aggressive impulses (in comparison to other species), and that humans possess a powerful instinct for property accumulation and territorialism. It is proposed that this instinct accounts for hostile behaviors ranging from minor street crime to world wars. Hormonal factors also appear to play a significant role in fostering aggressive tendencies. For example, the hormone testosterone has been shown to increase aggressive behaviors when injected into animals. Men and women convicted of violent crimes also possess significantly higher levels of testosterone than men and women convicted of non violent crimes. Numerous studies comparing different age groups, racial/ethnic groups, and cultures also indicate that men, overall, are more likely to engage in a variety of aggressive behaviors (e.g., sexual assault, aggravated assault, etc.) than women. One explanation for higher levels of aggression in men is based on the assumption that, on average, men have higher levels of testosterone than women.

Q. 11. All of the following statements can be seen as logically implied by the arguments of the passage EXCEPT:

1. If the alleged aggressive act is not sought to be avoided, it cannot really be considered aggression.
2. The Freudian theory of suicide as self-inflicted aggression implies that an aggressive act need not be sought to be avoided in order for it to be considered aggression.
3. A common theory of aggression is that it is the result of an abnormally low neural regulation of testosterone.
4. Freud's theory of aggression proposes that aggression results from the suppression of aggressive urges.

Q. 12. The author identifies three essential factors according to which theories of aggression are most commonly categorised. Which of the following options is closest to the factors identified by the author?

1. Extreme – Moderate – Mild.
2. Psychologically – Sociologically – Medically.
3. Hostile – Instrumental – Hormonal.
4. Aggressor – Circumstances of aggression – Victim.

Q. 13. "[A]n enemy combatant may be subjected to torture in order to extract useful intelligence, though those inflicting the torture may have

no real feelings of anger or animosity toward their subject." Which one of the following best explicates the larger point being made by the author here?

1. Information revealed by subjecting an enemy combatant to torture is not always reliable because of the animosity involved.
2. The use of torture to extract information is most effective when the torturer is not emotionally involved in the torture.
3. In certain kinds of aggression, inflicting pain is not the objective, and is no more than a utilitarian means to achieve another end.
4. When an enemy combatant refuses to reveal information, the use of torture can sometimes involve real feelings of hostility.

Q. 14. The author discusses all of the following arguments in the passage EXCEPT that:

1. Aggression in most societies is kept under control through moderating the death instinct identified by Freud.
2. The nature of aggression can vary depending on several factors, including intent.
3. Men in general are believed to be more hormonally driven to exhibit violence than women.
4. Several studies indicate that aggression may have roots in the biological condition of humanity.

Passage 4

Directions (Q. 15 to 18): Read the following passage carefully and answer the questions that follows.

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

174 incidents of piracy were reported to the International Maritime Bureau last year, with Somali pirates responsible for only three. The rest ranged from the discreet theft of coils of rope in the Yellow Sea to the notoriously ferocious Nigerian gunmen attacking and hijacking oil tankers in the Gulf of Guinea, as well as armed robbery off Singapore and the Venezuelan coast and kidnapping in the Sundarbans in the Bay of Bengal. For [Dr. Peter] Lehr, an expert on modern-day piracy, the phenomenon's history should be a source of instruction rather than entertainment, piracy past offering lessons for piracy present. . . .

But. . . where does piracy begin or end? According to St Augustine, a corsair captain once told Alexander the Great that in the forceful acquisition of power and wealth at sea, the difference between an emperor and a pirate was simply one of scale. By this logic, European empire-builders were the most successful pirates of all time. A more eclectic history might have included the conquistadors, Vasco da Gama and the East India Company. But Lehr sticks to the disorganised small fry, making comparisons with the renegades of today possible.

The main motive for piracy has always been a combination of need and greed. Why toil away as a starving peasant in the 16th century when a successful pirate made up to £4,000 on each raid? Anyone could turn to freebooting if the rewards were worth the risk. . . .

Increased globalisation has done more to encourage piracy than suppress it. European colonialism weakened delicate balances of power, leading to an influx of opportunists on the high seas. A rise in global shipping has meant rich pickings for freebooters. Lehr writes: "it quickly becomes clear that in those parts of the world that have not profited from globalisation and modernisation, and where abject poverty and the daily struggle for survival are still a reality, the root causes of piracy are still the same as they were a couple of hundred years ago. . . .

Modern pirate prevention has failed. After the French yacht *Le Gonant* was ransomed for \$2 million in 2008, opportunists from all over Somalia flocked to the coast for a piece of the action. . . . A consistent rule, even today, is there are never enough warships to patrol pirate-infested waters. Such ships are costly and only solve the problem temporarily; Somali piracy is bound to return as soon as the warships are withdrawn. Robot shipping, eliminating hostages, has been proposed as a possible solution; but as Lehr points out, this will only make pirates switch their targets to smaller carriers unable to afford the technology.

His advice isn't new. Proposals to end illegal fishing are often advanced but they are difficult to enforce. Investment in local welfare put a halt to Malaysian piracy in the 1970s, but was dependent on money somehow filtering through a corrupt bureaucracy to the poor on the periphery. Diplomatic initiatives against piracy are plagued by mutual distrust: the Russians execute pirates, while the EU and US are reluctant to capture them for fear they'll claim asylum.

Q. 15. "Why toil away as a starving peasant in the 16th century when a successful pirate made up to £4,000 on each raid?" In this sentence, the author's tone can best be described as being:

1. Ironic, about the reasons why so many took to piracy in medieval times.
2. Analytical, to explain the contrasts between peasant and pirate life in medieval England.
3. Indignant, at the scale of wealth successful pirates could amass in medieval times.
4. Facetious, about the hardships of peasant life in medieval England.

Q. 16. We can deduce that the author believes that piracy can best be controlled in the long run:

1. If we eliminate poverty and income disparities in affected regions.
2. Through lucrative welfare schemes to improve the lives of people in affected regions.
3. Through international cooperation in enforcing stringent deterrents.
4. Through the extensive deployment of technology to track ships and cargo.

Q. 17. "A more eclectic history might have included the conquistadors, Vasco da Gama and the East India Company. But Lehr sticks to the disorganised small fry . . ." From

this statement we can infer that the author believes that:

1. The disorganised piracy of today is no match for the organised piracy of the past.
2. Vasco da Gama and the East India Company laid the ground for modern piracy.
3. Colonialism should be considered an organised form of piracy.
4. Lehr does not assign adequate blame to empire builders for their past deeds.

Q. 18. The author ascribes the rise in piracy today to all of the following factors EXCEPT:

1. The high rewards via ransoms for successful piracy attempts.
2. The growth in international shipping with globalisation.
3. Decreased surveillance of the high seas.
4. Colonialism's disruption of historic ties among countries.

Q. 19. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

1. You can observe the truth of this in every e-business model ever constructed: monopolise and protect data.

2. Economists and technologists believe that a new kind of capitalism is being created - different from industrial capitalism as was merchant capitalism.
3. In 1962, Kenneth Arrow, the guru of mainstream economics, said that in a free market economy the purpose of inventing things is to create intellectual property rights.
4. There is, alongside the world of monopolised information and surveillance, a different dynamic growing up: information as a social good, incapable of being owned or exploited or priced.
5. Yet information is abundant. Information goods are freely replicable. Once a thing is made, it can be copied and pasted infinitely.

Q. 20. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

All humans make decisions based on one or a combination of two factors. This is either intuition or information. Decisions made through intuition are usually fast, people don't even think about the problem. It is quite philosophical, meaning that someone who made a decision based on intuition will have difficulty explaining the reasoning behind it. The decision-maker would often utilize her senses in drawing conclusions, which again is based on some experience in the field of study. On the other side of the spectrum, we have decisions made based on information. These decisions are rational — it is based on facts and figures, which unfortunately also means that it can be quite slow. The decision-maker would frequently use reports, analyses, and indicators to form her conclusion. This methodology results in accurate, quantifiable decisions, meaning that a person can clearly explain the rationale behind it.

1. It is better to make decisions based on information because it is more accurate, and the rationale behind it can be explained.
2. Decisions based on intuition and information result in differential speed and ability to provide a rationale.

3. We make decisions based on intuition or information on the basis of the time available.
4. While decisions based on intuition can be made fast, the reasons that led to these cannot be spelt out.

Q. 21. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. While you might think that you see or are aware of all the changes that happen in your immediate environment, there is simply too much information for your brain to fully process everything.
2. Psychologists use the term 'change blindness' to describe this tendency of people to be blind to changes though they are in the immediate environment.
3. It cannot be aware of every single thing that happens in the world around you.
4. Sometimes big shifts happen in front of your eyes and you are not at all aware of these changes.

Q. 22. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. But the attention of the layman, not surprisingly, has been captured by the atom bomb, although there is at least a chance that it may never be used again.
2. Of all the changes introduced by man into the household of nature, [controlled] large-scale nuclear fission is undoubtedly the most dangerous and most profound.
3. The danger to humanity created by the so-called peaceful uses of atomic energy may, however, be much greater.
4. The resultant ionizing radiation has become the most serious agent of pollution of the environment and the greatest threat to man's survival on earth.

Q. 23. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

1. The victim's trauma after assault rarely gets the attention that we lavish on the moment of damage that divided the survivor from a less encumbered past.
2. One thing we often do with narratives of sexual assault is sort their respective parties into different temporalities: it seems we are interested in perpetrators' futures and victims' pasts.
3. One result is that we don't have much of a vocabulary for what happens in a victim's life after the painful past has been excavated, even when our shared language gestures toward the future, as the term "survivor" does.
4. Even the most charitable questions asked about the victims seem to focus on the past, in pursuit of understanding or of corroboration of painful details.
5. As more and more stories of sexual assault have been made public in the last two years, the genre of their telling has exploded — crimes have a tendency to become not just stories but genres.

Q. 24. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

The rural-urban continuum and the heterogeneity of urban settings pose an obvious challenge to identifying urban areas and measuring urbanization rates in a consistent way within and across countries. An objective methodology for distinguishing between urban and rural areas that is based on one or two metrics with fixed thresholds may not adequately capture the wide diversity of places. A richer combination of criteria would better describe the multifaceted nature of a city's function and its environment, but the joint interpretation of these criteria may require an element of human judgment.

1. Current methodologies used to define urban and rural areas are no longer relevant to our being able to study trends in urbanisation.

2. Distinguishing between urban and rural areas might call for some judgement on the objective methodology being used to define a city's functions.

3. With the diversity of urban landscapes, measurable criteria for defining urban areas may need to be supplemented with human judgement.

4. The difficulty of accurately identifying urban areas means that we need to create a rich combination of criteria that can be applied to all urban areas.

Q. 25. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

With the Treaty of Westphalia, the papacy had been confined to ecclesiastical functions, and the doctrine of sovereign equality reigned. What political theory could then explain the origin and justify the functions of secular political order? In his *Leviathan*, published in 1651, three years after the Peace of Westphalia, Thomas Hobbes provided such a theory. He imagined a "state of nature" in the past when the absence of authority produced a "war of all against all." To escape such intolerable insecurity, he theorized, people delivered their rights to a sovereign power in return for the sovereign's provision of security for all within the state's border. The sovereign state's monopoly on power was established as the only way to overcome the perpetual fear of violent death and war.

1. Thomas Hobbes theorized that sovereign states emerged out of people's voluntary desire to overcome the sense of insecurity and establish the doctrine of sovereign equality.

2. Thomas Hobbes theorized the emergence of sovereign states based on a transactional relationship between people and sovereign state that was necessitated by a sense of insecurity of the people.

3. Thomas Hobbes theorized the voluntary surrender of rights by people as essential for emergence of sovereign states.

4. Thomas Hobbes theorized the emergence of sovereign states as a form of transactional governance to limit the power of the papacy.

Q. 26. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. It also has four movable auxiliary telescopes 1.8 m in diameter.
2. Completed in 2006, the Very Large Telescope (VLT) has four reflecting

telescopes, 8.2 m in diameter that can observe objects 4 billion times weaker than can normally be seen with the naked eye.

3. This configuration enables one to distinguish an astronaut on the Moon.
4. When these are combined with the large telescopes, they produce what is called interferometry: a simulation of the power of a mirror 16 m in diameter and the resolution of a telescope of 200 m.

Data Interpretation and Logical Reasoning (DILR)

Passage 1

Directions (Q. 1 to 4): Read the following passage carefully and answer the questions that follows.

Twenty five coloured beads are to be arranged in a grid comprising of five rows and five columns. Each cell in the grid must contain exactly one bead. Each bead is coloured either Red, Blue or Green.

While arranging the beads along any of the five rows or along any of the five columns, the rules given below are to be followed:

1. Two adjacent beads along the same row or column are always of different colours.
2. There is at least one Green bead between any two Blue beads along the same row or column.
3. There is at least one Blue and at least one Green bead between any two Red beads along the same row or column.

Every unique, complete arrangement of twenty five beads is called a configuration.

- Q. 1.** The total number of possible configurations using beads of only two colours is:
- Q. 2.** What is the maximum possible number of Red beads that can appear in any configuration?
- Q. 3.** What is the minimum number of Blue beads in any configuration?
- Q. 4.** Two Red beads have been placed in 'second row, third column' and 'third row, second column'. How many more Red beads can be placed so as to maximise the number of Red beads used in the configuration?

Passage 2

Directions (Q. 5 to 8): Read the following passage carefully and answer the questions that follows.

A shopping mall has a large basement parking lot with parking slots painted in it along a single row. These slots are quite narrow; a compact car can fit in a single slot but an SUV requires two slots. When a car arrives, the parking attendant guides the car to the first available slot from the beginning of the row into which the car can fit.

For our purpose, cars are numbered according to the order in which they arrive at the lot. For example, the first car to arrive is given a number 1, the second a number 2, and so on. This numbering does not indicate whether a car is a compact or an SUV. The configuration of a parking lot is a sequence of the car numbers in each slot. Each single vacant slot is represented by letter V.

For instance, suppose cars numbered 1 through 5 arrive and park, where cars 1, 3 and 5 are compact cars and 2 and 4 are SUVs. At this point, the parking lot would be described by the sequence 1, 2, 3, 4, 5. If cars 2 and 5 now vacate their slots, the parking lot would now be described as 1, V, V, 3, 4. If a compact car (numbered 6) arrives subsequently followed by an SUV (numbered 7), the parking lot would be described by the sequence 1, 6, V, 3, 4, 7.

Answer the following questions INDEPENDENTLY of each other.

- Q. 5.** Initially cars numbered 1, 2, 3, and 4 arrive among which 1 and 4 are SUVs while 2 and 3 are compact cars. Car 1 then leaves, followed by the arrivals of car 5 (a compact car) and car 6 (an SUV). Car 4 then leaves. Then car 7 (an SUV) and car 8 (a compact car) arrive. At this moment, which among the following numbered car is parked next to car 3?
1. 6
 2. 5
 3. 8
 4. 7
- Q. 6.** Suppose eight cars have arrived, of which two have left. Also suppose that car 4 is a compact and car 7 is an SUV. Which of the following is a POSSIBLE current configuration of the parking lot?
1. V, 2, 3, 7, 5, 6, 8
 2. 8, 2, 3, V, 6, 5, 7
 3. 8, 2, 3, V, 5, 7, 6
 4. 8, 2, 3, V, 5, 6, 7
- Q. 7.** Suppose the sequence at some point of time is 4, 5, 6, V, 3. Which of the following is NOT necessarily true?
1. Car 1 is an SUV.
 2. Car 5 is a compact.
 3. Car 4 is a compact.
 4. Car 3 is an SUV.
- Q. 8.** Suppose that car 4 is not the first car to leave and that the sequence at a time between the arrival of the car 7 and car 8 is V, 7, 3, 6, 5. Then which of the following statements MUST be false?
1. Car 2 is a compact.
 2. Car 7 is a compact.
 3. Car 4 is an SUV.
 4. Car 6 is a compact.

Passage 3

Directions (Q. 9 to 14): Read the following passage carefully and answer the questions that follows.

The Humanities department of a college is planning to organize eight seminars, one for each of the eight doctoral students - A, B, C, D, E, F, G and H. Four of them are from Economics, three from Sociology and one from Anthropology department. Each student is guided by one among P, Q, R, S and T. Two students are guided by each of P, R and T, while one student is guided by each of Q and S. Each student is guided by a guide belonging to their department.

Each seminar is to be scheduled in one of four consecutive 30-minute slots starting at 9:00 am, 9:30 am, 10:00 am and 10:30 am on the same day. More than one seminars can be scheduled in a slot, provided the guide is free. Only three rooms are available and hence at the most three seminars can be scheduled in a slot. Students who are guided by the same guide must be scheduled in consecutive slots.

The following additional facts are also known :

1. Seminars by students from Economics are scheduled in each of the four slots.
2. A's is the only seminar that is scheduled at 10:00 am. A is guided by R.
3. F is an Anthropology student whose seminar is scheduled at 10:30 am.
4. The seminar of a Sociology student is scheduled at 9:00 am.
5. B and G are both Sociology students, whose seminars are scheduled in the same slot. The seminar of an Economics student, who is guided by T, is also scheduled in the same slot.
6. P, who is guiding both B and C, has students scheduled in the first two slots.
7. A and G are scheduled in two consecutive slots.

- Q. 9.** Which one of the following statements is true?
1. Two seminars are scheduled in the first slot.
 2. Three seminars are scheduled in the last slot.
 3. Only one seminar is scheduled in the second slot.
 4. Three seminars are scheduled in the first slot.
- Q. 10.** Who all are NOT guiding any Economics students?
1. P, Q and R
 2. P, Q and S
 3. Q, R and S
 4. P, R and S

- Q. 11.** Which of the following statements is necessarily true?
1. S is guiding F.
 2. H is an Economics student.
 3. Q is guiding G.
 4. B is scheduled in the first slot.
- Q. 12.** If D is scheduled in a slot later than Q's, then which of the following two statement(s) is (are) true?
- (i) E and H are guided by T.
 - (ii) G is guided by Q.
1. Both (i) and (ii)
 2. Neither (i) nor (ii)
 3. Only (i)
 4. Only (ii)
- Q. 13.** If E and Q are both scheduled in the same slot, then which of the following statements BEST describes the relationship between D, H, and T?
1. Both D and H are guided by T.
 2. Neither D nor H is guided by T.
 3. At least one of D and H is guided by T.
 4. Exactly one of D and H is guided by T.
- Q. 14.** If D is scheduled in the slot immediately before Q's, then which of the following is NOT necessarily true?
1. E is guided by R.
 2. F is guided by S.
 3. D is guided by T.
 4. G is guided by Q.

Passage 4

Directions (Q. 15 to 20): Read the following passage carefully and answer the questions that follows.

In an election several candidates contested for a constituency. In any constituency, the winning candidate was the one who polled the highest number of votes, the first runner up was the one who polled the second highest number of votes, the second runner up was the one who polled the third highest number of votes, and so on. There were no ties (in terms of number of votes polled by the candidates) in any of the constituencies in this election.

In an electoral system, a security deposit is the sum of money that a candidate is required to pay to the election commission before he or she is permitted to contest. Only the defeated candidates (i.e., one who is not the winning candidate) who fail to secure more than one sixth of the valid votes polled in the constituency, lose their security deposits.

The following table provides some incomplete information about votes polled in four constituencies: A, B, C and D, in this election.

	Constituency			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total No. of valid votes polled	5,00,000	3,25,000	6,00,030	
No. of votes polled by the winning candidate	2,75,000	48,750		
No. of votes polled by the first runner up	95000			37,500
No. of votes polled by the second runner up				30,000
% of valid votes polled by the third runner up				10%

The following additional facts are known:

1. The first runner up polled 10,000 more votes than the second runner up in constituency A.
2. None of the candidates who contested in constituency C lost their security deposit. The difference in votes polled by any pair of candidates in this constituency was at least 10,000.
3. The winning candidate in constituency D polled 5% of valid votes more than that of the first runner up. All the candidates who lost their security deposits while contesting for this constituency, put together, polled 35% of the valid votes.

- Q. 15.** What is the percentage of votes polled in total by all the candidates who lost their security deposits while contesting for constituency A?
- Q. 16.** How many candidates who contested in constituency B lost their security deposit?
- Q. 17.** What BEST can be concluded about the number of votes polled by the winning candidate in constituency C?
1. between 1,40,005 and 1,40,010
 2. 1,40,006
 3. 1,40,010
 4. less than 2,00,010
- Q. 18.** What was the number of valid votes polled in constituency D?
1. 1,75,000
 2. 62,500
 3. 1,25,000
 4. 1,50,000
- Q. 19.** The winning margin of a constituency is defined as the difference of votes polled by the winner and that of the first runner up. Which of the following CANNOT be the list of constituencies, in increasing order of winning margin?
1. B, D, C, A
 2. D, B, C, A
 3. D, C, B, A
 4. B, C, D, A
- Q. 20.** For all the four constituencies taken together, what was the approximate number of votes polled by all the candidates who lost their security deposit expressed as a percentage of the total valid votes from these four constituencies?
1. 32.00%
 2. 23.91%
 3. 38.25%
 4. 23.54%

Passage 5

Directions (Q. 21 to 24): Read the following passage carefully and answer the questions that follows.

A chain of departmental stores has outlets in Delhi, Mumbai, Bengaluru and Kolkata. The sales are categorized by its three departments — 'Apparel', 'Electronics', and 'HomeDecor'. An Accountant has been asked to prepare a summary of the 2018 and 2019 sales amounts for an internal report. He has collated partial information and prepared the following table.

Sales Amounts (Crore Rupees)								
	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	—	—	—	—	—	—	—	54
Electronics	78	98	82	102	90	70	80	100
HomeDecor	—	100	—	72	—	80	—	54

The following additional information is known :

1. The sales amounts in the Apparel departments were the same for Delhi and Kolkata in 2018.
2. The sales amounts in the Apparel departments were the same for Mumbai and Bengaluru in 2018. This sales amount matched the sales amount in the Apparel department for Delhi in 2019.
3. The sales amounts in the HomeDecor departments were the same for Mumbai and Kolkata in 2018.
4. The sum of the sales amounts of four Electronics departments increased by the same amount as the sum of the sales amounts of four Apparel departments from 2018 to 2019.
5. The total sales amounts of the four HomeDecor departments increased by ₹70 Crores from 2018 to 2019.
6. The sales amounts in the HomeDecor departments of Delhi and Bengaluru each increased by ₹20 Crores from 2018 to 2019.
7. The sales amounts in the Apparel departments of Delhi and Bengaluru each increased by the same amount in 2019 from 2018. The sales amounts in the Apparel departments of Mumbai and Kolkata also each increased by the same amount in 2019 from 2018.
8. The sales amounts in the Apparel departments of Delhi, Kolkata and Bengaluru in 2019 followed an Arithmetic Progression.

- Q. 21.** In HomeDecor departments of which cities were the sales amounts the highest in 2018 and 2019, respectively?
1. Bengaluru and Delhi
 2. Delhi and Delhi
 3. Mumbai and Delhi
 4. Mumbai and Mumbai
- Q. 22.** What was the increase in sales amount, in Crore Rupees, in the Apparel department of Mumbai from 2018 to 2019?
- | | |
|-------|-------|
| 1. 8 | 2. 12 |
| 3. 10 | 4. 5 |
- Q. 23.** Among all the 12 departments (i.e., the 3 departments in each of the 4 cities), what was the maximum percentage increase in sales amount from 2018 to 2019?
- | | |
|-------|-------|
| 1. 50 | 2. 75 |
| 3. 25 | 4. 28 |
- Q. 24.** What was the total sales amount, in Crore Rupees, in 2019 for the chain of departmental stores?
- | | |
|--------|--------|
| 1. 750 | 2. 900 |
| 3. 600 | 4. 150 |

Quantitative Aptitude (QA)

- Q. 1.** In a group of 10 students, the mean of the lowest 9 scores is 42 while the mean of the highest 9 scores is 47. For the entire group of 10 students, the maximum possible mean exceeds the minimum possible mean by :
- | | |
|------|------|
| 1. 3 | 2. 6 |
| 3. 5 | 4. 4 |
- Q. 2.** From an interior point of an equilateral triangle, perpendiculars are drawn on all three sides. The sum of the lengths of the three perpendiculars is s . Then the area of the triangle is :
- | | |
|----------------------------|----------------------------|
| 1. $\frac{s^2}{2\sqrt{3}}$ | 2. $\frac{2s^2}{\sqrt{3}}$ |
| 3. $\frac{\sqrt{3}s^2}{2}$ | 4. $\frac{s^2}{\sqrt{3}}$ |
- Q. 3.** If x and y are positive real numbers satisfying $x + y = 102$, then the minimum possible value of $2601 \left(1 + \frac{1}{x}\right) \left(1 + \frac{1}{y}\right)$ is :
- Q. 4.** The sum of the perimeters of an equilateral triangle and a rectangle is 90 cm. The area, T , of the triangle and the area, R , of the rectangle, both in sq cm, satisfy the relationship $R = T^2$. If the sides of the rectangle are in the ratio 1:3, then the length, in cm, of the longer side of the rectangle, is :
- | | |
|-------|-------|
| 1. 18 | 2. 27 |
| 3. 21 | 4. 24 |
- Q. 5.** In a car race, car A beats car B by 45 km, car B beats car C by 50 km, and car A beats car C by 90 km. The distance (in km) over which the race has been conducted is :
- | | |
|--------|--------|
| 1. 475 | 2. 550 |
| 3. 450 | 4. 500 |
- Q. 6.** A sum of money is split among Amal, Sunil and Mita so that the ratio of the shares of Amal and Sunil is 3:2, while the ratio of the shares of Sunil and Mita is 4 : 5. If the difference between the largest and the smallest of these three shares is ₹400, then Sunil's share, in rupees, is :
- Q. 7.** The distance from B to C is thrice that from A to B. Two trains travel from A to C via B. The speed of train 2 is double that of train 1 while traveling from A to B and their speeds are interchanged while traveling from B to C. The ratio of the time taken by train 1 to that taken by train 2 in traveling from A to C is :
- | | |
|--------|--------|
| 1. 1:4 | 2. 5:7 |
| 3. 4:1 | 4. 7:5 |
- Q. 8.** Two circular tracks T1 and T2 of radii 100 m and 20 m, respectively touch at a point A. Starting from A at the same time, Ram and Rahim are walking on track T1 and track T2 at speeds 15 km/hr and 5 km/hr respectively. The number of full rounds that Ram will make before he meets Rahim again for the first time is :
- | | |
|------|------|
| 1. 4 | 2. 2 |
| 3. 5 | 4. 3 |
- Q. 9.** How many 4-digit numbers, each greater than 1000 and each having all four digits distinct, are there with 7 coming before 3?

- Q. 10.** Anil buys 12 toys and labels each with the same selling price. He sells 8 toys initially at 20% discount on the labeled price. Then he sells the remaining 4 toys at an additional 25% discount on the discounted price. Thus, he gets a total of Rs 2112, and makes a 10% profit. With no discounts, his percentage of profit would have been :
1. 55
 2. 60
 3. 54
 4. 50
- Q. 11.** In how many ways can a pair of integers (x, a) be chosen such that $x^2 - 2|x| + |a - 2| = 0$?
1. 7
 2. 6
 3. 5
 4. 4
- Q. 12.** In May, John bought the same amount of rice and the same amount of wheat as he had bought in April, but spent ₹150 more due to price increase of rice and wheat by 20% and 12%, respectively. If John had spent ₹450 on rice in April, then how much did he spend on wheat in May?
1. ₹560
 2. ₹570
 3. ₹590
 4. ₹580
- Q. 13.** Let the m -th and n -th terms of a geometric progression be $\frac{3}{4}$ and 12, respectively, where $m < n$. If the common ratio of the progression is an integer r , then the smallest possible value of $r + n - m$ is :
1. 6
 2. -4
 3. -2
 4. 2
- Q. 14.** The number of integers that satisfy the equality $(x^2 - 5x + 7)^{x+1} = 1$ is :
1. 2
 2. 3
 3. 4
 4. 5
- Q. 15.** Let C be a circle of radius 5 meters having center at O . Let PQ be a chord of C that passes through points A and B where A is located 4 meters north of O and B is located 3 meters east of O . Then, the length of PQ , in meters, is nearest to :
1. 7.2
 2. 6.6
 3. 8.8
 4. 7.8
- Q. 16.** For the same principal amount, the compound interest for two years at 5% per annum exceeds the simple interest for three years at 3% per annum by ₹1125. Then the principal amount in rupees is :
- Q. 17.** The number of pairs of integers (x, y) satisfying $x \geq y \geq 20$ and $2x + 5y = 99$ is :
- Q. 18.** A and B are two points on a straight line. Ram runs from A to B while Rahim runs from B to A . After crossing each other, Ram and Rahim reach their destinations in one minute and four minutes, respectively. If they start at the same time, then the ratio of Ram's speed to Rahim's speed is :
1. 1 : 2
 2. $\sqrt{2} : 1$
 3. 2 : 1
 4. $2\sqrt{2} : 1$
- Q. 19.** Let C_1 and C_2 be concentric circles such that the diameter of C_1 is 2 cm longer than that of C_2 . If a chord of C_1 has length 6 cm and is a tangent to C_2 , then the diameter, in cm, of C_1 is :
- Q. 20.** Aron bought some pencils and sharpeners. Spending the same amount of money as Aron, Aditya bought twice as many pencils and 10 less sharpeners. If the cost of one sharpener is ₹2 more than the cost of a pencil, then the minimum possible number of pencils bought by Aron and Aditya together is :
1. 30
 2. 27
 3. 33
 4. 36
- Q. 21.** Let $f(x) = x^2 + ax + b$ and $g(x) = f(x + 1) - f(x - 1)$. If $f(x) \geq 0$ for all real x , and $g(20) = 72$, then the smallest possible value of b is :
1. 1
 2. 4
 3. 0
 4. 16
- Q. 22.** If x and y are non-negative integers such that $x + 9 = z$, $y + 1 = z$ and $x + y < z + 5$, then the maximum possible value of $2x + y$ equals :
- Q. 23.** Students in a college have to choose at least two subjects from chemistry, mathematics and physics. The number of students choosing all three subjects is 18, choosing mathematics as one of their subjects is 23 and choosing physics as one of their subjects is 25. The smallest possible number of students who could choose chemistry as one of their subjects is :
1. 20
 2. 19
 3. 22
 4. 21
- Q. 24.** The value of $\log_a\left(\frac{a}{b}\right) + \log_b\left(\frac{b}{a}\right)$, for $1 < a \leq b$ cannot be equal to :
1. 1
 2. -0.5
 3. -1
 4. 0

Q. 25. John takes twice as much time as Jack to finish a job. Jack and Jim together take one-thirds of the time to finish the job than John takes working alone. Moreover, in order to finish the job, John takes three days more than that taken by three of them working together. In how many days will Jim finish the job working alone?

Q. 26. For real x , the maximum possible value of

$$\frac{x}{\sqrt{1+x^4}} \text{ is :}$$

- | | |
|-------------------------|-------------------------|
| 1. $\frac{1}{\sqrt{3}}$ | 2. $\frac{1}{\sqrt{2}}$ |
| 3. $\frac{1}{2}$ | 4. 1 |

Answer Key

Verbal Ability and Reading Comprehension (VARC)

1. (2)	2. (3)	3. (2)	4. (4)	5. (3)	6. (2)	7. (4)	8. (4)	9. (3)	10. (4)
11. (3)	12. (4)	13. (3)	14. (1)	15. (1)	16. (1)	17. (3)	18. (3)	19. (2)	20. (2)
21. 1342	22. 2413	23. (4)	24. (3)	25. (2)	26. 2134				

Data Interpretation and Logical Reasoning (DILR)

1. 2	2. 9	3. 6	4. 6	5. (1)	6. (4)	7. (4)	8. (4)	9. (1)	10. (2)
11. (1)	12. (1)	13. (3)	14. (1)	15. 9	16. 11	17. (2)	18. (1)	19. (4)	20. (2)
21. (2)	22. (2)	23. (1)	24. (2)						

Quantitative Aptitude (QA)

1. (4)	2. (4)	3. 2704	4. (2)	5. (3)	6. 800	7. (2)	8. (4)	9. 315	10. (4)
11. (1)	12. (1)	13. (3)	14. (2)	15. (3)	16. 90000	17. 17	18. (3)	19. 10	20. (3)
21. (2)	22. 23	23. (1)	24. (1)	25. 4	26. (2)				

Answers and Explanations

Verbal Ability and Reading Comprehension (VARC)

1. **Option (2) is Correct.**

Explanation: Option (3) is incorrect, as it implies corporate control ensures democratic access. The last paragraph states the exact opposite of options (1) and (4). The paragraph says concentration of control of corporate activity facilitates profit generation, but at the same time it can't be democratic energy. Option (2) captures this idea. Hence, option (2) is the correct answer.

2. **Option (3) is Correct.**

Explanation: You have to select the option that doesn't support the arguments in the passage. The argument from the passage, "disposal of toxic waste has long perpetuated social injustice through the flows of waste to the Global South and to marginalized communities in the Global North", is supported by option (1) and (4).

Option (2) is eliminated because it represents the same idea as, "agricultural finance reveals the concentration of control of corporate activity facilitates profit generation".

From the second and the third line of the paragraph one, it is clear that though investment in renewable energy is a "straightforward choice", further scrutiny is needed before declaring that it will lead to a low-carbon future. Thus, Option (3) doesn't support the argument of the paragraph. Hence, it is correct answer.

3. **Option (2) is Correct.**

Explanation: This is a tricky question. Rephrase the question stem-if false, supports the arguments in the passage means select the one that, if true, does not support the arguments in the passage.

The passage supports renewable energy resources. So, if option (1) is true it supports the argument in the passage. For the same

logic option (3) is also ruled out. Option (4) supports the last paragraph of the passage. Hence, it is also eliminated.

The passage supports renewable energy source, but suggest further scrutiny before declaring that it will lead to a low-carbon future. This is contrary to option (2). Hence, option (2) is the correct answer.

4. **Option (4) is Correct.**

Explanation: The idea of more environment-friendly carbon-based fuels has not been discussed in the passage. So, option (1) is ruled out.

Option (2), the study of the coexistence of marginalized people with their environments is not connected to the main idea of the passage. So, option (2) is also ruled out.

In the fourth paragraph the author clearly states that small-scale renewable energy systems do not produce high returns. So, option (3) is incorrect.

The author talks of the social injustice perpetuated through the disposal of toxic waste in the passage. Hence, most likely he will be supportive of more stringent global policies and regulations to ensure a more just system of toxic waste disposal. So, option (4) is the correct answer.

5. **Option (3) is Correct.**

Explanation: "But further scrutiny is needed before declaring that it will lead to a low-carbon future." and "Both the direct and indirect impacts of renewable energy must be examined to ensure that a climate-smart future does not intensify social and environmental harm." from the first paragraph make it clear that the author is apprehensive about the consequences of renewable energy systems. Hence, option (3) is the answer.

6. **Option (2) is Correct.**

Explanation: Option (1) can be eliminated because it talks of 'Michelangelo and Leonardo'. The passage talks about them to make a point about meaning making, and not as a key idea.

Option (3) is incorrect. It states 'work of genius' as a key idea, but it is used to make a point.

Option (4) is ruled out because it mentions 'lay audience', which is not a key idea of the passage.

Option (2) is the right answer. Because all words in option (2) relate to key ideas in the passage.

7. **Option (4) is Correct.**

Explanation: In this question you have to select the option, which can't be inferred from the passage.

From the line, "...task is to understand how artifacts contribute to the construction of a world", you can understand option (1) is true.

From the last line of the first paragraph, you can infer option (2).

From the line, the line "...scholars may learn a great deal when they scrutinize the constituents of vision, that is, the structures of perception as a physiological process as well as the epistemological frameworks informing a system of visual representation", you can understand option (3) is true.

The passage doesn't talk of 'institutional structures'. So, option (4) can't be inferred.

8. **Option (4) is Correct.**

Explanation: This is a contextual vocabulary question. To solve the question you need to substitute each option in the place of 'epiphenomena'. The last line of the paragraph says, "the scholar of visual culture seeks to regard images as evidence for explanation, not as epiphenomena". By substituting each of the answer options in place of 'epiphenomena' in this sentence, we see that only option 4 makes sense. So, epiphenomena are phenomena supplemental to the evidence.

9. **Option (3) is Correct.**

Explanation: This is a specific details question. To take out answer you need to

focus upon the preceding and the succeeding line. So from the lines, "They were unique creators of images that changed the way their contemporaries thought and felt...", it can be understood that social analysis cannot fully explain their genius. Hence, option (3) is the correct answer.

Option (1) is incorrect because it distorts the information by saying that they can't be subjected to social analysis. Passage says social analysis can't capture their geniuses completely.

Option (2) is not mentioned in the passage. So, it is ruled out.

Option (4) is eliminated because it is a vague option and doesn't make any sense in this context.

10. **Option (4) is Correct.**

Explanation: From the last line first two lines you can understand that scholars may learn that vision is a device developed by a culture to see intelligibly. Which understands as sight works on the basis of covenants with images we see. This is what option (4) says. Hence option (4) is the answer. Rest all the options distort meaning of the statement quoted.

11. **Option (3) is Correct.**

Explanation: The passage asserts that an abnormally low neural regulation of aggressive impulses and not testosterone in humans accounts for aggressive behaviour. Thus, statement 3 can't be inferred from the passage. Hence, option (3) is the answer.

All other options can be inferred from "Sigmund Freud (1930) proposed that all individuals are born with a death instinct that predisposes us to a variety of aggressive behaviors, including suicide (self directed aggression)..."

12. **Option (4) is Correct.**

Explanation: This is a direct question. From the last few lines of the first paragraph, "The first variable is the aggressor him/herself. The second is the social situation or circumstance in which the aggressive act(s) occur. The third variable is the target or victim of aggression."

Option (4) can be derived. Hence, option (4) is the correct answer.

13. Option (3) is Correct.

Explanation: The lines in the question were mentioned in the passage to make a point that one way of categorizing aggression is to categorize it on the base of its intent. So inflicting pain to a war combat soldier is not because of hostility but to gather some important from him. Hence, option (3) is the correct answer.

14. Option (1) is Correct.

Explanation: Option (2) can be derived from the line: Aggression is also categorized according to its ultimate intent.

Option (3) and option (4) can be derived from the last paragraph.

Only option (1) has not been discussed in the paragraph. Hence, option (1) is the correct answer.

15. Option (1) is Correct.

Explanation: Option (2) and option (4) can be outrightly eliminated. By reading the line you can understand that the author's tone is sarcastic. Out of option (1) and option (3), Option (1) is closer to the author's tone. 'Indignant' means angry, doesn't match with the author's tone. Hence, option (1) is the correct answer.

16. Option (1) is Correct.

Explanation: This is an easy question. From paragraph four, it is clear that the "root causes" of piracy are abject poverty and the daily struggle for survival. In last two paragraphs the author makes clear that international cooperation in enforcing strict deterrents, use of technology (robots & warships), and investments in local welfare have failed to achieve desired results. This makes option (1) correct answer. Options (2), (3), and (4) are ruled out on the basis of last two paragraphs.

17. Option (3) is Correct.

Explanation: The second paragraph starts with a question-where does piracy begin or end? And in answer to this question, a conversation is described, which suggests that European empire-builders were the most successful pirates of all time. From these lines we can easily understand that option (3) rephrases the author's believe. Hence, option (3) is the correct answer.

Option (1) is eliminated. No as such comparison is made in the passage.

Option (2) is too specific to select as answer. Vasco da Gama and the East India Company were quoted to make the point summed up in option (3).

Option (4) is ruled out because it is contrary to the author's opinion.

18. Option (3) is Correct.

Explanation: You have to select the option that can't be ascribed for the rise in piracy today.

From the lines of last third paragraph- "Increased globalisation has done more to encourage piracy than suppress it. European colonialism weakened delicate balances of power, leading to an influx of opportunists on the high seas. A rise in global shipping has meant rich pickings for freebooters." All the three options, Option (1), (2) and (4) are eliminated.

The passage mentions that there are never enough warships to patrol pirate-infested waters, but this does not suggest that the surveillance at the high seas is declining, just that the scale of the problem is large. So, you can say decline in surveillance is not the reason for the rise in piracy today. Hence, option (3) is the correct answer.

19. Option (2) is Correct.

Explanation: Statement 3 is the opening statement. It talks about the purpose of inventing things is to create intellectual property rights. Sentence 1 uses 'this', which refers to sentence 3. '1 & 3' makes a pair. Similarly, 4 & 5 is a link. 5 shows contrast of the fact mentioned in sentence '4'. So, the order would be 3145. Sentence '2' talks of a new kind of capitalism being created. This is not in tandem with rest of the sentences. Hence, (2) is the odd one out.

20. Option (2) is Correct.

Explanation: The paragraph compares intuitive decision making and information based decisions making on the basis of time taken in making decision, speed at which decisions are taken and ability to explain reason behind the decisions. This is captured by option (2). Hence, option (2) is the correct answer.

No where the paragraph concludes which on is a better way to make decision. Hence, option (1) is ruled out. Neither the paragraph tells that decisions are taken on the basis of the availability of time. So, option (3) is also eliminated. Option (4) focuses upon only one aspect of the paragraph. It does not capture the key ideas of the paragraph. So, it is also eliminated.

21. The correct answer is [1342].

Explanation: '1 and 3' is a pair and '4 and 2' is a pair. 1 is the opening sentence. It talks about the tendency discussed in the paragraph. In sentence 4 the pronoun 'it' refers to this tendency. '4' elaborates this tendency with an example and 2 best concludes the paragraph by providing name to the tendency. So, the sequence is 1342.

22. The correct answer is [2413].

Explanation: Statement 2 is an obvious opener as; it introduces the topic 'large scale nuclear fission'. '4' elaborates how it is dangerous. '2 and 4' is a mandatory pair. '1 and 3' also makes a pair. '3' talks about danger to humanity by so-called "peaceful uses" of atomic energy and 1 says that the attention of the layman, however, directed at the atom bomb instead. So the correct order is 2413.

23. Option (4) is Correct.

Explanation: Statement 5 introduces the topic of the paragraph: the new genre of stories of sexual assault. Sentence '2' carry forwards the idea by stating that the telling focuses on the perpetrators' futures and victims' pasts. Sentence '3' tells its result is lack of vocabulary and is followed by 1. Though statement '4' is about same topic, yet it is slightly different from others in scope. It talks about "questions asked about victims". Hence, (4) is odd one out.

24. Option (3) is Correct.

Explanation: The passage says that because of rural-urban continuum and heterogeneity of

urban arrangement to identify and measure urban area, we need a richer combination of measurable criteria along with some element of human judgement. Option (3) sums up all the ideas aptly. Hence, option (3) is the correct answer.

Option (1) is too generic to select as answer. Since, it does not capture all the key ideas.

Option (2) misses out key points and focuses upon 'human judgement' Option (4) is ruled out because it is too specific. It focuses on the combination of criteria and misses out the importance of human judgement.

25. Option (2) is Correct.

Explanation: Option (1) is ruled out as; it wrongly accredits an additional motive--the establishment of the doctrine of sovereign equality-- to the people.

According to the paragraph the people's sense of insecurity was the main motive. This is not mentioned in option (3). So, it is eliminated.

Option (4) asserts the motive as limiting the power of the papacy, which is not correct. So, option (4) is also eliminated.

The passage states that the secular political order emerged because people, in order to escape the insecurity of death and war, delivered their rights to a sovereign power in return for the sovereign's provision of security. This is aptly summed up by option (2). Hence, option (2) is the correct answer.

26. The correct answer is [2134].

Explanation: This is an easy question. Sentence 2 is an obvious opener as; it introduces the topic, 'telescope. 1 adds additional information by telling it features. 4 informs the result of combining the telescopes mentioned in B and A with large telescopes, and E concludes the paragraph stating how this configuration helps. So, the order is 2134.

Data Interpretation and Logical Reasoning (DILR)

Questions 1 to 14 video solutions :

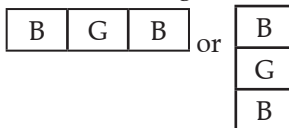


Questions 15 to 24 video solutions :

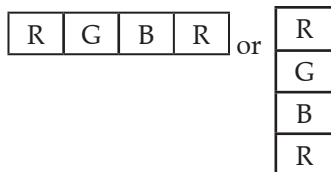


For Solutions 1 to 4:

- Two adjacent beads along any column/Row are different colour.
- There is atleast one Green bead between two blue bead along same Row or column.



- At least one Blue and atleast one Green between two Red beads along same row or column.



- The correct Answer is [2].**

If using beads of two colours in any row or column.

1 2 1 2 1

as only two colour are used. So Red beads can not be used here because between two Red beads there must be one Green and one Blue bead.

So, Two colour can be use \Rightarrow Blue and Green
Now two configuration possible \Rightarrow

- Start with Green Bead

G	B	G	B	G
B	G	B	G	B
G	B	G	B	G
B	G	B	G	B
G	B	G	B	G

- Start with Blue Bead

B	G	B	G	B
G	B	G	B	G
B	G	B	G	B
G	B	G	B	G
B	G	B	G	B

So clearly it can be said that only two configuration possible.

Hence, answer is 2.

- The correct Answer is [9].**

We know that configuration will be like R G B R

Now case 1 when consider two Red in every row as show here.

I	II	III	IV	V
R	1	2	R	
	R	1	2	R
R	1	2	R	
	R	1	2	R
R	1	2	R	

But in above configuration Ist and IVth column contains more than 2 Red beads. So it cannot possible.

So if IIIrd Row Beads adjust in such a way that it contains only one Red bead in mid sell only. Then configuration will be like shown below.

	I	II	III	IV	V
I	R			R	
II		R			R
III			(R)		
IV	R			R	
V		R			R

Now we can place Green and Blue Beads in vacant places. So it is clearly seen that maximum possibility of Red beads is 9 only and final configuration would be like.

R	G	B	R	G
G	R	G	B	R
B	G	R	G	B
R	B	G	R	G
G	R	B	G	R

3. **The correct Answer is [6].**
Keep in mind any two Blue beads one Green bead.

B G B

As to minimize Blue bead we have to increase Green and Red Bead as much as possible. We know maximum possible of Red bead is 9 from previous question. Now the pattern would be like as shown below.

R	G	B	R	G
G	R	G	B	R
B	G	R	G	B
R	B	G	R	G
G	R	B	G	R

So minimum number of Blue beads = 6

4. **The correct Answer is [6].**
According to question the configuration be like

①			②	
		R		
	R			③
④			⑤	
		⑥		

So now if we have to maximize the number of Red Beads. Then possible places are 1, 2, 3, 4, 5, 6 as shown in above diagram. So now final Red beads would be like.

R			R	
		R		
	R			R
R			R	
		R		

For Solutions 5 to 8:

5. **Option (1) is Correct.**
Four car 1, 2, 3, 4 arrive among which 1 and 4 are SUVs. While two and three are compact cars. Mean parking would be like.

$\underbrace{1 \quad 1} \quad 2 \quad 3 \quad \underbrace{4 \quad 4}$

Two places for SUV

Now when car 1 leaves then configuration be like

V V 2 3 4

When car 5, a compact car arrives then configuration

5, V, 2, 3, 4

Now car 6 arrives so again parking would be like

5, V, 2, 3, 4, 6

Because car 6 is SUV. So required two slots and cannot be fit in 1 vacant place/slot.

Now car 4 leave. So new configuration

5, V, 2, 3, V, V, 6

Now car 7 enters which is SUV so it will park at two vacant slots. So now configuration

5, V, 2, 3, 7, 6

Finally car 8, 9 compact car enters. Then final parking configuration.

5, 8, 2, 3, 7, 6

So car 7 is parked next to car 3.

6. **Option (4) is Correct.**

Given that

Car 4 → compact car

Car 4 → SUV

Option 1, 2, 3 have 4 cars in same sequence 8, 2, 3, V. So first check option 4 which is V, 2, 3, 7, 5, 6, 8

This is 4th car place which is SUV and car 7 is compact car.

So this case not possible.

Because 8, 2, 3, 0 is common in rest questions So Just have to focus on least 3 cars [5th, 6th and 7th].

If car 5 and 6 are here then 7 cannot be in between these two cars. So option 2 is also not possible.

Now option 1, 8, 2, 3, V, 6, 5, 7 is also not possible because 6 cannot be in between V and 5.

So only option 3, 8, 2, 3, V, 5, 6, 7 is the only possible configuration in parking lot.

7. **Option (4) is Correct.**

The sequence is 4, 5, 6, V, 3

So before car 3 there are 4 slots means came 1 and 2 were SUV. When they left then there are four vacant places.

V, V, V, V, 3

Then cars 4, 5, 6 came in parking lot and the sequence became.

4, 5, 6, V, 3

So to 2-3 points can be concluded here.

1. Car 1 & 2 are SUV

2. Car 4, 5, 6 are compact car

3. Can not be sure about car 3.

So option 1 is not necessarily true.

8. **Option (4) is Correct.**

As now sequence is V, 7, 3, 6, 5. It can be seen that 3 and 5 at their position.

Car 4 is not the first car which leaved.

So there are two cases either 1 and 2 left before car 4 or only can 1 left before car 4.

But in this case car 6 would have parked at slot 1 and 2. So this case fails.

In second case only can 1 left before car 4 as car parked in lot vacated by car 4

So for sure car 6 is compact car.

So, option 2 would be a correct answer.

For Solutions 9 to 14:

Given

1. Students → A, B, C, D, E, F, G, H
2. Guides → P (2 students), Q (1 student), R (2 Students), S (1 student), T(2 students)
3. Economics → 4 students
Sociology → 3 students
Anthropology → 1 student
4. Slots → 9:00, 9:30, 10:00, 10:30
5. One Eco seminar is held in each slots.
6. A's is the only seminar that is scheduled at 10 am and guided by R.
That must be Eco (as per above student)
7. F is Anthro student & seminar is at 10:30
8. One sociology student seminar is scheduled at 9:00 am.

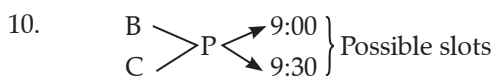
Now tabulated form of the data till point 4

9:00 am	9:30 am	10:00 am	10:30 am
Eco	Eco	A-Eco-R	Eco
Socio			F Anthro

Given

9. B & G → Socio student and Seminar at same slot.
Eco → T in same slot

As maximum 3 seminar are possible in one slot. So possible slots for B & G are 9:30 and 10:00 AM.



11. A, G in consecutive slots.

Now Tabulation from of the data till now

P(2)	Socio	B, C
Q(1)	Anthro/Socio	F/G
R(2)	Eco	A, one more (D/E/H)
S(1)	Socio/Anthro	G/F
T(2)	Eco	Two (D, E, H)

9:00	9:30	10:00	10:30
ECO	ECO	A-Eco-R	Eco-R
Socio	B-Socio		F Anthro
	G-Socio		

9. **Option (1) is Correct.**

As it can be seen from table two seminars are scheduled in first slot only.

10. **Option (2) is Correct.**

It is clear from table, R is guiding to Eco student. There is only one option where R is not present. So option is Right.

11. **Option (1) is Correct.**

As B is in second slot and we have no information about the Guide of G & F So only option 1. H is an Eco student is right.

12. **Option (1) is Correct.**

D's seminar is scheduled later than Q's seminar means Q's seminar cannot be last slot means F → G & G → Q

So student II is true.

Now Q's seminar is schedule in second slot, D's seminar is scheduled in last slot. So D is guided by R. Hence E & H are guided by T. Thus statement I is also true.

So, Both one & two are true.

13. **Option (3) is Correct.**

E and Q are scheduled in same slot.

Then there are two possibility that either second slot or in 4th slot.

I. It is second slot then E is guided by T and one among the D & E is also guided by T.

II. If it is in last slot then E is guided by R and both D & E are guided by T.

Thus, atleast one of the D & H is guided by T.

14. **Option (1) is Correct.**

If D is scheduled in the slot immediately before Q. It is only possible with D is in the first slot and Q is in the second slot.

Means D → T
G → Q
F → S

One (E/H) → T
(E/H) → R

So, statement E is guided by R is not necessarily true.

For Solutions 15 to 20:

15. The correct Answer is [9].

Given that Total votes polled in constituency A = 500000

winning candidate got = 275000

first runner up got = 95000

As per statement 1 second runner up got = 85000

By other candidates who lost their security

Total votes = 500000 - [275000 + 95000 + 85000]

$$= 45000$$

$$\text{So, percentage of votes} = \frac{45000 \times 100}{500000}$$

$$= 9\%$$

16. The correct Answer is [11].

Total candidates in constituency B = 12

Total valid votes = 325000

Minimum number of valid votes required to

$$\text{save security deposit} = 325000 \times \frac{1}{6} = 54167$$

As winner got 48750 votes only means except winner all candidates lost their security deposit.

So, number of candidates = 12 - 1 = 11

17. Option (2) is Correct.

Total candidates in constituency C = 5

Given

No candidates lost their security deposit.

Difference in votes by any pair of candidates was atleast 10000.

So 1st 2nd 3rd 4th 5th

$$A + 40000 \quad A + 30000 \quad A + 20000 \quad A + 10000 \quad A$$

$$\& (A + 40000) + (A + 30000) + (A + 20000) + (A + 10000) + A = 600030$$

$$5A + 100000 = 600030$$

$$A \Rightarrow 100006$$

$$\text{So, winners vote} \Rightarrow 100006 + 40000 = 140006$$

18. Option (1) is Correct.

Number of votes by first Runner up = 37500

Number of votes by second Runner up = 30000

Percentage of valid votes polled by third runner up = 10%

Given winning candidate polled 5% more than 1st Runner

$$\text{So winner polled votes} = 37500 \times \frac{105}{100} = 39375$$

suppose total votes = 100x

winner \rightarrow 39375

1st \rightarrow 37500

2nd \rightarrow 30000

3rd \rightarrow 10x

Minimum rates to save security deposits

$$= \frac{1}{6} \times 100 = 16.25\%$$

So as per the data atleast 3 candidates can save their deposit.

In this case

$$39375 + 37500 + 30000 = 65\% \text{ of } 100x$$

Total votes = 175000

19. Option (4) is Correct.

Margins \Rightarrow

$$A \rightarrow 275000 - 95000 = 180000$$

$$B \rightarrow \text{Not known}$$

$$C \rightarrow 150000 - 140000 = 10000$$

$$D \rightarrow 39375 - 37500 = 1875$$

For sure C's margin is more than D.

Only one option have this condition.

Option 4 \Rightarrow B, C, D, A

20. Option (2) is Correct.

Number of votes got by candidates who has lost their security deposit is as follow:

In A = 45000

$$B = 325000 - 48750 = 276250$$

$$C = 0$$

$$D = 175000 \times \frac{35}{100} = 61250$$

$$\text{Required Percentage} = \frac{382500}{1600000} \times 100 = 23.91\%$$

For Solutions 21 to 24:

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	x	y	y	y - x + 5y	y	2y - x	x	54
Electronics	78	98	82	102	90	70	80	100
Home decor	80	100	z	72	60	80	z	54

As per 3 statements assumed data filled in table as x, y, z .

As statement 4 \Rightarrow Apparel 2018 \neq 40 = Apparel 2019

As statement 5 \Rightarrow (Home Decor 2018) + 70 = (2019 of Home Decor)

Home Decor 2018 = (100 + 72 + 80 + 54) - 70 = 236

As statement 6 \Rightarrow

Delhi

Home Decor 2018 + 20 = 100

Home Decor 2018 = 80

Bengaluru

Home Decor 2018 + 20 = 80

Home Decor 2018 = 60

As statement 7 \Rightarrow

Bengaluru (2019) = $y + (y - x) = 2y - x$

Also Mumbai (2019) = $y + (54 - x) = y - x + 54$

As statement 8 \Rightarrow Apparels 2019

Delhi - Kolkata = Kolkata - Bengaluru

$3y - x = 2 \times 54 = 108 \quad \dots(i)$

Again using of statement 4 \Rightarrow

Putting all values \Rightarrow

$2x - y = 34 \quad \dots(ii)$

By solving (i) & (ii)

$\Rightarrow x = 42$ and $y = 50$

21. **Option (2) is Correct.**

Final Table after putting values of x & y

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
A	42	50	50	62	50	58	42	54
E	78	98	82	102	90	70	80	100
H	80	100	48	72	60	80	48	54

So, Home Decor 2018 Highest Sale in Delhi

Home Decor 2019 Highest Sale in Delhi

Ans is (Delhi and Delhi)

22. **Option (2) is Correct.**

Apparel of Mumbai

increase from 2018 to 19 = $62 - 50 = 12$

23. **Option (1) is Correct.**

Maximum percentage increase from Mumbai Home Decor from 2018 to 2019

$= \frac{72 - 48}{48} \times 100 = 50\%$

24. **Option (2) is Correct.**

Sum of sale of 2019 from all departments

$= 248 + 236 + 208 + 208 = 900$

Quantitative Aptitude (QA)

Questions 1 to 13 video solutions:



Questions 14 to 26 video solutions:



1. **Option (4) is correct.**

Let numbers are $a, b, c, d, e, f, g, h, i, j$ in decreasing order.

Given $\frac{a+b+c+d+e+f+g+h+i}{9} = 47$

means $a + b + c + d + e + f + g + h + i = 47 \times 9 \quad \dots(i)$

same way $b + c + d + e + f + g + h + i + j = 42 \times 9 \quad \dots(ii)$

Equation (1) - (2)

$\Rightarrow a - j = 45 \quad \dots(iii)$

to maximise average a should be maximum, then put j as 42 in equation (iii).

So $a = 45 + 42 = 87$

and maximum average = $\frac{87 + 42 \times 9}{10} = 46.5$

same to minimize average J should be minimum and put a as 47 in equation (iii)

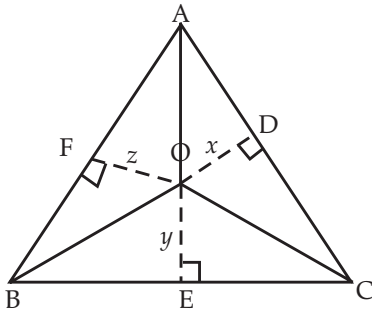
$\Rightarrow J = 47 - 45 = 2$

So, minimum average = $\frac{47 \times 9 + 2}{10} = 42.5$

So, difference = $46.5 - 42.5 = 4$

2. **Option (4) is correct.**

Let side of Equilateral triangle = a
and length of perpendicular are x, y, z as shown in diagram.



$$\begin{aligned} \text{Area of } \triangle ABC &= \text{Area } \triangle AOC \\ &+ \text{Area } \triangle BOC + \text{Area } \triangle AOB \\ &= \frac{1}{2} \times x \times a + \frac{1}{2} \times y \times a \\ &+ \frac{1}{2} \times z \times a \end{aligned}$$

$$\frac{\sqrt{3}}{4} a^2 = \frac{1}{2} \times a(x+y+z)$$

$$\frac{\sqrt{3}}{2} a = s \quad [\text{as } x+y+z = s]$$

$$a = \frac{2}{\sqrt{3}} s$$

As $\text{area} = \frac{\sqrt{3}}{4} a^2$

$$= \frac{\sqrt{3}}{4} \times \frac{4}{3} s^2 = \frac{s^2}{\sqrt{3}}$$

3. **The correct Answer is [2704].**

For minimum value of $2601 \left(1 + \frac{1}{x}\right) \left(1 + \frac{1}{y}\right)$

we have to maximise x & y
and given $x + y = 102$.

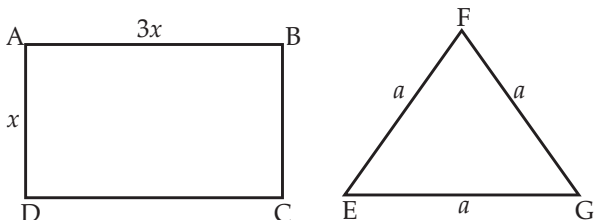
So, maximum possible value of

$$x = y = 51$$

$$\begin{aligned} \text{So, } 2601 \left(1 + \frac{1}{x}\right) \left(1 + \frac{1}{y}\right) &= 2601 \times \frac{52 \times 52}{51^2} \\ &= 2704 \end{aligned}$$

4. **Option (2) is correct.**

Let length of Rectangle $\Rightarrow x$ & $3x$ and breadth and side of $\triangle = a$



Given $2[x + 3x] + 3a = 90$

$$8x + 3a = 90 \quad \dots(i)$$

Area of rectangle $R = 3x^2$

Area of triangle $T = \frac{\sqrt{3}}{4} a^2$

Given $R = T^2$

$$3x^2 = \frac{3}{16} a^4$$

$$x = \frac{a^2}{4} \quad \dots(ii)$$

By equation (i) and (ii)

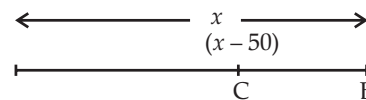
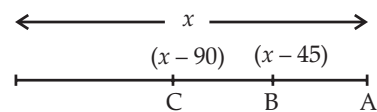
$$a = 6$$

So, the value of $x = \frac{a^2}{4} = \frac{36}{4} = 9$

So, the longer side of rectangle = $3 \times 9 = 27$

5. **Option (3) is correct.**

Let total distance = x



As time is constant they ratio of speed directly proportional to ratio of distance.

$$\Rightarrow \frac{(x-45)}{(x-90)} = \frac{x}{(x-50)}$$

$$\Rightarrow x^2 - 90x = x^2 - 95x + 2250$$

$$\Rightarrow x = 450 \text{ km}$$

6. **The correct Answer is [800].**

Ratio of share of Sunil and Mittal = 3 : 2

Ratio of share of Sunil and Mittal = 4 : 5

$$\text{So ratio of share of Amal : Sunil : Mittal} = 6 : 4 : 5$$

Difference between highest and lowest shares

$$\Rightarrow 6x - 4x = 400$$

$$x = 200$$

So, Sunil's share = $200 \times 4 = 800$

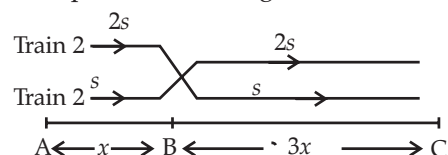
7. **Option (2) is correct.**

Let distance \Rightarrow

$$AB = x$$

and $BC = 3x$

and speed of train 1 = s , so train 2 = $2s$, after point B speeds interchanged.



Time taken by train 1 = $\frac{x}{s} + \frac{3x}{2s}$

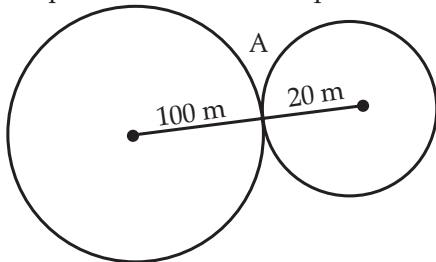
Time taken by train 2 = $\frac{x}{2s} + \frac{3x}{s}$

So, ratio = $\frac{\frac{x}{s} + \frac{3x}{2s}}{\frac{x}{2s} + \frac{3x}{s}} = 5 : 7$

8. Option (4) is correct.

Given speed of Ram = 15 kmph

Given speed of Rahim = 5 kmph



Ratio of time taken by them to complete one cycle

$$= \frac{2\pi \times 100}{15} : \frac{2\pi \times 20}{5}$$

$$= 5 : 3$$

Ratio between distance = 3 : 5

[As complete cycle]

Means Ram will complete 3 rounds before meeting Rahim first time.

9. The correct Answer is [315].

Total possible number when 7 comes at 1st place.

Total possible number

$$\Rightarrow \underline{7} \textcircled{3} \underline{\quad} \underline{\quad} = 8 \times 7$$

$$\underline{7} \underline{\quad} \textcircled{3} \underline{\quad} = 8 \times 7$$

$$\underline{7} \underline{\quad} \underline{\quad} \textcircled{3} = 8 \times 7$$

So total = $\textcircled{3} \times 8 \times 7 = 168$

Total possible number when 7 comes at second place

$$\Rightarrow \underline{\quad} \underline{7} \textcircled{3} \underline{\quad} = 7 \times 1$$

[0 cannot come at 1st place]

$$\underline{\quad} \underline{7} \underline{\quad} \textcircled{3} = 7 \times 7$$

Total = $2 \times 7 \times 7 = 98$

Total possible number when 7 comes at IIIrd place

$$\Rightarrow \underline{\quad} \underline{\quad} \underline{7} \textcircled{3} = 7 \times 7$$

$$= 49$$

Hence, total possible number

$$= 168 + 98 + 49 = 315$$

10. Option (4) is correct.

Let cost price = ₹x

As he is getting 10% profit when selling all at ₹2112

Means $12 \times x \times \frac{110}{100} = 2112$

$$x = ₹160$$

Now assume marked price = 100 x

So 8 toys sold at 80 x and 4 toys sold at [20% + 25%] discount.

Means at these 4 toys total discount

$$= 20 + 25 + \frac{25 \times 20}{100}$$

$$= 40\%$$

Means sale price = 60x

So total sale price = $8 \times 80 x + 4 \times 60 x$

$$= 880x$$

Given $80 x = 2112$

$$x = 2.4$$

So, marked price = $100 \times 2.4 = 240$

So the total percentage profit when all sold at marked price

$$= \frac{240 - 160}{160} \times 100$$

$$= 50\%$$

11. Option (1) is correct.

Given $|x|^2 - 2|x| + |a - 2| = 0$

Let $|x| = y$

then $y^2 - 2y + |a - 2| = 0$

We know that sum of roots

$$\Rightarrow \alpha + \beta = -b = 2$$

{for quadratic equation

$$ax^2 + bx + c = 0}$$

$$\alpha \cdot \beta = \frac{c}{a} = |a - 2|$$

Two possible value for α, β (0, 2) and (1, 1)

then values for

$$a = 2 \text{ (when } \alpha = 0, \beta = 2)$$

$$= 1, 3$$

$$\text{(when } (\alpha, \beta) = (1, 1))$$

Possible values for x and a

x	a
0	→ 2
-2	→ 2
2	→ 2
1	→ 1
	→ 3
-1	→ 1
	→ 3

So, total pair of integers (x, a) = 7

12. Option (1) is correct.

	Rice	Wheat
April	450	x
	$\downarrow + 20\%$	$\downarrow + 12\%$
May	$\downarrow ₹90$	$₹60$
{As given John spent 150 more in May}		
So,	12% of $x = 60$	
So,	$x = 500$	
Total amount spent on wheat in May		
$= 500 + 60 = 560$		

13. Option (3) is correct.

$$4^{\text{th}} \text{ term of g.p. } a.r^{n-1} = \frac{3}{4} \quad \dots(\text{i})$$

$$4^{\text{th}} \text{ term of g.p. } a.r^{n-1} = 12 \quad \dots(\text{ii})$$

By (ii)/(i) $r^{n-1+1-m} = \frac{12}{\frac{3}{4}}$

$$r^{n-m} = 16$$

As $n-m$ is positive. So for least value r must be negative.

$$r^{n-m} = (-4)^2$$

$$r = -4$$

So, least possible value of $r + n - m$
 $= -4 + 2 = -2$

14. Option (2) is correct.

Given $(x^2 - 5x + 7)^{x+1} = 1$
 This condition is only possible when

1. $x + 1 = 0$
 $x = -1$
2. $x^2 - 5x + 7 = 1$

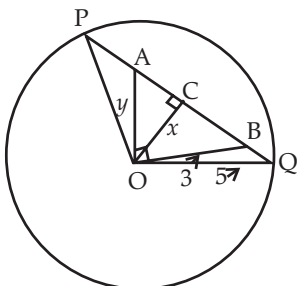
Then $x^2 - 5x + 6 = 0$
 $x = 2, 3$

So, total number of integer = 3.

15. Option (3) is correct.

$$\text{Length of AB} = \sqrt{4^2 + 3^2}$$

$$= 5$$



We know that for triangle OAB

$$\Rightarrow \frac{1}{2} \times 4 \times 3 = \frac{1}{2} \times 5 \times x$$

$$x = 2.4$$

In triangle OCQ $\Rightarrow CQ = \sqrt{5^2 - 2.4^2} = 4.4$

So, length of PQ = $4.4 \times 2 = 8.8$

16. The correct Answer is [90000].

Let principle amount = x

Total amount after 2 years compounded 5% per annum

$$= x \times \frac{105}{100} \times \frac{105}{100}$$

Total amount after 3 years at simple interest 3% per annum

$$= x \times \frac{109}{100}$$

Given

$$x \times \left(\frac{105}{100}\right)^2 - x \times \frac{109}{100} = 1125$$

$\therefore x = ₹90000$

17. The correct Answer is [17].

Given $2x + 5y = 99$

We know even + odd = odd

As $2x$ is even. Means y must be odd number.

And minimum possible for y would be -19 .

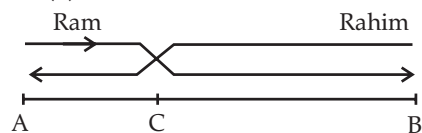
And x always be more than y .

So possible values for $y = -19, -17, -15 \dots$ till 13

As if y is greater than 13 then x will be less than y .

So from -19 to 13 total possible values for $y = 17$.

18. Option (3) is correct.



After crossing each other they reach their destination in 1 min and 4 min respectively

then let speed of Ram = s_1

and speed of Rahim = s_2

Then $\frac{s_1}{s_2} = \sqrt{\frac{T_2}{T_1}}$

$$\frac{s_1}{s_2} = \sqrt{\frac{4}{1}}$$

$$\frac{s_1}{s_2} = \frac{2}{1}$$

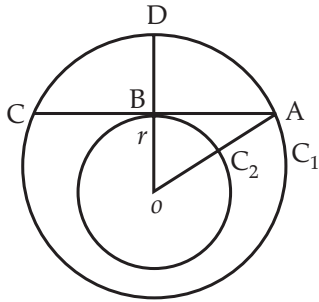
19. The correct Answer is [10].

Let $OB = r$

Then $OA = r + 1$

Given $AC = 6$

Means $AB = 3$



Only combination is possible for right angle triangle

$$OAB = 3, 4, 5$$

Means $OA = 5$ which is radius for C_1

So, diameter of $C_1 = 2 \times 5 = 10$ cm.

20. **Option (3) is correct.**

Let Arun buy x pencil and y sharpener

The Aditya buys $2x$ pencil and $(y - 10)$ sharpener.

Set cost price of pencil = P

cost price of sharpener = $(P + 2)$

	Pencil	Sharpener	Total cost
Arun	$x \times P$	$y \times (P + 2)$	
Aditya	$2x \times P$	$(y - 10) \times (P + 2)$	

Now

$$2xP - xP = y(P + 2) - (y - 10)(P + 2)$$

$$xP = 10P + 20$$

$$(x - 10)P = 20 \quad \dots(i)$$

from equation (1) $x_{\min} = 11$

So, total minimum possible pencil

$$= 11 \times 3 = 33$$

21. **Option (2) is correct.**

Given $f(x) = x^2 + ax + b \quad \dots(i)$

and $g(x) = f(x+1) - f(x-1) \quad \dots(ii)$

and $g(20) = 72$

Now put $x = 20$ in equation (ii)

$$\Rightarrow g(20) = f(21) - f(19)$$

$$72 = 21^2 + 21a + b - 19^2 - 19a - b$$

$$a = -4$$

Given $f(x) \geq 0$

Means $D \leq 0$

$$(a^2) - 4ab \leq 0$$

$$16 - 4b \leq 0$$

$$b \geq 4$$

Hence, smallest possible value of $b = 4$

22. **The correct Answer is [23].**

Given $x + 9 = z$ and $y + 1 = z$

and $x + y < z + 5$

Add both equation

$$\Rightarrow x + y = 2z - 10 < z + 5$$

So, $z < 15$

$$z_{\max} = 14$$

then $x = 5$

and $y_{\max} = 13$

Means $(2x + y)_{\max} = 2 \times 5 + 13 = 23$

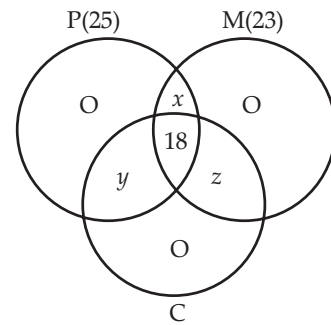
23. **Option (1) is correct.**

Given

only $P = 0$

only $M = 0$

only $C = 0$



Let only $P \& M = x$

only $P \& C = y$

only $C \& M = z$

for minimizing chemistry student, we have to maximise only $P \& M$ which is 5.

But those who choose P as one of their subject.

So value of $y = 2$

and $z_{\min} = 0$

Total number of student who choose chemistry as one of their subject

$$= 18 + 2 = 20$$

24. **Option (1) is correct.**

$$\log_a \left(\frac{a}{b} \right) + \log_b \left(\frac{b}{a} \right)$$

$$\Rightarrow \log_a a - \log_a b + \log_b b - \log_b a$$

$$= 2 - \left[\frac{\log b}{\log a} + \frac{\log a}{\log b} \right]$$

We know that $x + \frac{1}{x} \geq 2$

$$\text{So, } \left[2 - \left(x + \frac{1}{x} \right) \right]_{\min}^{\max} = 0$$

So, option (1) is right as answer cannot be more than 1.

25. The correct Answer is [4].

Given John : Jack
 Time 2 : 1
 So, efficiency 1 : 2 ... (i)
 Again Jack + Jim : John
 So, efficiency 3 : 1 ... (ii)
 from (i) and (ii)

$$\text{Efficiency of Jim} = 3 - 2 = 1$$

Now ratio of efficiency

$$\Rightarrow \text{John : Jack : Jim : All three} \\ 1 : 2 : 1 : 4$$

Means John : All three

$$\text{Efficiency} \Rightarrow 1 : 4$$

$$\text{So time} \Rightarrow 4 : 1$$

$$\text{Given } 4x - x = 3$$

$$x = 1$$

$$\text{Means time taken by John} = 4 \times 1 \\ = 4 \text{ day}$$

26. Option (2) is correct.

$$\frac{x}{\sqrt{1+x^4}} = \frac{1}{\sqrt{\frac{1}{x^2} + x^2}}$$

We know that

$$\left(x + \frac{1}{x}\right) \geq 2$$

$$\text{So minimum value for } \frac{1}{x^2} + x^2 = 2$$

$$\text{So, } \left(\frac{x}{\sqrt{1+x^4}}\right)_{\max} = \frac{1}{\left(\sqrt{\frac{1}{x^2} + x^2}\right)_{\min}} \\ = \frac{1}{\sqrt{2}}$$

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