

CAT 2020

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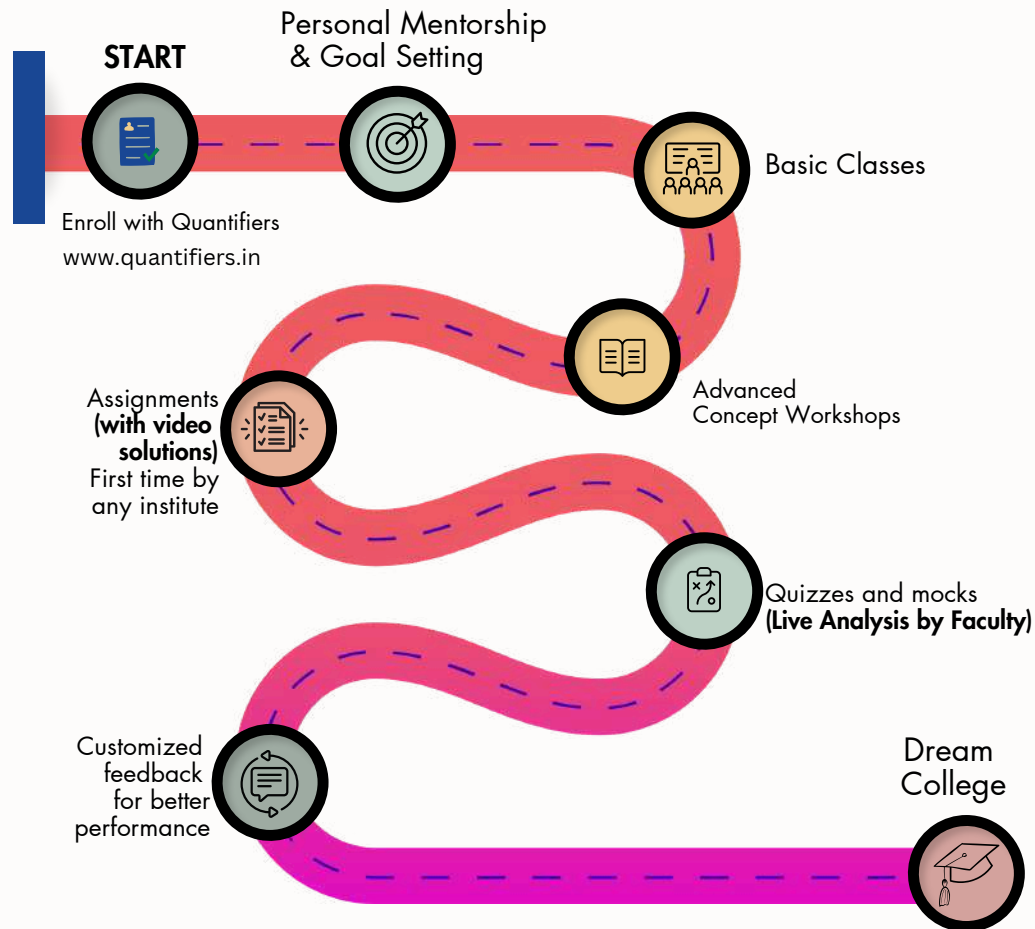
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CAT 2020 SLOT 2 VARC

DIRECTIONS for the question: Read the passage and answer the question based on it.

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 globalization 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 \$2million 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.

Question No. : 1

The author ascribes the rise In piracy today to all of the following factors EXCEPT:

A)Decreased surveillance of the high seas.

- B) The growth in international shipping with globalisation.
- C) The high rewards via ransoms for successful piracy attempts.
- D) Colonialism's disruption of historic ties among countries.

Question No. : 2

"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:

- A) Indignant, at the scale of wealth successful pirates could amass in medieval times.
- B) Ironic, about the reasons why so many took to piracy in medieval times.
- C) Analytical, to explain the contrasts between peasant and pirate life in medieval England.
- D) Facetious, about the hardships of peasant life in medieval England.

Question No. : 3

"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:

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

Question No. : 4

We can deduce that the author believes that piracy can best be controlled in the longrun:

- A) Through the extensive deployment of technology to track ships and cargo
- B) Through lucrative welfare schemes to improve the lives of people in affected regions.
- C) If we eliminate poverty and income disparities in affected regions.
- D) Through international cooperation in enforcing stringent deterrents

DIRECTIONS for the question: Read the passage and answer the question based on it.

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.’

Question No. : 5

Which one of the following statements, if false, could be seen as best supporting the arguments in the passage?

- A) Renewable energy systems have little or no environmental impact.
- B) Renewable energy systems are as expensive as non-renewable energy systems.
- C) Renewable energy systems are not as profitable as non-renewable energy systems.
- D) The production and distribution of renewable energy through small-scale, local systems is not economically sustainable.

Question No. : 6

All of the following statements, if true, could be seen as supporting the arguments in the passage, EXCEPT:

- A) One reason for the perpetuation of social injustice lies in the problem of the disposal of toxic waste.

- B) Marginalised people in Africa, Asia and Latin America have often been the main sufferers of corporate mineral extraction projects.
- C) The example of agricultural finance helps us to see how to concentrate corporate activity in the renewable energy sector.
- D) The possible negative impacts of renewable energy

Question No. : 7

Which one of the following statements, if true, could be an accurate inference from the first paragraph of the passage?

- A) The author has reservations about the consequences of non-renewable energy systems.
- B) The author does not think renewable energy systems can be as efficient as non-renewable energy systems
- C) The author's only reservation is about the profitability of renewable energy systems.
- D) The author has reservations about the consequences of renewable energy systems.

Question No. : 8

Which one of the following statements best captures the main argument of the last paragraph of the passage?

- A) Renewable energy systems are not democratic unless they are corporate-controlled.
- B) The development of the renewable energy sector is a double-edged sword.
- C) Renewable energy produced at the household or neighbourhood level is more efficient than mass-produced forms of energy.
- D) Most forms of renewable energy are not profitable investments for institutional investors.

Question No. : 9

Based on the passage, we can infer that the author would be most supportive of which one of the following practices?

- A) The study of the coexistence of marginalised people with their environments.
- B) Encouragement for the development of more environment-friendly carbon-based fuels.
- C) More stringent global policies and regulations to ensure a more just system of toxic waste disposal.
- D) The localised, small-scale development of renewable energy systems

DIRECTIONS for the question: Read the passage and answer the question based on it.

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 (orgazes) 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 no art. . . . 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 form any 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 life worlds 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.

Question No. : 10

“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?

- A) Socially existing beings cannot be analysed, unlike the art of Michelangelo or Leonardo which can.
- B) Michelangelo or Leonardo cannot be subjected to social analysis because of their genius.
- C) Social analytical accounts of people like Michelangelo or Leonardo cannot explain their genius.
- D) No analyses exist of Michelangelo's or Leonardo's social accounts

Question No. : 11

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

- A) Visual culture is not just about how we see, but also about how our visual practice scan impact and change the world.
- B) Artifacts are meaningful precisely because they help to construct the meanings of the world for us.
- C) Understanding the structures of perception is an important part of understanding how visual cultures work.
- D) Studying visual culture requires institutional structures without which the structures of perception cannot be analysed

Question No. : 12

“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?

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

Question No. : 13

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

- A) Imagery, Visual Practices, Life worlds, Structures of Perception.
- B) Visual Construction of Reality, Work of Genius, Ethnography, Epiphenomena
- C) Scholars, Social Analysis, Michelangelo and Leonardo, Interpretive Devices
- D) Visual Culture, Aesthetic Value, Lay Audience, Visual Experience.

Question No. : 14

Which one of the following best describes the word “epiphenomena” in the last sentence of the passage?

- A) Phenomena amenable to analysis.
- B) Visual phenomena of epic proportions.
- C) Overarching collections of images
- D) Phenomena supplemental to the evidence

DIRECTIONS for the question: Read the passage and answer the question based on it.

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 nonviolent 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.

Question No. : 15

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

- A) If the alleged aggressive act is not sought to be avoided, it cannot really be considered aggression
- B) Freud's theory of aggression proposes that aggression results from the suppression of aggressive urges.
- C) 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.

D) A common theory of aggression is that it is the result of an abnormally low neural regulation of testosterone.

Question No. : 16

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

- A) Hostile – Instrumental – Hormonal
- B) Extreme – Moderate – Mild
- C) Psychologically – Sociologically – Medically.
- D) Aggressor – Circumstances of aggression – Victim

Question No. : 17

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

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

Question No. : 18

“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.” Which one of the following best explicates the larger point being made by the author here?

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

Question No. : 19

DIRECTIONS for the question: The four sentences (labelled 1,2,3 and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentence and key in this sequence of 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.

Question No. : 20

DIRECTIONS for question The question consists of different statements one of which does not fit into the paragraph. Identify that sentence which is a misfit and choose that option 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.

Question No. : 21

DIRECTIONS for the question: Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

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.

Question No. : 22

DIRECTIONS for the question: Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

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.

Question No. : 23

DIRECTIONS for the question: Identify the most appropriate summary for the paragraph.

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.

- A) While decisions based on intuition can be made fast, the reasons that led to these cannot be spelt out.
- B) It is better to make decisions based on information because it is more accurate, and the rationale behind it can be explained.
- C) Decisions based on intuition and information result in differential speed and ability to provide a rationale.
- D) make decisions based on intuition or information on the basis of the time available.

Question No. : 24

DIRECTIONS for the question: Identify the most appropriate summary for the paragraph.

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.

- A) 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.
- B) Thomas Hobbes theorized the emergence of sovereign states as a form of transactional governance to limit the power of the papacy.
- C) Thomas Hobbes theorized the voluntary surrender of rights by people as essential for emergence of sovereign states.
- D) 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.

Question No. : 25

DIRECTIONS for question The question consists of different statements one of which does not fit into the paragraph. Identify that sentence which is a misfit and choose that option 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 monopolized 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.

Question No. : 26

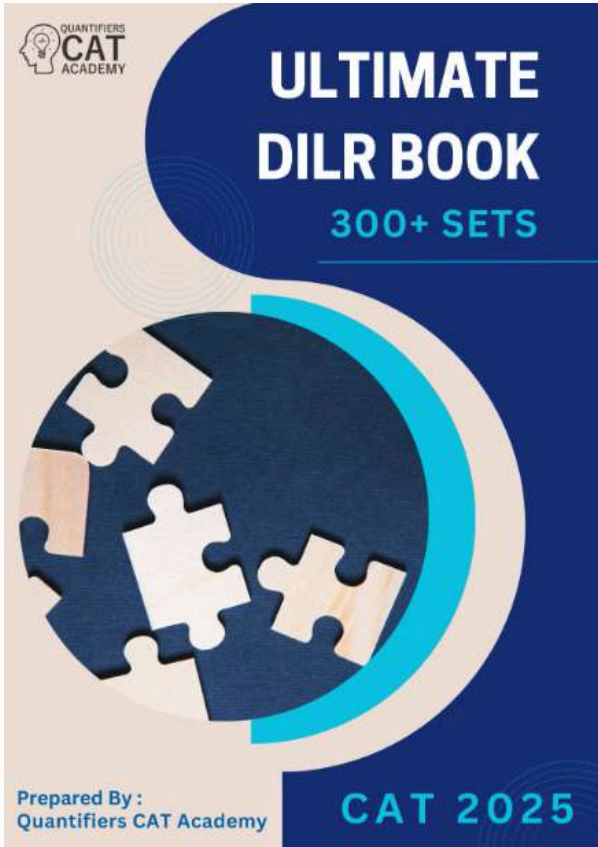
DIRECTIONS for the question: Identify the most appropriate summary for the paragraph.

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

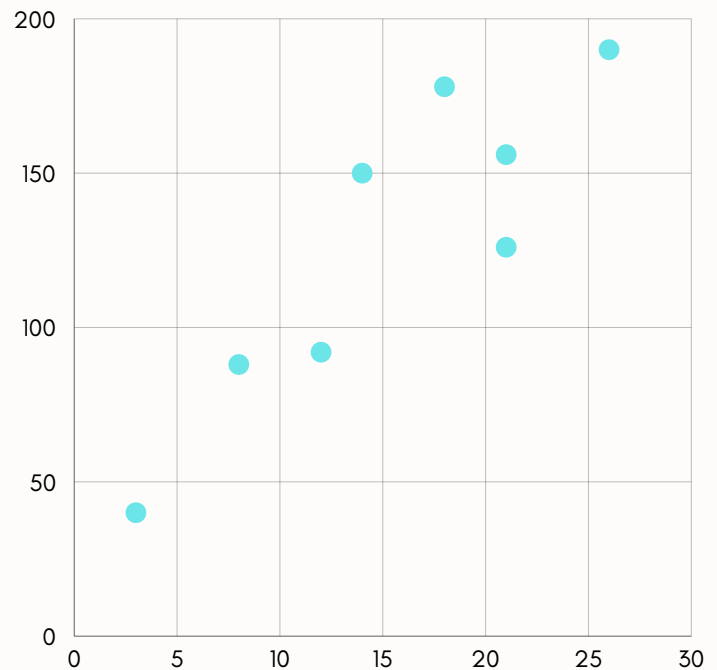
nature of a city's function and its environment, but the joint interpretation of these criteria may require an element of human judgment.

- A) 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.
- B) With the diversity of urban landscapes, measurable criteria for defining urban areas may need to be supplemented with human judgement.
- C) Current methodologies used to define urban and rural areas are no longer relevant to our being able to study trends in urbanisation.
- D) Distinguishing between urban and rural areas might call for some judgement on the objective methodology being used to define a city's functions.





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

Question No. : 1

The total number of possible configurations using beads of only two colors is:

Question No. : 2

What is the maximum possible number of Red beads that can appear in any configuration?

Question No. : 3

What is the minimum number of Blue beads in any configuration?

Question No. : 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?

DIRECTIONS for the question: Read the information given below and answer the question 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 9:00am, 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.

Question No. : 5

Which one of the following statements is true?

- A. Three seminars are scheduled in the first slot.
- B. Two seminars are scheduled in the first slot.
- C. Only one seminar is scheduled in the second slot.
- D. Three seminars are scheduled in the last slot.

Question No. : 6

Who all are NOT guiding any Economics students?

- A. P, Q and S
- B. P, R and S
- C. Q, R and S
- D. P, Q and R

Question No. : 7

Which of the following statements is necessarily true?

- A. B is scheduled in the first slot.
- B. H is an Economics student.
- C. Q is guiding G
- D. S is guiding F.

Question No. : 8

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.

- A. Only (i)
- B. Both (i) and (ii)

- C. Only (ii)
- D. Neither (i) nor (ii)

Question No. : 9

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?

- A. At least one of D and H is guided by T.
- B. Neither D nor H is guided by T.
- C. Both D and H are guided by T.
- D. Exactly one of D and H is guided by T.

Question No. : 10

If D is scheduled in the slot immediately before Q's, then which of the following is NOT necessarily true?

- A. D is guided by T.
- B. G is guided by Q.
- C. F is guided by S.
- D. E is guided by R.

DIRECTIONS for the question: Go through the graph and the information given below and answer the question 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	95,000			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.

Question No. : 11

What is the percentage of votes polled in total by all the candidates who lost their security deposits while contesting for constituency A?

Question No. : 12

How many candidates who contested in constituency B lost their security deposit?

Question No. : 13

What BEST can be concluded about the number of votes polled by the winning candidate in constituency C?

- A. Less than 2,00,010
- B. 1,40,010
- C. Between 1,40,005 and 1,40,010
- D. 1,40,006

Question No. : 14

What was the number of valid votes polled in constituency D?

- A. 1,75,000
- B. 1,50,000
- C. 62,500
- D. 1,25,000

Question No. : 15

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?

- A) B, C, D, A
- B) D, B, C, A
- C) B, D, C, A
- D) D, C, B, A

Question No. : 16

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?

- A) 23.91%
- B) 23.54%
- C) 32.00%
- D) 38.25%

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

- The sales amounts in the Apparel departments were the same for Delhi and Kolkata in 2018.
- 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.
- The sales amounts in the Home Décor departments were the same for Mumbai and Kolkata in 2018.
- 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 Home Décor departments increased by Rs 70 Crores from 2018 to 2019.
6. The sales amounts in the Home Décor departments of Delhi and Bengaluru each increased by Rs 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.

Question No. : 17

In Home Decor departments of which cities were the sales amounts the highest in 2018 and 2019, respectively?

- A. Mumbai and Mumbai
- B. Delhi and Delhi
- C. Bengaluru and Delhi
- D. Mumbai and Delhi

Question No. : 18

What was the increase in sales amount, in Crore Rupees, in the Apparel department of Mumbai from 2018 to 2019?

- A. 10
- B. 5
- C. 8
- D. 12

Question No. : 19

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?

- A. 75
- B. 50
- C. 28
- D. 25

Question No. : 20

What was the total sales amount, in Crore Rupees, in 2019 for the chain of departmental stores?

- A. 600
- B. 150
- C. 750
- D. 900

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

Question No. : 21

Answer the following questions INDEPENDENTLY of each other.

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?

- A) 8
- B) 5
- C) 7
- D) 6

Question No. : 22

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?

- A. 8, 2, 3, V, 5, 6, 7
- B. 8, 2, 3, V, 6, 5, 7
- C. V, 2, 3, 7, 5, 6, 8
- D. 8, 2, 3, V, 5, 7, 6

Question No. : 23

Suppose the sequence at some point of time is 4, 5, 6, V, 3. Which of the following is NOT necessarily true?

- A. Car 3 is an SUV
- B. Car 5 is a compact

- C. Car 4 is a compact
- D. Car 1 is an SUV

Question No. : 24

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?

- A. Car 4 is an SUV
- B. Car 2 is a compact
- C. Car 6 is a compact
- D. Car 7 is a compact



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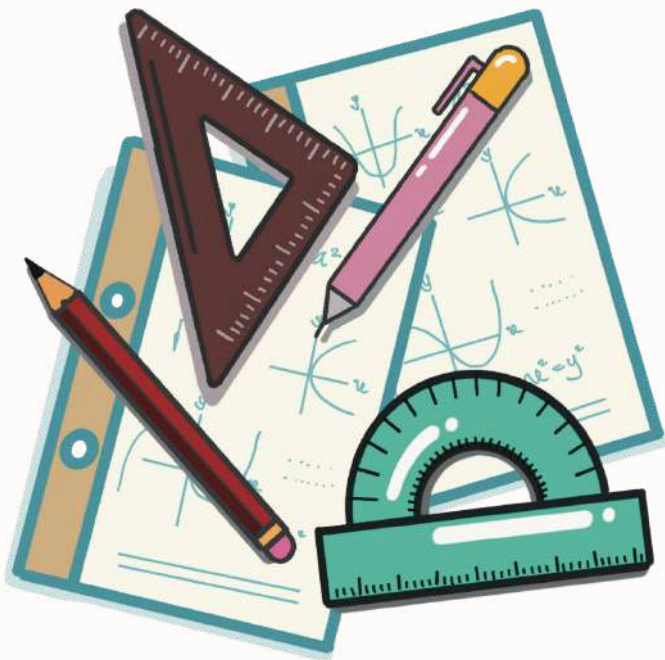
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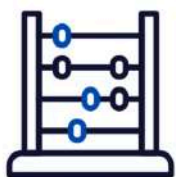
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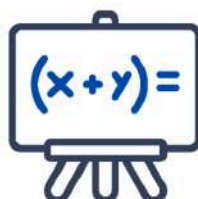
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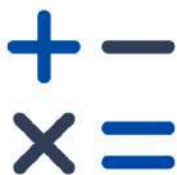


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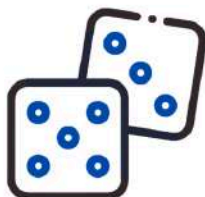
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CAT 2020 SLOT 2 QUANT

Question No. : 1

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

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 Rs 400, then Sunil's share, in rupees, is

Question No. : 2

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

The number of pairs of integers (x, y) satisfy $x \geq y \geq -20$ and $2x + 5y = 99$ is

Question No. : 3

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

The number of integers that satisfy the equality

$$(x^2 - 5x + 7)^{x+1} = 1$$

- A) 4
- B) 2
- C) 3
- D) 5

Question No. : 4

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

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 Rs. 1125. Then the principal amount in rupees is

Question No. : 5

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

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 Rs. 2 more than the cost of a pencil, then the minimum possible number of pencils bought by Aron and Aditya together is

- A) 36
- B) 33
- C) 30
- D) 27

Question No. : 6

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

In May, John bought the same amount of rice and the same amount of wheat as he had bought in April, but spent Rs. 150 more due to price increase of rice and wheat by 20% and 12%, respectively. If John had spent Rs. 450 on rice in April, then how much did he spend on wheat in May?

- A) Rs. 560
- B) Rs. 570
- C) Rs. 580
- D) Rs. 590

Question No. : 7

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

How many 4-digit numbers, each greater than 1000 and each having all four digits distinct, are there with 7 coming before 3?

Question No. : 8

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

If x and y are positive real numbers satisfying $x + y = 102$, then the minimum possible value of

$$2601 \left(1 + \frac{1}{x}\right) \left(1 + \frac{1}{y}\right)$$

Question No. : 9

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

In how many ways can a pair of integers (x, a) be chosen such that $x^2 - 2|x| + |a - 2| = 0$?

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

Question No. : 10

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

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 to meet Rahim again for the first time is

- A) 2

- B) 5
- C) 3
- D) 4

Question No. : 11

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

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

- A. 4
- B. 1
- C. 16
- D. 0

Question No. : 12

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

Let C_1 and C_2 be concentric circles such that the diameter of C_1 is 2cm longer than that of C_2 . If a chord of C_1 has length 6cm and is a tangent of C_2 , then the diameter, in cm, of C_1 is

Question No. : 13

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

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

- A) 21
- B) 18
- C) 24
- D) 27

Question No. : 14

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

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 travelling from A to C is

- A) 7:5
- B) 1:4
- C) 5:7
- D) 4:1

Question No. : 15

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

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

- A) 3
- B) 5
- C) 4
- D) 6

Question No. : 16

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

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

- A) -2
- B) 6
- C) 2
- D) -4

Question No. : 17

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

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

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

Question No. : 18

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

In a car race, car A beats car B by 45 km, car B beats car C by 50km, and car A beats C by 90 km. the distance (in km) over which the race has been conducted is

- A. 550
- B. 500
- C. 475

D. 450

Question No. : 19

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

From an interior point of an equilateral triangle, perpendiculars are drawn on all three sides.

A) $\frac{2s^2}{\sqrt{3}}$ B) $\frac{s^2}{2\sqrt{3}}$ C) $\frac{\sqrt{3}s^2}{2}$ D) $\frac{s^2}{\sqrt{3}}$

The sum of the lengths of the three perpendiculars is s. Then the area of triangle is

Question No. : 20

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

- A. 19
- B. 22
- C. 20
- D. 21

Question No. : 21

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

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

- A) 60
- B) 54
- C) 55
- D) 50

Question No. : 22

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

For real x , the maximum possible value of $\frac{x}{\sqrt{1+x^4}}$ is

- A) $\frac{1}{\sqrt{2}}$ B) $\frac{1}{2}$ C) $\frac{1}{\sqrt{3}}$ D) 1

Question No. : 23

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?

Question No. : 24

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

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

- A) -0.5
B) 1
C) 0
D) -1

Question No. : 25

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

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 $2x + y$?

Question No. : 26

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

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

- A) 8.8
B) 7.2
C) 7.8
D) 6.6



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SOLUTIONS

VARC

1. Correct Answer:- A

Options B, C and D find support in paragraph 4, 3 and 1 respectively. Only option A does not find mention in the passage.

2. Correct Answer:- B

Indignant means showing anger or annoyance

Analytical means logical

Facetious meaning sarcasm.

The author's views in the given sentence do not support any of the above.

Rather he is giving reasons to why the people indulge I piracy, so IRONIC is appropriate.

3. Correct Answer:- D

Option A is rejected because he has just mentioned them as examples and not those who laid foundation of piracy.

Option B is rejected as it is opposite to what is mentioned in 2nd paragraph.

Option C is eliminated as the paragraph talks about disorganised people and not piracy.

Only option D brings in the meaning of the sentence(i.e. acquisition of wealth)

4. Correct Answer:- C

Everything else is rejected by the author (refer penultimate paragraph) and only option C could help to bring piracy under control in the long run

5. Correct Answer:- A

Refer to the line “for some climate activists----- access to energy”. So option A is correct.

6. Correct Answer:- D

Negative impacts of renewable energy need to be studied to ensure no social or environmental harm. Hence option D is the answer.

7. Correct Answer:- D

The author's reservation is about different consequences of renewable energy systems on environment, profitability etc. hence option D is the answer.

8. Correct Answer:- B

According to the last paragraph, there are pros as well as con to look after before going ahead with the development of renewable energy, hence option B is correct.

9. Correct Answer:- C

Throughout the passage, the author is majorly concerned about developing renewable systems o energy to reduce carbon footprint and the disposal of toxic waste globally, hence option C is correct.

10. Correct Answer:- C

Options A, B and D are illogical, only C can be interpreted.

11. Correct Answer:- D

Options A, B and C find support in paragraph 1, 4 and last respectively. Only option D cannot be inferred because not only institutional structure, but a number of other factors need to be considered that help to study visual culture.

12. Correct Answer:- B

Only option B conveys the correct interpretation of the given sentence. The idea is sight or vision becomes the meaningful visual experience. Rest of the options distort the main idea by putting focus on images, meaningful convenants or images of convenants being the base of visual experience which is wrong.

13. Correct Answer:- A

If we scan the passage from paragraph, 2 till the end, we can find the proper order of the words. First is IMAGERY, second is VISUAL PRACTICES, third is LIFEWORLDS, fourth is STRUCTURES OF PERCEPTION. Hence option A.

14. Correct Answer:- D

EPIPHENOMENA means a secondary effect or by-product of some event or condition, so option D is bringing the correct meaning.

15. Correct Answer:- D

2nd line of para 1 supports option A

6th line of para 2 supports option B

5th line of para 2 supports option C

Whatever is mentioned as option D is opposite to the contents of the passage, hence the answer.

16. Correct Answer:- D

The answer is clearly mentioned in the last lines of 1st para. Hence option D.

17. Correct Answer:- D

Options A, B and C find mention in 2nd paragraph. But option D states opposite to the 4th line of 2nd para, hence the answer.

18. Correct Answer:- A

The example is used by the author to explain a different type of aggression and not the type of torture inflicted on the enemy with the motive to extract any information as depicted in options B, C and D.

The best explanation is given in option A.

19. Correct Answer:- 2413

Sentence 2 opens the paragraph as it introduces the topic.

Sentence 4 gives further explanation to 2 and its contrast is given in 1.

The paragraph concludes with 3.
So the sequence is 2413

20. Correct Answer:- 4

The sentences 5231 seem to form a sequence.

The 'questions' that arose in 4 seem to be from the same article but a link is missing to put 4 in the above sequence because we can't identify how the 'charitable questions' came up.

Hence sentence 4 is the misfit

21. Correct Answer:- 2143

Sentence 2 introduces the topic VLT.

The pronoun 'it' in 1 pairs with 2 (noun-pronoun pair)

4 describes further the functioning of VLT (key word 'these')

Finally 3 closes the paragraph.

So the sequence is 2143

22. Correct Answer:- 1342

Sentence 1 opens the paragraph by introducing the topic (your brain is aware of all changes going around)

Sentence 3 comes next in sequence (keyword "it" referring to brain)

Sentence 4 further explains 3

Sentence 2 concludes the paragraph.

The final sequence is 1342

23. Correct Answer:- C

We can conveniently eliminate options A and B as they focus on single aspect of the paragraph.

Option D, though specifies both aspects, is eliminated because it is not the matter of time that is considered to differentiate between both types of decision-making.

Only option C accurately captures the essence of the paragraph.

24. Correct Answer:- D

Options A and C are rejected because of the usage of 'voluntary desires' or 'voluntary surrender of rights' of people, rather it was a transactional relationship between people and sovereign state and the same is aptly presented in option D.

Option B is opposite to the contents of the paragraph, hence eliminated.

25. Correct Answer:- 2

correct sequence is 3154

Whereas in 2, altogether a different aspect (merchant capitalism) is taken which finds reference in none of the other sentences.

Although the other sentences talk about the beginning of the end of capitalism and also discuss new ways of working and sharing economy, but merchant capitalism is misfit here.

Hence sentence 2 is the misfit.

26. Correct Answer:- B

Option C is eliminated because the paragraph does not mention that current methodologies are irrelevant.

Option D is rejected as combination of criteria is also important for interpretation of city's functions.

Option A seems close but missed the aspect of human judgement, hence rejected.

Option B captures the summarized essence of the paragraph.



DILR

1. Correct Answer:- 2

If we have to use 2 colors, then those two colors have to be Blue and Green only, because if red color is used, then there has to be at least one green and one blue between any two beads. There are two possible configurations if exactly 2 colors are used. Diagrams are shown below:

A

BLUE	GREEN	BLUE	GREEN	BLUE
GREEN	BLUE	GREEN	BLUE	GREEN
BLUE	GREEN	BLUE	GREEN	BLUE
GREEN	BLUE	GREEN	BLUE	GREEN
BLUE	GREEN	BLUE	GREEN	BLUE

B

GREEN	BLUE	GREEN	BLUE	GREEN
BLUE	GREEN	BLUE	GREEN	BLUE
GREEN	BLUE	GREEN	BLUE	GREEN
BLUE	GREEN	BLUE	GREEN	BLUE
GREEN	BLUE	GREEN	BLUE	GREEN

2. Correct Answer:- 9

Maximum number of red beads can appear only when we minimize Blue and Green colored beads.

The arrangement is as given below:

RED	GREEN	BLUE	RED	GREEN
GREEN	RED	GREEN	BLUE	RED
BLUE	GREEN	RED	GREEN	BLUE
RED	BLUE	GREEN	RED	GREEN
GREEN	RED	BLUE	GREEN	RED

So we can see that there are 9 Red colored beads in the above arrangement.

3. Correct Answer:- 6

Minimum number of blue beads can appear only when we maximize Red and Green colored beads.

The arrangement is as given below:

RED	GREEN	BLUE	RED	GREEN
GREEN	RED	GREEN	BLUE	RED
BLUE	GREEN	RED	GREEN	BLUE
RED	BLUE	GREEN	RED	GREEN
GREEN	RED	BLUE	GREEN	RED

So we can see that there are 6 Blue colored beads in the above arrangement.

4. Correct Answer:- 6

We will make the arrangement as given in the question:

RED			RED	
		RED		
	RED			RED
RED			RED	
		RED		

Now we can see that there will be maximum 6 red colored beads which satisfy the given arrangement.

5. Correct Answer:- B

From 1, Economics is at scheduled at each slot

From 2, Only A is scheduled at 10 so it has to be Economics and guided by R

From 5, 6 and 7 B,G and C are having seminar on Sociology. B and C are guided by P and having seminar in first two slots so C will be at 9, B and G will be at 9:30 and 1 student from economics guided by T will be also be at 9:30. R cannot be at 9 because Students who are guided by the same guide must be scheduled in consecutive slots.

From 3, F is at 10:30, so at 9:30, 3 students are there and at 9 am, C and 1 more student having economics would be there, at 10 am only 1 student would be there. At 10:30 2 students one having economics and other having anthropology would be there.

From the information given we can draw following table

Name	Subject	Time	Guide
A	Economics	10 am	R
B	Sociology	9:30 am	P
C	Sociology	9 am	P
D	Economics		R,T
E	Economics		R,T
F	Anthropology	10:30 am	S/Q
G	Sociology	9:30 am	S/Q
H	Economics		R,T

From the above information only two would be in 1st slot

6. Correct Answer:- A

From 1, Economics is at scheduled at each slot

From 2, Only A is scheduled at 10 so it has to be Economics and guided by R

From 5, 6 and 7 B,G and C are having seminar on Sociology. B and C are guided by P and having seminar in first two slots so C will be at 9, B and G will be at 9:30 and 1 student from economics guided by T will be also be at 9:30. R cannot be at 9 because Students who are guided by the same guide must be scheduled in consecutive slots.

From 3, F is at 10:30, so at 9:30, 3 students are there and at 9 am, C and 1 more student having economics would be there, at 10 am only 1 student would be there. At 10:30 2 students one having economics and other having anthropology would be there.

From the information given we can draw following table

Name	Subject	Time	Guide
A	Economics	10 am	R
B	Sociology	9:30 am	P
C	Sociology	9 am	P
D	Economics		R.T
E	Economics		R.T
F	Anthropology	10:30 am	S.Q
G	Sociology	9:30 am	S.Q
H	Economics		R.T

Economics are guided by R and T. So ans. is Option 1

7. Correct Answer:- B

From 1, Economics is at scheduled at each slot

From 2, Only A is scheduled at 10 so it has to be Economics and guided by R

From 5, 6 and 7 B,G and C are having seminar on Sociology. B and C are guided by P and having seminar in first two slots so C will be at 9, B and G will be at 9:30 and 1 student from economics guided by T will be also be at 9:30. R cannot be at 9 because Students who are guided by the same guide must be scheduled in consecutive slots.

From 3, F is at 10:30, so at 9:30, 3 students are there and at 9 am, C and 1 more student having economics would be there, at 10 am only 1 student would be there. At 10:30 2 students one having economics and other having anthropology would be there.

From the information given we can draw following table

Name	Subject	Time	Guide
A	Economics	10 am	R
B	Sociology	9:30 am	P
C	Sociology	9 am	P
D	Economics		R.T
E	Economics		R.T
F	Anthropology	10:30 am	S.Q
G	Sociology	9:30 am	S.Q
H	Economics		R.T

From the above information H is an Economics student.

8. Correct Answer:- B

From 1, Economics is at scheduled at each slot

From 2, Only A is scheduled at 10 so it has to be Economics and guided by R

From 5, 6 and 7 B,G and C are having seminar on Sociology. B and C are guided by P and having seminar in first two slots so C will be at 9, B and G will be at 9:30 and 1 student from economics guided by T will be also be at 9:30. R cannot be at 9 because Students who are guided by the same guide must be scheduled in consecutive slots.

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From the information given we can draw following table

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D	Economics		R.T
E	Economics		R.T
F	Anthropology	10:30 am	S.Q
G	Sociology	9:30 am	S.Q
H	Economics		R.T

If D is scheduled later than Q then, Q will be at 9:30 and He will guide G and S will guide F. R will guide D at 10:30. E and H will be guided by T. So ans is option 2

9. Correct Answer:- A

From 1, Economics is at scheduled at each slot

From 2, Only A is scheduled at 10 so it has to be Economics and guided by R

From 5, 6 and 7 B,G and C are having seminar on Sociology. B and C are guided by P and having seminar in first two slots so C will be at 9, B and G will be at 9:30 and 1 student from economics guided by T will be also be at 9:30. R cannot be at 9 because Students who are guided by the same guide must be scheduled in consecutive slots.

From 3, F is at 10:30, so at 9:30, 3 students are there and at 9 am, C and 1 more student having economics would be there, at 10 am only 1 student would be there. At 10:30 2 students one having economics and other having anthropology would be there.

From the information given we can draw following table

Name	Subject	Time	Guide
A	Economics	10 am	R
B	Sociology	9:30 am	P
C	Sociology	9 am	P
D	Economics		R.T
E	Economics		R.T
F	Anthropology	10:30 am	S.Q
G	Sociology	9:30 am	S.Q
H	Economics		R.T

If E and Q are in same slot then it will be 9:30 or at 10:30

If E will be guided by R then D and H will be guided by T, and if E will be guided by T then one of D and H will be guided by T

So At least one of D and H is guided by T

So ans. will be 1st option

10. Correct Answer:- D

From 1, Economics is at scheduled at each slot

From 2, Only A is scheduled at 10 so it has to be Economics and guided by R

From 5, 6 and 7 B,G and C are having seminar on Sociology. B and C are guided by P and having seminar in first two slots so C will be at 9, B and G will be at 9:30 and 1 student from

economics guided by T will be also be at 9:30. R cannot be at 9 because Students who are guided by the same guide must be scheduled in consecutive slots.

From 3, F is at 10:30, so at 9:30, 3 students are there and at 9 am, C and 1 more student having economics would be there, at 10 am only 1 student would be there. At 10:30 2 students one having economics and other having anthropology would be there.

From the information given we can draw following table

Name	Subject	Time	Guide
A	Economics	10 am	R
B	Sociology	9:30 am	P
C	Sociology	9 am	P
D	Economics		R.T
E	Economics		R.T
F	Anthropology	10:30 am	S.Q
G	Sociology	9:30 am	S.Q
H	Economics		R.T

If D is immediately before Q then Q is at 9:30 and D is at 9 that means F if guided by S at 10:30, G is guided by Q, D and E can be guided by R/T

So ans is option 4

11. Correct Answer:- 9

	A	B	C	D
Number of candidates	10	12	5	8
Total valid votes	500000	325000	600030	
Winning candidate	275000	48750		
First runner up	95000			37500
Second runner up	(85000)			30000
% of votes by Third runner up				10%

Votes got by Second runner up from A= 95000-10000= 85000

Votes got by the candidates who lost their security deposits= 500000-275000-95000-85000= 45000

$$\text{Required \%} = \frac{45000}{500000} \times 100 = 9\%$$

12. Correct Answer:- 11

	A	B	C	D
Number of candidates	10	12	5	8
Total valid votes	500000	325000	600030	
Winning candidate	275000	48750		
First runner up	95000			37500
Second runner up	(85000)			30000
% of votes by Third runner up				10%

In constituency B winner got = $\frac{48750}{325000} \times 100 = 15\%$

So all the candidates except the winner lose their security deposit because they got less than $\frac{1}{6}$ of the total valid votes.
So ans is $12-1=11$

13. Correct Answer:- D

	A	B	C	D
Number of candidates	10	12	5	8
Total valid votes	500000	325000	600030	
Winning candidate	275000	48750		
First runner up	95000			37500
Second runner up	(85000)			30000
% of votes by Third runner up				10%

All candidates should get more than $\frac{1}{6}$ of the total valid votes which is

$$\frac{600030}{6} = 100005$$

Suppose winner got = x votes, and if we assume that each candidate got 10000 less votes than previous candidate
Then A.T.Q

$$= x + x - 10000 + x - 20000 + x - 30000 + x - 40000 = 600030$$

Then x = 140006

So ans is option 4

14. Correct Answer:- A

	A	B	C	D
Number of candidates	10	12	5	8
Total valid votes	500000	325000	600030	
Winning candidate	275000	48750		
First runner up	95000			37500
Second runner up	(85000)			30000
% of votes by Third runner up				10%

Let the valid votes in constituency D = x

1st runner up got = 37500

Winner got $37500 + .05x$

2nd runner up got 30000 votes and the remaining candidates loose their security so

A.T.Q

$$37500 + .05x + 37500 + 30000 = 0.65x$$

So x = 175000

So ans is 1st option

15. Correct Answer:- A

	A	B	C	D
Number of candidates	10	12	5	8
Total valid votes	500000	325000	600030	
Winning candidate	275000	48750		
First runner up	95000			37500
Second runner up	(85000)			30000
% of votes by Third runner up				10%

Winning margin in constituency D = $.05 \times 175000 = 8750$

Winning margin of C is atleast 10000 that means margin of C is greater than D

So option 1 is wrong.

16. Correct Answer:- A

	A	B	C	D
Number of candidates	10	12	5	8
Total valid votes	500000	325000	600030	
Winning candidate	275000	48750		
First runner up	95000			37500
Second runner up	(85000)			30000
% of votes by Third runner up				10%

Total votes = $500000 + 325000 + 600030 + 175000 = 1600030$

In A ($500000 - 275000 - 95000 - 85000$) = 45000 votes were polled to the candidates who lost their security

In B, All candidates except the winner lost their security which is equal to $325000 - 48750 = 276250$

In C, no one lost the security

In D, 35% of $175000 = 61250$ votes are polled to the candidates who lost their security

Total votes polled to the candidates who lost their security = $45000 + 276250 + 61250 = 382500$

So answer is option 1

17. Correct Answer:- B

We have the following incomplete table which can be filled with different letters as per the condition given.

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	x	y	y	c	y	b	x	54
Electronics	78	98	82	102	90	70	80	100
Home decor		100	a	72		80	a	54

In last point it is given that y, 54 and b are A. P. $\Rightarrow bb + y = 108$ ----(1)

The total of electronics dept. In 2018 = 330cr

Total of electronics dept. in 2019 = 370cr

Inc case are in sales in 2019 as compare to 2018 is 40 cr

As per the point 4, we have

$$(y + c + b + 54) - (x + y + y + x) = 40$$

$$\Rightarrow b + c + 54 - y - 2x = 40$$

$$\Rightarrow 2x + y - b - c = 14 \quad \text{---(2)}$$

From 7, we have $y - x = b - y$

$$\Rightarrow b = 2y - x \quad \text{---(3)}$$

$$\& \quad c - y = 54 - x$$

$$\Rightarrow c = 54 + y - x \quad \text{---(4)}$$

Using (3) & (4) in (2) we get $2x + y - 2y + x - 54 - y + x = 14$

$$\Rightarrow 4x - 2y = 68$$

$$\Rightarrow 2x - y = 34 \quad \text{---(5)}$$

Using (3) in (1), we get, $3y - x = 108 \quad \text{---(6)}$

Solve (5) & 6, to get $y = 50, x = 42$

$$\therefore (3) \Rightarrow b = 58$$

$$(4) \Rightarrow c = 62$$

Total sale of Home décor increased by Rs 70 cr. Using point 6, we can say that sale of Home décor in Delhi in 2018 is Rs 80 cr & in Bengaluru in 2018 is Rs 60 Cr.

$$\text{Now } 72 - a + 54 - a = 30$$

$$\Rightarrow 2a = 96 \Rightarrow a = 48$$

Hence the final table is as below

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home decor	80	100	48	72	60	80	48	54

In Home décor, Delhi has maximum sales in 2018 & 2019.

18. Correct Answer:- D

We have the following incomplete table which can be filled with different letters as per the condition given.

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	x	y	y	c	y	b	x	54
Electronics	78	98	82	102	90	70	80	100
Home decor		100	a	72		80	a	54

In last point it is given that $y, 54$ and b are A. P. $\Rightarrow bb + y = 108 \quad \text{---(1)}$

The total of electronics dept. In 2018 = 330cr

Total of electronics dept. in 2019 = 370cr

Incase are in sales in 2019 as compare to 2018 is 40 cr

As per the point 4, we have

$$(y + c + b + 54) - (x + y + y + x) = 40$$

$$\Rightarrow b + c + 54 - y - 2x = 40$$

$$\Rightarrow 2x + y - b - c = 14 \quad \text{---(2)}$$

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Total sale of Home décor increased by Rs 70 cr. Using point 6, we can say that sale of Home décor in Delhi in 2018 is Rs 80 cr & in Bengaluru in 2018 is Rs 60 Cr.

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Hence the final table is as below

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	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home decor	80	100	48	72	60	80	48	54

In Mumbai, the sales of Apparel dept. Increased by Rs. 12 cr.

19. Correct Answer:- B

We have the following incomplete table which can be filled with different letters as per the condition given.

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	x	y	y	c	y	b	x	54
Electronics	78	98	82	102	90	70	80	100
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$$\Rightarrow 2x + y - b - c = 14 \text{ ---(2)}$$

From 7, we have $y - x = b - y$

$$\Rightarrow b = 2y - x \text{ ----(3)}$$

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Using (3) & (4) in (2) we get $2x + y - 2y + x - 54 - y + x = 14$

$$\Rightarrow 4x - 2y = 68$$

$$\Rightarrow 2x - y = 34 \quad \text{---(5)}$$

Using (3) in (1), we get, $3y - x = 108$ --(6)

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$$\text{Now } 72 - a + 54 - a = 30$$

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Home decor	80	100	48	72	60	80	48	54

The max % increase is 50% for Mumbai in Home décor dept.

20. Correct Answer:- D

We have the following incomplete table which can be filled with different letters as per the condition given.

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	x	y	y	c	y	b	x	54
Electronics	78	98	82	102	90	70	80	100
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$$\Rightarrow c = 54 + y - x \quad \text{---(4)}$$

Using (3) & (4) in (2) we get $2x + y - 2y + x - 54 - y + x = 14$

$$\Rightarrow 4x - 2y = 68$$

$$\Rightarrow 2x - y = 34 \quad \text{---(5)}$$

Using (3) in (1), we get, $3y - x = 108$ --(6)

Solve (5) & 6, to get $y = 50$, $x = 42$

$\therefore (3) \Rightarrow b = 58$

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Total sale of Home décor increased by Rs 70 cr. Using point 6, we can say that sale of Home décor in Delhi in 2018 is Rs 80 cr & in Bengaluru in 2018 is Rs 60 Cr.

Now $72 - a + 54 - a = 30$

$\Rightarrow 2a = 96 \Rightarrow a = 48$

Hence the final table is as below

	Delhi		Mumbai		Bengaluru		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	42	50	50	62	50	58	42	54
Electronics	78	98	82	102	90	70	80	100
Home decor	80	100	48	72	60	80	48	54

The total sales of all dept. In 2019 is Rs. 900 crore

21. Correct Answer:- C

The initial cars are 1, 2, 3, 4, when car 1 leaves, we have the arrangement
V V 2 3 4

Now car 5 (a compact car) and car 6 (an SUV) came. So arrangement is
5 V 2 3 4 6

Now car 4 left, we have the arrangement
5 V 2 3 V V 6

Now car 7 (an S U V) and car 8 (a compact car) arrived, so final arrangement is 5, 8, 2, 3, 7, 6. Hence car number 7 is parked next to car 3.

22. Correct Answer:- A

As per the options, car 1 & car 4 left as Car 8 is the last car to arrive, so it should be either at 1st position or the last position. So option 3 is wrong.

In option 2, the position of car 4 is vacant. If car 5 arrived after car 4 left, then it should have been next to car 3. If car 4 left after the car 5 arrived, then car 5 should be next to V. in any case, car 5 cannot be after car 6. Hence option 2 is wrong.

In option 4, it is clear that car 4 left after car 5 arrived. So car next to car 5 should be car 6. Hence it is wrong.

Only option 1 is true where car 4 left after car 5 arrived.

23. Correct Answer:- A

Total cars arrived here are 6 and car 3 is placed in the end. It is possible if cars 1 & 2 are S U V, then we have the arrangement 1 2 3

Now cars 1 & 2 left, then the arrangement is V V V V 3

After that the cars 4, 5, 6 arrived in order so that the final arrangement is. 4 5 6 V 3

Hence cars 4 & 5 are compact & car 1 is an S U V. but we cannot say about car 3, whether it is an S U V or a compact car.

24. Correct Answer:- C

The original order is 1 2 3 4 5. Now car 6 is at the place of car 4 and car 4 is not the first one to leave. So either car 1 & car 2 will leave first.

If we assume that the first car left is car 1, then as car 2 is also leaving, so car 7 will take the first position. So first position cannot be empty.

Hence car 2 is the one which left at the first place and after it car 4 left.

So we have following possibilities.

1 V 3 V 5 or 1 V 3 V V 5

Car 2 is not an S U V because in that case, car 6 will be next to car 1.

Also car 6 is not compact otherwise, it will be again next to car 1. So car 6 is an S U V and we have the order 1 V 3 6 5

Now car 7 came which is compact and order is 1 7 3 6 5. After that the car 1 left to give the final order as V 7 3 6 5



QUANT

1. Correct Answer:- 800

Given that Amal : Sunil = 3 : 2.

Also, Sunil : Mita = 4 : 5

On combining the ratio we get Amal : Sunil : Mita = 6 : 4 : 5

So, let their shares be $6x$, $4x$ and $5x$

According to the question $6x - 4x = 400$

$$2x = 400$$

$$x = 200$$

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

2. Correct Answer:- 17

$2x + 5y = 99$ also it is given that $x \geq y \geq -20$

So, possible cases are

x	y	x	y
47	1	52	-1
42	3	57	-3
37	5	62	-5
32	7	67	-7
27	9	72	-9
22	11	77	-11
17	13	82	-13
		87	-15
		92	-17
		97	-19

So, total 17 cases are there

3. Correct Answer:- C

$$(x^2 - 5x + 7)^{x+1} = 1$$

For R.H.S to be 1, we must have $x^2 - 5x = -6$

$$x^2 - 5x + 6 = 0$$

On solving, we get $x = 2, 3$ (2 values)

Also, we must have $a^0 = 1$

So, $x + 1 = 0$ i.e. $x = -1$ (1 value) also satisfies.

Hence answer is 3.

4. Correct Answer:- 90000

Let the principal = 8000

So, simple interest for 3 years @ 3% per annum = Rs.720

Compound interest for 2 years @ 5% per annum = Rs.820

Difference = Rs.100

So, using unitary method

When difference is 100 principal is 8000

When difference is 1125 principal is 90000

5. Correct Answer:- B

Let the cost of pencil is Rs. x and of sharpener is Rs. $(x+2)$

Let Aron bought 'a' pencils & 'b' sharpeners.

Aditya bought '2a' pencils & 'b - 10' sharpeners.

Now, $ax + b(x + 2) = 2ax + (b - 10)(x + 2)$

$ax + bx + 2b = 2ax + bx + 2b - 10x - 20$

$ax - 10x = 20$

$a - 10 = 20/x$

$a = 20/x + 10$

Now 'a' is minimum when 'x' is maximum i.e. $x = 20$

Minimum 'a' = $20/20 + 10 = 11$

Total pencils = $3a = 3 \times 11 = 33$

6. Correct Answer:- A

Given that John had spent Rs.450 in April and it is being given that in May price of rice is increased by 20%. So, price of rice is increased by 90 (20% of 450). And it is given that in May he had Rs.150 more out of which 90 is for rice. So, for wheat he had spend Rs.60 more (150 - 90).

12% of original price in April = 60

100% of original price in April = 500.

So, he spend on wheat in may = $500 + 12\% \text{ of } 500 = 560$

7. Correct Answer:- 315

Case I: When 7 is at first place then 3 can be any of the three places

$= 1 \times 1 \times 8 \times 7 + 1 \times 8 \times 1 \times 7 + 1 \times 8 \times 7 \times 1 = 168$

Case II: When 3 is at the last place

$= 7 \times 1 \times 7 \times 1 + 7 \times 7 \times 1 \times 1 = 98$

Case III: When both 7 and 3 are in middle places

$= 7 \times 1 \times 1 \times 7 = 49$

So, total cases = $168 + 98 + 49 = 315$

8. Correct Answer:- 2704

Since we need to find the minimum value and as we know that minimum value will occur when we have symmetry. So, as $x + y = 102$. We have $x = 51$ and $y = 51$.

So, the minimum possible value of $2601 (1 + 1/x) (1 + 1/y) = 2704$

9. Correct Answer:- C

$x^2 - 2|x| + |a - 2| = 0$ _____ (1)

Case I: $x \geq 0$ & $a \geq 2$

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

For $D \geq 0 \Rightarrow 4 - 4(a - 2) \geq 0 \Rightarrow 1 - (a - 2) \geq 0$

$\Rightarrow 1 - a + 2 \geq 0 \Rightarrow a \leq 3$

Therefore $a = 2, 3$

If $a = 2$, eq''(1) becomes

$$x^2 - 2x = 0 \Rightarrow x = 0, 2$$

Therefore, (0, 2), (2, 0) are possible pairs.

If $a = 3$, eq''(1) becomes $x^2 - 2x + 1 = 0 \Rightarrow x = 1$

So (1, 3) is possible pair.

Case II: $x \geq 0, a < 2$

$$x^2 - 2x - (a - 2) = 0$$

$$\text{For } D \geq 0 \Rightarrow 4 + 4(a - 2) \geq 0$$

$$\Rightarrow 1 + a - 2 \geq 0$$

$$\Rightarrow a - 1 \geq 0 \Rightarrow a \geq 1$$

$$\Rightarrow a = 1$$

When $a = 1$, eq''(1) becomes $x^2 - 2x + 1 = 0 \Rightarrow x = 1$

Therefore (1,1) is possible pair.

Case III: If $x < 0, a \geq 2$

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

$$\text{For } D \geq 0 \Rightarrow 4 - 4(a - 2) \geq 0$$

$$1 - a + 2 \geq 0 \Rightarrow a \leq 3$$

$$\Rightarrow a = 2, 3$$

If $a = 2$, eq''(1) becomes $x^2 + 2x = 0 \Rightarrow x = 0, -2$

Therefore (0, 2) and (-2, 2) is pair

If $a = 3$, eq''(1) becomes $x^2 + 2x + 1 = 0 \Rightarrow (x + 1)^2 = 0 \Rightarrow x = -1$

Therefore (-1, 3) is possible pair.

Case IV: If $x < 0, a < 2$

$$x^2 + 2x - (a - 2) = 0$$

$$\text{For } D \geq 0 \Rightarrow 4 + 4(a - 2) \geq 0$$

$$1 + a - 2 \geq 0 \Rightarrow a \geq 1$$

$$\text{Therefore, } a = 1$$

Eq''(1) becomes $x^2 + 2x + 1 = 0 \Rightarrow x = -1$

Therefore (-1, 1) is possible pair.

There are 7 such pairs of integers as follows

(0, 2)
(2, 2)
(1, 3)
(1, 1)
(-2, 2)
(-1, 3)
(-1, 1)

10. Correct Answer:- C

Ratio of time taken by Ram and Rahim in covering one full round

$$= 2\pi \times 100 \times 18/15 \times 5 : 2\pi \times 20 \times 18/5 \times 5$$

$$= 5:3$$

So, minimum number of rounds to be taken by Ram and Rahim to meet are 3 & 5 respectively.

So, the number of full rounds that Ram will make to meet Rahim again for the first time is 3.

11. Correct Answer:- A

$$f(x) = x^2 + ax + b \text{ and } g(x) = f(x+1) - f(x-1)$$

$$g(x) = (x+1)^2 + a(x+1) + b - [(x-1)^2 + a(x-1) + b]$$

$$g(x) = x^2 + 2x + 1 + ax + a + b - [x^2 - 2x + 1 + ax - a + b]$$

$$g(x) = x^2 + 2x + 1 + ax + a + b - x^2 + 2x - 1 - ax + a - b$$

$$g(x) = 4x + 2a$$

$$\text{Now, } g(20) = 72 \Rightarrow 4(20) + 2a = 72$$

$$\Rightarrow 2a = -8$$

$$\Rightarrow a = -4$$

$$\therefore f(x) = x^2 - 4x + b$$

$$\text{As } f(x) \geq 0 \Rightarrow D \leq 0$$

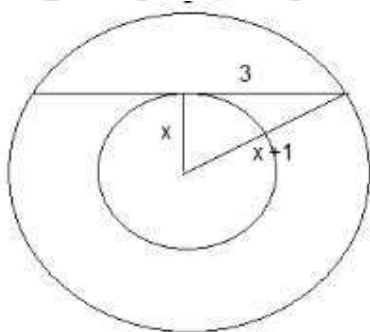
$$16 - 4b \leq 0$$

$$\Rightarrow b \geq 4$$

Therefore smallest value of b is 4.

12. Correct Answer:- 10

If the diameter of circle C1 is 2 more than the diameter of circle C2 so we can say that radius of C1 is 1 more than the radius of circle C2. As shown below in the figure,



Now, we can say that it must satisfy Pythagoras property

So, x will be 4 and x + 1 will be 5 i.e. radius of circle C1 is 5 cm.

So, diameter of circle C1 is 10 cm.

13. Correct Answer:- D

Let the ratio be x. So, the dimensions of rectangle is x and 3x and let the side of equilateral triangle be 'a'

$$\text{Perimeter of rectangle} = 2(x + 3x) = 8x$$

$$\text{Perimeter of equilateral triangle} = 3a$$

According to the question:

$$3a + 8x = 90 \quad (1)$$

Also, given that relation $R = T^2$, where R is area of rectangle and T is area of equilateral triangle

So, we have

$$3x^2 = (\sqrt{3}/4 a^2)^2$$

$$x = a^2/4$$

Substituting x in eqⁿ(1), we have

$$2a^2 + 3a - 90 = 0$$

On solving, we get $a = 6$

Hence, $x = 9$

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

14. Correct Answer:- C

Let the distance between $AB = x$ and $BC = 3x$



Let speed of train 1 be ' y ' and speed of train 2 be ' $2y$ '

As we know, Time = Distance/Speed

For A to B:

For Train 1 time $= x/y$ and For Train 2 time $= 3x/2y$

For B to C:

For Train 1 time $= x/2y$ and For Train 2 time $= 3x/y$

So, total time $= [x/y + 3x/2y]/[x/2y + 3x/y] = 5x/7x$

So, time taken by train 1 to that taken by train 2 in travelling from A to C is 5:7

15. Correct Answer:- C

Difference between highest number – Lowest number $= 9 \times 47 - 9 \times 42 = 45$

Maximum possible value of highest number $= 42 + 45 = 87$

Minimum possible value of lowest number $= 47 - 45 = 2$

So, Maximum possible mean $= [42 \times 9 + 87]/10 = 46.5$

Minimum possible mean $= [47 \times 9 + 2]/10 = 42.5$

Required difference $= 46.5 - 42.5 = 4$

16. Correct Answer:- A

Let ' a ', ' r ' be the first term and common ratio respectively.

Given that m^{th} term $= \frac{3}{4}$

$$a r^{m-1} = \frac{3}{4} \quad (1)$$

Also, n^{th} term $= 12$

$$a r^{n-1} = 12 \quad (2)$$

Dividing (2) by (1), we have

$$a r^{n-1} / a r^{m-1} = 12 / (\frac{3}{4})$$

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

Now, for minimum value of $r + n - m$, we have

$$r = -4 \text{ and } n - m = 2$$

Smallest possible value of $r + n - m = -4 + 2 = -2$

17. Correct Answer:- B

As we know that if two objects P and Q start at the same time in opposite direction from point A and B respectively. After passing each other, P reaches B in x seconds and Q reaches A in y seconds then,

Speed of P: Speed of Q = $\sqrt{b} : \sqrt{a}$

So, Ram's speed : Rahim's speed = $\sqrt{4} : \sqrt{1} = 2 : 1$

18. Correct Answer:- D

Let A travels = x

B travels = x - 45

C travels = x - 90

So, when B covers (x - 45) then C covers (x - 90)

When B covers x = $(x - 90)/(x - 45) \times x = (x - 50)$

On solving, we get x = 450

19. Correct Answer:- D

Let the side of equilateral triangle = 'a'

As we know area of equilateral triangle ΔABC

$$= \frac{\sqrt{3}}{4} (\text{Side})^2 = \frac{\sqrt{3}}{4} (a)^2 \quad (1)$$

Also, we have $PO + OQ + OR = s$ (Given)

$$\text{Area of } \Delta OAB = \frac{1}{2} \times AB \times OP = \frac{1}{2} \times a \times OP$$

$$\text{Area of } \Delta OBC = \frac{1}{2} \times BC \times OQ = \frac{1}{2} \times a \times OQ$$

$$\text{Area of } \Delta OAC = \frac{1}{2} \times AC \times OR = \frac{1}{2} \times a \times OR$$

$$\text{Area of } \Delta ABC = \text{Area of } \Delta OAB + \text{Area of } \Delta OBC + \text{Area of } \Delta OAC$$

$$= \frac{1}{2} \times a \times OP + \frac{1}{2} \times a \times OQ + \frac{1}{2} \times a \times OR$$

$$= \frac{1}{2} \times a \times (OP + OQ + OR)$$

$$= \frac{1}{2} \times a \times s \quad (2)$$

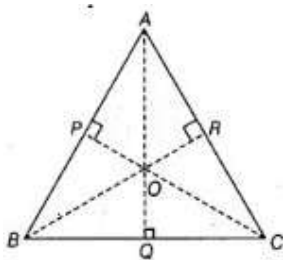
Equating (1) and (2), we have

$$\frac{\sqrt{3}}{4} a^2 = \frac{1}{2} \times a \times s$$

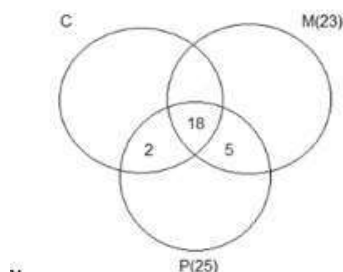
$$a = 2s/\sqrt{3}$$

Substituting, value of 'a' in equation (1), we have

$$\text{Area of equilateral } \Delta ABC = s^2/\sqrt{3}$$



20. Correct Answer:- C



As the number of students who have Chemistry needs to be minimum, so let 5 students have both Maths and Physics only. So, 2 students with Physics will have Chemistry also. Therefore, minimum students with Chemistry = $18 + 2 = 20$

21. Correct Answer:- D

Let x be the total purchase price of all articles and y be the marked price of one article.

So, according to the question:

$$8 \times 0.8 \times y + 4 \times 0.75 \times 0.8 \times y = 2112$$

On solving, we get $y = 240$

$$\text{Given, } 2112 = 1.10x$$

$$x = 1920$$

$$\text{If no discount is given, then } 12 \times 240 = 2880$$

$$\text{Required \%} = \frac{2880 - 1920}{1920} \times 100 = 50\%$$

22. Correct Answer:- A

As we know the minimum value of $x + 1/x = 2$. So, the answer will be $1/\sqrt{2}$.

23. Correct Answer:- 4

Since John takes twice as much as Jack to finish a job. So, efficiency of John and Jack is 1:2.

Also, Jack and Jim together take one-third of the time to finish the job than John. So, efficiency of Jack + Jim and John is 3:1.

So, efficiency of John, Jack and Jim is 1:2:1 respectively.

Now, let all of them together took ' x ' days so John alone take $x + 3$ days.

$$\text{So, } x(1 + 2 + 1) = x + 3$$

$$\text{On solving, we get } x = 1$$

$$\text{So, John takes} = 4 \text{ days, Jack} = \frac{4}{2} = 2 \text{ days and Jim} = 4 \text{ days}$$

24. Correct Answer:- B

Explanation:- Let $A = \log_a(a/b) + \log_b(b/a)$

$$A = \log_a a - \log_a b + \log_b b - \log_b a$$

$$A = 2 - [\log_a b + \log_b a]$$

$$A = 2 - [\log_a b + 1/\log_a b]$$

Now, $[\log_a b + 1/\log_a b]$ has minimum value 2.

Therefore, maximum value of $A = 2 - 2 = 0$

$\Rightarrow A$ cannot take value as 1.

25. Correct Answer:- 23

$$x + 9 = z \quad (1)$$

$$y + 1 = z \quad (2)$$

Adding (1) and (2), we get

$$x + y + 10 = 2z$$

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

$$\text{Now, } x + y < z + 5$$

$$2z - 10 < z + 5$$

$$z < 15$$

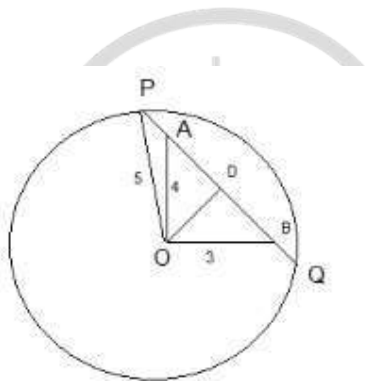
Therefore, Maximum $z = 14$

From eq"(1), Maximum $x = z - 9 = 5$

From eq"(2), Maximum $y = z - 1 = 13$

$$\text{Max.}(2x + y) = 2 \times 5 + 13 = 23$$

26. Correct Answer:- A



Here OD perpendicular to PQ

$$OA = 4, OB = 3$$

$$\Rightarrow AB = 5$$

Now in $\triangle OAB$

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

$$OD = \frac{12}{5} = 2.4$$

Now, join OP, $\triangle ODP$ is right angled triangle & $OP = 5$

$$PD = \sqrt{(OP)^2 - (OD)^2} = \sqrt{25 - (2.4)^2} = \sqrt{19.24} = 4.4$$

$$PD = 4.4$$

$$PB = 4.4 \times 2 = 8.8 \text{ m}$$

