

VERBAL ABILITY AND READING COMPREHENSION**PASSAGE 1**

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

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

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

Q.1) The author identifies three essential factors according to which theories of aggression are most commonly categorised. Which of the following options is closest to the factors identified by the author?

a) Psychologically – Sociologically – Medically.

- b) Extreme – Moderate – Mild.
- c) Hostile – Instrumental – Hormonal.
- d) Aggressor – Circumstances of aggression – Victim.

Q.2) The author discusses all of the following arguments in the passage EXCEPT that:

- a) aggression in most societies is kept under control through moderating the death instinct identified by Freud.
- b) the nature of aggression can vary depending on several factors, including intent.
- c) several studies indicate that aggression may have roots in the biological condition of humanity.
- d) men in general are believed to be more hormonally driven to exhibit violence than women.

Q.3) All of the following statements can be seen as logically implied by the arguments of the passage EXCEPT:

- a) a common theory of aggression is that it is the result of an abnormally low neural regulation of testosterone.
- b) if the alleged aggressive act is not sought to be avoided, it cannot really be considered aggression.
- c) Freud's theory of aggression proposes that aggression results from the suppression of aggressive urges.
- d) the Freudian theory of suicide as self-inflicted aggression implies that an aggressive act need not be sought to be avoided in order for it to be considered aggression.

Q.4) "[A]n enemy combatant may be subjected to torture in order to extract useful intelligence, though those inflicting the torture may have no real feelings of anger or animosity toward their subject." Which one of the following best explicates the large point being made by the author here?

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

PASSAGE 2

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

In a low-carbon world, renewable energy technologies are hot business. For investors looking to redirect funds, wind turbines and solar panels, among other technologies, seem a straight forward choice. But renewables need to be further scrutinized before being championed as forging a path toward a low-carbon future. Both the direct and indirect impacts of renewable energy must be examined to ensure that a climate-smart future does not intensify social and environmental harm. As renewable energy production requires land, water, and labor, among other inputs, it imposes costs on people and the environment. Hydropower projects, for instance, have led to community dispossession and exclusion . . . Renewable energy supply chains are also intertwined with mining, and their technologies contribute to growing levels of electronic waste . . . Furthermore, although renewable energy can be produced and distributed through small-scale, local systems, such an approach might not generate the high returns on investment needed to attract capital.

Although an emerging sector, renewables are enmeshed in long-standing resource extraction through their dependence on minerals and metals . . . Scholars document the negative consequences of mining . . . even for mining operations that commit to socially responsible practices[:] “many of the world’s largest reservoirs of minerals like cobalt, copper, lithium,[and] rare earth minerals”—the ones needed for renewable technologies—“are found in fragile states and under communities of marginalized peoples in Africa, Asia, and Latin America.” Since the demand for metals and minerals will increase substantially in a renewable-powered future . . . this intensification could exacerbate the existing consequences of extractive activities.

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

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

Q.5) 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 has reservations about the consequences of renewable energy systems.
- c) The author's only reservation is about the profitability of renewable energy systems.
- d) The author does not think renewable energy systems can be as efficient as non-renewable energy systems.

Q.6) 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) Renewable energy produced at the household or neighbourhood level is more efficient than mass-produced forms of energy.
- c) Most forms of renewable energy are not profitable investments for institutional investors.
- d) The development of the renewable energy sector is a double-edged sword.

Q.7) Based on the passage, we can infer that the author would be most supportive of which one of the following practices?

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

Q.8) 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) The production and distribution of renewable energy through small-scale, local systems is not economically sustainable.
- c) Renewable energy systems are as expensive as non-renewable energy systems.
- d) Renewable energy systems are not as profitable as non-renewable energy systems.

Q.9) All of the following statements, if true, could be seen as supporting the arguments in the passage, EXCEPT:

- a) The possible negative impacts of renewable energy need to be studied before it can be offered as a financial investment opportunity.

- b) One reason for the perpetuation of social injustice lies in the problem of the disposal of toxic waste.
- c) Marginalised people in Africa, Asia and Latin America have often been the main sufferers of corporate mineral extraction projects.
- d) The example of agricultural finance helps us to see how to concentrate corporate activity in the renewable energy sector.

PASSAGE 3

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

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

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

The main motive for piracy has always been a combination of need and greed. Why toil away as a starving peasant in the 16th century when a successful pirate made up to £4,000 one ach 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.

Q.10) "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) the disorganised piracy of today is no match for the organised piracy of the past.
- b) Lehr does not assign adequate blame to empire builders for their past deeds.
- c) colonialism should be considered an organised form of piracy.
- d) Vasco da Gama and the East India Company laid the ground for modern piracy.

Q.11) "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) facetious, about the hardships of peasant life in medieval England.
- b) indignant, at the scale of wealth successful pirates could amass in medieval times.
- c) ironic, about the reasons why so many took to piracy in medieval times.
- d) analytical, to explain the contrasts between peasant and pirate life in medieval England.

Q.12) 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.

Q.13) We can deduce that the author believes that piracy can best be controlled in the long run:

- a) if we eliminate poverty and income disparities in affected regions.
- b) through lucrative welfare schemes to improve the lives of people in affected regions.
- c) through international cooperation in enforcing stringent deterrents.
- d) through the extensive deployment of technology to track ships and cargo.

PASSAGE 4

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

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

Accordingly, the study of visual culture should be characterized by several concerns. First, scholars of visual culture need to examine any and all imagery – high and low, art and non 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 for many different people. And the history of meaning-making has a great deal to do with how scholars as well as lay audiences today understand these artists and their achievements.

Third, scholars studying visual culture might properly focus their interpretative work on 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.

Q.14) All of the following statements may be considered valid inferences from the passage, EXCEPT:

- a) studying visual culture requires institutional structures without which the structures of perception cannot be analysed.
- b) visual culture is not just about how we see, but also about how our visual practices can impact and change the world.

c) understanding the structures of perception is an important part of understanding how visual cultures work.

d) artifacts are meaningful precisely because they help to construct the meanings of the world for us.

Q.15) "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) Social analytical accounts of people like Michelangelo or Leonardo cannot explain their genius.

b) Michelangelo or Leonardo cannot be subjected to social analysis because of their genius.

c) Socially existing beings cannot be analysed, unlike the art of Michelangelo or Leonardo which can.

d) No analyses exist of Michelangelo's or Leonardo's social accounts.

Q.16) Which one of the following best describes the word "epiphenomena" in the last sentence of the passage?

a) Phenomena supplemental to the evidence.

b) Overarching collections of images.

c) Visual phenomena of epic proportions.

d) Phenomena amenable to analysis.

Q.17) "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) The way we experience sight is through images operated on by meaningful covenants.

b) Sight as a meaningful visual experience is possible when there is a foundational condition established in images of covenants.

c) Sight becomes a meaningful visual experience because of covenants of meaningfulness that we establish with the images we see.

d) Images are meaningful visual experiences when they have a foundation of covenants seeing them.

Q.18) Which set of keywords below most closely captures the arguments of the passage?

a) Visual Culture, Aesthetic Value, Lay Audience, Visual Experience.

b) Scholars, Social Analysis, Michelangelo and Leonardo, Interpretive Devices.

c) Visual Construction of Reality, Work of Genius, Ethnography, Epiphenomena.

d) Imagery, Visual Practices, Life worlds, Structures of Perception.

Q.19) The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. It also has four movable auxiliary telescopes 1.8 m in diameter.
2. Completed in 2006, the Very Large Telescope (VLT) has four reflecting telescopes, 8.2 m in diameter that can observe objects 4 billion times weaker than can normally be seen with the naked eye.
3. This configuration enables one to distinguish an astronaut on the Moon.
4. When these are combined with the large telescopes, they produce what is called interferometry: a simulation of the power of a mirror 16 m in diameter and the resolution of a telescope of 200 m.

[TITA]

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

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

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

Q.21) The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

With the Treaty of Westphalia, the papacy had been confined to ecclesiastical functions, and the doctrine of sovereign equality reigned. What political theory could then explain the origin and justify

the functions of secular political order? In his Leviathan, published in 1651, three years after the Peace of Westphalia, Thomas Hobbes provided such a theory. He imagined a “state of nature” in the past when the absence of authority produced a “war of all against all.” To escape such intolerable insecurity, he theorized, people delivered their rights to a sovereign power in return for the sovereign’s provision of security for all within the state’s border. The sovereign state’s monopoly on power was established as the only way to overcome the perpetual fear of violent death and war.

- a) 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.
- b) 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.
- 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 as a form of transactional governance to limit the power of the papacy.

Q.22) Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

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

[TITA]

Q.23) The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

- 1. While you might think that you see or are aware of all the changes that happen in your immediate environment, there is simply too much information for your brain to fully process everything.
- 2. Psychologists use the term ‘change blindness’ to describe this tendency of people to be blind to changes though they are in the immediate environment.

3. It cannot be aware of every single thing that happens in the world around you.
4. Sometimes big shifts happen in front of your eyes and you are not at all aware of these changes.

[TITA]

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

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

- a) Current methodologies used to define urban and rural areas are no longer relevant to our being able to study trends in urbanisation.
- b) With the diversity of urban landscapes, measurable criteria for defining urban areas may need to be supplemented with human judgement.
- c) Distinguishing between urban and rural areas might call for some judgement on the objective methodology being used to define a city's functions.
- d) The difficulty of accurately identifying urban areas means that we need to create a rich combination of criteria that can be applied to all urban areas.

Q.25) Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:

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

[TITA]

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

1. 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.

[TITA]

DATA INTERPRETATION AND LOGICAL REASONING

SET 1

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

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

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

Answer the following questions INDEPENDENTLY of each other.

Q.1) 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) 5
- b) 6
- c) 8
- d) 7

Q.2) 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, 7, 6
- b) V, 2, 3, 7, 5, 6, 8
- c) 8, 2, 3, V, 5, 6, 7
- d) 8, 2, 3, V, 6, 5, 7

Q.3) 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 1 is an SUV.
- c) Car 5 is a compact.
- d) Car 4 is a compact.

Q.4) 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 2 is a compact.
- b) Car 7 is a compact.
- c) Car 6 is a compact.
- d) Car 4 is an SUV.

SET 2

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.

Q.5) Which one of the following statements is true?

- a) Two seminars are scheduled in the first slot.
- b) Three seminars are scheduled in the first slot.
- c) Three seminars are scheduled in the last slot.
- d) Only one seminar is scheduled in the second slot.

Q.6) Who all are NOT guiding any Economics students?

- a) P, Q and R
- b) Q, R and S
- c) P, Q and S
- d) P, R and S

Q.7) Which of the following statements is necessarily true?

- a) S is guiding F.
- b) Q is guiding G.
- c) H is an Economics student.
- d) B is scheduled in the first slot.

Q.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) Both (i) and (ii)
 - b) Neither (i) nor (ii)

c) Only (ii)

d) Only (i)

Q.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) Both D and H are guided by T.

c) Exactly one of D and H is guided by T.

d) Neither D nor H is guided by T.

Q.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) F is guided by S.

c) E is guided by R.

d) G is guided by Q.

SET 3

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

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

The following additional information is known.

1. The sales amounts in the Apparel departments were the same for Delhi and Kolkata in 2018.

2. The sales amounts in the Apparel departments were the same for Mumbai and Bengaluru in 2018. This sales amount matched the sales amount in the Apparel department for Delhi in 2019.

3. The sales amounts in the Home Decor departments were the same for Mumbai and Kolkata in 2018.

4. The sum of the sales amounts of four Electronics departments increased by the same amount as the sum of the sales amounts of four Apparel departments from 2018 to 2019.

5. The total sales amounts of the four Home Decor departments increased by Rs 70 Crores from 2018 to 2019.

6. The sales amounts in the Home Decor 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.

Q.11) In Home Decor departments of which cities were the sales amounts the highest in 2018 and 2019, respectively?

- a) Mumbai and Delhi
- b) Mumbai and Mumbai
- c) Bengaluru and Delhi
- d) Delhi and Delhi

Q.12) What was the increase in sales amount, in Crore Rupees, in the Apparel department of Mumbai from 2018 to 2019?

- a) 10
- b) 12
- c) 8
- d) 5

Q.13) 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) 28
- c) 25
- d) 50

Q.14) What was the total sales amount, in Crore Rupees, in 2019 for the chain of departmental stores?

- a) 750
- b) 900
- c) 150
- d) 600

SET 4

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.

Q.15) What is the percentage of votes polled in total by all the candidates who lost their security deposits while contesting for constituency A?

[TITA]

Q.16) How many candidates who contested in constituency B lost their security deposit?

[TITA]

Q.17) What BEST can be concluded about the number of votes polled by the winning candidate in constituency C?

- a) 1,40,010
- b) between 1,40,005 and 1,40,010
- c) less than 2,00,010
- d) 1,40,006

Q.18) What was the number of valid votes polled in constituency D?

- a) 1,75,000
- b) 1,50,000
- c) 1,25,000
- d) 62,500

Q.19) The winning margin of a constituency is defined as the difference of votes polled by the winner and that of the first runner up. Which of the following CANNOT be the list of constituencies, in increasing order of winning margin?

- a) D, C, B, A
- b) B, D, C, A
- c) B, C, D, A
- d) D, B, C, A

Q.20) For all the four constituencies taken together, what was the approximate number of votes polled by all the candidates who lost their security deposit expressed as a percentage of the total valid votes from these four constituencies?

- a) 23.54%
- b) 23.91%
- c) 32.00%
- d) 38.25%

SET 5

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

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

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

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

Q.21) The total number of possible configurations using beads of only two colours is:

[TITA]

Q.22) What is the maximum possible number of Red beads that can appear in any configuration?

[TITA]

Q.23) What is the minimum number of Blue beads in any configuration?

[TITA]

Q.24) 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?

[TITA]

QUANTITATIVE ABILITY

Q.1) 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

[TITA]

Q.2) From an interior point of an equilateral triangle, perpendiculars are drawn on all three sides. The sum of the lengths of three perpendiculars is s . Then the area of the triangle is

- a) $2s^2/\sqrt{3}$
- b) $s^2/2\sqrt{3}$
- c) $\sqrt{3} s^2/2$
- d) $s^2/\sqrt{3}$

Q.3) The value of $\log_a(a/b) + \log_b(b/a)$, for $1 < a \leq b$ cannot be equal to

- a) 1
- b) -1
- c) 0
- d) -0.5

Q.4) 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) 6.6
- c) 7.8
- d) 7.2

Q.5) 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) 54
- b) 60
- c) 55
- d) 50

Q.6) 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) 5
- b) 3

c) 4

d) 6

Q.7) The number of pairs of integers (x,y) satisfying $x \geq y \geq -20$ and $2x + 5y = 99$ is

[TITA]

Q.8) 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) 4:1

d) 5:7

Q.9) In May, John bought the same amount of rice and the same amount of wheat as he had bought in April, but spent ₹ 150 more due to price increase of rice and wheat by 20% and 12%, respectively. If John had spent ₹ 450 on rice in April, then how much did he spend on wheat in May?

a) ₹ 580

b) ₹ 590

c) ₹ 560

d) ₹ 570

Q.10) Aron bought some pencils and sharpeners. Spending the same amount of money as Aron, Aditya bought twice as many pencils and 10 less sharpeners. If the cost of one sharpener is ₹ 2 more than the cost of a pencil, then the minimum possible number of pencils bought by Aron and Aditya together is

a) 30

b) 33

c) 36

d) 27

Q.11) For real x , the maximum possible value of $x/\sqrt{1+x^4}$

a) $1/\sqrt{3}$

- b) $1/2$
- c) $1/\sqrt{2}$
- d) 1

Q.12) The sum of the perimeters of an equilateral triangle and a rectangle is 90cm. 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) 24
- b) 18
- c) 27
- d) 21

Q.13) In a car race, car A beats car B by 45 km, car B beats car C by 50 km, and car A beats car C by 90 km. The distance (in km) over which the race has been conducted is

- a) 450
- b) 475
- c) 550
- d) 500

Q.14) 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) $\sqrt{2}$
- b) $1/2$
- c) 2
- d) $2\sqrt{2}$

Q.15) Let the m^{th} and n^{th} terms of a geometric progression be $3/4$ 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) 6
- b) -4
- c) 2

d) -2

Q.16) If x and y are non-negative integers such that $x + 9 = z$, $y + 1 = z$ and $x + y < z + 5$, then the maximum possible value of $2x + y$ equals

[TITA]

Q.17) 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) 0

b) 1

c) 4

d) 16

Q.18) How many 4-digit numbers, each greater than 1000 and each having all four digits distinct, are there with 7 coming before 3?

[TITA]

Q.19) 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

[TITA]

Q.20) Two circular tracks T1 and T2 of radii 100 m and 20 m, respectively touch at a point A. Starting from A at the same time, Ram and Rahim are walking on track T1 and track T2 at speeds 15 km/hr and 5 km/hr respectively. The number of full rounds that Ram will make before he meets Rahim again for the first time is

a) 4

b) 5

c) 3

d) 2

Q.21) If x and y are positive real numbers satisfying $x + y = 102$, then the minimum possible value of

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

[TITA]

Q.22) 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) 21
- b) 22
- c) 19
- d) 20

Q.23) The number of integers that satisfy the equality $(x^2 - 5x + 7)^{x+1} = 1$ is

- a) 5
- b) 3
- c) 2
- d) 4

Q.24) In how many ways can a pair of integers (x, a) be chosen such that $x^2 - 2|x| + |a - 2| = 0$?

- a) 4
- b) 6
- c) 7
- d) 5

Q.25) John takes twice as much time as Jack to finish a job. Jack and Jim together take one-third 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?

[TITA]

Q.26) Let C_1 and C_2 be concentric circles such that the diameter of C_1 is 2 cm longer than that of C_2 . If a chord of C_1 has length 6 cm and is a tangent to C_2 , then the diameter, in cm, of C_1 is

[TITA]

SOLUTIONSVARC-

Q.1) Answer - D

This answer is clear from the last line of 1st paragraph: "The first variable is the **aggressor him/herself**. The second is the **social situation or circumstance** in which the aggressive act(s) occur. The third variable is the **target or victim of aggression**."

Q.2) Answer - A

Option 1 – While 2nd paragraph mentions death instinct as a cause of aggression, the paragraph never talks about controlling aggression by moderating it.

Option 2 – The start of 1st paragraph talks about the categorization of aggression on the basis of intent.

Option 3 – In the 2nd line of 2nd paragraph, it is clearly stated that aggressive urges and actions are the result of inborn, biological factors.

Option 4 – The end of 2nd paragraph mentions studies that have shown men to be more likely to engage in aggressive behaviours than women.

Q.3) Answer - A

Option 1 – The latter half of second paragraph tells us about how aggressive behaviour is a result of high levels of testosterone rather than low. Hence, this cannot be inferred from the passage.

Option 2 – In the second line of the passage, it is mentioned that aggressive behaviour must be avoided in order for it to be considered aggression

Option 3 – In the second paragraph, Freud has clearly mentioned that aggression (mental illness) results from an unhealthy suppression of aggressive urges

Option 4 – This can be inferred from the second paragraph. Freud has called suicide a form of self-directed aggression as a result of natural death instincts, which is obviously not sought to be avoided.

Q.4) Answer - D

This statement is mentioned in the first para as an example of Instrumental aggression being a means to an end other than pain or injury.

Option 1 – The original statement does not talk about real feelings of hostility being revealed by the torture, but rather mentions the possibility of absence real feelings of animosity in the torturer.

Option 2 – The possible lack of animosity has clearly been mentioned, whereas the idea of reliability of information is an assumption.

Option 3 – The original statement does not mention anything about the effectiveness of the use of torture, hence this is false

Option 4 – The original statement mentions the possibility of lack of anger or animosity in the torturer, which implies that the torturer’s ultimate objective is extracting information rather than inflicting pain.

Q.5) Answer - B

Option 1 – The 1st paragraph does not mention about consequence of non-renewable sources.

Option 2 – This is correct, as the author is concerned about all kinds of consequences of renewable energy systems.

Option 3 – The author also shows concern towards the indirect environmental impact of renewable energy systems.

Option 4 – The paragraph does not discuss anything about the efficiency of the 2 systems or their comparison.

Q.6) Answer - D

Option 1 – The paragraph mentions that democratization is a possible result of renewable energy systems, but does not imply that it requires a corporate control.

Option 2 – The paragraph never speaks about the comparison between efficiencies of the household or mass produced forms of energy.

Option 3 – This is only true for small-scale & distributed forms of energy as per the paragraph, and is partially reflective of the last paragraph.

Option 4 – A double-edged sword implies that development of renewable energy sector has both favourable and unfavourable possibilities, which is mentioned in the paragraph: while renewable energy systems may lead to democratized access, small scale production also leads to low financial returns.

Q.7) Answer - D

Option 1 – The passage does not discuss development of any alternative non-renewable fuels.

Option 2 – The author mentions the plight of marginalised communities wrt the mining activities in their areas and not co-existence with the environments.

Option 3 – The author has, on multiple occasions, mentioned the drawbacks of localised, small scale renewable energy systems.

Option 4 – In the 3rd paragraph, the author mentions how socially unjust the system of toxic waste disposal is, and would agree with more stringent global policies and regulations on the same.

Q.8) Answer - A

The question is basically asking for a statement that weakens the arguments given in the passage, i.e., something opposite to what the passage states.

Option 1 – This is opposite to what is stated in the passage in 1st paragraph: “As renewable energy production requires land, water, and labor, among other inputs, it imposes costs on people and the environment”. Hence, this weakens the arguments in the passage.

Option 2 – This is supportive of the arguments in the passage, and is clearly mentioned in paragraph 1, last line: “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”, as well as in paragraph 4: “such small-scale, localized production is unlikely to generate high returns for investors”

Option 3 – The financial expenses of the 2 systems or their implementation is nowhere directly mentioned in the passage. Hence, this is eliminated.

Option 4 – This is a similar argument to option 2, renewable systems are not as economically sustainable as non-renewable systems and are hence not as profitable. This too supports the arguments in the passage.

Q.9) Answer - A

Option 1 – The passage does talk about studying negative impacts of renewable energy before adopting it. It also mentions that renewable energy has become a part of financial portfolios, though in its nascent stages. However, the 2 are never mentioned as related concepts.

Option 2 – 3rd paragraph directly states: “The disposal of toxic waste has long perpetuated social injustice.”. Hence, this can be eliminated.

Option 3 – The 2nd paragraph mentions that largest reservoirs of minerals required for renewable technologies “are found in fragile states and under communities of marginalized peoples in Africa, Asia, and Latin America”. It goes on to state that increase in demand of renewable power will lead to worsening of situations due to excessive extraction.

Option 4 – The 4th paragraph mentions the concentration of control of corporate activity in agricultural finance and their help in profit generation. This is considered to be a learning example for understanding investments in the renewable sector.

Q.10) Answer - C

This statement is in the last line of 2nd paragraph.

Option 1 – The paragraph makes no comparison between the disorganised piracy of today and organised piracy of past.

Option 2 – Even though Lehr does not mention the empire builders, it does not imply that he does not consider them to be pirates.

Option 3 – The author mentions East India Company should be included as pirates, which implies that the author considers colonialism as a form of organised piracy.

Option 4 – While the paragraph imply Vasco da Gama and EIC were pirates of different scales, it cannot be inferred that they laid stones for modern piracy.

Q.11) Answer - C

The statement is from the 3rd paragraph.

Option 1 – The hardships of peasant life are hardly the key aspect in the statement, hence this can be rejected.

Option 2 – The author does not show any anger or displeasure through the statement

Option 3 – The author is bringing out the irony in the situation by pointing out the disparities in the right but poor and wrong but rich paths.

Option 4 – Again, the contrast between the kinds of life the peasants and pirates led is not the key aspect, but the reason to take up piracy is.

Q.12) Answer - A

Option 1 – The author has mentioned in the 5th paragraph that there is inadequate surveillance of the high seas, but never mentions a decreased surveillance. Hence, this is not a cause cited by the author.

Option 2 – This is clearly mentioned in the 4th paragraph: “Increased globalisation has done more to encourage piracy than suppress it.....A rise in global shipping has meant rich pickings for freebooters.” Hence, this is considered to be a cause of piracy by the author.

Option 3 – In the 5th paragraph, the author has mentioned an instance of modern prevention failing, wherein a huge ransom for a yacht led to a large number of pirates flocking to the area.

Option 4 – The author states in 4th paragraph that “European colonialism weakened delicate balances of power, leading to an influx of opportunists on the high seas”. This implies that the author considers colonialism to be a cause for rise in piracy.

Q.13) Answer - A

Option 1 – The last paragraph mentions that investment in local welfare had put a halt to Malaysian piracy, though through corrupt methods. It can be inferred that eliminating poverty and income disparity has the potential to control piracy.

Option 2 – While this is very close to Option 1, it is a distortion of welfare to welfare schemes, which means something entirely different.

Option 3 – The last lines of the passage mentions distrust in the diplomatic initiatives against piracy, and the problems with different governments’ handling of the issue. So international cooperation is also not a solution.

Option 4 – While there is no direct reference to technology, the 5th paragraph mentions the deployment of warships to be only a temporary solution, and technology to only direct pirates towards smaller ships. Hence, tracking technology is not a solution.

Q.14) Answer - A

Option 1 – The 5th paragraph mentions structures of perception, but does not relate any of the other aspects mentioned in this option. Hence, this cannot be inferred.

Option 2 – The 2nd paragraph says: “the study of visual culture must scrutinize visual practice as much as images themselves, asking what images do when they are put to use..... investigating an artist’s or a work’s contribution to the experience of beauty, taste, value, or genius”. Hence, this statement can be inferred.

Option 3 – The 5th paragraph mentions the structures of perception as the fourth important concern while studying visual culture. Hence, this can be inferred.

Option 4 – The 4th paragraph says: “The task is to understand how artifacts contribute to the construction of a world”. Hence, this can be inferred from the passage.

Q.15) Answer - A

The statement is from the 3rd paragraph.

Option 1 – The original statement is said in reference to the analysis and enquiry of masterpieces by investigating the artist’s contribution to social experiences. Hence, the statement means that social analytical accounts of the work of these 2 artists will not be able to explain their genius.

Option 2 – The paragraph says that the works of genius should be understood by socially analysing these works and their contribution. Hence, this is not correct.

Option 3 – This is completely irrelevant, as none of it is mentioned in the passage.

Option 4 – The statement refers to the social description of the 2 artists and not their social accounts. Irrelevant.

Q.16) Answer - A

Epiphenomena is mentioned in contrast to considering images as an evidence for explanation. Hence, it must mean something that happens by chance or as a secondary result.

Option 1 – “Phenomena supplemental to the evidence” correctly captures this meaning.

Q.17) Answer - C

The statement is from the end of the 5th paragraph of the passage. It talks about how the act of seeing something becomes a meaningful visual experience when we establish covenants of meaningfulness with images.

This is clearly reflected in **Option 3**.

Q.18) Answer - D

Option 1 – Lay culture is only mentioned once in the entire passage, hence not a keyword.

Option 2 – Michelangelo and Leonardo are only used as examples in the passage, hence not keywords.

Option 3 – Ethnography is a very minor aspect of something mentioned in the passage.

Option 4 – Imagery, Visual Practices, Lifeworlds, Structures of Perception represent the major arguments mentioned in the passage.

Q.19) Answer - 2143

Statement 2 is clearly the opening statement, as all others have a reference to a preceding statement. Statement 1-4 are a pair, since 1 talks about 4 movable auxiliary telescopes, and 4 continues by talking about combining these telescopes to produce a certain configuration. Statement 3 explains the use of this configuration. Hence, the sequence is 2143.

Q.20) Answer - A

Option 1 – This correctly encompasses the views expressed in the paragraph.

Option 2 – The passage does not talk about which kind of decision making is better. Also, this option is partial as it omits the intuition-based decision making.

Option 3 – This is very vague, as it only mentions the 2 ways of making decisions. It is also incorrect, as the paragraph says the time taken to make decision is dependant on the way of taking decisions, and not the other way around.

Option 4 – This option completely misses out decisions based on information.

Q.21) Answer - A

Option 1 – It captures the essence of the passage perfectly without missing anything out.

Option 2 – This is incorrect, as the doctrine of sovereign equality is the first line in the paragraph and has been used as an example and not the cause.

Option 3 – While this is correct in its essence, it is very limited and misses out on the aspect of monopoly.

Option 4 – This is incorrect, as the limitation of the power of papacy was not the primary reason for the emergence of sovereign states.

Q.22) Answer – 2

Statement 1 talks about the monopolisation and protection of data in e-businesses. Statement 4 is related and talks about the other side of monopoly: information being not owned by anyone. Statement 5 is along the same lines and talks about information goods being replicable. Statement 3 is also related and talks about intellectual property rights. **Statement 2 talks about industrial and merchant capitalism, which is irrelevant in context to the other statements.**

Q.23) Answer – 1342

Statement 4-2 are clearly a pair, since 4 talks about the phenomenon of not being able to see changes happening in front of your eyes, and Statement 2 gives a term to this phenomenon. Statement 3 says “It” cannot be aware to every single thing, and this it refers to the brain mentioned in Statement 1: “there is simply too much information for your brain to fully process everything”. Hence, 1-3 are a pair. Statement 1 seems to be a more appropriate opening for the paragraph, since 1-3 talk about something that 4-2 fixate and explain. Hence, sequence is 1342.

Q.24) Answer - B

Option 1 – This is very vague and just states the problem of defining rural and urban areas using current methodologies. incomplete.

Option 2 – It correctly captures the meaning of the passage and mentions the need of human judgement in order to define criteria.

Option3 – This is limited, and only mentions that the problem requires attention without talking about the solution.

Option 4 – This completely misses out on the rural areas and aspects of their measurement.

Q.25) Answer – 4

Statement 5 clearly opens the passage, by introducing how sexual assault has become a genre in the past 2 years. Statement 2 follows by talking about what these stories do by fixating on “victims” past and “perpetrators” future. Statement 3 comes next by talking about how we don’t know how to address the future of these victims, even though we use the word “survivor”. Statement 1 continues this chain of thought by mentioning how we rarely focus on the trauma faced by the survivor and rather fixate on the incident of assault itself.

Hence, statement 4 does not fit and is the odd one.

Q.26) Answer – 2413

Statement 2 starts the paragraph by introducing the context of dangers of nuclear fission. Statement 4-1 are a pair, since 4 talks about the actual dangers posed by radiation, and 1 mentions a contrast in the view held by common people who focus on atom bombs. Statement 3 continues to drive home the fact that dangers posed by peaceful use (radiation) may “however” be much greater. Hence, the sequence is 2413.

DILR-

Q.1) Answer - D

Step i)	1	1	2	3	4	4	V	V
Step ii)	5	V	2	3	4	4	6	6
Step iii)	5	8	2	3	7	7	6	6

Hence, cars **7 & 2** are parked near car 3.

Q.2) Answer - C

From the options, we can understand that initially, cars 1-6 were in the lot, post which 1 & 4 left and 7 & 8 came in.

Initial	1	2	3	4	5	6		
Option 1:	8	2	3	V	5	7	6	Not possible, since 7 will not fit before 6
Option 2:	V	2	3	7	5	6	8	Not possible, 7 takes 2 slots & cannot replace 4 which takes one slot
Option 3:	8	2	3	V	5	6	7	1 leaves and is replaced by 8, 4's position stays vacant and 7 fits at the end - POSSIBLE
Option 4:	8	2	3	V	6	5	7	6 cannot come before 5, hence not possible

Q.3) Answer - A

4, 6, 5, V, 3

- This tells us that 1 & 2 have left and 4, 5, and 6 have joined after 3 entered and 1 & 2 left.
- Also, this implies that 1 & 2 leaving has accommodated 4 positions: 4, 5, 6, & V.
- Therefore, 1 & 2 must be SUVs, and 4, 5, & 6 must be compacts. Nothing can be concluded about Car 3.

Q.4) Answer – C

V, 7, 3, 6, 5

Initial sequence could be 1, 2, 3, 4, 5

Now, we know that 4 was not the first car to leave. However, 6 is the next car and is taking the position of 4.

The possibilities could be:

- 1 leaves, followed by 4, **OR**
- 2 leaves, followed by 4

In either case, the positions after both cars leaving would be **1, V, 3, V, 5** or **V, 2, 3, V, 5**.

Now, 6 arrives and takes the position of 4, skipping the initial vacant position in both cases. This is only possible when the first vacant position is not enough to accommodate Car 6. Hence, **Car 6 must be an SUV.**

Q.5) Answer - A

Let's start by consolidating all information available:

- We know we have 4 Economics, 3 Sociology, and 1 Anthropology student.
- 5 guides: P, R, and T guide 2 students each. Q and S guide one student each.
- Each student has guide belonging to same department.
- 4 slots: 9am, 9.30am, 10am, and 10.30am. Maximum 3 seminars in each slot.
- Seminars guided by same person never in same slot, always in consecutive slots.

Let's create a table and fill all further information in it:

- From (1), Economics students have seminars in all 4 slots
- From (2), 10am has only one seminar by 'A', hence A must be Economics student
- From (3), 10.30 has another seminar of Anthropology. 'F' must be the only Anthropology student. From (4), 9am has another seminar of Sociology.
- From (5), B & G have seminars in same slot. This slot cannot be either of the last 2 slots, since we need 2 empty slots. Hence, B & G are scheduled at either 9am or 9.30 am.
- From (6), since P is guiding B & C, C must be a Sociology student too, and B & C must have seminars in consecutive slots. Hence, C must be 9/9.30 depending on B's slot.
- From (7), since A's slot is 10, G (along with B) must be scheduled at 9.30am. Consequently, C must be scheduled at 9am.
- We know identities of 3 Sociology and 1 Anthropology student, hence remaining must be Economics students.
- Since Q & S guide 1 student each, they must be either of Anthropology or Sociology guides, and must guide either of F or G. Hence, R & T are Economics guides.
- Since same guides must have consecutive slots, R must have 10 and 10.30 slots while T has 9 & 9.30 slots.

Student	Department	Guide	Slot	Comments
A	Economics	R	10am	
B	Sociology	P	9.30am	9/9.30
C	Sociology	P	9am	9.30/9
D	Economics	R/T		
E	Economics	R/T		
F	Anthropology	Q/S	10.30am	
G	Sociology	S/Q	9.30am	9/9.30
H	Economics	R/T		

9.00am	Econ	Socio	X
9.30am	Econ	Socio	Socio
10.00am	Econ	X	X
10.30am	Econ	Anthro	X

A is clear from the solution, the first slot has 2 seminars.

Q.6) Answer – C

Let's start by consolidating all information available:

- We know we have 4 Economics, 3 Sociology, and 1 Anthropology student.
- 5 guides: P, R, and T guide 2 students each. Q and S guide one student each.
- Each student has guide belonging to same department.
- 4 slots: 9am, 9.30am, 10am, and 10.30am. Maximum 3 seminars in each slot.
- Seminars guided by same person never in same slot, always in consecutive slots.

Let's create a table and fill all further information in it:

- From (1), Economics students have seminars in all 4 slots
- From (2), 10am has only one seminar by 'A', hence A must be Economics student
- From (3), 10.30 has another seminar of Anthropology. 'F' must be the only Anthropology student. From (4), 9am has another seminar of Sociology.
- From (5), B & G have seminars in same slot. This slot cannot be either of the last 2 slots, since we need 2 empty slots. Hence, B & G are scheduled at either 9am or 9.30 am.
- From (6), since P is guiding B & C, C must be a Sociology student too, and B & C must have seminars in consecutive slots. Hence, C must be 9/9.30 depending on B's slot.
- From (7), since A's slot is 10, G (along with B) must be scheduled at 9.30am. Consequently, C must be scheduled at 9am.
- We know identities of 3 Sociology and 1 Anthropology student, hence remaining must be Economics students.
- Since Q & S guide 1 student each, they must be either of Anthropology or Sociology guides, and must guide either of F or G. Hence, R & T are Economics guides.
- Since same guides must have consecutive slots, R must have 10 and 10.30 slots while T has 9 & 9.30 slots.

Student	Department	Guide	Slot	Comments
A	Economics	R	10am	
B	Sociology	P	9.30am	9/9.30
C	Sociology	P	9am	9.30/9
D	Economics	R/T		
E	Economics	R/T		
F	Anthropology	Q/S	10.30am	
G	Sociology	S/Q	9.30am	9/9.30
H	Economics	R/T		

9.00am	Econ	Socio	X
9.30am	Econ	Socio	Socio
10.00am	Econ	X	X
10.30am	Econ	Anthro	X

R & T are guiding Economics students while P, Q, and S are not.

Q.7) Answer – C

Let's start by consolidating all information available:

- We know we have 4 Economics, 3 Sociology, and 1 Anthropology student.
- 5 guides: P, R, and T guide 2 students each. Q and S guide one student each.
- Each student has guide belonging to same department.
- 4 slots: 9am, 9.30am, 10am, and 10.30am. Maximum 3 seminars in each slot.
- Seminars guided by same person never in same slot, always in consecutive slots.

Let's create a table and fill all further information in it:

- From (1), Economics students have seminars in all 4 slots
- From (2), 10am has only one seminar by 'A', hence A must be Economics student
- From (3), 10.30 has another seminar of Anthropology. 'F' must be the only Anthropology student. From (4), 9am has another seminar of Sociology.
- From (5), B & G have seminars in same slot. This slot cannot be either of the last 2 slots, since we need 2 empty slots. Hence, B & G are scheduled at either 9am or 9.30 am.
- From (6), since P is guiding B & C, C must be a Sociology student too, and B & C must have seminars in consecutive slots. Hence, C must be 9/9.30 depending on B's slot.
- From (7), since A's slot is 10, G (along with B) must be scheduled at 9.30am. Consequently, C must be scheduled at 9am.
- We know identities of 3 Sociology and 1 Anthropology student, hence remaining must be Economics students.
- Since Q & S guide 1 student each, they must be either of Anthropology or Sociology guides, and must guide either of F or G. Hence, R & T are Economics guides.
- Since same guides must have consecutive slots, R must have 10 and 10.30 slots while T has 9 & 9.30 slots.

Student	Department	Guide	Slot	Comments
A	Economics	R	10am	
B	Sociology	P	9.30am	9/9.30
C	Sociology	P	9am	9.30/9
D	Economics	R/T		
E	Economics	R/T		
F	Anthropology	Q/S	10.30am	
G	Sociology	S/Q	9.30am	9/9.30
H	Economics	R/T		

9.00am	Econ	Socio	X
9.30am	Econ	Socio	Socio
10.00am	Econ	X	X
10.30am	Econ	Anthro	X

- (1) S may be guiding either of 'F' or 'G', so not necessarily true
- (2) Similarly, Q may be guiding either of 'F' or 'G', so not necessarily true
- (3) We are sure that 'H' is an Economics student, hence **TRUE**
- (4) 'B' is scheduled in the second slot, hence False

Q.8) Answer – A

Student	Department	Guide	Slot	Comments
A	Economics	R	10am	
B	Sociology	P	9.30am	9/9.30
C	Sociology	P	9am	9.30/9
D	Economics	R	10.30	
E	Economics	T	9/9.30	
F	Anthropology	S	10.30am	
G	Sociology	Q	9.30am	9/9.30

- If 'D' is scheduled in a slot later than Q's, it means that Q must be in the 9.30am slot, guiding 'G'. Hence, S is in the 10.30am slot guiding 'F'.
- Also, it implies that 'D' must be scheduled in the 10.30 slot guided by R, and 'E' & 'H' are in the 9am or 9.30am slot guided by T.

Hence, **both statements are true.**

Q.9) Answer – A

Student	Department	Guide	Slot	Comments
A	Economics	R	10am	
B	Sociology	P	9.30am	9/9.30
C	Sociology	P	9am	9.30/9
D	Economics	R/T		
E	Economics	R/T		
F	Anthropology	Q/S	10.30am	
G	Sociology	S/Q	9.30am	9/9.30
H	Economics	R/T		

- If Q is scheduled in the 9.30am slot guiding 'G', 'E' must also be in 9.30am slot guided by T.
- If Q is scheduled in the 10.30am slot guiding 'F', 'E' must also be in 10.30am slot guided by R.

Hence, no new inferences can be gained from this information.

Since 'A' is guided by R, **at least one of 'D' and 'H' will have to be guided by T.**

Q.10) Answer - C

Student	Department	Guide	Slot	Comments
A	Economics	R	10am	
B	Sociology	P	9.30am	9/9.30
C	Sociology	P	9am	9.30/9
D	Economics	T	9am	
E	Economics	R/T		
F	Anthropology	S	10.30am	
G	Sociology	Q	9.30am	9/9.30
H	Economics	R/T		

If Q is in 10.30am slot, 'D' must be in 10am slot. But that is not feasible as A is in the 10am slot already and no 2 Eco students are in the same slot.

Hence, Q must be in the 9.30am slot and 'D' in the 9am slot guided by T. We can see from the solution that '**E**' may be guided by either R or T.

Q.11) Answer - D

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	X	Y	Y	A	Y	B	X	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	Z	72	60	80	Z	54

- From (4),
Increase in Electronics sales from 2018 to 2019:
 $(98+102+70+100) - (78+82+90+80) = 40 =$ Increase in Apparels sales from 2018 to 2019
- From (5),
Total sales in Home Décor in 2019 = $100+72+80+54 = 306$
Hence, Total sales in Home Décor in 2018 = $306 - 70 = 236$
From (6), we know sales of Home Décor in 2018 of Delhi and Bangalore.
 $80 + Z + 60 + Z = 236$
 $2Z = 96$
 $Z = 48$
- From (7), we know that
 $Y - X = B - Y$
 $2Y = B + X$
 $B = 2Y - X$ -----(i)
Also,
 $A - Y = 54 - X$ -----(ii)
- From (8), we know that Y, 54, and B are in A.P.
 $54 - Y = B - 54$
 $B = 108 - Y$ -----(iii)
Therefore, from (i) we get
 $108 - Y = 2Y - X$
 $X = 3Y - 108$ -----(iv)
And (ii) becomes:
 $A - Y = 54 - (3Y - 108)$
 $A = 54 - 3Y + 108 + Y$

$$A = 162 - 2Y \text{ -----(v)}$$

- From (4), we knew that

$$(Y+A+B+54) - (X+Y+Y+X) = 40$$

Substituting values from (iii), (iv), and (v), we get:

$$(Y+162-2Y+108-Y+54) - (3Y-108+Y+Y+3Y-108) = 40$$

$$324 - 2Y - 8Y + 216 = 40$$

$$10Y = 500$$

$$Y = 50$$

Therefore, we get values of A, B, and X by substituting values of Y.

$$A = 162 - 2Y = 162 - 100$$

$$A = 62$$

$$B = 108 - y = 108 - 50$$

$$B = 58$$

$$X = 3Y - 108 = 150 - 108$$

$$X = 42$$

Therefore, our final table looks like this:

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		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

We can see from the table that **Delhi** had the highest sales amount in Home Décor in both the years.

Q.12) Answer – B

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	X	Y	Y	A	Y	B	X	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	Z	72	60	80	Z	54

- From (4),
Increase in Electronics sales from 2018 to 2019:
 $(98+102+70+100) - (78+82+90+80) = 40 =$ Increase in Apparels sales from 2018 to 2019
- From (5),
Total sales in Home Décor in 2019 = $100+72+80+54 = 306$
Hence, Total sales in Home Décor in 2018 = $306 - 70 = 236$
From (6), we know sales of Home Décor in 2018 of Delhi and Bangalore.
 $80 + Z + 60 + Z = 236$
 $2Z = 96$
 $Z = 48$
- From (7), we know that
 $Y - X = B - Y$
 $2Y = B + X$

$$B = 2Y - X \text{ -----(i)}$$

Also,

$$A - Y = 54 - X \text{ -----(ii)}$$

- From (8), we know that Y, 54, and B are in A.P.

$$54 - Y = B - 54$$

$$B = 108 - Y \text{ -----(iii)}$$

Therefore, from (i) we get

$$108 - Y = 2Y - X$$

$$X = 3Y - 108 \text{ -----(iv)}$$

And (ii) becomes:

$$A - Y = 54 - (3Y - 108)$$

$$A = 54 - 3Y + 108 + Y$$

$$A = 162 - 2Y \text{ -----(v)}$$

- From (4), we knew that

$$(Y+A+B+54) - (X+Y+Y+X) = 40$$

Substituting values from (iii), (iv), and (v), we get:

$$(Y+162-2Y+108-Y+54) - (3Y-108+Y+Y+3Y-108) = 40$$

$$324 - 2Y - 8Y + 216 = 40$$

$$10Y = 500$$

$$Y = 50$$

Therefore, we get values of A, B, and X by substituting values of Y.

$$A = 162 - 2Y = 162 - 100$$

$$A = 62$$

$$B = 108 - y = 108 - 50$$

$$B = 58$$

$$X = 3Y - 108 = 150 - 108$$

$$X = 42$$

Therefore, our final table looks like this:

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		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

Mumbai's sales in Apparel department increased by **12 crores** (62cr – 50cr)

Q.13) Answer – D

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	X	Y	Y	A	Y	B	X	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	Z	72	60	80	Z	54

- From (4),

Increase in Electronics sales from 2018 to 2019:

$$(98+102+70+100) - (78+82+90+80) = 40 = \text{Increase in Apparels sales from 2018 to 2019}$$

- From (5),

$$\text{Total sales in Home Décor in 2019} = 100+72+80+54 = 306$$

$$\text{Hence, Total sales in Home Décor in 2018} = 306 - 70 = \mathbf{236}$$

From (6), we know sales of Home Décor in 2018 of Delhi and Bangalore.

$$80 + Z + 60 + Z = 236$$

$$2Z = 96$$

$$Z = 48$$

- From (7), we know that

$$Y - X = B - Y$$

$$2Y = B + X$$

$$B = 2Y - X \text{ -----(i)}$$

Also,

$$A - Y = 54 - X \text{ -----(ii)}$$

- From (8), we know that Y, 54, and B are in A.P.

$$54 - Y = B - 54$$

$$B = 108 - Y \text{ -----(iii)}$$

Therefore, from (i) we get

$$108 - Y = 2Y - X$$

$$X = 3Y - 108 \text{ -----(iv)}$$

And (ii) becomes:

$$A - Y = 54 - (3Y - 108)$$

$$A = 54 - 3Y + 108 + Y$$

$$A = 162 - 2Y \text{ -----(v)}$$

- From (4), we knew that

$$(Y+A+B+54) - (X+Y+Y+X) = 40$$

Substituting values from (iii), (iv), and (v), we get:

$$(Y+162-2Y+108-Y+54) - (3Y-108+Y+Y+3Y-108) = 40$$

$$324 - 2Y - 8Y + 216 = 40$$

$$10Y = 500$$

$$\mathbf{Y = 50}$$

Therefore, we get values of A, B, and X by substituting values of Y.

$$A = 162 - 2Y = 162 - 100$$

$$\mathbf{A = 62}$$

$$B = 108 - y = 108 - 50$$

$$\mathbf{B = 58}$$

$$X = 3Y - 108 = 150 - 108$$

$$\mathbf{X = 42}$$

Therefore, our final table looks like this:

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		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

We see maximum percentage increase in the Home Décor department in Mumbai, increasing from 48 to 72.

$$\text{Increase} = \frac{[(72-48)/48] \times 100}{1} = 50\%$$

Q.14) Answer – B

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		Kolkata	
	2018	2019	2018	2019	2018	2019	2018	2019
Apparels	X	Y	Y	A	Y	B	X	54
Electronics	78	98	82	102	90	70	80	100
Home Decor	80	100	Z	72	60	80	Z	54

- From (4),
Increase in Electronics sales from 2018 to 2019:
 $(98+102+70+100) - (78+82+90+80) = 40 = \text{Increase in Apparels sales from 2018 to 2019}$
- From (5),
Total sales in Home Décor in 2019 = $100+72+80+54 = 306$
Hence, Total sales in Home Décor in 2018 = $306 - 70 = 236$
From (6), we know sales of Home Décor in 2018 of Delhi and Bangalore.
 $80 + Z + 60 + Z = 236$
 $2Z = 96$
 $Z = 48$
- From (7), we know that
 $Y - X = B - Y$
 $2Y = B + X$
 $B = 2Y - X$ -----(i)
Also,
 $A - Y = 54 - X$ -----(ii)
- From (8), we know that Y, 54, and B are in A.P.
 $54 - Y = B - 54$
 $B = 108 - Y$ -----(iii)
Therefore, from (i) we get
 $108 - Y = 2Y - X$
 $X = 3Y - 108$ -----(iv)
And (ii) becomes:
 $A - Y = 54 - (3Y - 108)$
 $A = 54 - 3Y + 108 + Y$
 $A = 162 - 2Y$ -----(v)
- From (4), we knew that
 $(Y+A+B+54) - (X+Y+Y+X) = 40$
Substituting values from (iii), (iv), and (v), we get:
 $(Y+162-2Y+108-Y+54) - (3Y-108+Y+Y+3Y-108) = 40$
 $324 - 2Y - 8Y + 216 = 40$
 $10Y = 500$
Y = 50
Therefore, we get values of A, B, and X by substituting values of Y.

$$A = 162 - 2Y = 162 - 100$$

$$\mathbf{A = 62}$$

$$B = 108 - y = 108 - 50$$

$$\mathbf{B = 58}$$

$$X = 3Y - 108 = 150 - 108$$

$$\mathbf{X = 42}$$

Therefore, our final table looks like this:

Sales Amounts (in Cr. Rs.)								
	Delhi		Mumbai		Bangalore		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

Total sales amount in 2019:

$$(50 + 62 + 58 + 54) + (98 + 102 + 70 + 100) + (100 + 72 + 80 + 54)$$

$$= (224) + (370) + (306)$$

$$= \mathbf{900 \text{ crores}}$$

Q.15) Answer - 9

We know that candidates who **failed to secure more $1/6^{\text{th}}$ of total valid votes** lose their security deposit.

Let us put the information we have in a table:

- From (1), we know that the 2nd runner-up in A polled 95000-10000 = 85000 votes
- From (2), we know that everyone in C secured more than $(1/6) * 600030 = 100005$ votes.
Also, the minimum difference between any 2 candidates' votes was 10,000.
- From (3), let's assume the total no. of votes polled in D was 100x. Then votes polled by winner = 37,500 + 5x.
Also, we know that candidates who lost their deposit in D together polled 35% votes.

	CONSTITUENCY			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total no. of votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by winning candidate	2,75,000	48,750		37,500 + 5x
No. of votes polled by 1 st runner-up	95,000			37,500
No. of votes polled by 2 nd runner-up	85,000			30,000
% of valid votes polled by 3 rd runner-up				10% = 10x

Total votes polled in A = 5,00,000

Total votes polled by top 3 candidates = 2,75,000 + 95,000 + 85,000 = 4,55,000

Votes polled by bottom 7 candidates = 5,00,000 - 4,55,000 = 45,000

We can see that 45,000 is clearly less than $1/6^{\text{th}}$ of 5,00,000 (83,333). Hence, all the bottom 7 candidates lost their deposit.

Total % votes polled by them = $\left(\frac{45000}{500000}\right) * 100 = 9\%$

Q.16) Answer – 11

We know that candidates who **failed to secure more $1/6^{\text{th}}$ of total valid votes** lose their security deposit.

Let us put the information we have in a table:

- From (1), we know that the 2nd runner-up in A polled 95000-10000 = 85000 votes
- From (2), we know that everyone in C secured more than $(1/6)*600030 = 100005$ votes. Also, the minimum difference between any 2 candidates' votes was 10,000.
- From (3), let's assume the total no. of votes polled in D was 100x. Then votes polled by winner = 37,500 + 5x.
Also, we know that candidates who lost their deposit in D together polled 35% votes.

	CONSTITUENCY			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total no. of votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by winning candidate	2,75,000	48,750		37,500 + 5x
No. of votes polled by 1 st runner-up	95,000			37,500
No. of votes polled by 2 nd runner-up	85,000			30,000
% of valid votes polled by 3 rd runner-up				10% = 10x

Total votes polled in B = 3,25,000

$1/6^{\text{th}}$ of 325000 = 54166.66 ~ 54167

We can see that the winning candidate also secured less than $1/6^{\text{th}}$ of the total valid votes. Hence, the rest 11 candidates must have secured lesser votes than that.

Hence, **11 candidates lost their security deposit in B.**

Q.17) Answer – D

We know that candidates who **failed to secure more $1/6^{\text{th}}$ of total valid votes** lose their security deposit.

Let us put the information we have in a table:

- From (1), we know that the 2nd runner-up in A polled 95000-10000 = 85000 votes
- From (2), we know that everyone in C secured more than $(1/6)*600030 = 100005$ votes. Also, the minimum difference between any 2 candidates' votes was 10,000.
- From (3), let's assume the total no. of votes polled in D was 100x. Then votes polled by winner = 37,500 + 5x.

Also, we know that candidates who lost their deposit in D together polled 35% votes.

	CONSTITUENCY			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total no. of votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by winning candidate	2,75,000	48,750		37,500 + 5x
No. of votes polled by 1 st runner-up	95,000			37,500
No. of votes polled by 2 nd runner-up	85,000			30,000
% of valid votes polled by 3 rd runner-up				10% = 10x

Total no. of votes polled in C = 6,00,030

Total no. of candidates = 5

We know that everyone polled more than 1,00,005 votes in C, and minimum diff between any 2 is 10,000.

Hence, minimum votes polled by bottom 4:

$$(1,00,006) + (1,00,006 + 10000) + (1,00,006 + 2*10000) + (1,00,006 + 3*10000)$$

$$= 4*1,00,006 + 60,000 = \mathbf{4,60,024 \text{ votes}}$$

$$\text{Maximum votes polled by winning candidate} = 6,00,030 - 4,60,024 = 1,40,006$$

$$\text{Minimum votes polled by 1}^{\text{st}} \text{ runner-up} = 1,00,006 + 30,000 = 1,30,006$$

Diff between the two is 10,000. Hence, we can conclude that winner polled **exactly 1,40,006 votes.**

Q.18) Answer – A

We know that candidates who **failed to secure more 1/6th of total valid votes** lose their security deposit.

Let us put the information we have in a table:

- From (1), we know that the 2nd runner-up in A polled 95000-10000 = 85000 votes
- From (2), we know that everyone in C secured more than $(1/6)*600030 = 100005$ votes. Also, the minimum difference between any 2 candidates' votes was 10,000.
- From (3), let's assume the total no. of votes polled in D was 100x. Then votes polled by winner = 37,500 + 5x.
Also, we know that candidates who lost their deposit in D together polled 35% votes.

	CONSTITUENCY			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total no. of votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by winning candidate	2,75,000	48,750		37,500 + 5x
No. of votes polled by 1 st runner-up	95,000			37,500
No. of votes polled by 2 nd runner-up	85,000			30,000
% of valid votes polled by 3 rd runner-up				10% = 10x

Total votes polled in D = $100x$

Votes secured by top 4 = $37,500 + 5x + 37,500 + 30,000 + 10x = 1,05,000 + 15x$

We can also see that the 3rd runner-up secured less than $1/6^{\text{th}}$ (10%) votes and hence lost security deposit. So, minimum 5 and maximum 7 candidates lost security deposit.

We can have 3 cases here:

CASE I: 7 candidates (all except winner) lost security deposit. In this case, top candidate will have remaining 65% votes.

$$37,500 + 5x = 65x$$

$$60x = 37,500$$

$$x = 625$$

$$\text{Total votes polled} = 100x = 62,500$$

$$1/6^{\text{th}} \text{ of } 62,500 = 10,417$$

$$\text{Votes secured by 1}^{\text{st}} \text{ runner-up} = 37,500 > 10,417$$

1st runner up couldn't have lost deposit. Hence, this case is not feasible.

CASE II: 6 candidates (all except winner & 1st runner-up) lost security deposit. In this case, top 2 candidates will have remaining 65% votes.

$$37,500 + 5x + 37,500 = 65x$$

$$75,000 = 60x$$

$$x = 1250$$

$$\text{Total votes polled} = 100x = 1,25,000$$

$$1/6^{\text{th}} \text{ of } 1,25,000 = 20,833$$

Once again, 1st runner-up secured more than $1/6^{\text{th}}$ votes and couldn't have lost deposit. This case is also not feasible.

CASE III: 5 candidates (all except winner, 1st runner-up & 2nd runner-up) lost security deposit. In this case, top 3 candidates will have remaining 65% votes.

$$75,000 + 5x + 30,000 = 65x$$

$$60x = 1,05,000$$

$$x = 1750$$

$$\text{Total votes polled} = 100x = 1,75,000$$

$$1/6^{\text{th}} \text{ of } 1,75,000 = 29,167$$

$$\text{Votes secured by 3}^{\text{rd}} \text{ runner-up} = 10x = 10,500 < 29,167$$

Hence, this is the only feasible case.

Therefore, total number of valid votes polled in D is **1,75,000**.

Q.19) Answer – C

	CONSTITUENCY			
	A	B	C	D
No. of candidates contesting	10	12	5	8
Total no. of votes polled	5,00,000	3,25,000	6,00,030	100x
No. of votes polled by winning candidate	2,75,000	48,750	1,40,006	37,500 + 5x
No. of votes polled by 1 st runner-up	95,000		1,30,006	37,500
No. of votes polled by 2 nd runner-up	85,000			30,000
% of valid votes polled by 3 rd runner-up				10% = 10x
Winning margin	1,80,000		10,000	5x = 8750

The confirmed order we know is $D < C < A$. 'B' could be anywhere in between except more than A.

Hence, **$B < C < D < A$ is not possible** as we know that margin of C is greater than that of D.

Q.20) Answer - B

Total number of valid votes in 4 constituencies = $5,00,000 + 3,25,000 + 6,00,030 + 1,75,000$
 = **16,00,030**

We can consolidate the data about the candidates who lost security in the below table:

Constituency	Votes polled by candidates who lost security
A	45,000 (All except top 3)
B	2,76,250 (All except winner)
C	0 (Nobody lost security)
D	$35x = 61,250$

Therefore, total number of votes polled by candidates who lost their security deposit:

$$45,000 + 2,76,250 + 0 + 61,250 = 3,82,500$$

$$\% = (3,82,500/16,00,030) * 100 = \mathbf{23.9\%}$$

Q.21) Answer - 2

Rules:

- Adjacent beads of different colours
- At least one green bead between any 2 blue beads
- At least one green & at least one blue bead between any 2 red beads

	C1	C2	C3	C4	C5
R1	B	G	B	G	B
R2	G	B	G	B	G
R3	B	G	B	G	B
R4	G	B	G	B	G
R5	B	G	B	G	B

	C1	C2	C3	C4	C5
R1	G	B	G	B	G
R2	B	G	B	G	B
R3	G	B	G	B	G
R4	B	G	B	G	B
R5	G	B	G	B	G

It is clear that using Red would require the other 2 colours too. Hence, combinations of Red + Blue and Red + Green are not possible.

Using Blue + Green combination:

2 arrangements are possible

Q.22) Answer – 9

	C1	C2	C3	C4	C5
R1	R	B	G	R	B/G
R2	B/G	R	B	G	R
R3	B	G	R	B	G
R4	R	B	G	R	B/G
R5	B/G	R	B	G	R

Maximum number of Red beads possible in a configuration = 9

Q.23) Answer - 6

	C1	C2	C3	C4	C5
R1	R	B	G	R	G
R2	G	R	B	G	R
R3	B	G	R	B	G
R4	R	B	G	R	G
R5	G	R	B	G	R

Minimum number of Blue beads possible in a configuration = 6

Q.24) Answer - 6

	C1	C2	C3	C4	C5
R1	R			R	
R2			R		
R3		R			R
R4	R			R	
R5			R		

If we place 2 red beads at R2-C3 and R3-C2, the rest of the red beads can be maximised in the following way:

A total of 8 red beads can be placed in this configuration. Hence, we can place **6 more red beads** to maximise their number.

QA-

Q.1) Answer - 90000

Let Principal Amount = x

$$\begin{aligned} \text{Compound Interest} &= x(1 + 0.05)^2 - x \\ &= x(1.05)^2 - x \end{aligned}$$

$$= 1.1025x - x$$

$$= 0.1025x$$

$$\text{Simple Interest} = \frac{x \cdot 3 \cdot 3}{100}$$

As stated in the question,

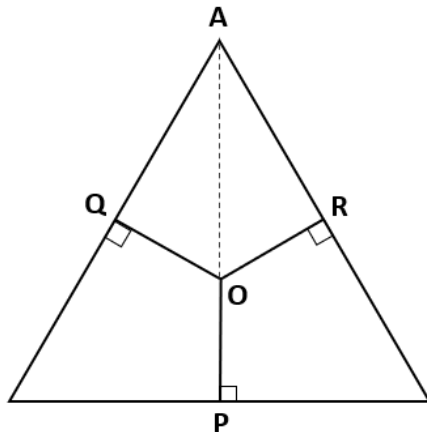
$$CI = SI + 1125$$

$$0.1025x = (9x/100) + 1125$$

$$1125 = 41x/400 - 9x/100 = 5x/400 = x/80$$

$$X = 90000$$

Q.2) Answer - D



Let OP, OQ, and OR be 3 altitudes drawn from the centroid of the equilateral triangle.

Length of all 3 perpendiculars will be equal. Therefore, length of $OP = OQ = OR = s/3$

AP is the altitude of the triangle. We know that the centroid divides the altitude in the ratio 2:1

$$\text{Hence, } AO : OP = 2:1$$

$$AO = 2s/3$$

$$AP = AO + OP = s$$

Let side of triangle be 'a'

$$\text{Altitude } AP = s = \frac{\sqrt{3}a}{2}$$

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

$$\text{Area of triangle} = \left(\frac{1}{2}\right) \cdot a \cdot s$$

$$= \left(\frac{1}{2}\right) \cdot \frac{2s}{\sqrt{3}} \cdot s$$

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

Q.3) Answer - A

$$\log_a(a/b) + \log_b(b/a)$$

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

$$= 1 - \log_a b + 1 - \log_b a$$

$$= 2 - (\log_a b + \log_b a)$$

$$= 2 - (\log b / \log a + \log a / \log b)$$

$$= 2 - (x+1/x) \quad [\log_a/\log_b = x]$$

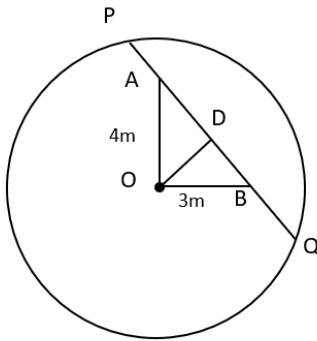
Minimum possible value of $(x+1/x)$ is 2, given x is +ve and real.

Hence Maximum possible value of $2 - (x+1/x) = 0$ and cannot be equal to 1

Q.4) Answer - A

Since AOB is a right-angled triangle and $AO = 4m$, $BO = 3m$

$AB = 5m$



Dropping a perpendicular from O on AB at D, we know that:

$$OA * OB = AB * OD$$

$$4*3 = 5*OD$$

$$OD = 12/5$$

We know that OD bisects the chord PQ. Hence, $PD = QD$

Also, in triangle OPD:

$$OD^2 + PD^2 = OP^2$$

$$(12/5)^2 + PD^2 = 5^2 = 25$$

$$PD^2 = 25 - 144/25 = (625 - 144)/25 = 481/25$$

$$PD = \sqrt{481/5} \sim 21.9/5 = 4.4$$

$$PQ = 2*PD = 8.8$$

Q.5) Answer - D

Let common SP be x

For 8 toys, $SP = 0.8x$

For remaining 4 toys, $SP = 0.75*0.8x = 0.6x$

$$\text{Total SP} = 8*0.8x + 4*0.6x = 2112$$

$$6.4x + 2.4x = 2112$$

$$8.8x = 2112$$

$$x = 240$$

Also let Total Cost Price = y

$$2112 = 1.1y$$

$$y = 1920$$

With no discounts, Total SP = $12 \times 240 = 2880$

Profit = $2880 - 1920 = 960$

Profit % = $(960/1920) \times 100 = 50\%$

Q.6) Answer - C

Let $a_1, a_2, a_3, \dots, a_{10}$ be the 10 scores in ascending order (a_1 – lowest, a_{10} – highest)

Mean of lowest 9 scores = 42

Sum of lowest 9 scores = $42 \times 9 = 378 = a_1 + a_2 + \dots + a_9$

Mean of highest 9 scores = 47

Sum of highest 9 scores = $47 \times 9 = 423 = a_2 + a_3 + \dots + a_{10}$

Difference between highest and lowest score = $423 - 378 = 45 = a_{10} - a_1$

Maximum possible mean when a_1 is maximum

Hence $a_1 = 42, a_{10} = 87$

Maximum mean = $(378 + 87) / 10 = 46.5$

Minimum possible mean when a_{10} is minimum

Hence, $a_{10} = 47, a_1 = 2$

Minimum mean = $(423 + 2) / 10 = 42.5$

Difference = $46.5 - 42.5 = 4$

Q.7) Answer – 17

$2x + 5y = 99$

$x = (99 - 5y) / 2$

Also, $x \geq y$

If $x = y, 2x + 5y = 7x = 99$

$x = 14.xx$

Hence, $x \geq 15$

Possible values are:

x	Y
97	-19
92	-17
87	-15
...	...
17	13
12	15
7	17

However, pairs only till (17,13) will be considered since after that, 'y' becomes greater than 'x'.

Therefore, total number of possible pairs are 17

Q.8) Answer - D

$BC = 3 \times AB$

$AB = x, BC = 3x$

Let 2 trains be T1 & T2.

From A to B: Speed of T1 = s ; Speed of T2 = $2s$

From B to C: Speed of T1 = $2s$; Speed of T2 = s

Total time taken by T1 (t_1) = $(x/s) + (3x/2s) = 5x/2s$

Total time taken by T2 (t_2) = $(x/2s) + 3x/s = 7x/2s$

Ratio $t_1:t_2 = 5x/2s:7x/2s = 5:7$

Q.9) Answer - C

In April, John bought 'r' amount of rice at 'x' price, and 'w' amount of wheat at 'y' price.

Money spent = $r*x + w*y$

Also, $r*x = 450$

In May, amount spent = $r(1.2x) + w(1.12y)$

$$= 1.2r*x + 1.12w*y = (r*x + w*y) + 150$$

$$0.2r*x + 0.12w*y = 150$$

$$0.12w*y = 150 - 0.2*450 = 60$$

$$w*y = 60/0.12 = 500$$

Amount spent on wheat in May = $1.12*500 = 560$

Q.10) Answer – B

Let cost of pencil be 'x' and sharpener be 'x+2'.

Amount spent by Aron = $p*x + s*(x+2)$

Amount spent by Aditya = $2p*x + (s-10)(x+2)$

Therefore: $px + sx + 2s = 2px + sx - 10x + 2s - 20$

$$px - 10x - 20 = 0$$

$$x(p-10) = 20$$

Since $p-10 > 0$, $p(\min) = 11$

Total pencils = $p + 2p = 33$

Q.11) Answer - C

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

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

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

Minimum value of $\frac{1}{x^2} + x^2$ is 2. Hence, maximum value of the above expression is $1/\sqrt{2}$.

Q.12) Answer - C

Let side of triangle be 'a'; Breadth of rectangle = x; Length of rectangle = 3x

Therefore: $3a + 2(x+3x) = 90$

$$3a + 8x = 90 \text{ -----(i)}$$

Also, $R = T^2$

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

$$3x^2 = 3a^2/16$$

$$x = a^2/4$$

Hence (i) becomes:

$$3a + 8(a^2/4) = 90$$

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

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

Solving the quadratic equation, we get $a = 6$

$$x = 9; 3x = 27$$

Hence, **longer side = 27**

Q.13) Answer - A

Let the length of track be 'x'

In time 't_A', distances covered by all 3 cars are:

A: x (completes race)

B: x - 45

C: x - 90

In time 't_B', distances covered are:

B: x (Completes race)

C: x - 50

Ratio of distances = ratio of speeds

Therefore, ratio of speeds of B & C are:

$$\frac{x - 45}{x - 90} = \frac{x}{x - 50}$$

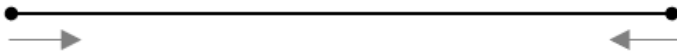
$$(x - 45)(x - 50) = x(x - 90)$$

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

$$5x = 2250$$

$$x = 450$$

Q.14) Answer - C



Assuming Ram's speed = 'a' and Rahim's speed = 'b'.

If they cross each other at time 't':

Distance travelled by Ram = a*t

Distance travelled by Rahim = b*t

Further time taken by Ram to reach B = (Dist. Remaining/Speed) = (b*t)/a = 1min -----①

Similarly, further time taken by Rahim to reach A = (a*t)/b = 4min -----②

Assume ratio (a/b) = x

Therefore, ① becomes: t/x = 1 &

② becomes: t*x = 4

Multiplying both equations, we get: $t^2 = 4$
 Therefore $t = 2$
 Applying value of t , we get $x = 2 = a/b$

Q.15) Answer - D

Let the GP have first term 'a' and common ratio 'r'

$$m^{\text{th}} \text{ term} = ar^{(m-1)} = \frac{3}{4}$$

$$n^{\text{th}} \text{ term} = ar^{(n-1)} = 12$$

Dividing both terms, we get:

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

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

Given that 'r' is an integer, possible value for 'r' & 'n-m' may be:

r	n-m	r+n-m
2	4	6
-2	4	2
4	2	6
-4	2	-2

Therefore, smallest possible value of **r+n-m** is **-2**.

Q.16) Answer - 23

Acc. to the question:

$$x + 9 = z \text{ \& } y + 1 = z$$

$$\text{Therefore, } x + 9 = y + 1$$

$$\mathbf{y = x + 8}$$

$$x + y < z + 5$$

$$x + x + 8 < x + 9 + 5$$

$$\mathbf{x < 6}$$

$$\text{Now, } 2x + y = 2x + x + 8 = 3x + 8$$

For this to be maximum, x has to be maximum.

Maximum possible value of $x = 5$.

$$\text{Therefore, max possible value of } 3x + 8 = 3(5) + 8 = \mathbf{23}$$

Q.17) Answer - C

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

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

$$72 = 40 \cdot 2 + 2a$$

$$2a = -8$$

$$a = -4$$

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

Now, $f(x) \geq 0$ for all real x

Therefore, $D \leq 0$

$$16 - 4b \leq 0$$

$$16 \leq 4b$$

$$4 \leq b$$

Hence, **smallest possible value of b is 4**

Q.18) Answer - 315

3 cases:

- I. 7 is in first place: 3 can go to 3 places, remaining 2 places will have 8 & 7 possibilities each
Hence, possible numbers are $3 \times 8 \times 7 = 168$
- II. 7 is in second place: 3 can go to 2 places, first place will have 7 possibilities (excluding 0), and remaining place will also have 7 possibilities
Hence, possible numbers are $2 \times 7 \times 7 = 98$
- III. 7 is in third place: 3 can only go to one place, remaining 2 places have 7 possibilities each
Hence, possible numbers are $1 \times 7 \times 7 = 49$

Therefore, total number of possibilities are **$168 + 98 + 49 = 315$**

Q.19) Answer - 800

Ratio of Anil and Sunil is 3:2 and ratio of Sunil and Mita is 4:5.

Amal	Sunil	Mita
3×2	2×2	
	4	5
6	4	5

To get their common ratio, we multiply Amal and Sunil's ratio by 2.

Therefore, Ratio of amount with Amal, Sunil, and Mita is 6:4:5.

Let the common ratio be 'x'

Largest amount = $6x$, Smallest amount = $4x$

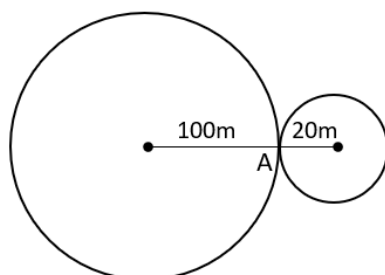
$$6x - 4x = 400$$

$$2x = 400$$

$$x = 200$$

$$\text{Sunil's share} = 4x = 4 \times 200 = \mathbf{800}$$

Q.20) Answer - C



$$\text{Circumference of T1} = 2\pi \times 100 = 200\pi$$

Time taken by Ram to reach A again = $200\pi/15 = 40\pi/3$

Circumference of T2 = $2\pi*20 = 40\pi$

Time taken by Rahim to reach A again = $40\pi/5$

Ratio of the time taken by Ram & Rahim = $(40\pi/3)/(40\pi/5) = 5/3$

Ratio of time is inverse of ratio of distance travelled

Therefore, ratio of rounds travelled by Ram : Rahim = 3:5

Ram makes **3 rounds** before he meets Rahim again

Q.21) Answer - 2704

$x + y = 102$

$2601*(1+1/x)*(1+1/y)$

$= 2601*[(x+1)/x]*[(y+1)/y]$

$= 2601*[(x+1)(y+1)/xy]$

To minimise this equation, the denominator will have to be maximised

xy is maximum when $x = y$

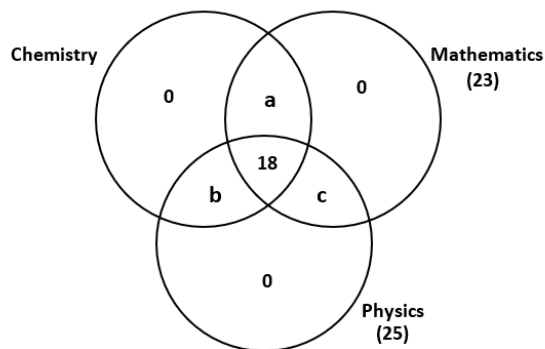
Therefore, $x = y = 51$

The equation becomes:

$2601*52*52/51*51$

= 2704

Q.22) Answer – D



We can summarize the information given in the question as per the above Venn diagram.

We can conclude that:

$$a + c = 5$$

$$b + c = 7$$

Hence, $b - a = 2$

We have to minimize $a + b$.

Assuming if $a = 0$

Then $b = 2$ & $c = 5$

Therefore, number of students choosing Chemistry as one subject = **$18 + 2 = 20$**

Q.23) Answer - B

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

2 cases:

I. Power is 0

$$x + 1 = 0$$

$$x = -1$$

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

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

$$x^2 - 2x - 3x + 6 = 0$$

$$x(x - 2) - 3(x - 2) = 0$$

$$(x - 2)(x - 3) = 0$$

$$x = 2, x = 3$$

III. $x^2 - 5x + 7 = -1$; Given power is even

$$x^2 - 5x + 8 = 0$$

No real roots

Hence, 3 integers (-1, 2, 3) satisfy the given equation

Q.24) Answer - C

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

Since x^2 and $|a - 2|$ will always be positive, we can infer that:

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

Putting values in the equation:

i. If $x = 0$,

$$|a - 2| = 0$$

$$a = 2$$

ii. If $x = 1$,

$$|a - 2| = 1$$

$$a = 3, 1$$

iii. If $x = -1$,

$$|a - 2| = 1$$

$$a = 3, 1$$

iv. If $x = 2$,

$$|a - 2| = 0$$

$$a = 2$$

v. If $x = -2$,

$$|a - 2| = 0$$

$$a = 2$$

vi. If $x = 3$,

$$|a - 2| = -3 \text{ (Not possible)}$$

x	a
0	2
1	1
1	3
-1	1
-1	3
2	2
-2	2
3	Not possible

Hence, there are 7 possible pairs of integers.

Q.25) Answer - 4

Let's assume the **amount of work** done by each person in a day:

$$\text{John} - x$$

$$\text{Jack} - 2x$$

If Jack and Jim together take $\frac{1}{3}$ of the time that John takes, it means they together complete 3 times the work that John alone completes in a day.

$$\text{Hence, Jack} + \text{Jim} = 3x$$

$$\text{Jim} - x$$

Assuming the work to be done is 100 units.

Number of days taken by each person is:

$$\text{John} - 100/x$$

$$\text{Jack} - 50/x$$

$$\text{Jim} - 100/x$$

$$\text{All 3 together} - 25/x$$

$$\text{Therefore, } 100/x = 25/x + 3$$

$$100 = 25 + 3x$$

$$3x = 75$$

$$x = 25$$

$$\text{Jim will finish the job alone in } 100/x = 100/25 = \mathbf{4 \text{ days}}$$

Alternative Approach:

Let's assume the number of days taken by each person as:

$$\text{John} - 3x$$

$$\text{Jack} - 3x/2$$

$$\text{Jack} + \text{Jim} - x$$

$$\text{John} + \text{Jack} + \text{Jim} - \frac{1}{\frac{1}{3x} + \frac{1}{x}} = 3x/4$$

$$\text{Therefore, } 3x/4 + 3 = 3x$$

$$9x/4 = 3$$

$$x = 4/3$$

Now, Jack and Jim together finish in x days. Assume Jim completes in y days:

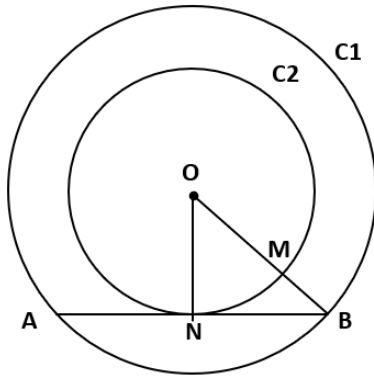
$$\frac{2}{3x} + \frac{1}{y} = \frac{1}{x}$$

$$(2/4) + 1/y = 3/4$$

$$1/y = 1/4$$

$$\text{Therefore, } \mathbf{y = 4 \text{ days}}$$

Q.26) Answer - 10



In the figure, 'O' is the centre of circles 'C1' and 'C2' with radii 'x' & 'y' respectively

If $d_1 - d_2 = 2\text{cm}$, $x - y = 1\text{cm}$

Hence, $MB = 1\text{cm}$

AB is a chord with 6cm length and tangent to C2.

Therefore, $AN = NB = 3\text{cm}$; $ON = y$; $OB = y + 1$

In right triangle ONB:

$$(ON)^2 + (NB)^2 = (OB)^2$$

$$y^2 + 9 = (y+1)^2$$

$$9 = 2y + 1$$

$$2y + 8$$

$$y = 4$$

Therefore, $x = y + 1 = 5\text{cm}$

Diameter = $2x = 10\text{cm}$