

CAT 2022 Question
Paper with Solution -
Slot 1

CAT 2022 VARC Section

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

Stories concerning the Undead have always been with us. From out of the primal darkness of Mankind's earliest years, come whispers of eerie creatures, not quite alive (or alive in a way which we can understand), yet not quite dead either. These may have been ancient and primitive deities who dwelt deep in the surrounding forests and in remote places, or simply those deceased who refused to remain in their tombs and who wandered about the countryside, physically tormenting and frightening those who were still alive. Mostly they were ill-defined—strange sounds in the night beyond the comforting glow of the fire, or a shape, half-glimpsed in the twilight along the edge of an encampment. They were vague and indistinct, but they were always there with the power to terrify and disturb. They had the power to touch the minds of our early ancestors and to fill them with dread. Such fear formed the basis of the earliest tales although the source and exact nature of such terrors still remained very vague.

And as Mankind became more sophisticated, leaving the gloom of their caves and forming themselves into recognizable communities—towns, cities, whole cultures—so the Undead travelled with them, inhabiting their folklore just as they had in former times. Now they began to take on more definite shapes. They became walking cadavers; the physical embodiment of former deities and things which had existed alongside Man since the Creation. Some still remained vague and ill-defined but, as Mankind strove to explain the horror which it felt towards them, such creatures emerged more readily into the light.

In order to confirm their abnormal status, many of the Undead were often accorded attributes, which defied the natural order of things—the power to transform themselves into other shapes, the ability to sustain themselves by drinking human blood, and the ability to influence human minds across a distance. Such powers—described as supernatural—only [lent] an added dimension to the terror that humans felt regarding them.

And it was only natural, too, that the Undead should become connected with the practice of magic. From very early times, Shamans and witchdoctors had claimed at least some power and control over the spirits of departed ancestors, and this has continued down into more “civilized” times. Formerly, the invisible spirits and forces that thronged around men's earliest encampments, had spoken “through” the tribal Shamans but now, as entities in their own right, they were subject to magical control and could be physically summoned by a competent sorcerer. However, the relationship between the magician and an Undead creature was often a very tenuous and uncertain one. Some sorcerers might have even become Undead entities once they died, but they might also have been susceptible to the powers of other magicians when they did.

From the Middle Ages and into the Age of Enlightenment, theories of the Undead continued to grow and develop. Their names became more familiar—werewolf, vampire, ghoul—each one certain to strike fear into the hearts of ordinary humans.

Q.1)

All of the following statements, if false, could be seen as being in accordance with the passage, EXCEPT:

- [1] the transition from the Middle Ages to the Age of Enlightenment saw new theories of the Undead.
- [2] the Undead remained vague and ill-defined, even as Mankind strove to understand the horror they inspired.
- [3] the relationship between Shamans and the Undead was believed to be a strong and stable one.
- [4] the growing sophistication of Mankind meant that humans stopped believing in the Undead.

Q.2)

Which one of the following observations is a valid conclusion to draw from the statement, “From out of the primal darkness of Mankind’s earliest years, come whispers of eerie creatures, not quite alive (or alive in a way which we can understand), yet not quite dead either.”?

- [1] Mankind’s primal years were marked by creatures alive with eerie whispers, but seen only in the darkness.
- [2] We can understand the lives of the eerie creatures in Mankind’s early years through their whispers in the darkness.
- [3] Mankind’s early years were marked by a belief in the existence of eerie creatures that were neither quite alive nor dead.
- [4] Long ago, eerie creatures used to whisper in the primal darkness that they were not quite dead.

Q.3)

Which one of the following statements best describes what the passage is about?

- [1] The passage describes the failure of human beings to fully comprehend their environment.
- [2] The writer discusses the transition from primitive thinking to the Age of Enlightenment.
- [3] The passage discusses the evolution of theories of the Undead from primitive thinking to the Age of Enlightenment.
- [4] The writer describes the ways in which the Undead come to be associated with Shamans and the practice of magic.

[MARKS]

Q.4)

“In order to confirm their abnormal status, many of the Undead were often accorded attributes, which defied the natural order of things . . .” Which one of the following best expresses the claim made in this statement?

- [1] The Undead are deified in nature’s order by giving them divine attributes.
- [2] Human beings conceptualise the Undead as possessing abnormal features.
- [3] According the Undead an abnormal status is to reject the natural order of things.
- [4] The natural attributes of the Undead are rendered abnormal by changing their status.

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

The Chinese have two different concepts of a copy. Fangzhipin . . . are imitations where the difference from the original is obvious. These are small models or copies that can be purchased in a museum shop, for example. The second concept for a copy is fuzhipin . . . They are exact reproductions of the original, which, for the Chinese, are of equal value to the original. It has absolutely no negative connotations. The discrepancy with regard to the understanding of what a copy is has often led to misunderstandings and arguments between China and Western museums. The Chinese often send copies abroad instead of originals, in the firm belief that they are not essentially different from the originals. The rejection that then comes from the Western museums is perceived by the Chinese as an insult. . . .

The Far Eastern notion of identity is also very confusing to the Western observer. The Ise Grand Shrine [in Japan] is 1,300 years old for the millions of Japanese people who go there on pilgrimage every year. But in reality this temple complex is completely rebuilt from scratch every 20 years. . . .

The cathedral of Freiburg Minster in southwest Germany is covered in scaffolding almost all year round. The sandstone from which it is built is a very soft, porous material that does not withstand natural erosion by rain and wind. After a while, it crumbles. As a result, the cathedral is continually being examined for damage, and eroded stones are replaced. And in the cathedral's dedicated workshop, copies of the damaged sandstone figures are constantly being produced. Of course, attempts are made to preserve the stones from the Middle Ages for as long as possible. But at some point they, too, are removed and replaced with new stones.

Fundamentally, this is the same operation as with the Japanese shrine, except in this case the production of a replica takes place very slowly and over long periods of time. . . . In the field of art as well, the idea of an unassailable original developed historically in the Western world. Back in the 17th century [in the West], excavated artworks from antiquity were treated quite differently from today. They were not restored in a way that was faithful to the original. Instead, there was massive intervention in these works, changing their appearance. . . .

It is probably this intellectual position that explains why Asians have far fewer scruples about cloning than Europeans. The South Korean cloning researcher Hwang Woo-suk, who attracted worldwide attention with his cloning experiments in 2004, is a Buddhist. He found a great deal of support and followers among Buddhists, while Christians called for a ban on human cloning. . . . Hwang legitimised his cloning experiments with his religious affiliation: 'I am Buddhist, and I have no philosophical problem with cloning. And as you know, the basis of Buddhism is that life is recycled through reincarnation. In some ways, I think, therapeutic cloning restarts the circle of life.'

Q.5)

Which one of the following scenarios is unlikely to follow from the arguments in the passage?

[1] A 21st century Christian scientist is likely to oppose cloning because of his philosophical orientation.

[2] A 17th century British painter would have no problem adding personal touches when restoring an ancient Roman painting.

[3] A 17th century French artist who adhered to a Christian worldview would need to be completely true to the original intent of a painting when restoring it.

[4] A 20th century Japanese Buddhist monk would value a reconstructed shrine as the original.

Q.6)

The value that the modern West assigns to “an unassailable original” has resulted in all of the following EXCEPT:

[1] it allows regular employment for certain craftsmen.

[2] it discourages them from carrying out human cloning.

[3] it discourages them from making interventions in ancient art.

[4] it discourages them from simultaneous displays of multiple copies of a painting.

Q.7)

Which one of the following statements does not correctly express the similarity between the Ise Grand Shrine and the cathedral of Freiburg Minster?

[1] Both can be regarded as very old structures.

[2] Both are continually undergoing restoration.

[3] Both were built as places of worship.

[4] Both will one day be completely rebuilt.

Q.8)

Based on the passage, which one of the following copies would a Chinese museum be unlikely to consider as having less value than the original?

[1] Pablo Picasso’s painting of Vincent van Gogh’s original painting, bearing Picasso’s signature.

[2] Pablo Picasso’s miniaturised, but otherwise faithful and accurate painting of Vincent van Gogh’s original painting.

[3] Pablo Picasso’s photograph of Vincent van Gogh’s original painting, printed to exactly the same scale.

[4] Pablo Picasso’s painting of Vincent van Gogh’s original painting, identical in every respect.

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

Critical theory of technology is a political theory of modernity with a normative dimension. It belongs to a tradition extending from Marx to Foucault and Habermas according to which advances in the formal claims of human rights take center stage while in the background centralization of ever more powerful public institutions and private organizations imposes an authoritarian social order.

Marx attributed this trajectory to the capitalist rationalization of production. Today it marks many

institutions besides the factory and every modern political system, including so-called socialist systems. This trajectory arose from the problems of command over a disempowered and deskilled labor force; but everywhere [that] masses are organized – whether it be Foucault’s prisons or Habermas’s public sphere – the same pattern prevails. Technological design and development is shaped by this pattern as the material base of a distinctive social order. Marcuse would later point to a “project” as the basis of what he called rather confusingly “technological rationality.” Releasing technology from this project is a democratic political task. In accordance with this general line of thought, critical theory of technology regards technologies as an environment rather than as a collection of tools. We live today with and even within technologies that determine our way of life. Along with the constant pressures to build centers of power, many other social values and meanings are inscribed in technological design. A hermeneutics of technology must make explicit the meanings implicit in the devices we use and the rituals they script. Social histories of technologies such as the bicycle, artificial lighting or firearms have made important contributions to this type of analysis. Critical theory of technology attempts to build a methodological approach on the lessons of these histories. As an environment, technologies shape their inhabitants. In this respect, they are comparable to laws and customs. Each of these institutions can be said to represent those who live under their sway through privileging certain dimensions of their human nature. Laws of property represent the interest in ownership and control. Customs such as parental authority represent the interest of childhood in safety and growth. Similarly, the automobile represents its users in so far as they are interested in mobility. Interests such as these constitute the version of human nature sanctioned by society. This notion of representation does not imply an eternal human nature. The concept of nature as non-identity in the Frankfurt School suggests an alternative. On these terms, nature is what lies at the limit of history, at the point at which society loses the capacity to imprint its meanings on things and control them effectively. The reference here is, of course, not to the nature of natural science, but to the lived nature in which we find ourselves and which we are. This nature reveals itself as that which cannot be totally encompassed by the machinery of society. For the Frankfurt School, human nature, in all its transcending force, emerges out of a historical context as that context is [depicted] in illicit joys, struggles and pathologies. We can perhaps admit a less romantic . . . conception in which those dimensions of human nature recognized by society are also granted theoretical legitimacy.

Q.9)

Which one of the following statements contradicts the arguments of the passage?

- [1] The problems of command over a disempowered and deskilled labour force gave rise to similar patterns of the capitalist rationalisation of production wherever masses were organised.
- [2] Marx’s understanding of the capitalist rationalisation of production and Marcuse’s understanding of a “project” of “technological rationality” share theoretical inclinations.
- [3] Paradoxically, the capitalist rationalisation of production is a mark of so-called socialist systems as well.

[4] Masses are organised in patterns set by Foucault's prisons and Habermas' public sphere.

Q.10)

Which one of the following statements could be inferred as supporting the arguments of the passage?

[1] Technologies form the environmental context and shape the contours of human society.

[2] Nature decides the point at which society loses its capacity to control history.

[3] The romantic conception of nature referred to by the passage is the one that requires theoretical legitimacy.

[4] It is not human nature, but human culture that is represented by institutions such as law and custom.

Q.11)

Which one of the following statements best reflects the main argument of the fourth paragraph of the passage?

[1] Technology, laws, and customs are not unlike each other if considered as institutions.

[2] Technology, laws, and customs are comparable, but dissimilar phenomena.

[3] Automobiles represent the interest in mobility present in human nature.

[4] Technological environments privilege certain dimensions of human nature as effectively as laws and customs.

Q.12)

All of the following claims can be inferred from the passage, EXCEPT:

[1] analyses of technologies must engage with their social histories to be able to reveal their implicit and explicit meanings for us.

[2] the significance of parental authority to children's safety does not therefore imply that parental authority is a permanent aspect of human nature.

[3] the critical theory of technology argues that, as issues of human rights become more prominent, we lose sight of the ways in which the social order becomes more authoritarian.

[4] technologies seek to privilege certain dimensions of human nature at a high cost to lived nature.

The passage below is accompanied by a set of questions. Choose the best answer to each question. Stoicism was founded in 300 BC by the Greek philosopher Zeno and survived into the Roman era until about AD 300. According to the Stoics, emotions consist of two movements. The first movement is the immediate feeling and other reactions (e.g., physiological response) that occur when a stimulus or event occurs. For instance, consider what could have happened if an army general accused Marcus Aurelius of treason in front of other officers. The first movement for Marcus may have been (internal) surprise and anger in response to this insult, accompanied perhaps by some involuntary physiological and expressive responses such as face flushing and a movement of the eyebrows. The second movement is what one does next about the emotion. Second movement behaviors occur after thinking and are under one's control. Examples of second

movements for Marcus might have included a plot to seek revenge, actions signifying deference and appeasement, or perhaps proceeding as he would have proceeded whether or not this event occurred: continuing to lead the Romans in a way that Marcus Aurelius believed best benefited them. In the Stoic view, choosing a reasoned, unemotional response as the second movement is the only appropriate response. The Stoics believed that to live the good life and be a good person, we need to free ourselves of nearly all desires such as too much desire for money, power, or sexual gratification. Prior to second movements, we can consider what is important in life. Money, power, and excessive sexual gratification are not important. Character, rationality, and kindness are important. The Epicureans, first associated with the Greek philosopher Epicurus . . . held a similar view, believing that people should enjoy simple pleasures, such as good conversation, friendship, food, and wine, but not be indulgent in these pursuits and not follow passion for those things that hold no real value like power and money. As Oatley (2004) states, “the Epicureans articulated a view—enjoyment of relationship with friends, of things that are real rather than illusory, simple rather than artificially inflated, possible rather than vanishingly unlikely—that is certainly relevant today” . . . In sum, these ancient Greek and Roman philosophers saw emotions, especially strong ones, as potentially dangerous. They viewed emotions as experiences that needed to be [reined] in and controlled. As Oatley (2004) points out, the Stoic idea bears some similarity to Buddhism. Buddha, living in India in the 6th century BC, argued for cultivating a certain attitude that decreases the probability of (in Stoic terms) destructive second movements. Through meditation and the right attitude, one allows emotions to happen to oneself (it is impossible to prevent this), but one is advised to observe the emotions without necessarily acting on them; one achieves some distance and decides what has value and what does not have value. Additionally, the Stoic idea of developing virtue in oneself, of becoming a good person, which the Stoics believed we could do because we have a touch of the divine, laid the foundation for the three monotheistic religions: Judaism, Christianity, and Islam . . . As with Stoicism, tenets of these religions include controlling our emotions lest we engage in sinful behavior.

Q.13)

Which one of the following statements, if false, could be seen as contradicting the facts/arguments in the passage?

- [1] Despite practising meditation and cultivating the right attitude, emotions cannot ever be controlled.
- [2] The Greek philosopher Zeno survived into the Roman era until about AD 300.
- [3] In the Stoic view, choosing a reasoned, unemotional response as the first movement is an appropriate response to emotional situations.
- [4] In the Epicurean view, indulging in simple pleasures is not desirable.

Q.14)

“Through meditation and the right attitude, one allows emotions to happen to oneself (it is impossible to prevent this), but one is advised to observe the emotions without necessarily acting on them; one achieves

some distance and decides what has value and what does not have value.” In the context of the passage, which one of the following is not a possible implication of the quoted statement?

[1] Emotional responses can make it difficult to distinguish valuable experiences from valueless experiences.

[2] “Meditation and the right attitude”, in this instance, implies an initially passive reception of all experiences.

[3] Meditation allows certain out-of-body experiences that permit us to gain the distance necessary to control our emotions.

[4] The observation of emotions in a distant manner corresponds to the second movement referred to earlier in the passage.

Q.15)

On the basis of the passage, which one of the following statements can be regarded as true?

[1] There were no Stoics in India at the time of the Roman civilisation.

[2] The Epicureans believed in controlling all emotions.

[3] The Stoic influences can be seen in multiple religions.

[4] The Stoics valorised the pursuit of money, power, and sexual gratification.

Q.16)

Which one of the following statements would be an accurate inference from the example of Marcus Aurelius?

[1] Marcus Aurelius was one of the leaders of the Roman army.

[2] Marcus Aurelius was humiliated by the accusation of treason in front of the other officers.

[3] Marcus Aurelius was a Stoic whose philosophy survived into the Roman era.

[4] Marcus Aurelius plotted revenge in his quest for justice.

Q.17)

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

Sentence: Having made citizens more and less knowledgeable than their predecessors, the Internet has proved to be both a blessing and a curse.

Paragraph: Never before has a population, nearly all of whom has enjoyed at a least a secondary school education, been exposed to so much information, whether in newspapers and magazines or through YouTube, Google, and Facebook. ____ (1) _____. Yet it is not clear that people today are more knowledgeable than their barely literate predecessors. Contemporary advances in technology offered more serious and inquisitive students access to realms of knowledge previously unimaginable and unavailable. ____ (2) _____. But such readily available knowledge leads many more students away from serious study, the reading of actual texts, and toward an inability to write effectively and grammatically. ____ (3) _____. It has let people

choose sources that reinforce their opinions rather than encouraging them to question inherited beliefs.

____ (4) ____.

[1] Option 1

[2] Option 2

[3] Option 3

[4] Option 4

Q.18)

The four sentences (labelled 1, 2, 3 and 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. Some company leaders are basing their decisions on locating offices to foster innovation and growth, as their best-performing inventors suffered the greatest productivity losses when their commutes grew longer.
2. Shorter commutes support innovation by giving employees more time in the office and greater opportunities for in-person collaboration, while removing the physical strain of a long commute.
3. This is not always the case: remote work does not automatically lead to greater creativity and productivity as office water-cooler conversations are also very important for innovation.
4. Some see the link between long commutes and productivity as support for work-from-home scenarios, as many workers have grown accustomed to their commute-free arrangements during the pandemic.

Q.19)

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

Sentence: Easing the anxiety and pressure of having a “big day” is part of the appeal for many couples who marry in secret.

Paragraph: Wedding season is upon us and – after two years of Covid chaos that saw nuptials scaled back– you may think the temptation would be to go all out. ____ (1) _____. But instead of expanding the guest list, many couples are opting to have entirely secret ceremonies. With Covid case numbers remaining high and the cost of living crisis meaning that many couples are feeling the pinch, it’s no wonder that some are less than eager to send out invites. ____ (2) _____. Plus, it can’t hurt that in celebrity circles getting married in secret is all the rage. ____ (3) _____. “I would definitely say that secret weddings are becoming more common,” says Landis Bejar, the founder of a therapy practice, which specialises in helping brides and grooms manage wedding stress. “People are looking for ways to get out of the spotlight and avoid the pomp and circumstance of weddings. ____ (4) _____. They just want to get to the part where they are married.”

[1] Option 1

[2] Option 2

[3] Option 3

[4] Option 4

Q.20)

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

All that we think we know about how life hangs together is really some kind of illusion that we have perpetrated on ourselves because of our limited vision. What appear to be inanimate objects such as stones turn out not only to be alive in the same way that we are, but also in many infinitesimal ways to be affected by stimuli just as humans are. The distinction between animate and inanimate simply cannot be made when you enter the world of quantum mechanics and try to determine how those apparent subatomic particles, of which you and everything else in our universe is composed, are all tied together. The point is that physics and metaphysics show there is a pattern to the universe that goes beyond our capacity to grasp it with our brains.

[1] The inanimate world is both sentient and cognizant like its animate counterpart.

[2] The effect of stimuli is similar in inanimate objects when compared to animate objects or living beings.

[3] Quantum physics indicates that an astigmatic view of reality results in erroneous assumptions about the universe.

[4] Arbitrary distinctions between inanimate and animate objects disappear at the scale at which quantum mechanics works.

Q.21)

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

It's not that modern historians of medieval Africa have been ignorant about contacts between Ethiopia and Europe; they just had the power dynamic reversed. The traditional narrative stressed Ethiopia as weak and in trouble in the face of aggression from external forces, so Ethiopia sought military assistance from their fellow Christians to the north. But the real story, buried in plain sight in medieval diplomatic texts, simply had not yet been put together by modern scholars. Recent research pushes scholars of medieval Europe to imagine a much more richly connected medieval world: at the beginning of the so-called Age of Exploration, there is evidence that the kings of Ethiopia were sponsoring their own missions of diplomacy, faith and commerce.

[1] Medieval historical sources selectively promoted the narrative that powerful European forces were called on to protect weak African civilisations such as Ethiopia, but this is far from reality.

[2] Historians were under the illusion that Ethiopia needed military protection from their neighbours, but in fact the country had close commercial and religious connections with them.

[3] Medieval texts have documented how strong connections between the Christian communities of Ethiopia and Europe were invaluable in establishing military and trade links between the two civilisations.

[4] Medieval texts have been 'cherry-picked' to promote a view of Ethiopia as weak and in need of Europe's

military help with aggressive neighbours, but recent studies reveal it was a well-connected and outward-looking culture.

Q.22)

The four sentences (labelled 1, 2, 3 and 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. Fish skin collagen has excellent thermo-stability and tensile strength making it ideal for use as bandage that adheres to the skin and adjusts to body movements.
2. Collagen, one of the main structural proteins in connective tissues in the human body, is well known for promoting skin regeneration.
3. Fish skin swims in here as diseases and bacteria that affect fish are different from most human pathogens.
4. The risk of introducing disease agents into other species through the use of pig and cow collagen proteins for wound healing has inhibited its broader applications in the medical field.

Q.23)

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

Petitioning is an expeditious democratic tradition, used frequently in prior centuries, by which citizens can bring issues directly to governments. As expressions of collective voice, they support procedural democracy by shaping agendas. They can also recruit citizens to causes, give voice to the voteless, and apply the discipline of rhetorical argument that clarifies a point of view. By contrast, elections are limited in several respects: they involve only a few candidates, and thus fall far short of a representative democracy. Further, voters' choices are not specific to particular policies or laws, and elections are episodic, whereas the voice of the people needs to be heard and integrated constantly into democratic government.

- [1] By giving citizens greater control over shaping political and democratic agendas, political petitions are invaluable as they represent an ideal form of a representative democracy.
- [2] Petitioning has been important to democratic functioning, as it supplements the electoral process by enabling ongoing engagement with the government.
- [3] Petitioning is definitely more representative of the collective voice, and the functioning of democratic government could improve if we relied more on petitioning rather than holding periodic elections.
- [4] Citizens become less inclined to petitioning as it enables vocal citizens to shape political agendas, but this needs to change to strengthen democracies today.

Q.24)

The four sentences (labelled 1, 2, 3 and 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. The creative element in product design has become of paramount importance as it is one of the few ways a firm or industry can sustain a competitive advantage over its rivals.
2. In fact, the creative element in the value of world industry would be larger still, if we added the contribution of the creative element in other industries, such as the design of tech accessories.
3. The creative industry is receiving a lot of attention today as its growth rate is faster than that of the world economy as a whole.
4. It is for this reason that today's trade issues are increasingly involving intellectual property, as Western countries have an interest in protecting their revenues along with freeing trade in non-tangibles.



Adhara, Bithi, Chhaya, Dhanavi, Esther, and Fathima are the interviewers in a process that awards funding for new initiatives. Every interviewer individually interviews each of the candidates individually and awards a token only if she recommends funding. A token has a face value of 2, 3, 5, 7, 11, or 13. Each interviewer awards tokens of a single face value only.

Once all six interviews are over for a candidate, the candidate receives a funding that is Rs.1000 times the product of the face values of all the tokens. For example, if a candidate has tokens with face values 2, 5, and 7, then they get a funding of $\text{Rs.}1000 \times (2 \times 5 \times 7) = \text{Rs.}70,000$.

Pragnyaa, Qahira, Rasheeda, Smera, and Tantra were five candidates who received funding. The funds they received, in descending order, were Rs.390,000, Rs.210,000, Rs.165,000, Rs.77,000, and Rs.66,000.

The following additional facts are known:

1. Fathima awarded tokens to everyone except Qahira, while Adhara awarded tokens to no one except Pragnyaa.
2. Rashida received the highest number of tokens that anyone received, but she did not receive one from Esther.
3. Bithi awarded a token to Smera but not to Qahira, while Dhanavi awarded a token to Qahira but not to Smera.

Q.1)

How many tokens did Qahira receive?

Q.2)

Who among the following definitely received a token from Bithi but not from Dhanavi?

[1] Qahira

[2] Tantra

[3] Pragnyaa

[4] Rasheeda

Q.3)

How many tokens did Chhaya award?

Q.4)

How many tokens did Smera receive?

Q.5)

Which of the following could be the amount of funding that Tantra received?

(a) Rs. 66,000

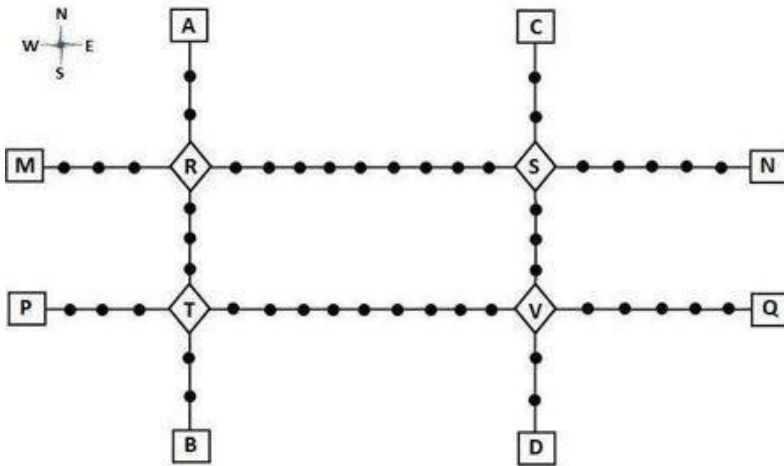
(b) Rs. 165,000

[1] Both (a) and (b)

[2] Neither (a) nor (b)

[3] Only (a)

[4] Only (b)



Given above is the schematic map of the metro lines in a city with rectangles denoting terminal stations (e.g. A), diamonds denoting junction stations (e.g. R) and small filled-up circles denoting other stations. Each train runs either in east-west or north-south direction, but not both. All trains stop for 2 minutes at each of the junction stations on the way and for 1 minute at each of the other stations. It takes 2 minutes to reach the next station for trains going in east-west direction and 3 minutes to reach the next station for trains going in north-south direction. From each terminal station, the first train starts at 6 am; the last trains leave the terminal stations at midnight. Otherwise, during the service hours, there are metro service every 15 minutes in the north-south lines and every 10 minutes in the east-west lines. A train must rest for at least 15 minutes after completing a trip at the terminal station, before it can undertake the next trip in the reverse direction. (All questions are related to this metro service only. Assume that if someone reaches a station exactly at the time a train is supposed to leave, (s)he can catch that train.)

Q.6)

If Hari is ready to board a train at 8:05 am from station M, then when is the earliest that he can reach station N?

[1] 9:01 am

[2] 9:11 am

[3] 9:13 am

[4] 9:06 am

Q.7)

If Priya is ready to board a train at 10:25 am from station T, then when is the earliest that she can reach station S?

[1] 11:12 am

[2] 11:07 am

[3] 11:22 am

[4] 11:28 am

Q.8)

Haripriya is expected to reach station S late. What is the latest time by which she must be ready to board at station S if she must reach station B before 1 am via station R?

[1] 11:35 pm

[2] 11:43 pm

[3] 11:49 am

[4] 11:39 pm

Q.9)

What is the minimum number of trains that are required to provide the service on the AB line (considering both north and south directions)?

Q.10)

What is the minimum number of trains that are required to provide the service in this city?

There are 15 girls and some boys among the graduating students in a class. They are planning a get-together, which can be either a 1-day event, or a 2-day event, or a 3-day event. There are 6 singers in the class, 4 of them are boys. There are 10 dancers in the class, 4 of them are girls. No dancer in the class is a singer. Some students are not interested in attending the get-together. Those students who are interested in attending a 3-day event are also interested in attending a 2-day event; those who are interested in attending a 2-day event are also interested in attending a 1-day event.

The following facts are also known:

1. All the girls and 80% of the boys are interested in attending a 1-day event. 60% of the boys are interested in attending a 2-day event.
2. Some of the girls are interested in attending a 1-day event, but not a 2-day event; some of the other girls are interested in attending both.
3. 70% of the boys who are interested in attending a 2-day event are neither singers nor dancers. 60% of the girls who are interested in attending a 2-day event are neither singers nor dancers.
4. No girl is interested in attending a 3-day event. All male singers and 2 of the dancers are interested in attending a 3-day event.
5. The number of singers interested in attending a 2-day event is one more than the number of dancers interested in attending a 2-day event.

Q.11)

How many boys are there in the class?

Q.12)

Which of the following can be determined from the given information?

- I. The number of boys who are interested in attending a 1-day event and are neither dancers nor singers.

II. The number of female dancers who are interested in attending a 1-day event.

[1] Only II

[2] Neither I nor II

[3] Both I and II

[4] Only I

Q.13)

What fraction of the class are interested in attending a 2-day event?

[1] $\frac{7}{10}$

[2] $\frac{2}{3}$

[3] $\frac{9}{13}$

[4] $\frac{7}{13}$

Q.14)

What BEST can be concluded about the number of male dancers who are interested in attending a 1-day event?

[1] 4 or 6

[2] 6

[3] 5 or 6

[4] 5

Q.15)

How many female dancers are interested in attending a 2-day event?

[1] 1

[2] Cannot be determined

[3] 2

[4] 0

The management of a university hockey team was evaluating performance of four women players - Amla, Bimla, Harita and Sarita for their possible selection in the university team for next year. For this purpose, the management was looking at the number of goals scored by them in the past 8 matches, numbered 1 through 8. The four players together had scored a total of 12 goals in these matches. In the 8 matches, each of them had scored at least one goal. No two players had scored the same total number of goals.

The following facts are known about the goals scored by these four players only. All the questions refer only to the goals scored by these four players.

1. Only one goal was scored in every even numbered match.

2. Harita scored more goals than Bimla.

3. The highest goal scorer scored goals in exactly 3 matches including Match 4 and Match 8.

4. Bimla scored a goal in Match 1 and one each in three other consecutive matches.
5. An equal number of goals were scored in Match 3 and Match 7, which was different from the number of goals scored in either Match 1 or Match 5.
6. The match in which the highest number of goals was scored was unique and it was not Match 5.

Q.16)

How many goals were scored in Match 7?

[1] Cannot be determined

[2] 1

[3] 3

[4] 2

Q.17)

Which of the following is the correct sequence of goals scored in matches 1, 3, 5 and 7?

[1] 4, 1, 2, 1

[2] 5, 1, 0, 1

[3] 3, 2, 1, 2

[4] 3, 1, 2, 1

Q.18)

Which of the following statement(s) is/are true?

Statement-1: Amla and Sarita never scored goals in the same match.

Statement-2: Harita and Sarita never scored goals in the same match.

[1] Both the statements

[2] Statement-1 only

[3] None of the statements

[4] Statement-2 only

Q.19)

Which of the following statement(s) is/are false?

Statement-1: In every match at least one player scored a goal.

Statement-2: No two players scored goals in the same number of matches.

[1] Statement-2 only

[2] Statement-1 only

[3] None of the statements

[4] Both the statements

Q.20)

If Harita scored goals in one more match as compared to Sarita, which of the following statement(s) is/are necessarily true?

Statement-1: Amla scored goals in consecutive matches.

Statement-2: Sarita scored goals in consecutive matches.

[1] None of the statements

[2] Statement-1 only

[3] Both the statements

[4] Statement-2 only



Q.1)

Let a and b be natural numbers. If $a^2 + ab + a = 14$ and $b^2 + ab + b = 28$, then $(2a + b)$ equals

[1] 10

[2] 7

[3] 8

[4] 9

Q.2)

For any real number x , let $[x]$ be the largest Integer less than or equal to x . If $\sum_{n=1}^N \left[\frac{1}{5} + \frac{n}{25} \right] = 25$ then N is

Q.3)

Trains A and B start traveling at the same time towards each other with constant speeds from stations X and Y, respectively. Train A reaches station Y in 10 minutes while train B takes 9 minutes to reach station X after meeting train A. Then the total time taken, in minutes, by train B to travel from station Y to station X is

[1] 6

[2] 10

[3] 15

[4] 12

Q.4)

A trapezium ABCD has side AD parallel to BC, $\angle BAD = 90^\circ$, $BC = 3$ cm and $AD = 8$ cm. If the perimeter of this trapezium is 36 cm, then its area, in sq. cm, is

Q.5)

For natural numbers x, y , and z , if $xy + yz = 19$ and $yz + xz = 51$, then the minimum possible value of xyz is

Q.6)

Let a, b, c be non-zero real numbers such that $b^2 < 4ac$, and $f(x) = ax^2 + bx + c$. If the set S consists of all integers m such that $f(m) < 0$, then the set S must necessarily be

[1] the empty set

[2] the set of all positive integers

[3] the set of all integers

[4] either the empty set or the set of all integers

Q.7)

A mixture contains lemon juice and sugar syrup in equal proportion. If a new mixture is created by adding this mixture and sugar syrup in the ratio 1 : 3, then the ratio of lemon juice and sugar syrup in the new mixture is

[1] 1 : 4

[2] 1 : 5

[3] 1 : 6

[4] 1 : 7

Q.8)

The average of three integers is 13. When a natural number n is included, the average of these four integers remains an odd integer. The minimum possible value of n is

[1] 3

[2] 1

[3] 4

[4] 5

Q.9)

Amal buys 110 kg of syrup and 120 kg of juice, syrup being 20% less costly than juice, per kg. He sells 10 kg of syrup at 10% profit and 20 kg of juice at 20% profit. Mixing the remaining juice and syrup, Amal sells the mixture at ₹ 308.32 per kg and makes an overall profit of 64%. Then, Amal's cost price for syrup, in rupees per kg, is

Q.10)

For any natural number t , suppose the sum of the first t terms of an arithmetic progression is $(n + 2n^2)$. If the n^{th} term of the progression is divisible by 9, then the smallest possible value of n is

[1] 4

[2] 7

[3] 9

[4] 8

Q.11)

Ankita buys 4 kg cashews, 14 kg peanuts and 6 kg almonds when the cost of 7 kg cashews is the same as that of 30 kg peanuts or 9 kg almonds. She mixes all the three nuts and marks a price for the mixture in order to make a profit of ₹1752. She sells 4 kg of the mixture at this marked price and the remaining at a 20%

discount on the marked price, thus making a total profit of ₹744. Then the amount, in rupees, that she had spent in buying almonds is

- [1] 1176
- [2] 2520
- [3] 1680
- [4] 1440

Q.12)

The average weight of students in a class increases by 600 gm when some new students join the class. If the average weight of the new students is 3 kg more than the average weight of the original students, then the ratio of the number of original students to the number of new students is

- [1] 1 : 2
- [2] 4 : 1
- [3] 1 : 4
- [4] 3 : 1

Q.13)

The number of ways of distributing 20 identical balloons among 4 children such that each child gets some balloons but no child gets an odd number of balloons, is

Q.14)

The largest real value of a for which the equation $|x + a| + |x - 1| = 2$ has an infinite number of solutions for x is

- [1] 0
- [2] 2
- [3] 1
- [4] -1

Q.15)

All the vertices of a rectangle lie on a circle of radius R . If the perimeter of the rectangle is P , then the area of the rectangle is

- [1] $\frac{P^2}{16} - R^2$
- [2] $\frac{P^2}{2} - 2PR$

[3] $\frac{P^2}{8} - \frac{R^2}{2}$

[4] $\frac{P^2}{8} - 2R^2$

Q.16)

Let ABCD be a parallelogram such that the coordinates of its three vertices A, B, C are (1, 1), (3, 4) and (-2, 8), respectively. Then, the coordinates of the vertex D are

[1] (-3, 4)

[2] (0, 11)

[3] (4, 5)

[4] (-4, 5)

Q.17)

Let A be the largest positive integer that divides all the numbers of the form $3^k + 4^k + 5^k$ and B be the largest positive integer that divides all the numbers of the form $4^k + 3(4^k) + 4^{k+2}$, where k is any positive integer. Then $(A + B)$ equals

Q.18)

Let $0 \leq a \leq x \leq 100$ and $f(x) = |x - a| + |x - 100| + |x - a - 50|$. Then the maximum value of $f(x)$ becomes 100 when a is equal to

[1] 25

[2] 0

[3] 100

[4] 50

Q.19)

Pinky is standing in a queue at a ticket counter. Suppose the ratio of the number of persons standing ahead of Pinky to the number of persons standing behind her in the queue is 3 : 5. If the total number of persons in the queue is less than 300, then the maximum possible number of persons standing ahead of Pinky is

Q.20)

In a class of 100 students, 73 like coffee, 80 like tea and 52 like lemonade. It may be possible that some students do not like any of these three drinks. Then the difference between the maximum and minimum possible number of students who like all the three drinks is

[1] 52

[2] 53

[3] 48

[4] 47

Q.21)

Alex invested his savings in two parts. The simple interest earned on the first part at 15% per annum for 4 years is the same as the simple interest earned on the second part at 12% per annum for 3 years. Then, the percentage of his savings invested in the first part is

[1] 37.5%

[2] 60%

[3] 62.5%

[4] 40%

Q.22)

In a village, the ratio of number of males to females is 5 : 4. The ratio of number of literate males to literate females is 2 : 3. The ratio of the number of illiterate males to illiterate females is 4 : 3. If 3600 males in the village are literate, then the total number of females in the village is

Answer Keys

Q. No.	VARC	DILR	Quant
1	1	2	3
2	3	3	44
3	3	3	3
4	2	3	66
5	3	1	34
6	2	2	4
7	2	1	4
8	4	4	4
9	4	8	160
10	1	48	2
11	1	50	3
12	4	1	2
13	4	4	84
14	3	3	3
15	3	4	4
16	1	2	4
17	4	1	82
18	2143	1	4
19	2	3	111
20	4	1	4
21	4		1
22	2431		43200
23	2		
24	3214		

CAT 2022 Question Paper with Solution
- Slot 2

CAT 2023 VARC Section

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

Humans today make music. Think beyond all the qualifications that might trail after this bald statement: that only certain humans make music, that extensive training is involved, that many societies distinguish musical specialists from nonmusicians, that in today's societies most listen to music rather than making it, and so forth. These qualifications, whatever their local merit, are moot in the face of the overarching truth that making music, considered from a cognitive and psychological vantage, is the province of all those who perceive and experience what is made. We are, almost all of us, musicians — everyone who can entrain (not necessarily dance) to a beat, who can recognize a repeated tune (not necessarily sing it), who can distinguish one instrument or one singing voice from another. I will often use an antique word, recently revived, to name this broader musical experience. Humans are musicking creatures. . . .

The set of capacities that enables musicking is a principal marker of modern humanity. There is nothing polemical in this assertion except a certain insistence, which will figure often in what follows, that musicking be included in our thinking about fundamental human commonalities. Capacities involved in musicking are many and take shape in complicated ways, arising from innate dispositions . . . Most of these capacities overlap with nonmusical ones, though a few may be distinct and dedicated to musical perception and production. In the area of overlap, linguistic capacities seem to be particularly important, and humans are (in principle) language-makers in addition to music-makers — speaking creatures as well as musicking ones.

Humans are symbol-makers too, a feature tightly bound up with language, not so tightly with music. The species Cassirer dubbed *Homo symbolicus* cannot help but tangle musicking in webs of symbolic thought and expression, habitually making it a component of behavioral complexes that form such expression. But in fundamental features musicking is neither language-like nor symbol-like, and from these differences come many clues to its ancient emergence.

If musicking is a primary, shared trait of modern humans, then to describe its emergence must be to detail the coalescing of that modernity. This took place, archaeologists are clear, over a very long *durée*: at least 50,000 years or so, more likely something closer to 200,000, depending in part on what that coalescence is taken to comprise. If we look back 20,000 years, a small portion of this long period, we reach the lives of humans whose musical capacities were probably little different from our own. As we look farther back we reach horizons where this similarity can no longer hold — perhaps 40,000 years ago, perhaps 70,000, perhaps 100,000. But we never cross a line before which all the cognitive capacities recruited in modern musicking abruptly disappear. Unless we embrace the incredible notion that music sprang forth in full-blown glory, its emergence will have to be tracked in gradualist terms across a long period.

This is one general feature of a history of music's emergence . . . The history was at once sociocultural and biological . . . The capacities recruited in musicking are many, so describing its emergence involves following several or many separate strands.

Q.1)

Which one of the following statements, if true, would weaken the author's claim that humans are musicking creatures?

- [1] As musicking is neither language-like nor symbol-like, it is a much older form of expression.
- [2] Nonmusical capacities are of far greater consequence to human survival than the capacity for music.
- [3] Musical capacities are primarily socio-cultural, which explains the wide diversity of musical forms.
- [4] From a cognitive and psychological vantage, musicking arises from unconscious dispositions, not conscious ones.

Q.2)

Which one of the following sets of terms best serves as keywords to the passage?

- [1] Humans; Psychological vantage; Musicking; Cassirer; Emergence of music.
- [2] Musicking; Cognitive psychology; Antique; Symbol-makers; Modernity.
- [3] Humans; Capacities; Language; Symbols; Modernity.

[4] Humans; Musicking; Linguistic capacities; Symbol-making; Modern humanity.

Q.3)

Based on the passage, which one of the following statements is a valid argument about the emergence of music/musicking?

[1] Although musicking is not language-like, it shares the quality of being a form of expression.

[2] All musical work is located in the overlap between linguistic capacity and music production.

[3] Anyone who can perceive and experience music must be considered capable of musicking.

[4] 20,000 years ago, human musical capacities were not very different from what they are today.

Q.4)

“Think beyond all the qualifications that might trail after this bald statement . . .” In the context of the passage, what is the author trying to communicate in this quoted extract?

[1] Thinking beyond qualifications allows us to give free reign to musical expressions.

[2] A bald statement is one that is trailed by a series of qualifying clarifications and caveats.

[3] Although there may be many caveats and other considerations, the statement is essentially true.

[4] A bald statement is one that requires no qualifications to infer its meaning.

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

[Octopuses are] misfits in their own extended families . . . They belong to the Mollusca class Cephalopoda. But they don’t look like their cousins at all. Other molluscs include sea snails, sea slugs, bivalves – most are shelled invertebrates with a dorsal foot. Cephalopods are all arms, and can be as tiny as 1 centimetre and as large at 30 feet. Some of them have brains the size of a walnut, which is large for an invertebrate. . . .

It makes sense for these molluscs to have added protection in the form of a higher cognition; they don’t have a shell covering them, and pretty much everything feeds on cephalopods, including humans. But how did cephalopods manage to secure their own invisibility cloak?

Cephalopods fire from multiple cylinders to achieve this in varying degrees from species to species. There are four main catalysts – chromatophores, iridophores, papillae and leucophores. . . .

[Chromatophores] are organs on their bodies that contain pigment sacs, which have red, yellow and brown pigment granules. These sacs have a network of radial muscles, meaning muscles arranged in a circle radiating outwards. These are connected to the brain by a nerve. When the cephalopod wants to change colour, the brain carries an electrical impulse through the nerve to the muscles that expand outwards, pulling open the sacs to display the colours on the skin. Why these three colours? Because these are the colours the light reflects at the depths they live in (the rest is absorbed before it reaches those depths). . . .

Well, what about other colours? Cue the iridophores. Think of a second level of skin that has thin stacks of cells. These can reflect light back at different wavelengths. . . . It's using the same properties that we've seen in hologram stickers, or rainbows on puddles of oil. You move your head and you see a different colour. The sticker isn't doing anything but reflecting light – it's your movement that's changing the appearance of the colour. This property of holograms, oil and other such surfaces is called "iridescence". . . .

Papillae are sections of the skin that can be deformed to make a texture bumpy. Even humans possess them (goosebumps) but cannot use them in the manner that cephalopods can. For instance, the use of these cells is how an octopus can wrap itself over a rock and appear jagged or how a squid or cuttlefish can imitate the look of a coral reef by growing miniature towers on its skin. It actually matches the texture of the substrate it chooses.

Finally, the leucophores: According to a paper, published in Nature, cuttlefish and octopuses possess an additional type of reflector cell called a leucophore. They are cells that scatter full spectrum light so that they appear white in a similar way that a polar bear's fur appears white. Leucophores will also reflect any filtered light shown on them . . . If the water appears blue at a certain depth, the octopuses and cuttlefish can appear blue; if the water appears green, they appear green, and so on and so forth.

Q.5)

All of the following are reasons for octopuses being "misfits" EXCEPT that they:

[1] exhibit higher intelligence than other molluscs.

- [2] do not possess an outer protective shell.
- [3] are consumed by humans and other animals.
- [4] have several arms.

Q.6)

Based on the passage, it can be inferred that camouflaging techniques in an octopus are most dissimilar to those in:

- [1] polar bears
- [2] cuttlefish
- [3] squids
- [4] sea snails

Q.7)

Based on the passage, we can infer that all of the following statements, if true, would weaken the camouflaging adeptness of Cephalopods EXCEPT:

- [1] the hydrostatic pressure at the depths at which Cephalopods reside renders radial muscle movements difficult.
- [2] the number of chromatophores in Cephalopods is half the number of iridophores and leucophores.
- [3] light reflects the colours red, green, and yellow at the depths at which Cephalopods reside.
- [4] the temperature of water at the depths at which Cephalopods reside renders the transmission of neural signals difficult.

Q.8)

Which one of the following statements is not true about the camouflaging ability of Cephalopods?

- [1] Cephalopods can change their colour.
- [2] Cephalopods can change their texture.
- [3] Cephalopods can blend into the colour of their surroundings.
- [4] Cephalopods can take on the colour of their predator.

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

question.

We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterisations overlap but are not congruent. Academic disciplines are social institutions. . . . My view is that institutions are all those social entities that organise action: they link acting individuals into social structures. There are various kinds of institutions. Hegelians and Marxists emphasise universal institutions such as the family, rituals, governance, economy and the military. These are mostly institutions that just grew. Perhaps in some imaginary beginning of time they spontaneously appeared. In their present incarnations, however, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military. Institutions deriving from statute, like joint-stock companies are formal by contrast with informal ones such as friendships. There are some institutions that come in both informal and formal variants, as well as in mixed ones. Consider the fact that the stock exchange and the black market are both market institutions, one formal one not. Consider further that there are many features of the work of the stock exchange that rely on informal, noncodifiable agreements, not least the language used for communication. To be precise, mixtures are the norm . . . From constitutions at the top to by-laws near the bottom we are always adding to, or tinkering with, earlier institutions, the grown and the designed are intertwined. It is usual in social thought to treat culture and tradition as different from, although alongside, institutions. The view taken here is different. Culture and tradition are sub-sets of institutions analytically isolated for explanatory or expository purposes. Some social scientists have taken all institutions, even purely local ones, to be entities that satisfy basic human needs – under local conditions . . . Others differed and declared any structure of reciprocal roles and norms an institution. Most of these differences are differences of emphasis rather than disagreements. Let us straddle all these versions and present institutions very generally . . . as structures that serve to coordinate the actions of individuals. . . . Institutions themselves then have no aims or purpose other than those given to them by actors or used by actors to explain them . . .

Language is the formative institution for social life and for science . . . Both formal and

informal language is involved, naturally grown or designed. (Language is all of these to varying degrees.) Languages are paradigms of institutions or, from another perspective, nested sets of institutions. Syntax, semantics, lexicon and alphabet/character-set are all institutions within the larger institutional framework of a written language. Natural languages are typical examples of what Ferguson called ‘the result of human action, but not the execution of any human design’[;] reformed natural languages and artificial languages introduce design into their modifications or refinements of natural language. Above all, languages are paradigms of institutional tools that function to coordinate.

Q.9)

“Consider the fact that the stock exchange and the black market are both market institutions, one formal one not.” Which one of the following statements best explains this quote, in the context of the passage?

- [1] Market instruments can be formally traded in the stock exchange and informally traded in the black market.
- [2] The stock exchange and the black market are both organised to function by rules.
- [3] The stock exchange and the black market are both dependent on the market to survive.
- [4] The stock exchange and the black market are examples of how, even within the same domain, different kinds of institutions can co-exist.

Q.10)

All of the following inferences from the passage are false, EXCEPT:

- [1] institutions like the family, rituals, governance, economy, and the military are natural and cannot be consciously modified.
- [2] as concepts, “culture” and “tradition” have no analytical, explanatory or expository power, especially when they are treated in isolation.
- [3] the institution of friendship cannot be found in the institution of joint-stock companies because the first is an informal institution, while the second is a formal one.
- [4] “natural language” refers to that stage of language development where no conscious human intent is evident in the formation of language.

Q.11)

In the first paragraph of the passage, what are the two “characterisations” that are seen as

overlapping but not congruent?

[1] “an arena of thought” and “academic disciplines”.

[2] “individuals” and “social structures”.

[3] “academic disciplines” and “institutions”.

[4] “the philosophy of the social sciences” and “a set of social institutions”.

Q.12)

Which of the following statements best represents the essence of the passage?

[1] It is usual in social thought to treat culture and tradition as different from institutions.

[2] Language is the fundamental formal institution for social life and for science.

[3] The stock exchange and the black market are both market institutions.

[4] Institutions are structures that serve to coordinate the actions of individuals.

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

When we teach engineering problems now, we ask students to come to a single “best” solution defined by technical ideals like low cost, speed to build, and ability to scale. This way of teaching primes students to believe that their decision-making is purely objective, as it is grounded in math and science. This is known as technical-social dualism, the idea that the technical and social dimensions of engineering problems are readily separable and remain distinct throughout the problem-definition and solution process.

Nontechnical parameters such as access to a technology, cultural relevancy or potential harms are deemed political and invalid in this way of learning. But those technical ideals are at their core social and political choices determined by a dominant culture focused on economic growth for the most privileged segments of society. By choosing to downplay public welfare as a critical parameter for engineering design, we risk creating a culture of disengagement from societal concerns amongst engineers that is antithetical to the ethical code of engineering.

In my field of medical devices, ignoring social dimensions has real consequences. . . . Most FDA-approved drugs are incorrectly dosed for people assigned female at birth, leading to unexpected adverse reactions. This is because they have been inadequately represented in

clinical trials.

Beyond physical failings, subjective beliefs treated as facts by those in decision-making roles can encode social inequities. For example, spirometers, routinely used devices that measure lung capacity, still have correction factors that automatically assume smaller lung capacity in Black and Asian individuals. These racially based adjustments are derived from research done by eugenicists who thought these racial differences were biologically determined and who considered nonwhite people as inferior. These machines ignore the influence of social and environmental factors on lung capacity.

Many technologies for systemically marginalized people have not been built because they were not deemed important such as better early diagnostics and treatment for diseases like endometriosis, a disease that afflicts 10 percent of people with uteruses. And we hardly question whether devices are built sustainably, which has led to a crisis of medical waste and health care accounting for 10 percent of U.S. greenhouse gas emissions.

Social justice must be made core to the way engineers are trained. Some universities are working on this. . . . Engineers taught this way will be prepared to think critically about what problems we choose to solve, how we do so responsibly and how we build teams that challenge our ways of thinking.

Individual engineering professors are also working to embed societal needs in their pedagogy. Darshan Karwat at the University of Arizona developed activist engineering to challenge engineers to acknowledge their full moral and social responsibility through practical self-reflection. Khalid Kadir at the University of California, Berkeley, created the popular course Engineering, Environment, and Society that teaches engineers how to engage in place-based knowledge, an understanding of the people, context and history, to design better technical approaches in collaboration with communities. When we design and build with equity and justice in mind, we craft better solutions that respond to the complexities of entrenched systemic problems.

Q.13)

In this passage, the author is making the claim that:

[1] technical-social dualism has emerged as a technique for engineering students to incorporate social considerations into their technical

problem-solving processes.

[2] engineering students today are trained to be non-subjective in their reasoning as this best enables them to develop much-needed universal solutions.

[3] the objective of best solutions in engineering has shifted the focus of pedagogy from humanism and social obligations to technological perfection.

[4] engineering students today are taught to focus on objective technical outcomes, independent of the social dimensions of their work.

Q.14)

We can infer that the author would approve of a more evolved engineering pedagogy that includes all of the following EXCEPT:

[1] moving towards technical-social dualism where social community needs are incorporated in problem-definition and solutions.

[2] design that is based on the needs of communities using local knowledge and responding to local priorities.

[3] making considerations of environmental sustainability intrinsic to the development of technological solutions.

[4] a more responsible approach to technical design and problem-solving than a focus on speed in developing and bringing to scale.

Q.15)

All of the following are examples of the negative outcomes of focusing on technical ideals in the medical sphere EXCEPT the:

[1] continuing calibration of medical devices based on past racial biases that have remained unadjusted for changes.

[2] incorrect assignment of people as female at birth which has resulted in faulty drug interventions.

[3] neglect of research and development of medical technologies for the diagnosis and treatment of diseases that typically afflict marginalised communities.

[4] exclusion of non-privileged groups in clinical trials which leads to incorrect drug dosages.

Q.16)

The author gives all of the following reasons for why marginalised people are systematically discriminated against in technology-related interventions EXCEPT:

- [1] “And we hardly question whether devices are built sustainably, which has led to a crisis of medical waste and health care accounting for 10 percent of U.S. greenhouse gas emissions.” [2] “But those technical ideals are at their core social and political choices determined by a dominant culture focused on economic growth for the most privileged segments of society.” [3] “These racially based adjustments are derived from research done by eugenicists who thought these racial differences were biologically determined and who considered nonwhite people as inferior.” [4] “Beyond physical failings, subjective beliefs treated as facts by those in decision-making roles can encode social inequities.”

Q.17)

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

Today, many of the debates about behavioural control in the age of big data echo Cold War-era anxieties about brainwashing, insidious manipulation and repression in the ‘technological society’. In his book Psychopolitics, Han warns of the sophisticated use of targeted online content, enabling ‘influence to take place on a pre-reflexive level’. On our current trajectory, “freedom will prove to have been merely an interlude.” The fear is that the digital age has not liberated us but exposed us, by offering up our private lives to machine-learning algorithms that can process masses of personal and behavioural data. In a world of influencers and digital entrepreneurs, it’s not easy to imagine the resurgence of a culture engendered through disconnect and disaffiliation, but concerns over the threat of online targeting, polarisation and big data have inspired recent polemics about the need to rediscover solitude and disconnect.

- [1] The role of technology in influencing public behaviour is reminiscent of the manner in which behaviour was manipulated during the Cold War.
- [2] With big data making personal information freely available, the debate on the nature of freedom and the need for privacy has resurfaced.
- [3] The notion of freedom and privacy is at stake in a world where artificial intelligence is

capable of influencing behaviour through data gathered online.

[4] Rather than freeing us, digital technology is enslaving us by collecting personal information and influencing our online behaviour.

Q.18)

The four sentences (labelled 1, 2, 3 and 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] The trajectory of cheerfulness through the self is linked to the history of the word 'cheer' which comes from an Old French meaning 'face'.

[2] Translations of the Bible into vernacular languages, expanded the noun 'cheer' into the more abstract 'cheerful-ness', something that circulates as an emotional and social quality defining the self and a moral community.

[3] When you take on a cheerful expression, no matter what the state of your soul, your cheerfulness moves into the self: the interior of the self is changed by the power of cheer. [4] People in the medieval 'Canterbury Tales' have a 'piteous' or a 'sober' cheer; 'cheer' is an expression and a body part, lying at the intersection of emotions and physiognomy.

Q.19)

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

There's a common idea that museum artworks are somehow timeless objects available to admire for generations to come. But many are objects of decay. Even the most venerable Old Master paintings don't escape: pigments discolour, varnishes crack, canvases warp. This challenging fact of art-world life is down to something that sounds more like a thread from a morality tale: inherent vice. Damien Hirst's iconic shark floating in a tank – entitled *The Physical Impossibility of Death in the Mind of Someone Living* – is a work that put a spotlight on inherent vice. When he made it in 1991, Hirst got himself in a pickle by not using the right kind of pickle to preserve the giant fish. The result was that the shark began to decompose quite quickly – its preserving liquid clouding, the skin wrinkling, and an unpleasant smell wafting from the tank.

[1] The role of museums has evolved to ensure that the artworks are preserved forever in

addition to guarding and displaying them.

[2] Artworks may not last forever; they may deteriorate with time, and the challenge is to slow down their degeneration.

[3] Museums are left with the moral responsibility of restoring and preserving the artworks since artists cannot preserve their works beyond their life.

[4] Museums have to guard timeless art treasures from intrinsic defects such as the deterioration of paint, polish and canvas.

Q.20)

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

Several of the world's earliest cities were organised along egalitarian lines. In some regions, urban populations governed themselves for centuries without any indication of the temples and palaces that would later emerge; in others, temples and palaces never emerged at all, and there is simply no evidence of a class of administrators or any other sort of ruling stratum. It would seem that the mere fact of urban life does not, necessarily, imply any particular form of political organization, and never did. Far from resigning us to inequality, the picture that is now emerging of humanity's past may open our eyes to egalitarian possibilities we otherwise would have never considered.

[1] We now have the evidence in support of the existence of an egalitarian urban life in some ancient cities, where political and civic organisation was far less hierarchical.

[2] Contrary to our assumption that urban settlements have always involved hierarchical political and administrative structures, ancient cities were not organised in this way.

[3] The emergence of a class of administrators and ruling stratum transformed the egalitarian urban life of ancient cities to the hierarchical civic organisations of today.

[4] The lack of hierarchical administration in ancient cities can be deduced by the absence of religious and regal structures such as temples and palaces.

Q.21)

The four sentences (labelled 1, 2, 3 and 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] Women may prioritize cooking because they feel they alone are responsible for mediating a toxic and unhealthy food system.
- [2] Food is commonly framed through the lens of individual choice: you can choose to eat healthily.
- [3] This is particularly so in a neoliberal context where the state has transferred the responsibility for food onto individual consumers.
- [4] The individualized framing of choice appeals to a popular desire to experience agency, but draws away from the structural obstacles that stratify individual food choices.

Q.22)

The four sentences (labelled 1, 2, 3 and 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] From chemical pollutants in the environment to the damming of rivers to invasive species transported through global trade and travel, every environmental issue is different and there is no single tech solution that can solve this crisis.
- [2] Discourse on the threat of environmental collapse revolves around cutting down emissions, but biodiversity loss and ecosystem collapse are caused by myriad and diverse reasons.
- [3] This would require legislation that recognises the rights of future generations and other species that allows the judiciary to uphold a much higher standard of environmental protection than currently possible.
- [4] Clearly, our environmental crisis requires large political solutions, not minor technological ones, so, instead of focusing on infinite growth, we could consider a path of stable-state economies, while preserving markets and healthy competition.

Q.23)

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

Sentence: This was years in the making but fast-tracked during the pandemic, when “people started being more mindful about their food”, he explained.

Paragraph: For millennia, ghee has been a venerated staple of the subcontinental diet, but it

fell out of favour a few decades ago when saturated fats were largely considered to be unhealthy. ____ (1) ____ But more recently, as the thinking around saturated fats is shifting globally, Indians are finding their own way back to this ingredient that is so integral to their cuisine. ____ (2) ____ For Karmakar, a renewed interest in ghee is emblematic of a return-to-basics movement in India. ____ (3) ____ This movement is also part of an overall trend towards “slow food”. In keeping with the movement’s philosophy, ghee can be produced locally (even at home) and has inextricable cultural ties. ____ (4) ____ At a basic level, ghee is a type of clarified butter believed to have originated in India as a way to preserve butter from going rancid in the hot climate.

[1] Option 1

[2] Option 2

[3] Option 3

[4] Option 4

Q.24)

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

Sentence: Most were first-time users of a tablet and a digital app.

Paragraph: Aage Badhein’s USP lies in the ethnographic research that constituted the foundation of its development process. Customizations based on learning directly from potential users were critical to making this self-paced app suitable for both a literate and non-literate audience. ____ (1) ____ The user interface caters to a Hindi-speaking audience who have minimal to no experience with digital services and devices. ____ (2) ____ The content and functionality of the app are suitable for a wide audience. This includes youth preparing for an independent role in life or a student ready to create a strong foundation of financial management early in her life. ____ (3) ____ Household members desirous of improving their family’s financial strength to reach their aspirations can also benefit. We piloted Aage Badhein in early 2021 with over 400 women from rural areas. ____ (4) ____ The digital solution generated a large amount of interest in the communities.

[1] Option 1

[2] Option 2

[3] Option 3

[4] Option 4



CAT 2023 DILR Section

A speciality supermarket sells 320 products. Each of these products was either a cosmetic product or a nutrition product. Each of these products was also either a foreign product or a domestic product. Each of these products had at least one of the two approvals – FDA or EU. The following facts are also known:

1. There were equal numbers of domestic and foreign products.
2. Half of the domestic products were FDA approved cosmetic products.
3. None of the foreign products had both the approvals, while 60 domestic products had both the approvals.
4. There were 140 nutrition products, half of them were foreign products.
5. There were 200 FDA approved products. 70 of them were foreign products and 120 of them were cosmetic products.

Q.1)

How many foreign products were FDA approved cosmetic products?

Q.2)

How many cosmetic products did not have FDA approval?

[1] 10

[2] 60

[3] 50

[4] Cannot be determined

Q.3)

Which among the following options best represents the number of domestic cosmetic products that had both the approvals?

[1] At least 10 and at most 80

[2] At least 20 and at most 70

[3] At least 20 and at most 50

[4] At least 10 and at most 60

Q.4)

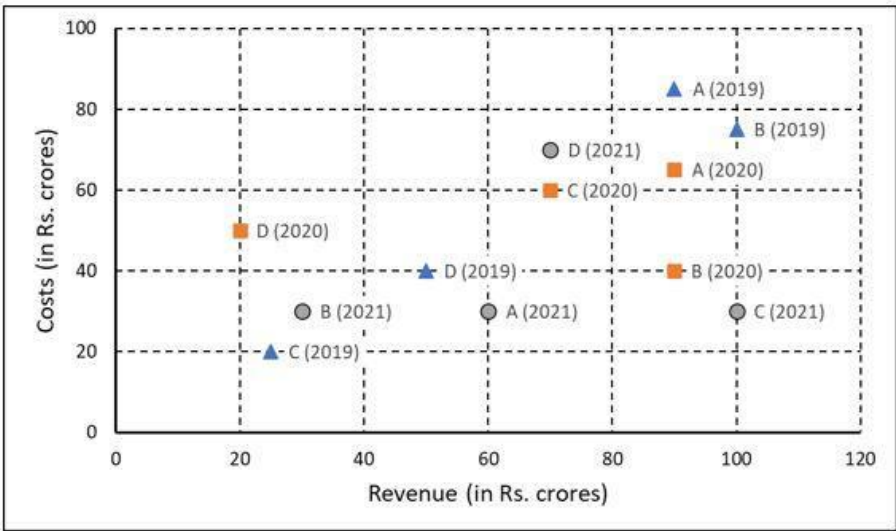
If 70 cosmetic products did not have EU approval, then how many nutrition products had both the approvals?

- [1] 10
 - [2] 20
 - [3] 30
 - [4] 50
- Q.5)

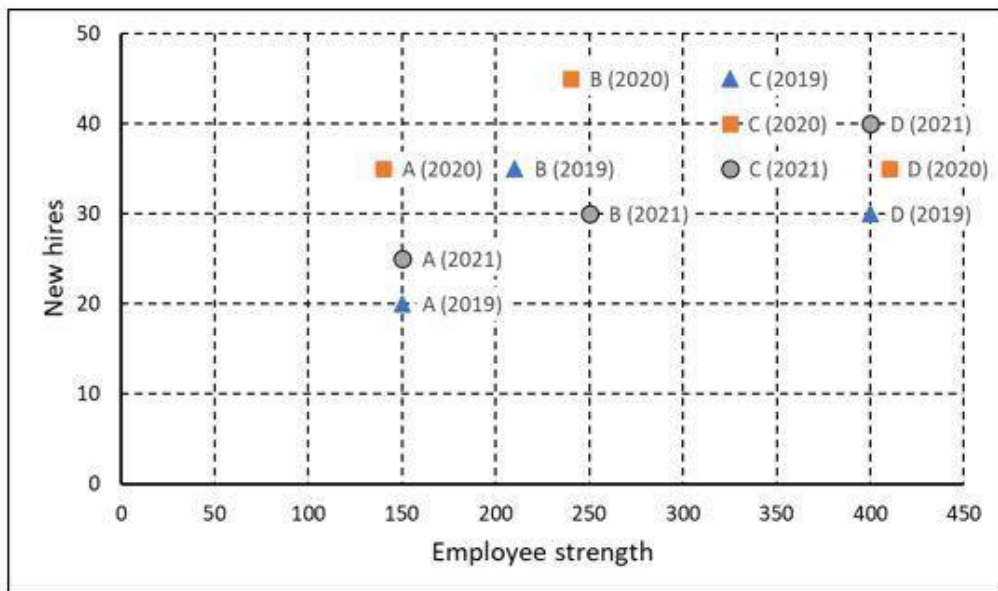
If 50 nutrition products did not have EU approval, then how many domestic cosmetic products did not have EU approval?

The two plots below show data for four companies code-named A, B, C, and D over three years - 2019, 2020, and 2021.

The first plot shows the revenues and costs incurred by the companies during these years. For example, in 2021, company C earned Rs.100 crores in revenue and spent Rs.30 crores. The profit of a company is defined as its revenue minus its costs.



The second plot shows the number of employees employed by the company (employee strength) at the start of each of these three years, as well as the number of new employees hired each year (new hires). For example, Company B had 250 employees at the start of 2021, and 30 new employees joined the company during the year.



Q.6)

Considering all three years, which company had the highest annual profit?

- [1] Company B
- [2] Company C
- [3] Company D
- [4] Company A

Q.7)

Which of the four companies experienced the highest annual loss in any of the years?

- [1] Company B
- [2] Company C
- [3] Company A
- [4] Company D

Q.8)

The ratio of a company's annual profit to its annual costs is a measure of its performance.

Which of the four companies had the lowest value of this ratio in 2019?

- [1] Company D
- [2] Company C
- [3] Company B
- [4] Company A

Q.9)

The total number of employees lost in 2019 and 2020 was the least for:

[1] Company D

[2] Company B

[3] Company A

[4] Company C

Q.10)

Profit per employee is the ratio of a company's profit to its employee strength. For this purpose, the employee strength in a year is the average of the employee strength at the beginning of that year and the beginning of the next year. In 2020, which of the four companies had the highest profit per employee?

[1] Company B

[2] Company A

[3] Company C

[4] Company D

A few salesmen are employed to sell a product called TRICCEK among households in various housing complexes. On each day, a salesman is assigned to visit one housing complex. Once a salesman enters a housing complex, he can meet any number of households in the time available. However, if a household makes a complaint against the salesman, then he must leave the housing complex immediately and cannot meet any other household on that day. A household may buy any number of TRICCEK items or may not buy any item. The salesman needs to record the total number of TRICCEK items sold as well as the number of households met in each day. The success rate of a salesman for a day is defined as the ratio of the number of items sold to the number of households met on that day. Some details about the performances of three salesmen - Tohri, Hokli and Lahur, on two particular days are given below.

1. Over the two days, all three of them met the same total number of households, and each of them sold a total of 100 items.
2. On both days, Lahur met the same number of households and sold the same number of items.
3. Hokli could not sell any item on the second day because the first household he met on that

day complained against him.

4. Tohri met 30 more households on the second day than on the first day.

5. Tohri's success rate was twice that of Lahur's on the first day, and it was 75% of Lahur's on the second day.

Q.11)

What was the total number of households met by Tohri, Hokli and Lahur on the first day?

Q.12)

How many TRICCEK items were sold by Tohri on the first day?

Q.13)

How many households did Lahur meet on the second day?

[1] more than 35

[2] between 30 and 35

[3] 20 or less

[4] between 21 and 29

Q.14)

How many households did Tohri meet on the first day?

[1] between 21 and 40

[2] more than 40

[3] between 11 and 20

[4] 10 or less

Q.15)

Which of the following statements is FALSE?

[1] Tohri had a higher success rate on the first day compared to the second day.

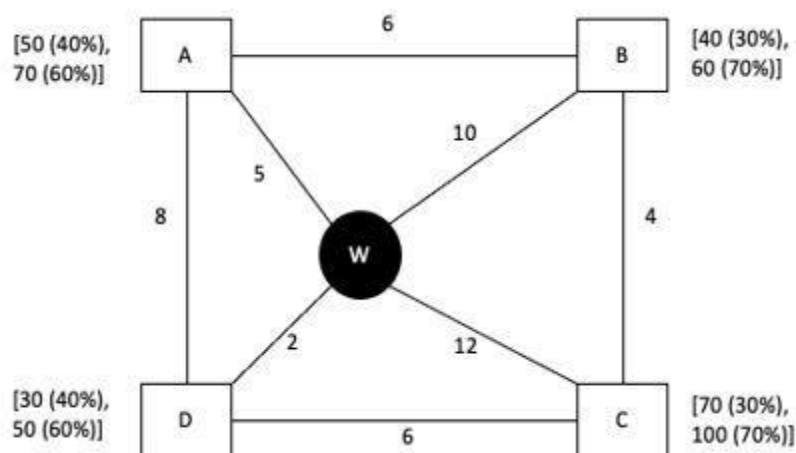
[2] Among the three, Lahur had the lowest success rate on the first day.

[3] Among the three, Tohri had the highest success rate on the second day.

[4] Among the three, Tohri had the highest success rate on the first day.

Every day a widget supplier supplies widgets from the warehouse (W) to four locations – Ahmednagar (A), Bikrampore (B), Chitrachak (C), and Deccan Park (D). The daily demand for widgets in each location is uncertain and independent of each other. Demands and

corresponding probability values (in parenthesis) are given against each location (A, B, C, and D) in the figure below. For example, there is a 40% chance that the demand in Ahmednagar will be 50 units and a 60% chance that the demand will be 70 units. The lines in the figure connecting the locations and warehouse represent two-way roads connecting those places with the distances (in km) shown beside the line. The distances in both the directions along a road are equal. For example, the road from Ahmednagar to Bikrampore and the road from Bikrampore to Ahmednagar are both 6 km long.



Every day the supplier gets the information about the demand values of the four locations and creates the travel route that starts from the warehouse and ends at a location after visiting all the locations exactly once. While making the route plan, the supplier goes to the locations in decreasing order of demand. If there is a tie for the choice of the next location, the supplier will go to the location closest to the current location. Also, while creating the route, the supplier can either follow the direct path (if available) from one location to another or can take the path via the warehouse. If both paths are available (direct and via warehouse), the supplier will choose the path with minimum distance.

Q.16)

If the last location visited is Ahmednagar, then what is the total distance covered in the route (in km)?

Q.17)

If the total number of widgets delivered in a day is 250 units, then what is the total distance covered in the route (in km)?

Q.18)

What is the chance that the total number of widgets delivered in a day is 260 units and the

route ends at Bikrampore?

- [1] 7.56%
- [2] 17.64%
- [3] 10.80%
- [4] 33.33%

Q.19)

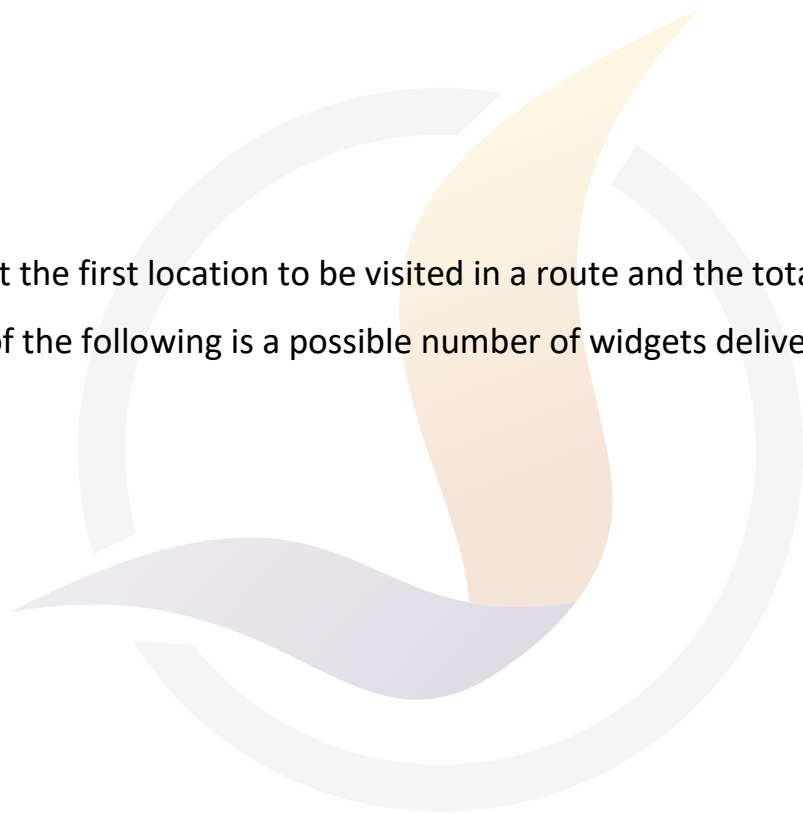
If the first location visited from the warehouse is Ahmednagar, then what is the chance that the total distance covered in the route is 40 km?

- [1] 18%
- [2] 5.4%
- [3] 30%
- [4] 3.24%

Q.20)

If Ahmednagar is not the first location to be visited in a route and the total route distance is 29 km, then which of the following is a possible number of widgets delivered on that day?

- [1] 210
- [2] 220
- [3] 200
- [4] 250



CAT 2023 Quant Section

Q.1)

In triangle ABC , altitudes AD and BE are drawn to the corresponding bases. If $\angle BAC = 45^\circ$ and $\angle ABC = \theta$, then $\frac{AD}{BE}$ equals

- [1] 1
- [2] $\sqrt{2} \cos \theta$
- [3] $\frac{(\sin \theta + \cos \theta)}{\sqrt{2}}$
- [4] $\sqrt{2} \sin \theta$

Q.2)

Consider the arithmetic progression 3, 7, 11, ... and let A_n denote the sum of the first n terms of this progression. Then the value of $\frac{1}{25} \sum_{n=1}^{25} A_n$ is

- [1] 404
- [2] 415
- [3] 455
- [4] 442

Q.3)

In an examination, there were 75 questions. 3 marks were awarded for each correct answer, 1 mark was deducted for each wrong answer and 1 mark was awarded for each unattempted question. Rayan scored a total of 97 marks in the examination. If the number of unattempted questions was higher than the number of attempted questions, then the maximum number of correct answers that Rayan could have given in the examination is

Q.4)

The number of integer solutions of the equation $(x^2 - 10)^{(x^2 - 3x - 10)} = 1$ is

Q.5)

Suppose for all integers x , there are two functions f and g such that $f(x) + f(x - 1) - 1 = 0$ and $g(x) = x^2$. $f(x^2 - x) = 5$, then the value of the sum $f(g(5)) + g(f(5))$ is

Q.6)

Two ships meet mid-ocean, and then, one ship goes south and the other ship goes west, both

travelling at constant speeds. Two hours later, they are 60 km apart. If the speed of one of the ships is 6 km per hour more than the other one, then the speed, in km per hour, of the slower ship is

[1] 20

[2] 24

[3] 12

[4] 18

Q.7)

The number of integers greater than 2000 that can be formed with the digits 0, 1, 2, 3, 4, 5, using each digit at most once, is

[1] 1200

[2] 1440

[3] 1420

[4] 1480

Q.8)

Mr. Pinto invests one-fifth of his capital at 6%, one-third at 10% and the remaining at 1%, each rate being simple interest per annum. Then, the minimum number of years required for the cumulative interest income from these investments to equal or exceed his initial capital is

Q.9)

The average of a non-decreasing sequence of N numbers $a_1, a_2, \dots, a_N$ is 300. If a_1 is replaced by $6a_1$; the new average becomes 400. Then, the number of possible values of a_1 is

Q.10)

If a and b are non-negative real numbers such that $a + 2b = 6$, then the average of the maximum and minimum possible values of $(a + b)$ is

[1] 3.5

[2] 4.5

[3] 4

[4] 3

Q.11)

Working alone, the times taken by Anu, Tanu and Manu to complete any job are in the ratio

: 8 : 10. They accept a job which they can finish in 4 days if they all work together for 8 hours per day. However, Anu and Tanu work together for the first 6 days, working 6 hours 40 minutes per day. Then, the number of hours that Manu will take to complete the remaining job working alone is

Q.12)

Let r and c be real numbers. If r and $-r$ are roots of $5x^3 + cx^2 - 10x + 9 = 0$, then c equals

[1] $-\frac{9}{2}$

[2] 4

[3] -4

[4] $\frac{9}{2}$

Q.13)

In an election, there were four candidates and 80% of the registered voters casted their votes. One of the candidates received 30% of the casted votes while the other three candidates received the remaining casted votes in the proportion 1 : 2 : 3. If the winner of the election received 2512 votes more than the candidate with the second highest votes, then the number of registered voters was

[1] 50240

[2] 62800

[3] 60288

[4] 40192

Q.14)

The number of distinct integer values of n satisfying: $\frac{4 - \log_2 n}{3 - \log_4 n} < 0$, is

Q.15)

Manu earns ₹4000 per month and wants to save an average of ₹550 per month in a year. In the first nine months, his monthly expense was ₹3500, and he foresees that, tenth month onward, his monthly expense will increase to ₹3700. In order to meet his yearly savings target, his monthly earnings, in rupees, from the tenth month onward should be

[1] 4350

[2] 4400

[3] 4300

[4] 4200

Q.16)

On day one, there are 100 particles in a laboratory experiment. On day n , where $n \geq 2$, one out of every n particles produces another particle. If the total number of particles in the laboratory experiment increases to 1000 on day m , then m equals

[1] 16

[2] 19

[3] 17

[4] 18

Q.17)

For some natural number n , assume that $(15,000)!$ is divisible by $(n!)!$. The largest possible value of n is

[1] 4

[2] 5

[3] 6

[4] 7

Q.18)

There are two containers of the same volume, first container half-filled with sugar syrup and the second container half-filled with milk. Half the content of the first container is transferred to the second container, and then the half of this mixture is transferred back to the first container. Next, half the content of the first container is transferred back to the second container. Then the ratio of sugar syrup and milk in the second container is

[1] 4 : 5

[2] 6 : 5

[3] 5 : 4

[4] 5 : 6

Q.19)

The length of each side of an equilateral triangle ABC is 3 cm. Let D be a point on BC such that

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

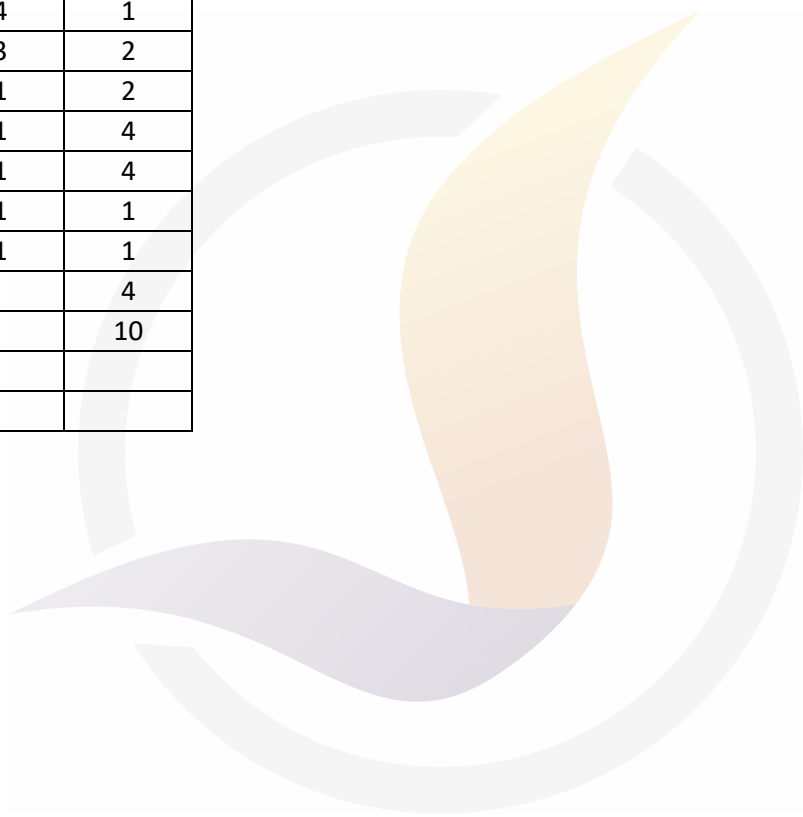
Sociologists working in the Chicago School tradition have focused on how rapid or dramatic social change causes increases in crime. Just as Durkheim, Marx, Toennies, and other European sociologists thought that the rapid changes produced by industrialization and urbanization produced crime and disorder, so too did the Chicago School theorists. The location of the University of Chicago provided an excellent opportunity for Park, Burgess, and McKenzie to study the social ecology of the city. Shaw and McKay found . . . that areas of the city characterized by high levels of social disorganization had higher rates of crime and delinquency.

In the 1920s and 1930s Chicago, like many American cities, experienced considerable immigration. Rapid population growth is a disorganizing influence, but growth resulting from in-migration of very different people is particularly disruptive. Chicago's in-migrants were both native-born whites and blacks from rural areas and small towns, and foreign immigrants. The heavy industry of cities like Chicago, Detroit, and Pittsburgh drew those seeking opportunities and new lives. Farmers and villagers from America's hinterland, like their European cousins of whom Durkheim wrote, moved in large numbers into cities. At the start of the twentieth century, Americans were predominately a rural population, but by the century's mid-point most lived in urban areas. The social lives of these migrants, as well as those already living in the cities they moved to, were disrupted by the differences between urban and rural life. According to social disorganization theory, until the social ecology of the "new place" can adapt, this rapid change is a criminogenic influence. But most rural migrants, and even many of the foreign immigrants to the city, looked like and eventually spoke the same language as the natives of the cities into which they moved. These similarities allowed for more rapid social integration for these migrants than was the case for African Americans and most foreign immigrants.

In these same decades America experienced what has been called "the great migration": the massive movement of African Americans out of the rural South and into northern (and some

Answer Keys

Q. No.	VARC	DILR	Quant
1	3	1	4
2	4	2	3
3	4	4	24
4	3	1	4
5	3	50	12
6	4	2	4
7	2	4	2
8	4	4	1
9	4	2	1
10	4	1	2
11	3	84	6
12	4	40	1
13	4	4	2
14	1	4	1
15	2	3	2
16	1	1	2
17	2	1	4
18	3142	1	4
19	2	1	1
20	1	1	1
21	2431		4
22	2143		10
23	3		
24	4		



CAT 2022 Question Paper with Solution
- Slot 3

the area of triangle ADC is half the area of triangle ABD. Then the length of AD. in cm, is

[1] $\sqrt{7}$

[2] $\sqrt{8}$

[3] $\sqrt{6}$

[4] $\sqrt{5}$

Q.20)

Five students, including Amit, appear for an examination in which possible marks are integers between 0 and 50, both inclusive. The average marks for all the students is 38 and exactly three students got more than 32. If no two students got the same marks and Amit got the least marks among the five students, then the difference between the highest and lowest possible marks of Amit is

[1] 20

[2] 22

[3] 21

[4] 24

Q.21)

Let $f(x)$ be a quadratic polynomial in x such that $f(x) \geq 0$ for all real numbers x . If $f(2) = 0$ and $f(4) = 6$, then $f(-2)$ is equal to

[1] 36

[2] 12

[3] 6

[4] 24

Q.22)

Regular polygons A and B have number of sides in the ratio 1 : 2 and interior angles in the ratio 3 : 4. Then the number of sides of B equals

southern) cities. The scale of this migration is one of the most dramatic in human history. These migrants, unlike their white counterparts, were not integrated into the cities they now called home. In fact, most American cities at the end of the twentieth century were characterized by high levels of racial residential segregation . . . Failure to integrate these migrants, coupled with other forces of social disorganization such as crowding, poverty, and illness, caused crime rates to climb in the cities, particularly in the segregated wards and neighborhoods where the migrants were forced to live.

Foreign immigrants during this period did not look as dramatically different from the rest of the population as blacks did, but the migrants from eastern and southern Europe who came to American cities did not speak English, and were frequently Catholic, while the native born were mostly Protestant. The combination of rapid population growth with the diversity of those moving into the cities created what the Chicago School sociologists called social disorganization.

Q.1)

A fundamental conclusion by the author is that:

[1] the best circumstances for crime to flourish are when there are severe racial disparities.

[2] to prevent crime, it is important to maintain social order through maintaining social segregation.

[3] according to European sociologists, crime in America is mainly in Chicago.

[4] rapid population growth and demographic diversity give rise to social disorganisation that can feed the growth of crime.

Q.2)

Which one of the following sets of words/phrases best encapsulates the issues discussed in the passage?

[1] Durkheim; Marx; Toennies; Shaw

[2] Chicago School; Native-born Whites; European immigrants; Poverty

[3] Chicago School; Social organisation; Migration; Crime

[4] Rapid population growth; Heavy industry; Segregation; Crime

Q.3)

Which one of the following is not a valid inference from the passage?

- [1] The differences between urban and rural lifestyles were crucial factors in the disruption experienced by migrants to American cities.
- [2] According to social disorganisation theory, the social integration of African American migrants into Chicago was slower because they were less organised.
- [3] According to social disorganisation theory, fast-paced social change provides fertile ground for the rapid growth of crime.
- [4] The failure to integrate in-migrants, along with social problems like poverty, was a significant reason for the rise in crime in American cities.

Q.4)

The author notes that, “At the start of the twentieth century, Americans were predominately a rural population, but by the century’s mid-point most lived in urban areas.” Which one of the following statements, if true, does not contradict this statement?

- [1] Demographic transition in America in the twentieth century is strongly marked by an out-migration from rural areas.
- [2] The estimation of per capita income in America in the mid-twentieth century primarily required data from rural areas.
- [3] Economists have found that throughout the twentieth century, the size of the labour force in America has always been largest in rural areas.
- [4] A population census conducted in 1952 showed that more Americans lived in rural areas than in urban ones.

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

Interpretations of the Indian past . . . were inevitably influenced by colonial concerns and interests, and also by prevalent European ideas about history, civilization and the Orient. Orientalist scholars studied the languages and the texts with selected Indian scholars, but made little attempt to understand the world-view of those who were teaching them. The readings therefore are something of a disjuncture from the traditional ways of looking at the Indian past. . . .

Orientalism [which we can understand broadly as Western perceptions of the Orient] fuelled the fantasy and the freedom sought by European Romanticism, particularly in its opposition to the more disciplined Neo-Classicism. The cultures of Asia were seen as bringing a new Romantic paradigm. Another Renaissance was anticipated through an acquaintance with the Orient, and this, it was thought, would be different from the earlier Greek Renaissance. It was believed that this Oriental Renaissance would liberate European thought and literature from the increasing focus on discipline and rationality that had followed from the earlier Enlightenment. . . . [The Romantic English poets, Wordsworth and Coleridge,] were apprehensive of the changes introduced by industrialization and turned to nature and to fantasies of the Orient.

However, this enthusiasm gradually changed, to conform with the emphasis later in the nineteenth century on the innate superiority of European civilization. Oriental civilizations were now seen as having once been great but currently in decline. The various phases of Orientalism tended to mould European understanding of the Indian past into a particular pattern. . . . There was an attempt to formulate Indian culture as uniform, such formulations being derived from texts that were given priority. The so-called 'discovery' of India was largely through selected literature in Sanskrit. This interpretation tended to emphasize non-historical aspects of Indian culture, for example the idea of an unchanging continuity of society and religion over 3,000 years; and it was believed that the Indian pattern of life was so concerned with metaphysics and the subtleties of religious belief that little attention was given to the more tangible aspects.

German Romanticism endorsed this image of India, and it became the mystic land for many Europeans, where even the most ordinary actions were imbued with a complex symbolism. This was the genesis of the idea of the spiritual east, and also, incidentally, the refuge of European intellectuals seeking to distance themselves from the changing patterns of their own societies. A dichotomy in values was maintained, Indian values being described as 'spiritual' and European values as 'materialistic', with little attempt to juxtapose these values with the reality of Indian society. This theme has been even more firmly endorsed by a section of Indian opinion during the last hundred years.

It was a consolation to the Indian intelligentsia for its perceived inability to counter the technical superiority of the west, a superiority viewed as having enabled Europe to colonize Asia and other parts of the world. At the height of anti-colonial nationalism it acted as a salve for having been made a colony of Britain.

Q.5)

It can be inferred from the passage that to gain a more accurate view of a nation's history and culture, scholars should do all of the following EXCEPT:

- [1] examine their own beliefs and biases.
- [2] develop an oppositional framework to grasp cultural differences.
- [3] examine the complex reality of that nation's society.
- [4] read widely in the country's literature.

Q.6)

In the context of the passage, all of the following statements are true EXCEPT:

- [1] India's spiritualism served as a salve for European colonisers.
- [2] Orientalists' understanding of Indian history was linked to colonial concerns.
- [3] Indian texts influenced Orientalist scholars.
- [4] Orientalist scholarship influenced Indians.

Q.7)

It can be inferred from the passage that the author is not likely to support the view that:

- [1] India's culture has evolved over the centuries.
- [2] Indian culture acknowledges the material aspects of life.

[3] the Orientalist view of Asia fired the imagination of some Western poets.

[4] India became a colony although it matched the technical knowledge of the West.

Q.8)

Which one of the following styles of research is most similar to the Orientalist scholars' method of understanding Indian history and culture?

[1] Reading about the life of early American settlers and later waves of migration to understand the evolution of American culture.

[2] Reading 18th century accounts by travellers to India to see how they viewed Indian life and culture of the time.

[3] Studying artefacts excavated at a palace to understand the lifestyle of those who lived there.

[4] Analysing Hollywood action movies that depict violence and sex to understand contemporary America.

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

As software improves, the people using it become less likely to sharpen their own know-how. Applications that offer lots of prompts and tips are often to blame; simpler, less solicitous programs push people harder to think, act and learn.

Ten years ago, information scientists at Utrecht University in the Netherlands had a group of people carry out complicated analytical and planning tasks using either rudimentary software that provided no assistance or sophisticated software that offered a great deal of aid. The researchers found that the people using the simple software developed better strategies, made fewer mistakes and developed a deeper aptitude for the work. The people using the more advanced software, meanwhile, would often "aimlessly click around" when confronted with a tricky problem. The supposedly helpful software actually short-circuited their thinking and learning.

[According to] philosopher Hubert Dreyfus our skills get sharper only through practice, when we use them regularly to overcome different sorts of difficult challenges. The goal of

modern software, by contrast, is to ease our way through such challenges. Arduous, painstaking work is exactly what programmers are most eager to automate—after all, that is where the immediate efficiency gains tend to lie. In other words, a fundamental tension ripples between the interests of the people doing the automation and the interests of the people doing the work.

Nevertheless, automation's scope continues to widen. With the rise of electronic health records, physicians increasingly rely on software templates to guide them through patient exams. The programs incorporate valuable checklists and alerts, but they also make medicine

more routinized and formulaic—and distance doctors from their patients Harvard Medical School professor Beth Lown, in a 2012 journal article . . . warned that when doctors become “screen-driven,” following a computer's prompts rather than “the patient's narrative thread,” their thinking can become constricted. In the worst cases, they may miss important diagnostic signals. . . .

In a recent paper published in the journal *Diagnosis*, three medical researchers . . . examined the misdiagnosis of Thomas Eric Duncan, the first person to die of Ebola in the U.S., at Texas Health Presbyterian Hospital Dallas. They argue that the digital templates used by the hospital's clinicians to record patient information probably helped to induce a kind of tunnel vision. “These highly constrained tools,” the researchers write, “are optimized for data capture but at the expense of sacrificing their utility for appropriate triage and diagnosis, leading users to miss the forest for the trees.” Medical software, they write, is no “replacement for basic history-taking, examination skills, and critical thinking.” . . .

There is an alternative. In “human-centered automation,” the talents of people take precedence In this model, software plays an essential but secondary role. It takes over routine functions that a human operator has already mastered, issues alerts when unexpected situations arise, provides fresh information that expands the operator's perspective and counters the biases that often distort human thinking. The technology becomes the expert's partner, not the expert's replacement.

Q.9)

In the Ebola misdiagnosis case, we can infer that doctors probably missed the forest for the

trees because:

- [1] they were led by the data processed by digital templates.
- [2] the data collected were not sufficient for appropriate triage.
- [3] they used the wrong type of digital templates for the case.
- [4] the digital templates forced them to acquire tunnel vision.

Q.10)

It can be inferred that in the Utrecht University experiment, one group of people was “aimlessly clicking around” because:

- [1] the other group was carrying out the tasks more efficiently.
- [2] they did not have the skill-set to address complicated tasks.
- [3] they were hoping that the software would help carry out the tasks.
- [4] they wanted to avoid making mistakes.

Q.11)

From the passage, we can infer that the author is apprehensive about the use of sophisticated automation for all of the following reasons EXCEPT that:

- [1] it could mislead people.
- [2] it stops users from exercising their minds.
- [3] computers could replace humans.
- [4] it stunts the development of its users.

Q.12)

In the context of the passage, all of the following can be considered examples of human-centered automation EXCEPT:

- [1] a smart-home system that changes the temperature as instructed by the resident.
- [2] software that offers interpretations when requested by the human operator.
- [3] medical software that provides optional feedback on the doctor’s analysis of the medical situation.
- [4] software that auto-completes text when the user writes an email.

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

question.

Nature has all along yielded her flesh to humans. First, we took nature's materials as food, fibers, and shelter. Then we learned to extract raw materials from her biosphere to create our own new synthetic materials. Now Bios is yielding us her mind—we are taking her logic. Clockwork logic—the logic of the machines—will only build simple contraptions. Truly complex systems such as a cell, a meadow, an economy, or a brain (natural or artificial) require a rigorous nontechnological logic. We now see that no logic except bio-logic can assemble a thinking device, or even a workable system of any magnitude.

It is an astounding discovery that one can extract the logic of Bios out of biology and have something useful. Although many philosophers in the past have suspected one could abstract the laws of life and apply them elsewhere, it wasn't until the complexity of computers and human-made systems became as complicated as living things, that it was possible to prove this. It's eerie how much of life can be transferred. So far, some of the traits of the living that have successfully been transported to mechanical systems are: self-replication, self-governance, limited self-repair, mild evolution, and partial learning.

We have reason to believe yet more can be synthesized and made into something new. Yet at the same time that the logic of Bios is being imported into machines, the logic of Technos is being imported into life. The root of bioengineering is the desire to control the organic long enough to improve it. Domesticated plants and animals are examples of technos-logic applied to life. The wild aromatic root of the Queen Anne's lace weed has been fine-tuned over generations by selective herb gatherers until it has evolved into a sweet carrot of the garden; the udders of wild bovines have been selectively enlarged in a "unnatural" way to satisfy humans rather than calves. Milk cows and carrots, therefore, are human inventions as much as steam engines and gunpowder are. But milk cows and carrots are more indicative of the kind of inventions humans will make in the future: products that are grown rather than manufactured.

Genetic engineering is precisely what cattle breeders do when they select better strains of Holsteins, only bioengineers employ more precise and powerful control. While carrot and milk cow breeders had to rely on diffuse organic evolution, modern genetic engineers can use

directed artificial evolution—purposeful design—which greatly accelerates improvements. The overlap of the mechanical and the lifelike increases year by year. Part of this bionic convergence is a matter of words. The meanings of “mechanical” and “life” are both stretching until all complicated things can be perceived as machines, and all self-sustaining machines can be perceived as alive. Yet beyond semantics, two concrete trends are happening: (1) Human-made things are behaving more lifelike, and (2) Life is becoming more engineered. The apparent veil between the organic and the manufactured has crumpled to reveal that the two really are, and have always been, of one being.

Q.13)

Which one of the following sets of words/phrases best serves as keywords to the passage?

- [1] Complex systems; Bio-logic; Bioengineering; Technos-logic; Convergence
- [2] Nature; Bios; Technos; Self-repair; Holsteins
- [3] Nature; Computers; Carrots; Milk cows; Genetic engineering
- [4] Complex systems; Carrots; Milk cows; Convergence; Technos-logic

Q.14)

None of the following statements is implied by the arguments of the passage, EXCEPT:

- [1] purposeful design represents the pinnacle of scientific expertise in the service of human betterment and civilisational progress.
- [2] the biological realm is as complex as the mechanical one; which is why the logic of Bios is being imported into machines.
- [3] historically, philosophers have known that the laws of life can be abstracted and applied elsewhere.
- [4] genetic engineers and bioengineers are the same insofar as they both seek to force evolution in an artificial way.

Q.15)

The author claims that, “The apparent veil between the organic and the manufactured has crumpled to reveal that the two really are, and have always been, of one being.” Which one of the following statements best expresses the point being made by the author here?

- [1] Organic reality has crumpled under the veil of manufacturing, rendering the apparent and

the real as the same being.

[2] The crumpling of the organic veil between apparent and manufactured reality reveals them to have the same being.

[3] Apparent reality and organic reality are distinguished by the fact that the former is manufactured.

[4] Scientific advances are making it increasingly difficult to distinguish between organic reality and manufactured reality.

Q.16)

The author claims that, “Part of this bionic convergence is a matter of words”. Which one of the following statements best expresses the point being made by the author?

[1] A bionic convergence indicates the meeting ground of genetic engineering and artificial intelligence.

[2] “Mechanical” and “life” were earlier seen as opposite in meaning, but the difference between the two is increasingly blurred.

[3] “Bios” and “Technos” are both convergent forms of logic, but they generate meanings about the world that are mutually exclusive.

[4] “Mechanical” and “life” are words from different logical systems and are, therefore, fundamentally incompatible in meaning.

Q.17)

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

“It does seem to me that the job of comedy is to offend, or have the potential to offend, and it cannot be drained of that potential,” Rowan Atkinson said of cancel culture. “Every joke has a victim. That’s the definition of a joke. Someone or something or an idea is made to look ridiculous.” The Netflix star continued, “I think you’ve got to be very, very careful about saying what you’re allowed to make jokes about. You’ve always got to kick up? Really?” He added, “There are lots of extremely smug and self-satisfied people in what would be deemed lower down in society, who also deserve to be pulled up. In a proper free society, you should be allowed to make jokes about absolutely anything.”

[1] Cancel culture does not understand the role and duty of comedians, which is to deride and mock everyone.

[2] Every joke needs a victim and one needs to include people from lower down the society and not just the upper class.

[3] All jokes target someone and one should be able to joke about anyone in the society, which is inconsistent with cancel culture.

[4] Victims of jokes must not only be politicians and royalty, but also arrogant people from lower classes should be mentioned by comedians.

Q.18)

The four sentences (labelled 1, 2, 3 and 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] If I wanted to sit indoors and read, or play Sonic the Hedgehog on a red-hot Sega Mega Drive, I would often be made to feel guilty about not going outside to “enjoy it while it lasts”.

[2] My mum, quite reasonably, wanted me and my sister out of the house, in the sun.

[3] Tales of my mum’s idyllic-sounding childhood in the Sussex countryside, where trees were climbed by 8 am and streams navigated by lunchtime, were passed down to us like folklore.

[4] To an introverted kid, that felt like a threat – and the feeling has stayed with me.

Q.19)

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

Tamsin Blanchard, curator of Fashion Open Studio, an initiative by a campaign group showcasing the work of ethical designers says, “We’re all drawn to an exquisite piece of embroidery, a colourful textile or even a style of dressing that might have originated from another heritage. [But] this magpie mentality, where all of culture and history is up for grabs as ‘inspiration’, has accelerated since the proliferation of social media... Where once a fashion student might research the history and traditions of a particular item of clothing with care and respect, we now have a world where images are lifted from image libraries without a care for their cultural significance. It’s easier than ever to steal a motif or a craft technique

and transfer it on to a piece of clothing that is either mass produced or appears on a runway without credit or compensation to their original communities.”

[1] Copying an embroidery design or pattern of textile from native communities who own them is tantamount to stealing and they need to be compensated.

[2] Cultural collaboration is the need of the hour. Beautiful design ideas of indigenous people need to be showcased and shared worldwide.

[3] Taking fashion ideas from any cultural group without their consent is a form of appropriation without giving due credit, compensation, and respect.

[4] Media has encouraged mass production; images are copied effortlessly without care or concern for the interests of ethnic communities.

Q.20)

The four sentences (labelled 1, 2, 3 and 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] Various industrial sectors including retail, transit systems, enterprises, educational institutions, event organizing, finance, travel etc. have now started leveraging these beacons solutions to track and communicate with their customers.

[2] A beacon fixed on to a shop wall enables the retailer to assess the proximity of the customer, and come up with a much targeted or personalized communication like offers, discounts and combos on products in each shelf.

[3] Smart phones or other mobile devices can capture the beacon signals, and distance can be estimated by measuring received signal strength.

[4] Beacons are tiny and inexpensive, micro-location-based technology devices that can send radio frequency signals and notify nearby Bluetooth devices of their presence and transmit information.

Q.21)

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

To defend the sequence of alphabetisation may seem bizarre, so obvious is its application

that it is hard to imagine a reference, catalogue or listing without it. But alphabetical order was not an immediate consequence of the alphabet itself. In the Middle Ages, deference for ecclesiastical tradition left scholars reluctant to categorise things according to the alphabet — to do so would be a rejection of the divine order. The rediscovery of the ancient Greek and Roman classics necessitated more efficient ways of ordering, searching and referencing texts. Government bureaucracy in the 16th and 17th centuries quickened the advance of alphabetical order, bringing with it pigeonholes, notebooks and card indexes.

[1] The alphabetic order took several centuries to gain common currency because of religious beliefs and a lack of appreciation of its efficacy in the ordering of things.

[2] Unlike the alphabet, once the efficacy of the alphabetic sequence became apparent to scholars and administrators, its use became widespread.

[3] The ban on the use by scholars of any form of categorisation - but the divinely ordained one - delayed the adoption of the alphabetic sequence by several centuries.

[4] While adoption of the written alphabet was easily accomplished, it took scholars several centuries to accept the alphabetic sequence as a useful tool in their work.

Q.22)

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

Sentence: This has meant a lot of uncertainty around what a wide-scale return to office might look like in practice.

Paragraph: Bringing workers back to their desks has been a rocky road for employers and employees alike. The evolution of the pandemic has meant that best laid plans have often not materialised. ____ (1) ____ The flow of workers back into offices has been more of a trickle than a steady stream. ____ (2) ____ Yet while plenty of companies are still working through their new policies, some employees across the globe are now back at their desks, whether on a full-time or hybrid basis. ____ (3) ____ That means we're beginning to get some clarity on what return-to-office means – what's working, as well as what has yet to be settled.

____ (4) ____

[1] Option 1

[2] Option 2

[3] Option 3

[4] Option 4

Q.23)

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

Sentence: When people socially learn from each other, they often learn without understanding why what they're copying—the beliefs and behaviours and technologies and know-how—works.

Paragraph: ____ (1) ____ . The dual-inheritance theorysays....that inheritance is itself an evolutionary system. It has variation. What makes us a new kind of animal, and so different and successful as a species, is we rely heavily on social learning, to the point where socially acquired information is effectively a second line of inheritance, the first being our genes.... ____ (2) ____ . People tend to home in on who seems to be the smartest or most successful person around, as well as what everybody seems to be doing—the majority of people have something worth learning. ____ (3) ____ . When you repeat this process over time, you can get, around the world, cultural packages—beliefs or behaviours or technology or other solutions—that are adapted to the local conditions. People have different psychologies, effectively. ____ (4) ____ .

[1] Option 1

[2] Option 2

[3] Option 3

[4] Option 4

Q.24)

The four sentences (labelled 1, 2, 3 and 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] The more we are able to accept that our achievements are largely out of our control, the easier it becomes to understand that our failures, and those of others, are too.

[2] But the raft of recent books about the limits of merit is an important correction to the arrogance of contemporary entitlement and an opportunity to reassert the importance of luck, or grace, in our thinking.

[3] Meritocracy as an organising principle is an inevitable function of a free society, as we are designed to see our achievements as worthy of reward.

[4] And that in turn should increase our humility and the respect with which we treat our fellow citizens, helping ultimately to build a more compassionate society.



All the first-year students in the computer science (CS) department in a university take both the courses (i) AI and (ii) ML. Students from other departments (non-CS students) can also take one of these two courses, but not both. Students who fail in a course get an F grade; others pass and are awarded A or B or C grades depending on their performance. The following are some additional facts about the number of students who took these two courses this year and the grades they obtained.

1. The numbers of non-CS students who took AI and ML were in the ratio 2 : 5.
2. The number of non-CS students who took either AI or ML was equal to the number of CS students.
3. The numbers of non-CS students who failed in the two courses were the same and their total is equal to the number of CS students who got a C grade in ML.
4. In both the courses, 50% of the students who passed got a B grade. But, while the numbers of students who got A and C grades were the same for AI, they were in the ratio 3 : 2 for ML.
5. No CS student failed in AI, while no non-CS student got an A grade in AI.
6. The numbers of CS students who got A, B and C grades respectively in AI were in the ratio 3 : 5 : 2, while in ML the ratio was 4 : 5 : 2.
7. The ratio of the total number of non-CS students failing in one of the two courses to the number of CS students failing in one of the two courses was 3 : 1.
8. 30 students failed in ML.

Q.1)

How many students took AI?

- [1] 90
- [2] 60
- [3] 270
- [4] 210

Q.2)

How many CS students failed in ML?

Q.3)

How many non-CS students got A grade in ML? Q.4)

How many students got A grade in AI?

[1] 63

[2] 99

[3] 84

[4] 42

Q.5)

How many non-CS students got B grade in ML?

[1] 165

[2] 75

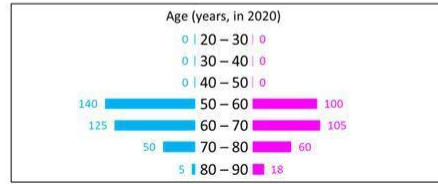
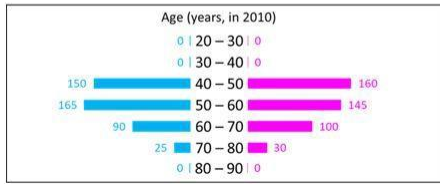
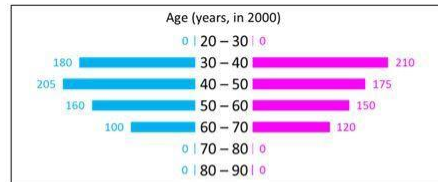
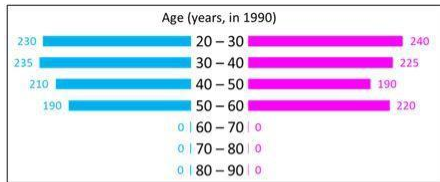
[3] 25

[4] 90

In the following, a year corresponds to 1st of January of that year.

A study to determine the mortality rate for a disease began in 1980. The study chose 1000 males and 1000 females and followed them for forty years or until they died, whichever came first. The 1000 males chosen in 1980 consisted of 250 each of ages 10 to less than 20, 20 to less than 30, 30 to less than 40, and 40 to less than 50. The 1000 females chosen in 1980 also consisted of 250 each of ages 10 to less than 20, 20 to less than 30, 30 to less than 40, and 40 to less than 50.

The four figures below depict the age profile of those among the 2000 individuals who were still alive in 1990, 2000, 2010, and 2020. The blue bars in each figure represent the number of males in each age group at that point in time, while the pink bars represent the number of females in each age group at that point in time. The numbers next to the bars give the exact numbers being represented by the bars. For example, we know that 230 males among those tracked and who were alive in 1990 were aged between 20 and 30.



Q.6)

In 2000, what was the ratio of the number of dead males to dead females among those being tracked?

- [1] 41 : 43
- [2] 71 : 69
- [3] 109 : 107
- [4] 129 : 131

Q.7)

How many people who were being tracked and who were between 30 and 40 years of age in 1980 survived until 2010?

- [1] 310
- [2] 110
- [3] 190
- [4] 90

Q.8)

How many individuals who were being tracked and who were less than 30 years of age in 1980 survived until 2020?

- [1] 470
- [2] 240
- [3] 230
- [4] 580

Q.9)

How many of the males who were being tracked and who were between 20 and 30 years of age in 1980 died in the period 2000 to 2010?

Q.10)

How many of the females who were being tracked and who were between 20 and 30 years of age in 1980 died between the ages of 50 and 60?

There are only four neighbourhoods in a city - Levmosto, Tyhrmosto, Pesmosto and Kitmosto. During the onset of a pandemic, the number of new cases of a disease in each of these neighbourhoods was recorded over a period of five days. On each day, the number of new cases recorded in any of the neighbourhoods was either 0, 1, 2 or 3.

The following facts are also known:

1. There was at least one new case in every neighbourhood on Day 1.
2. On each of the five days, there were more new cases in Kitmosto than in Pesmosto.
3. The number of new cases in the city in a day kept increasing during the five-day period. The number of new cases on Day 3 was exactly one more than that on Day 2.
4. The maximum number of new cases in a day in Pesmosto was 2, and this happened only once during the five-day period.
5. Kitmosto is the only place to have 3 new cases on Day 2.
6. The total numbers of new cases in Levmosto, Tyhrmosto, Pesmosto and Kitmosto over the five-day period were 12, 12, 5 and 14 respectively.

Q.11)

What BEST can be concluded about the total number of new cases in the city on Day 2?

- [1] Either 7 or 8
- [2] Either 6 or 7
- [3] Exactly 7
- [4] Exactly 8

Q.12)

What BEST can be concluded about the number of new cases in Levmosto on Day 3?

- [1] Exactly 2
- [2] Either 2 or 3
- [3] Either 0 or 1

[4] Exactly 3

Q.13)

On which day(s) did Pesmisto not have any new case?

[1] Both Day 2 and Day 3

[2] Only Day 3

[3] Both Day 2 and Day 4

[4] Only Day 2

Q.14)

Which of the two statements below is/are necessarily false? Statement A: There were 2 new cases in Tyhrmisto on Day 3. Statement B: There were no new cases in Pesmisto on Day 2.

[1] Neither Statement A nor Statement B

[2] Statement B only

[3] Both Statement A and Statement B

[4] Statement A only

Q.15)

On how many days did Levpisto and Tyhrmisto have the same number of new cases?

[1] 4

[2] 5

[3] 2

[4] 3

Pulak, Qasim, Ritesh, and Suresh participated in a tournament comprising of eight rounds. In each round, they formed two pairs, with each of them being in exactly one pair. The only restriction in the pairing was that the pairs would change in successive rounds. For example, if Pulak formed a pair with Qasim in the first round, then he would have to form a pair with Ritesh or Suresh in the second round. He would be free to pair with Qasim again in the third round. In each round, each pair decided whether to play the game in that round or not. If they decided not to play, then no money was exchanged between them. If they decided to play, they had to bet either ₹1 or ₹2 in that round. For example, if they chose to bet ₹2, then

the player winning the game got ₹2 from the one losing the game.

At the beginning of the tournament, the players had ₹10 each. The following table shows partial information about the amounts that the players had at the end of each of the eight rounds. It shows every time a player had ₹10 at the end of a round, as well as every time, at the end of a round, a player had either the minimum or the maximum amount that he would have had across the eight rounds. For example, Suresh had ₹10 at the end of Rounds 1, 3, and 8 and not after any of the other rounds. The maximum amount that he had at the end of any round was ₹13 (at the end of Round 5), and the minimum amount he had at the end of any round was ₹8 (at the end of Round 2). At the end of all other rounds, he must have had either ₹9, ₹11, or ₹12.

It was also known that Pulak and Qasim had the same amount of money with them at the end of Round 4.

	Pulak	Qasim	Ritesh	Suresh
Round 1		₹8	₹10	₹10
Round 2	₹13	₹10		₹8
Round 3				₹10
Round 4				
Round 5	₹10	₹10		₹13
Round 6				
Round 7		₹12	₹4	
Round 8	₹13			₹10

Q.16)

What BEST can be said about the amount of money that Ritesh had with him at the end of Round 8?

- [1] ₹4 or ₹5
- [2] Exactly ₹5
- [3] Exactly ₹6
- [4] ₹5 or ₹6

Q.17)

What BEST can be said about the amount of money that Pulak had with him at the end of Round 6?

[1] Exactly ₹12

[2] ₹11 or ₹12

[3] ₹12 or ₹13

[4] Exactly ₹11

Q.18)

How much money (in ₹) did Ritesh have at the end of Round 4?

Q.19)

How many games were played with a bet of ₹2?

Q.20)

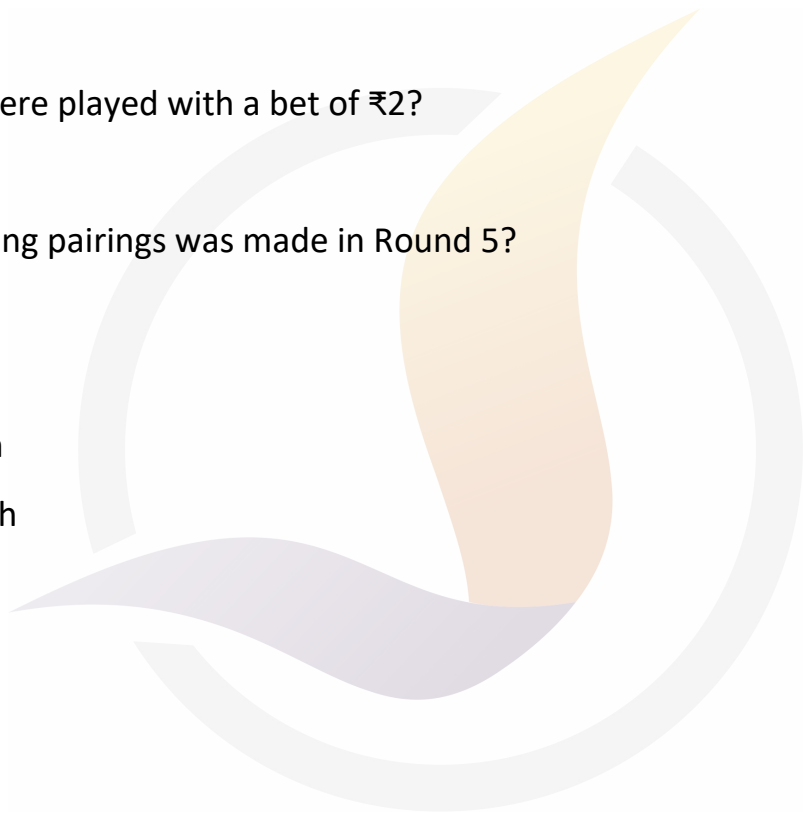
Which of the following pairings was made in Round 5?

[1] Pulak and Ritesh

[2] Pulak and Qasim

[3] Pulak and Suresh

[4] Qasim and Suresh



CAT 2023 QUANT Section

Q.1)

The arithmetic mean of all the distinct numbers that can be obtained by rearranging the digits in 1421, including itself, is

[1] 3333

[2] 2442

[3] 2222

[4] 2592

Q.2)

Two ships are approaching a port along straight routes at constant speeds. Initially, the two ships and the port formed an equilateral triangle with sides of length 24 km. When the slower ship travelled 8 km, the triangle formed by the new positions of the two ships and the port became right-angled. When the faster ship reaches the port, the distance, in km, between the other ship and the port will be

[1] 6

[2] 4

[3] 8

[4] 12

Q.3)

Suppose k is any integer such that the equation $2x^2 + kx + 5 = 0$ has no real roots and the equation $x^2 + (k - 5)x + 1 = 0$ has two distinct real roots for x . Then, the number of possible values of k is

[1] 9

[2] 13

[3] 8

[4] 7

Q.4)

A glass contains 500 cc of milk and a cup contains 500 cc of water. From the glass, 150 cc of milk is transferred to the cup and mixed thoroughly. Next, 150 cc of this mixture is

transferred from the cup to the glass. Now, the amount of water in the glass and the amount of milk in the cup are in the ratio

[1] 3 : 10

[2] 10 : 3

[3] 1 : 1

[4] 10 : 13

Q.5)

If $c = \frac{16x}{y} + \frac{49y}{x}$ for some non-zero real numbers x and y , then c cannot take the value

[1] 60

[2] -50

[3] -70

[4] -60

Q.6)

The minimum possible value of $\frac{x^2 - 6x + 10}{3 - x}$, for $x < 3$, is

[1] - 2

[2] $-\frac{1}{2}$

[3] $\frac{1}{2}$

[4] 2

Q.7)

Bob can finish a job in 40 days, if he works alone. Alex is twice as fast as Bob and thrice as fast as Cole in the same job. Suppose Alex and Bob work together on the first day, Bob and Cole work together on the second day, Cole and Alex work together on the third day, and then, they continue the work by repeating this three-day roster, with Alex and Bob working together on the fourth day, and so on. Then, the total number of days Alex would have worked when the job gets finished, is

Q.8)

Moody takes 30 seconds to finish riding an escalator if he walks on it at his normal speed in

the same direction. He takes 20 seconds to finish riding the escalator if he walks at twice his normal speed in the same direction. If Moody decides to stand still on the escalator, then the time, in seconds, needed to finish riding the escalator is

Q.9)

Consider six distinct natural numbers such that the average of the two smallest numbers is 14, and the average of the two largest numbers is 28. Then, the maximum possible value of the average of these six numbers is

[1] 23

[2] 24

[3] 23.5

[4] 22.5

Q.10)

The lengths of all four sides of a quadrilateral are integer valued. If three of its sides are of length 1 cm, 2 cm and 4 cm, then the total number of possible lengths of the fourth side is

[1] 5

[2] 4

[3] 3

[4] 6

Q.11)

The average of all 3-digit terms in the arithmetic progression 38, 55, 72, ..., is

Q.12)

If $\left(\sqrt{\frac{7}{5}}\right)^{3x-y} = \frac{875}{2401}$ and $\left(\frac{4a}{b}\right)^{6x-y} = \left(\frac{2a}{b}\right)^{y-6x}$, for all non-zero real values of a and b , then the value of $x + y$ is

Q.13)

Suppose the medians BD and CE of a triangle ABC intersect at a point O. If area of triangle ABC is 108 sq. cm., then, the area of the triangle EOD, in sq. cm., is

Q.14)

A donation box can receive only cheques of ₹100, ₹250, and ₹500. On one good day, the donation box was found to contain exactly 100 cheques amounting to a total sum of ₹15250.

Then, the maximum possible number of cheques of ₹500 that the donation box may have contained, is

Q.15)

Two cars travel from different locations at constant speeds. To meet each other after starting at the same time, they take 1.5 hours if they travel towards each other, but 10.5 hours if they travel in the same direction. If the speed of the slower car is 60 km/hr, then the distance traveled, in km, by the slower car when it meets the other car while traveling towards each other, is

[1] 100

[2] 90

[3] 120

[4] 150

Q.16)

A school has less than 5000 students and if the students are divided equally into teams of either 9 or 10 or 12 or 25 each, exactly 4 are always left out. However, if they are divided into teams of 11 each, no one is left out. The maximum number of teams of 12 each that can be formed out of the students in the school is

Q.17)

Nitu has an initial capital of ₹20,000. Out of this, she invests ₹8,000 at 5.5% in bank A, ₹5,000 at 5.6% in bank B and the remaining amount at $x\%$ in bank C, each rate being simple interest per annum. Her combined annual interest income from these investments is equal to 5% of the initial capital. If she had invested her entire initial capital in bank C alone, then her annual interest income, in rupees, would have been

[1] 800

[2] 700

[3] 900

[4] 1000

Q.18)

In a triangle ABC, $AB = AC = 8$ cm. A circle drawn with BC as diameter passes through A.

Another circle drawn with center at A passes through B and C. Then the area, in sq. cm, of the overlapping region between the two circles is

[1] $16(\pi - 1)$

[2] 32π

[3] 16π

[4] $32(\pi - 1)$

Q.19)

Let r be a real number and $f(x) = \begin{cases} 2x-r & \text{if } x \geq r \\ r & \text{if } x < r \end{cases}$. Then, the equation $f(x) = f(f(x))$ holds for all real values of x where

[1] $x \neq r$

[2] $x > r$

[3] $x \geq r$

[4] $x \leq r$

Q.20)

A group of N people worked on a project. They finished 35% of the project by working 7 hours a day for 10 days. Thereafter, 10 people left the group and the remaining people finished the rest of the project in 14 days by working 10 hours a day. Then the value of N is

[1] 150

[2] 36

[3] 23

[4] 140

Q.21)

If $(3+2\sqrt{2})$ is a root of the equation $ax^2 + bx + c = 0$, and $(4+2\sqrt{3})$ is a root of the equation $ay^2 + my + n = 0$, where a, b, c, m and n are integers, then the value of $\left(\frac{b}{m} + \frac{c-2b}{n}\right)$ is

[1] 4

[2] 0

[3] 1

[4] 3

Q.22)

In an examination, the average marks of students in sections A and B are 32 and 60, respectively. The number of students in section A is 10 less than that in section B. If the average marks of all the students across both the sections combined is an integer, then the difference between the maximum and minimum possible number of students in section A is



Answer Keys

Q.No.	VARC	DILR	QUANT
1	4	3	3
2	3	12	4
3	2	27	1
4	1	1	3
5	2	2	2
6	1	2	4
7	4	3	11
8	4	1	60
9	1	40	4
10	3	30	1
11	3	4	548
12	4	4	14
13	1	2	9
14	4	3	12
15	4	2	2
16	2	3	150
17	3	1	1
18	2314	6	4
19	3	6	4
20	4312	3	4
21	1		1
22	2		63
23	2		
24	3214		