

CAT 2022 Slot 3 VARC

DIRECTIONS for the questions 1 – 4: 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 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.

1. Which one of the following is not a valid inference from the passage?
 - A. The differences between urban and rural lifestyles were crucial factors in the disruption experienced by migrants to American cities.
 - B. The failure to integrate in-migrants, along with social problems like poverty, was a significant reason for the rise in crime in American cities.
 - C. According to social disorganisation theory, fast-paced social change provides fertile ground for the rapid growth of crime.
 - D. According to social disorganisation theory, the social integration of African American migrants into Chicago was slower because they were less organised.

2. Which one of the following sets of words/phrases best encapsulates the issues discussed in the passage?
- A. Chicago School; Native-born Whites; European immigrants; Poverty
 - B. Durkheim; Marx; Toennies; Shaw
 - C. Rapid population growth; Heavy industry; Segregation; Crime
 - D. Chicago School; Social organisation; Migration; Crime
3. 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?
- A. Demographic transition in America in the twentieth century is strongly marked by an out-migration from rural areas.
 - B. Economists have found that throughout the twentieth century, the size of the labour force in America has always been largest in rural areas.
 - C. A population census conducted in 1952 showed that more Americans lived in rural areas than in urban ones.
 - D. The estimation of per capita income in America in the mid-twentieth century primarily required data from rural areas.
4. A fundamental conclusion by the author is that:
- A. the best circumstances for crime to flourish are when there are severe racial disparities.
 - B. to prevent crime, it is important to maintain social order through maintaining social segregation.
 - C. according to European sociologists, crime in America is mainly in Chicago.
 - D. rapid population growth and demographic diversity give rise to social disorganisation that can feed the growth of crime

DIRECTIONS for the questions 5 – 8: 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.

5. In the Ebola misdiagnosis case, we can infer that doctors probably missed the forest for the trees because:
 - A. they were led by the data processed by digital templates.
 - B. the digital templates forced them to acquire tunnel vision.
 - C. the data collected were not sufficient for appropriate triage.
 - D. they used the wrong type of digital templates for the case.
6. It can be inferred that in the Utrecht University experiment, one group of people was "aimlessly clicking around" because:
 - A. they wanted to avoid making mistakes.
 - B. they did not have the skill-set to address complicated tasks.
 - C. they were hoping that the software would help carry out the tasks.
 - D. the other group was carrying out the tasks more efficiently.
7. 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:
 - A. it could mislead people.
 - B. it stunts the development of its users.
 - C. it stops users from exercising their minds.
 - D. computers could replace humans.
8. In the context of the passage, all of the following can be considered examples of human-centered automation EXCEPT:
 - A. a smart-home system that changes the temperature as instructed by the resident.
 - B. software that auto-completes text when the user writes an email.
 - C. medical software that provides optional feedback on the doctor's analysis of the medical situation.
 - D. software that offers interpretations when requested by the human operator.

DIRECTIONS for the questions 9 – 12: 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.

9. 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?
- A. Scientific advances are making it increasingly difficult to distinguish between organic reality and manufactured reality.
 - B. The crumpling of the organic veil between apparent and manufactured reality reveals them to have the same being.
 - C. Organic reality has crumpled under the veil of manufacturing, rendering the apparent and the real as the same being.
 - D. Apparent reality and organic reality are distinguished by the fact that the former is manufactured.
10. None of the following statements is implied by the arguments of the passage, EXCEPT:
- A. purposeful design represents the pinnacle of scientific expertise in the service of human betterment and civilisational progress.
 - B. genetic engineers and bioengineers are the same insofar as they both seek to force evolution in an artificial way.
 - C. the biological realm is as complex as the mechanical one; which is why the logic of Bios is being imported into machines.
 - D. historically, philosophers have known that the laws of life can be abstracted and applied elsewhere.
11. Which one of the following sets of words/phrases best serves as keywords to the passage?
- A. Nature; Computers; Carrots; Milk cows; Genetic engineering
 - B. Complex systems; Carrots; Milk cows; Convergence; Technos-logic
 - C. Complex systems; Bio-logic; Bioengineering; Technos-logic; Convergence

D. Nature; Bios; Technos; Self-repair; Holsteins

12. 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?

- A. "Mechanical" and "life" were earlier seen as opposite in meaning, but the difference between the two is increasingly blurred.
- B. "Mechanical" and "life" are words from different logical systems and are, therefore, fundamentally incompatible in meaning.
- C. "Bios" and "Technos" are both convergent forms of logic, but they generate meanings about the world that are mutually exclusive.
- D. A bionic convergence indicates the meeting ground of genetic engineering and artificial intelligence.

DIRECTIONS for the questions 13 – 16: 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.

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

- A. India's spiritualism served as a salve for European colonizers.
- B. Orientalists' understanding of Indian history was linked to colonial concerns.
- C. Indian texts influenced Orientalist scholars.
- D. Orientalist scholarship influenced Indians.

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

- A. India's culture has evolved over the centuries.
- B. The Orientalist view of Asia fired the imagination of some Western poets.
- C. Indian culture acknowledges the material aspects of life.
- D. India became a colony although it matched the technical knowledge of the West.

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

- A. Reading 18th century accounts by travellers to India to see how they viewed Indian life and culture of the time.
- B. Studying artefacts excavated at a palace to understand the lifestyle of those who lived there.
- C. Reading about the life of early American settlers and later waves of migration to understand the evolution of American culture.
- D. Analysing Hollywood action movies that depict violence and sex to understand contemporary America.

16. 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:

- A. examine the complex reality of that nation's society.
- B. develop an oppositional framework to grasp cultural differences.
- C. read widely in the country's literature.
- D. examine their own beliefs and biases.

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

- 1. 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.

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

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.

- A. 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.
- B. Unlike the alphabet, once the efficacy of the alphabetic sequence became apparent to scholars and administrators, its use became widespread.
- C. 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.
- D. 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.

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

“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.”

- A. Victims of jokes must not only be politicians and royalty, but also arrogant people from lower classes should be mentioned by comedians.
- B. Every joke needs a victim and one needs to include people from lower down the society and not just the upper class.
- C. Cancel culture does not understand the role and duty of comedians, which is to deride and mock everyone.
- D. All jokes target someone and one should be able to joke about anyone in the society, which is inconsistent with cancel culture.

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

Sentence: 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 theory says 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) _____.

- A. Option 1 B. Option 2 C. Option 3 D. Option 4

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

Sentence: 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) _____.
A. Option 1 B. Option 2 C. Option 3 D. Option 4

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

1. 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.

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

1. 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.

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

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."

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

- B. Media has encouraged mass production; images are copied effortlessly without care or concern for the interests of ethnic communities.
- C. Cultural collaboration is the need of the hour. Beautiful design ideas of indigenous people need to be showcased and shared worldwide.
- D. Copying an embroidery design or pattern of textile from native communities who own them is tantamount to stealing and they need to be compensated.



CAT 2022 SLOT 3 DILR

DIRECTIONS for the question 1 – 5: Read the information given below and answer the question that follows.

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.

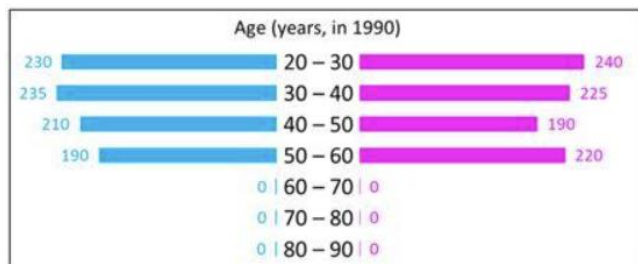
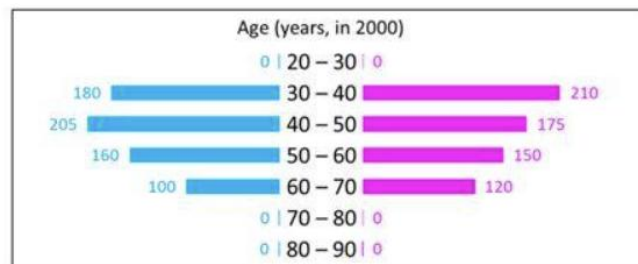
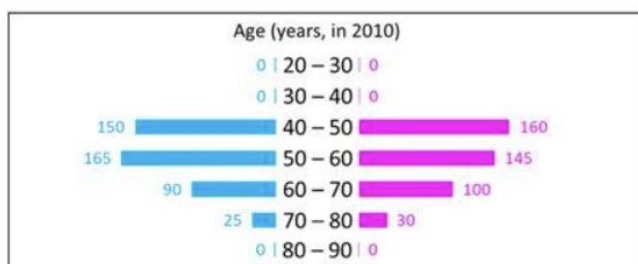
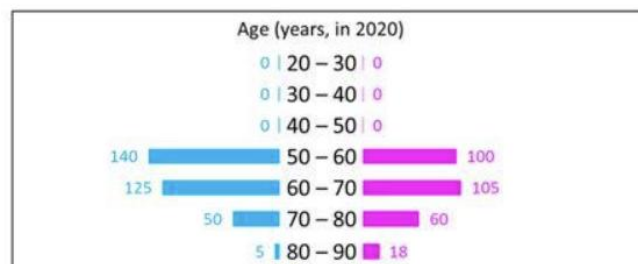
1. How many students took AI?
A. 210 B. 90 C. 60 D. 270
2. How many CS students failed in ML?
3. How many non-CS students got A grade in ML?
4. How many students got A grade in AI?
A. 84 B. 42 C. 63 D. 99
5. How many non-CS students got B grade in ML?
A. 165 B. 25 C. 90 D. 75

DIRECTIONS for the question 6 – 10: Read the information given below and answer the question that follows.

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.



6. In 2000, what was the ratio of the number of dead males to dead females among those being tracked?
A. 41: 43 B. 71: 69 C. 129: 131 D. 109: 107
7. How many people who were being tracked and who were between 30 and 40 years of age in 1980 survived until 2010?
A. 190 B. 110 C. 310 D. 90
8. How many individuals who were being tracked and who were less than 30 years of age in 1980 survived until 2020?
A. 230 B. 580 C. 470 D. 240
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?
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?

DIRECTIONS for the question 11 – 15: Read the information given below and answer the question that follows.

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:

- There was at least one new case in every neighbourhood on Day 1.
- On each of the five days, there were more new cases in Kitmosto than in Pesmosto.
- 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.
- The maximum number of new cases in a day in Pesmosto was 2, and this happened only once during the five-day period.
- 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.
11. What BEST can be concluded about the total number of new cases in the city on Day 2?
 A. Exactly 7 B. Either 6 or 7 C. Either 7 or 8 D. Exactly 8
12. What BEST can be concluded about the number of new cases in Levmosto on Day 3?
 A. Exactly 2 B. Exactly 3 C. Either 0 or 1 D. Either 2 or 3
13. On which day(s) did Pesmosto not have any new case?
 A. Only Day 3 B. Both Day 2 and Day 3 C. Only Day 2 D. Both Day 2 and Day 4
14. Which of the two statements below is/are necessarily false? Statement A: There were 2 new cases in Tyhrmosto on Day 3. Statement B: There were no new cases in Pesmosto on Day 2.
 A. Statement B only
 B. Both Statement A and Statement B
 C. Neither Statement A nor Statement B
 D. Statement A only
15. On how many days did Levmosto and Tyhrmosto have the same number of new cases?
 A. 2 B. 5 C. 3 D. 4

DIRECTIONS for the questions 16 - 20: Read the information given below and answer the question that follows.

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 Rs.1 or Rs.2 in that round. For example, if they chose to bet Rs.2, then the player winning the game got Rs.2 from the one losing the game.

At the beginning of the tournament, the players had Rs.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 Rs.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 Rs.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 Rs.13 (at the end of Round 5), and the minimum amount he had at the end of any round was Rs.8 (at the end of Round 2). At the end of all other rounds, he must have had either Rs.9, Rs.11, or Rs.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		Rs.8	Rs.10	Rs.10
Round 2	Rs.13	Rs.10		Rs.8
Round 3				Rs.10
Round 4				
Round 5	Rs.10	Rs.10		Rs.13
Round 6				
Round 7		Rs.12	Rs.4	
Round 8	Rs.13			Rs.10

16. What BEST can be said about the amount of money that Ritesh had with him at the end of Round 8?
 A. Rs. 5 or Rs. 6 B. Rs. 4 or Rs. 5 C. Exactly Rs. 6 D. Exactly Rs. 5
17. What BEST can be said about the amount of money that Pulak had with him at the end of Round 6?
 A. Rs. 11 or Rs. 12 B. Rs. 12 or Rs. 13 C. Exactly Rs. 11 D. Exactly Rs. 12
18. How much money (in Rs.) did Ritesh have at the end of Round 4?
19. How many games were played with a bet of Rs. 2?
20. Which of the following pairings was made in Round 5?
 A. Pulak and Suresh B. Qasim and Suresh C. Pulak and Qasim D. Pulak and Ritesh

CAT 2022 SLOT 3 QUANT

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

1. 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
A. 140 B. 36 C. 23 D. 150
2. A donation box can receive only cheques of Rs.100, Rs.250, and Rs.500. On one good day, the donation box was found to contain exactly 100 cheques amounting to a total sum of Rs.15250. Then, the maximum possible number of cheques of Rs.500 that the donation box may have contained, is:
3. The arithmetic mean of all the distinct numbers that can be obtained by rearranging the digits in 1421, including itself, is
A. 2592 B. 2442 C. 3333 D. 2222
4. 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:
5. 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
A. 4 B. 5 C. 6 D. 3
6. The minimum possible value of $\frac{x^2 - 6x + 10}{3 - x}$, for $x < 3$, is
A. $-1/2$ B. 2 C. -2 D. $1/2$
7. 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:
8. 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:
9. 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.
A. $x \leq r$ B. $x \geq r$ C. $x \neq r$ D. $x > r$
10. In a triangle ABC, $AB = AC = 8\text{cm}$. 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
A. $32(\pi - 1)$ B. 32π C. $16(\pi - 1)$ D. 16π
11. 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

- A. 10: 3 B. 1: 1 C. 3: 10 D. 10: 13

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:

13. 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:

14. 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

A. 8 B. 9 C. 7 D. 13

15. 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

A. 12 B. 4 C. 6 D. 8

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:

17. 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

A. 90 B. 100 C. 150 D. 120

18. 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

- A. 22.5 B. 24 C. 23 D. 23.5

19. If $C = 16x/y + 49y/x$ for some non-zero real numbers x and y, the C cannot take the value

A. -70 B. 60 C. -50 D. -60

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

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

A. 1 B. 3 C. 0 D. 4

22. Nitu has an initial capital of Rs. 20,000. Out of this, she invests Rs. 8,000 at 5.5% in bank A, Rs. 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 back C alone, then her annual interest income, in rupees, would have been

A. 800

B. 700

C. 1000

D. 900



Solutions:

VARC

1. Correct Answer: D

This question tests your ability to distinguish between what the passage actually says and what might seem like a reasonable inference but is actually a distortion of the original idea. In "not a valid inference" questions, three options will align with the passage, and one will either contradict it or introduce a reason the passage never mentions.

Option A is a valid inference. The passage clearly states that the social lives of migrants were disrupted by the differences between urban and rural life, making this a direct and accurate takeaway from the second paragraph.

Option B is also a valid inference. The passage explicitly says that failure to integrate migrants, combined with forces like crowding, poverty, and illness, caused crime rates to climb. This is almost a paraphrase of what the passage says, so it holds up perfectly.

Option C is valid as well. The passage states that according to social disorganization theory, rapid change acts as a criminogenic influence until the social ecology of the new place can adapt. Option C captures this idea accurately.

Now, Option D is where the distortion lies. The passage does say that African Americans were integrated more slowly than white migrants, but the reason given is not that they were "less organized." The actual reason the passage provides is that they looked visibly different from the existing urban population, which prevented social integration. The passage contrasts African Americans with white migrants by saying the latter could blend in more easily because of physical and linguistic similarities. Saying African Americans were "less organized" is a reason the passage never mentions and has nothing to do with the argument being made. This makes Option D an invalid inference, and therefore the correct answer.

2. Correct Answer: D

This question tests your ability to identify the central themes of the passage as a whole. The correct set of words should collectively cover all the major ideas discussed, without being too narrow or missing a key concept. Option D works perfectly because each word in the set maps directly to a core theme of the passage. The Chicago School is the theoretical framework the entire discussion is built around. Social organization (and its absence, i.e., disorganisation) is the central concept used to explain crime. Migration is the key social phenomenon being examined throughout. And crime is the ultimate outcome that the passage is trying to explain. Together, these four words give you a complete and accurate snapshot of what the passage is about. Option A falls short because while it mentions specific groups like Native-born Whites and European immigrants, it misses the concept of Social Organization entirely, which is arguably the most important theoretical idea in the passage. Without it, the set feels like a list of characters rather than a summary of themes. Option B is the weakest of the lot. It lists only the names of sociologists mentioned in the passage but completely ignores the Chicago School, migration, crime, and social disorganisation. Names alone do not encapsulate the issues discussed. Option C gets some things right, like rapid population growth and crime, but it misses Migration as a standalone theme, which is critical given that the great migration of African Americans is one of the most discussed events in the passage. Replacing migration with heavy industry, which is only a passing detail, makes this set incomplete and slightly off-focus.

3. Correct Answer: A

This question asks you to find the statement that does not contradict the author's claim that America shifted from being predominantly rural at the start of the twentieth century to predominantly urban by mid-century. In other words, you need the option that either supports or is at least consistent with this idea of a rural-to-urban population shift. Option A fits perfectly. If there was a strong out-migration from rural areas in twentieth century America, that directly supports the idea that people were moving away from rural areas and into cities. This is entirely consistent with what the author says, so it does not contradict the statement at all. This is your answer. Option B contradicts the author's claim. If the labor force was always largest in rural areas throughout the twentieth century, that implies rural areas continued to hold the majority of the population, which goes against the idea that most Americans had shifted to urban areas by mid-century. Option C is a direct contradiction. A census from 1952, which falls right around the century's mid-point, showing more Americans in rural areas than urban ones would flatly disprove the author's statement that most Americans lived in urban areas by that time. Option D also contradicts the passage. If per capita income estimates at mid-century primarily required rural data, it implies that the bulk of the economically active population was still in rural areas, again undermining the author's claim of a decisive shift toward urban living by mid-century.

4. Correct Answer: D

This question asks you to identify the fundamental conclusion of the passage, meaning the central argument that the entire passage builds toward. The key here is to find the option that best captures the overarching idea running through all the paragraphs, not just a detail from one part of the passage. Option D is the correct answer because it brings together all the major threads of the passage into one coherent conclusion. The author discusses how rapid population growth through migration, combined with the diversity of people moving into cities, created social disorganisation. And it is this social disorganisation that the author identifies as the root cause of rising crime rates. This idea is present in virtually every paragraph of the passage, making it the most fundamental takeaway.

Option A is too narrow. While racial disparities are discussed in the context of African American migrants being excluded from integration, the author never concludes that racial disparity alone is the best condition for crime to flourish. The broader argument is about social disorganisation, of which racial segregation is just one contributing factor.

Option B actually inverts the logic of the passage. The author argues that segregation and the failure to integrate migrants contributed to crime. Suggesting that maintaining social segregation prevents crime is the exact opposite of what the passage concludes.

Option C is factually inaccurate and far too specific. The European sociologists mentioned, like Durkheim, Marx, and Toennies, wrote about industrialization and urbanization in general, not specifically about crime in Chicago. Attributing such a narrow claim to them misrepresents the passage entirely.

5. Correct Answer: A

This question tests your ability to make a careful inference from a specific part of the passage while also being alert to language that is too extreme or too literal to qualify as a valid inference. Option A is the correct answer. The passage says that the digital templates used by clinicians were "optimized for data capture" and that this caused users to "miss the forest for the trees." The reasonable inference here is that the doctors were being guided and led by the data that these templates collected and processed, which narrowed their focus and caused them to miss the bigger diagnostic picture. This is a fair and measured inference that stays true to the passage's intent. Option B uses dangerously strong language. The passage says the templates "probably helped to induce" tunnel vision, which is a tentative and suggestive claim. Saying the templates "forced" tunnel vision on the doctors goes much further than what the passage actually states. In CAT reading comprehension, words like forced, always, never, and must are red flags because they introduce a certainty that the passage itself does not claim. Option C is not an inference at all. The passage does explicitly mention that the tools sacrificed "utility for appropriate triage and diagnosis," but this is a direct statement from the passage, not something we are inferring. More importantly, the question is asking why the doctors missed the forest for the trees, and insufficient data is not the reason the passage points to. The issue was the nature of the templates, not the quantity of data. Option D introduces information that is simply not present in the passage. There is no discussion anywhere about different types of digital templates or about the wrong type being used in Duncan's case. Bringing in an idea the passage never raises makes this option completely unsupported.

6. Correct Answer: C

This question tests your ability to infer the reason behind a specific behavior described in the passage, in this case, why the group using advanced software was "aimlessly clicking around" when faced with a tricky problem. Option C is the correct answer. The passage tells us that the advanced software offered a great deal of aid and prompts, which means the users were conditioned to rely on it for guidance. So when they hit a difficult problem, instead of thinking it through independently, they kept clicking around hoping the software would step in and show them the way. This is exactly what the passage means when it says the helpful software "short-circuited their thinking and learning." They had outsourced their problem-solving to the tool, and when the tool did not deliver an easy answer, they were lost. Option A is not supported by the passage. There is no suggestion that these users were cautiously trying to avoid errors. In fact, the passage tells us the group using simple software made fewer mistakes, while the advanced software group struggled. Avoiding mistakes was clearly not what was driving their aimless clicking. Option B gets the cause and effect backwards. The passage does not say these people lacked the skill-set to begin with. The whole point of the experiment is that relying on sophisticated software prevented them from developing their skills. They did not start without ability; rather, the software stopped them from building it. Option D is a distractor that brings in a comparison that has no bearing on why one group was clicking aimlessly. The behavior of the other group had no influence on what the advanced software group was doing. These were parallel experiences, not connected ones.

7. Correct Answer: D

This is an EXCEPT question, which means three of the four options will be valid inferences that the author does support, and you need to find the one that the author does not express apprehension about. Option A is a valid concern of the author. The passage discusses how sophisticated software can mislead users, most clearly in the Ebola misdiagnosis case, where digital templates gave doctors a kind of tunnel vision and led them away from the correct diagnosis. The author is clearly worried about automation leading people astray. Option B is also a valid concern. The Utrecht University experiment is cited precisely to show that advanced software stunts the development of its users. The group using simple software developed better strategies and deeper aptitude, while those using advanced software had their thinking and learning short-circuited. The author is very much apprehensive about this. Option C is another concern the author raises. Philosopher Hubert Dreyfus is quoted to support the idea that skills sharpen only through practice and overcoming difficult challenges. When software eases people through those challenges, it stops them from exercising their minds. This is a central worry running through the entire passage. Option D, however, is not something the author expresses apprehension about. In fact, the author's own proposed solution, human-centered automation, is built on the premise that technology should be the expert's partner, not the expert's replacement. The author never entertains the idea that computers could or should replace humans. If anything, the author is arguing against that possibility by advocating for a model where human talent always takes precedence. So D is not a fear the author holds, making it the correct answer to this EXCEPT question.

8. Correct Answer: B

This question tests your understanding of the concept of human-centered automation as defined in the passage. The passage describes human-centered automation as a model where human talent takes precedence; the software plays a secondary role, takes over only routine functions already mastered by the human, and acts as the expert's partner rather than the expert's replacement. With this definition in mind, you need to find the option that does not fit this model. Option A is a clear example of human-centered automation. A smart-home system that adjusts temperature only when instructed by the resident is entirely driven by human command. The technology is responding to the human, not the other way around. The human remains fully in control, which is exactly what the passage describes. Option C also fits the human-centered model well. Medical software that provides optional feedback on a doctor's own analysis means the doctor is still doing the thinking and diagnosing independently. The software only offers additional input when needed, which aligns perfectly with the passage's idea of software expanding the operator's perspective without replacing their judgment. Option D is consistent with human-centered automation as well. Software that offers interpretations only when requested by the human operator keeps the human firmly in the driver's seat. The technology assists on demand rather than taking over the process, which is precisely the secondary, supportive role the passage envisions for automation. Option B, however, does not fit. Auto-complete software that finishes a user's sentences is not waiting for the human to master a task and then assisting with the routine parts. Instead, it is jumping ahead of the human's own thinking and completing their work for them. This is closer to the kind of intrusive, prompt-heavy software the author criticizes earlier in the passage, the kind that short-circuits thinking and learning rather than supporting it. The automation here is leading the process, not the human, which makes it machine-centered rather than human-centered.

9. Correct Answer: A

This question tests your ability to paraphrase and correctly interpret a figurative statement made by the author. The line in question uses the metaphor of a "veil crumpling" to suggest that the perceived boundary between the organic and the manufactured was never as real as we thought, and that boundary is now disappearing entirely. Option A captures this idea most accurately. The passage builds toward the conclusion that the meanings of "mechanical" and "life" have stretched to the point where the distinction between the two is increasingly blurred. Human-made things are becoming more lifelike, and life itself is becoming more engineered. Scientific advances are precisely what is driving this convergence, making it harder and harder to draw a clean line between what is organic and what is manufactured. This is exactly what the author means. Option B sounds close at first but is actually a muddled restatement that does not make clear logical sense. It talks about "the organic veil between apparent and manufactured reality," which misreads the metaphor. The veil in the passage is between the organic and the manufactured, not something that belongs to either one of them. The phrasing here is confusing and distorts the original meaning. Option C goes further in the wrong direction by suggesting that organic reality has "crumpled under" manufacturing, which implies that the organic has been defeated or overtaken by the manufactured. The author is not making that argument at all. The passage presents convergence as a two-way process, with bio-logic being imported into machines and technos-logic being imported into life simultaneously. Option D completely misreads the passage. The author is arguing that the distinction between apparent and organic reality is dissolving, not that it is defined by one being manufactured. This option introduces a contrast the author is actively trying to break down.

10. Correct Answer: B

This is an EXCEPT question in reverse, meaning you are looking for the one statement that is actually implied by the passage, while the other three are not. This requires careful reading of each option against what the passage explicitly argues or reasonably suggests. Option B is the correct answer because the passage does imply this. In the fifth paragraph, the author directly compares genetic engineers to cattle breeders, saying that genetic engineering is "precisely what cattle breeders do," only with more precise and powerful control. Both groups are working to direct evolution artificially rather than letting it unfold organically. The passage makes it clear that the difference between them is one of degree and precision, not of fundamental purpose. Both are forcing evolution in an artificial, purposeful direction, which is exactly what Option B states. Option A goes well beyond what the passage implies. While the author does mention purposeful design in the context of genetic engineering, there is no suggestion that it represents the "pinnacle of scientific expertise" or that it is linked to broader civilizational progress. These are grand claims that the author never makes, and importing them into the passage would be a stretch. Option C actually reverses the logic of the passage. The author argues that mechanical systems have become as complex as living things, and it is this complexity that has made it possible to import bio-logic into machines. It is not that biological and mechanical realms are equally complex and therefore bio-logic is being borrowed. The direction of the argument matters here, and Option C gets it backwards. Option D overstates what the passage says. The passage mentions that philosophers in the past "suspected" one could abstract the laws of life and apply them elsewhere, but suspicion is very different from knowledge. Saying they "have known" this historically is a stronger claim than what the passage actually supports.

11. Correct Answer: C

This question tests your ability to identify the central themes of the passage as a whole. The correct set of keywords should collectively represent the core ideas discussed across all paragraphs, rather than picking up on specific examples or minor details. Option C is the correct answer because every word in this set maps directly to a major theme of the passage. Complex systems is introduced early on when the author explains why clockwork logic is insufficient and bio-logic is needed. Bio-logic is arguably the most central concept in the passage, referring to the logic of living systems that is now being borrowed by machines. Bioengineering covers the discussion of how technos-logic is being applied to life through selective breeding and genetic engineering. Technos-logic represents the counterpart movement, where the logic of technology is being imported into the organic world. And Convergence captures the ultimate conclusion of the passage, that the mechanical and the lifelike are increasingly overlapping and becoming one. Together, these five words give a complete and accurate picture of the passage. Option A includes specific examples like carrots and milk cows, which are illustrative details rather than thematic keywords. It also misses bio-logic, bioengineering, and convergence, which are the conceptual anchors of the passage. Option B is closer but still substitutes carrots and milk cows for bio-logic and bioengineering. As with Option A, these are examples used to explain a concept, not the concept itself. A keyword set should capture ideas, not illustrations. Option D picks up on some important terms like Bios and Technos but then includes self-repair and Holsteins, which are minor details mentioned in passing. Self-repair is just one of several traits listed in the third paragraph, and Holsteins is simply a breed of cattle used as an example. Neither belongs in a keyword set that is meant to represent the passage's core argument.

12. Correct Answer: A

This question tests your ability to correctly interpret a specific claim made by the author and find the option that best paraphrases it. The line in question says that part of the bionic convergence between the mechanical and the lifelike is happening at the level of language itself, meaning the very words we use are shifting in meaning. Option A captures this perfectly. The author says in the last paragraph that the meanings of "mechanical" and "life" are both stretching until complicated things can be perceived as machines and self-sustaining machines can be perceived as alive. This directly implies that what were once seen as opposite or clearly distinct categories are now blurring into each other. The convergence is not just happening in laboratories and engineering labs, it is also happening in how we define and understand these words. Option A expresses this idea cleanly and accurately. Option B goes in the completely opposite direction. The author is arguing that the meanings of "mechanical" and "life" are converging, not that they are fundamentally incompatible. Calling them words from different logical systems that cannot be reconciled directly contradicts the passage's central argument about convergence. Option C also misreads the passage. The author never suggests that Bios and Technos generate mutually exclusive meanings. In fact, the entire passage is built around showing how these two logics are flowing into each other and becoming increasingly unified. Calling them mutually exclusive is the exact opposite of what the author argues. Option D brings in artificial intelligence, which is never mentioned in the passage. While the passage does discuss mechanical systems and bioengineering, it does not frame bionic convergence as specifically the meeting point of genetic engineering and AI. This option introduces an idea that is simply not present in the text.

13. Correct Answer: A

This is an EXCEPT question, which means three of the four options will be clearly supported by the passage, and you need to identify the one that is not accurately stated or is a distortion of what the passage actually says. Option A is the correct answer because it misattributes the idea of India's spiritualism acting as a "salve." The passage explicitly states in the last paragraph that the spiritual image of India acted as a salve for the Indian intelligentsia, not for European colonizers. It gave Indians a sense of cultural pride and consolation for being unable to counter the technical superiority of the West. Saying it served as a salve for European colonizers completely reverses who the beneficiary was, making this statement false and therefore the correct answer to this EXCEPT question. Option B is clearly supported by the passage. The very first paragraph states that interpretations of the Indian past were inevitably influenced by colonial concerns and interests. This makes Option B a true and traceable statement. Option C is also supported. The passage mentions that Orientalist scholars studied languages and texts with selected Indian scholars, and that the so-called discovery of India was largely through selected literature in Sanskrit. Indian texts were clearly a key input into Orientalist scholarship, making Option C accurate. Option D is well supported too. The last paragraph describes how the spiritual image of India, which was originally a product of Orientalist framing, was "even more firmly endorsed by a section of Indian opinion during the last hundred years." This shows that Orientalist scholarship did indeed influence how Indians came to see themselves, confirming Option D as a true statement.

14. Correct Answer: D

This question tests your ability to identify what the author would not support, based on the views and arguments presented throughout the passage. You need to find the option that either contradicts the author's position or introduces an idea the passage clearly argues against. Option D is the correct answer. The passage explicitly states that India's perceived inability to counter the technical superiority of the West was what allowed Europe to colonize Asia. This means the author acknowledges and accepts that India did not match the West's technical knowledge, and that this gap was precisely what made colonization possible. Saying that India became a colony despite matching Western technical knowledge directly contradicts this, and the author would clearly not support such a view. Option A is something the author would support. The passage criticizes the Orientalist interpretation that portrayed Indian society as having an "unchanging continuity over 3,000 years." By pointing out this as a problematic and non-historical reading, the author implicitly supports the view that Indian culture has in fact evolved over the centuries. Option B is well supported by the passage. The second paragraph clearly describes how Orientalist views of Asia fuelled European Romanticism and inspired poets like Wordsworth and Coleridge, who turned to fantasies of the Orient. The author presents this as a historical fact, so it is a view the author would support. Option C is also consistent with the author's perspective. The passage criticizes the Orientalist portrayal of Indian culture as being so consumed by metaphysics and religion that little attention was given to tangible, material aspects. By presenting this as a distortion, the author implies that Indian culture does in fact engage with the material aspects of life, making Option C a view the author would support.

15. Correct Answer: D

This question tests your ability to understand the methodology of Orientalist scholars as described in the passage and then identify which research style most closely mirrors it. The passage tells us that Orientalist scholars studied selected texts, made little attempt to understand the worldview of those teaching them, and ended up with interpretations that were shaped more by their own colonial biases and European preconceptions than by authentic engagement with Indian culture. In short, their method was selective, superficial, and filtered through an external lens. Option D is the most similar research style. Analyzing Hollywood action movies to understand contemporary America is exactly this kind of superficial, filtered, and unrepresentative approach. Hollywood films, particularly action movies, are not a balanced or authentic reflection of American life and culture. They are a highly selective, commercially driven, and often exaggerated product. Drawing broad cultural conclusions from them would be as misleading as the Orientalists drawing conclusions about India from a handful of selected Sanskrit texts. The method in both cases involves using a narrow, biased source to make sweeping cultural generalizations. Option A is a more legitimate and direct method of historical research. Travellers' accounts, while subjective, are primary sources that document actual observations from the time and place being studied. This is far more grounded than the Orientalist approach. Option B is an even more rigorous method. Studying excavated artefacts involves direct physical evidence and follows established archaeological methodology. There is no parallel to the Orientalist's selective and bias-driven approach here. Option C involves reading historical accounts of actual migrants and settlers, which is a well-rounded and evidence-based approach to understanding cultural evolution. It does not involve the kind of selective distortion that characterized Orientalist scholarship.

16. Correct Answer: B

This is an EXCEPT question where you need to identify the one approach that would not help scholars gain a more accurate understanding of a nation's history and culture. The passage's critique of Orientalist scholarship gives us a clear sense of what good historical and cultural research should and should not involve. Option B is the correct answer. Developing an oppositional framework means setting up a system where two things are defined against each other, like the dichotomy the passage describes between "spiritual" India and "materialistic" Europe. The passage explicitly criticizes this approach, pointing out that such oppositions were maintained with little attempt to juxtapose these values with the reality of Indian society. An oppositional framework, by its very nature, forces cultures into rigid contrasting categories, which distorts rather than illuminates the truth. This is precisely the kind of thinking the author argues against, so it is the last thing a scholar seeking accuracy should rely on. Option A is something the author would recommend. The passage criticizes Orientalist scholars for emphasizing non-historical and unchanging aspects of Indian culture while ignoring the more tangible realities of Indian society. Examining the complex reality of a nation's society is exactly the kind of grounded approach the author advocates for. Option C is also implicitly recommended by the passage. The author criticizes Orientalists for relying on a narrow selection of Sanskrit texts rather than engaging broadly with Indian literature and thought. Reading widely would address this limitation and lead to a more balanced understanding. Option D is strongly implied as essential throughout the passage. The entire critique of Orientalism rests on the fact that these scholars allowed their colonial biases, European preconceptions, and Romantic fantasies to colour their readings of Indian history. Being aware of and examining one's own beliefs and biases is presented as a fundamental requirement for honest and accurate scholarship.

To attempt this question, one must know the meaning of 'oppositional framework' in context of the passage.

17. Correct Answer: 2314

This is a paragraph ordering question where you need to identify the logical and narrative flow that connects all four sentences into a coherent paragraph. The key is to spot opening cues, pronoun references, and thematic links between sentences. Sentence 2 is clearly the opener. It introduces the two central elements of the paragraph, the narrator's mum and the narrator along with their sister, and establishes the basic situation of being sent outside into the sun. A sentence that introduces characters and context is almost always the starting point. Sentence 3 follows naturally from 2. The word "us" in sentence 3 refers directly to "me and my sister" mentioned in sentence 2, making this a strong pronoun link. Sentence 3 elaborates on the mum's motivation by describing her own idyllic outdoor childhood in Sussex, which explains why she was so keen on sending the children outside. The tales of climbing trees and navigating streams are passed down as justification for her attitude. Sentence 1 follows sentence 3 because it picks up on the outdoor imagery established in sentence 3. The phrase "enjoy it while it lasts" in sentence 1 is the narrator's memory of being pushed to go outside, which connects directly to the mum's idealization of outdoor life described in sentence 3. Sentence 1 also introduces the narrator's resistance to this pressure through the contrasting desire to stay indoors and read or play video games. Sentence 4 is the natural closer. The word "threat" refers back to the guilt-inducing pressure described in sentence 1, and the phrase "the feeling has stayed with me" provides a reflective, conclusive note that wraps up the paragraph perfectly. Closing sentences in CAT parajumbles often carry this kind of personal reflection or summary tone.

18. Correct Answer: A

This is a summary question where you need to find the option that best captures all the major ideas of the passage without distorting, narrowing, or adding to them. A good summary must cover the what, the why, and the how of the passage's argument. Option A is the correct answer because it accurately captures both the key reasons for the delay in adopting alphabetical order. The passage mentions two main factors: first, religious beliefs in the Middle Ages that made scholars reluctant to categorize things outside the divine order, and second, the eventual recognition of its practical utility through the rediscovery of classical texts and government bureaucracy. Option A brings both of these together cleanly by saying adoption was delayed due to religious beliefs and a lack of appreciation of its efficacy. It also correctly notes that it took several centuries, reflecting the historical sweep of the passage from the Middle Ages to the 16th and 17th centuries. Option B is incomplete because it only talks about what happened once alphabetical order was accepted, without addressing the religious resistance that caused the delay. It also sets up an unnecessary contrast between the alphabet and its sequence that the passage does not really emphasize as a central point. Option C is too narrow. It focuses only on the religious ban on non-divine categorization and completely ignores the second half of the passage about how practical needs like referencing classical texts and managing government bureaucracy eventually drove the adoption of alphabetical order. A summary that leaves out half the argument is not a good summary. Option D introduces the idea that "adoption of the written alphabet was easily accomplished," which is something the passage never actually claims. The passage is entirely about the alphabetical sequence, not about the adoption of the alphabet as a writing system. This option brings in an assumption that has no basis in the text.

19. Correct Answer: D

This is a summary question where you need to find the option that best captures the complete argument made in the passage without being too narrow, too extreme, or adding ideas that are not there. Option D is the correct answer because it covers all the essential points Rowan Atkinson makes. First, it acknowledges that every joke necessarily targets someone, which is the foundational claim of the passage. Second, it captures his argument that in a free society one should be able to joke about anyone. Third, and most importantly, it correctly frames this in the context of cancel culture, which is what the entire quote is responding to. The word "inconsistent" is well chosen because Atkinson is essentially saying that cancel culture's restrictions go against what a proper free society should allow. Option D ties all of this together accurately and concisely. Option A is too specific and narrow. It focuses only on the idea of including arrogant people from the lower classes as targets of comedy, which is just one supporting detail Atkinson uses to make his broader point. Reducing the entire passage to this single example misses the central argument about freedom of expression and cancel culture entirely. Option B has the same problem as Option A. It zeroes in on the class-based aspect of the argument and presents it as the main point, when it is actually just an illustration Atkinson uses to challenge the idea that comedy should always "kick up" at those in power. The bigger argument about unrestricted comedic freedom is lost here. Option C gets close but uses language that is too extreme. Saying that the duty of comedians is to "deride and mock everyone" goes further than what Atkinson actually claims. His argument is about the right to joke about anything, not an obligation to mock everyone. The word "duty" introduces a prescriptive tone that the passage does not support.

20. Correct Answer: B

This question tests your ability to identify the most logical placement of a given sentence within a paragraph by looking at the flow of ideas, thematic connections, and the way sentences build on each other. The given sentence talks about how social learning often happens without people understanding why what they are copying actually works. This is an elaboration on the concept of social learning, not an introduction to a new idea or a concluding thought. This immediately helps us eliminate Options 1 and 4. The sentence is too specific and mid-argument to open the paragraph, and it does not carry the kind of conclusive or summarising tone needed to close it. Between Options 2 and 3, the placement at blank 2 works best for a very specific reason. The sentence immediately before blank 2 introduces the idea that socially acquired information functions as a second line of inheritance. The given sentence flows naturally from this by elaborating on what social learning actually looks like in practice, namely that people copy beliefs, behaviours, and technologies without necessarily understanding the underlying reasons. This is a direct and logical continuation of the thought. The sentence after blank 2 then moves on to describe how people choose whom to learn from, focusing on the smartest or most successful individuals or the majority. This follows naturally because once we understand that people copy without full comprehension, it makes sense to then ask how they decide who to copy from. Option 3 does not work because the sentences around blank 3 are already flowing smoothly. The sentence before it talks about who people learn from, and the sentence after it talks about how repeating this process creates cultural packages. Inserting the given sentence here would interrupt this smooth progression rather than add to it.

21. Correct Answer: B

This question tests your ability to place a given sentence in the position where it connects most naturally with the sentences around it, both before and after the blank. The given sentence says that there has been a lot of uncertainty around what a wide-scale return to office might look like in practice. The key phrase here is "this has meant," which is a consequence marker, meaning the sentence must follow something that caused or produced this uncertainty. Option 4 can be eliminated immediately. The sentence just before blank 4 says that clarity is beginning to emerge about what return-to-office means. Placing a sentence about uncertainty right after a statement about growing clarity would create a direct contradiction and disrupt the logical flow of the paragraph. Option 3 can also be ruled out. The sentence before blank 3 mentions that some employees are already back at their desks on a full-time or hybrid basis. This is a statement of progress and resolution, which makes it an awkward fit for a sentence about ongoing uncertainty in practice. Now between Options 1 and 2, both seem plausible at first glance since the earlier part of the paragraph is discussing disruption and slow progress. However, Option 1 does not work as well because the sentence before blank 1 talks about best laid plans not materialising, and the sentence after blank 1 talks about the trickle of workers returning. The given sentence fits more naturally at blank 2, because the sentence before it describes the slow trickle of workers returning, and the given sentence explaining that this has created uncertainty about wide-scale return follows logically. The sentence after blank 2 then shifts with "yet" to acknowledge that despite this uncertainty, some companies and employees are moving forward, which is a natural pivot after acknowledging the uncertainty.

22. Correct Answer: 4312

This is a paragraph ordering question where you need to identify the logical sequence in which the four sentences build on each other to form a coherent and complete paragraph about beacon technology. Sentence 4 is the natural opener because it introduces and defines the subject, beacons, from scratch. It tells us what beacons are, describing them as tiny, inexpensive, micro-location-based devices that send radio frequency signals and notify nearby Bluetooth devices. Any paragraph discussing a technical concept must begin by establishing what that concept is, and sentence 4 does exactly that. Sentence 3 follows directly from sentence 4 because it picks up on the idea of radio frequency signals introduced in the previous sentence and explains what happens next in the process. It tells us that smartphones and mobile devices can capture these beacon signals and estimate distance by measuring signal strength. This is a direct and logical continuation of the technical explanation begun in sentence 4. Sentence 1 comes next because it moves the discussion from the technical mechanism to the practical application. Having established what beacons are and how devices interact with their signals, the paragraph now zooms out to tell us that various industries including retail, transit, finance, and education have started using beacon solutions to track and communicate with customers. This is the bridge between the technology and its real-world use. Sentence 2 is the ideal closing sentence because it zooms back in with a specific, concrete example of how beacons work in practice, using the retail context mentioned in sentence 1 as its focus. A beacon on a shop wall helping a retailer send personalised offers to nearby customers is a vivid illustration that brings the entire explanation to life and gives the paragraph a satisfying, specific conclusion.

23. Correct Answer: 3214

This is a paragraph ordering question where the four sentences together build an argument about meritocracy, its limits, and what recognising those limits can do for society. Sentence 3 is the natural opener because it introduces the subject of meritocracy in a broad, general way and explains why it exists as an organising principle in free societies. It tells us that humans are naturally inclined to see their achievements as deserving of reward, which is why meritocracy takes root. A sentence that defines and contextualises the central concept is almost always the best starting point. Sentence 2 follows from sentence 3 because it introduces a counterpoint using the conjunction "but," which signals a contrast or correction to what was just said. Sentence 3 establishes meritocracy as a natural and inevitable tendency, and sentence 2 then brings in recent books that challenge this tendency by highlighting the limits of merit and the role of luck and grace. The "but" at the start of sentence 2 is a strong structural clue that it must follow a statement it is pushing back against. Sentence 1 comes next because it elaborates on the argument introduced in sentence 2 about the limits of merit. If our achievements are largely out of our control, as the books in sentence 2 suggest, then it follows that our failures and the failures of others are too. This is a direct logical extension of the idea that merit has limits, making 2 and 1 a tight thematic pair. Sentence 4 is the ideal closer because it builds on the humility and tolerance discussed in sentence 1 and takes the argument to its ultimate conclusion, that recognising the role of luck and accepting our lack of control should make us more humble, more respectful of others, and ultimately help build a more compassionate society. This kind of broad, forward-looking conclusion is the hallmark of a closing sentence.

24. Correct Answer: A

Correct Answer: A This is a summary question where you need to find the option that best captures the complete argument of the passage without being too narrow, too extreme, or introducing ideas that are not present in the text. Option A is the correct answer because it accurately captures the central argument of the entire passage. The passage is about how cultural ideas, motifs, and craft techniques are being borrowed from other communities without credit, compensation, or respect, which is the essence of cultural appropriation. Option A brings all three of these elements together cleanly and applies them broadly to any cultural group, which matches the scope of the passage. It neither overstates nor understates the argument. Option B is partially correct in that it mentions media and mass production, but it narrows the argument too much by focusing only on images being copied. The passage's concern is broader, covering motifs, craft techniques, styles of dressing, and embroidery, not just images. The phrase "ethnic communities" also feels limiting compared to the passage's more general reference to original communities and their cultural heritage. Option C completely misreads the tone and argument of the passage. The passage is a critique of how cultural ideas are being stolen without acknowledgment, not a call for cultural collaboration or a celebration of sharing indigenous designs worldwide. Suggesting that the passage advocates for showcasing and sharing indigenous designs globally is the opposite of what the author is arguing. Option D gets the spirit of the argument right but is too specific. It focuses only on embroidery designs and textile patterns, whereas the passage covers a much wider range of cultural borrowings including styles of dressing, motifs, and craft techniques. A summary that works only for one example from the passage cannot be the best encapsulation of its overall argument.

CAT 2022 SLOT3 DILR

1. Correct Answer: D

From directions 1, 2, 3, 5, 6; we can fill the table as below.

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	4x	5x	2x	z
Non CS	2k	AI	0			x
	5k	ML				x

From 7th direction, Total number of non CS students failing in one of the two courses: CS student failing in one of the two courses = 3:1

$$2x: z = 3:1 \Rightarrow z = 2x/3$$

From 8th direction, $z + x = 30$

$$5x/3 = 80 \Rightarrow x = 18$$

So, we can fill values in the table:

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

Also, every student takes both the courses in CS. So, number of students in AI = number of students in ML = 210

So, total number of students in CS = 210

$$K = 30$$

So, in Non CS, AI students = 60, in Non CS, ML students = 150

Also, $3y + 5y + 2y = 210$ implies $y = 21$.

So, we can put values for the first row.

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

By taking 4th direction, we can have the final table as below:

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0	21	21	18
	5k	ML	27	75	30	18

Total students who took AI = $210 + 60 = 270$

2. Correct Answer: 12

From directions 1, 2, 3, 5, 6; we can fill the table as below.

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	4x	5x	2x	z
Non CS	2k	AI	0			x
	5k	ML				x

From 7th direction, Total number of non CS students failing in one of the two courses: CS student failing in one of the two courses = 3:1

$$2x: z = 3:1 \Rightarrow z = 2x/3$$

From 8th direction, $z + x = 30$

$$5x/3 = 80 \Rightarrow x = 18$$

So, we can fill values in the table:

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

Also, every student takes both the courses in CS. So, number of students in AI = number of students in ML = 210

So, total number of students in CS = 210

$$K = 30$$

So, in Non CS, AI students = 60, in Non CS, ML students = 150

Also, $3y + 5y + 2y = 210$ implies $y = 21$.

So, we can put values for the first row.

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

By taking 4th direction, we can have the final table as below:

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0	21	21	18
	5k	ML	27	75	30	18

12 CS students failed in ML.

3. Correct Answer: 27

From directions 1, 2, 3, 5, 6; we can fill the table as below.

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	4x	5x	2x	z
Non CS	2k	AI	0			x
	5k	ML				x

From 7th direction, Total number of non CS students failing in one of the two courses: CS student failing in one of the two courses = 3:1

$$2x: z = 3:1 \Rightarrow z = 2x/3$$

From 8th direction, $z + x = 30$

$$5x/3 = 80 \Rightarrow x = 18$$

So, we can fill values in the table:

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

Also, every student takes both the courses in CS. So, number of students in AI = number of students in ML = 210

So, total number of students in CS = 210

$$K = 30$$

So, in Non CS, AI students = 60, in Non CS, ML students = 150

Also, $3y + 5y + 2y = 210$ implies $y = 21$.

So, we can put values for the first row.

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

By taking 4th direction, we can have the final table as below:

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0	21	21	18
	5k	ML	27	75	30	18

27 non CS students got A grade in ML.

4. Correct Answer: C

From directions 1, 2, 3, 5, 6; we can fill the table as below.

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	4x	5x	2x	z
Non CS	2k	AI	0			x
	5k	ML				x

From 7th direction, Total number of non CS students failing in one of the two courses: CS student failing in one of the two courses = 3:1

$$2x: z = 3:1 \Rightarrow z = 2x/3$$

From 8th direction, $z + x = 30$

$$5x/3 = 80 \Rightarrow x = 18$$

So, we can fill values in the table:

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

Also, every student takes both the courses in CS. So, number of students in AI = number of students in ML = 210

So, total number of students in CS = 210

$$K = 30$$

So, in Non CS, AI students = 60, in Non CS, ML students = 150

Also, $3y + 5y + 2y = 210$ implies $y = 21$.

So, we can put values for the first row.

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

By taking 4th direction, we can have the final table as below:

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0	21	21	18
	5k	ML	27	75	30	18

63 students got A grade in AI.

5. Correct Answer: D

From directions 1, 2, 3, 5, 6; we can fill the table as below.

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	4x	5x	2x	z
Non CS	2k	AI	0			x
	5k	ML				x

From 7th direction, Total number of non CS students failing in one of the two courses: CS student failing in one of the two courses = 3:1

$$2x: z = 3:1 \Rightarrow z = 2x/3$$

From 8th direction, $z + x = 30$

$$5x/3 = 80 \Rightarrow x = 18$$

So, we can fill values in the table:

			A	B	C	F
CS	7k	AI	3y	5y	2y	0
		ML	72	90	36	12
Non CS	2k	AI	0			18
	5k	ML				18

Also, every student takes both the courses in CS. So, number of students in AI = number of students in ML = 210

So, total number of students in CS = 210

$$K = 30$$

So, in Non CS, AI students = 60, in Non CS, ML students = 150

Also, $3y + 5y + 2y = 210$ implies $y = 21$.

So, we can put values for the first row.

			A	B	C	F
CS	7k	AI	63	105	42	0
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	5k	ML				18

By taking 4th direction, we can have the final table as below:

			A	B	C	F
CS	7k	AI	63	105	42	0
		ML	72	90	36	12
Non CS	2k	AI	0	21	21	18
	5k	ML	27	75	30	18

75 non-CS students got B grade in ML.

6. Correct Answer: B

We know that in 1980, total number of males = total number of females = 1000.

Also, $1000 = \text{Deaths} + \text{alive people}$

So, number of deaths of males = $1000 - (180 + 205 + 160 + 100) = 355$

Number of deaths of females = $1000 - (210 + 175 + 150 + 120) = 345$

So, required ratio = $355 : 345 = 71 : 69$

So, required ratio = $355 : 345 = 71 : 69$

7. Correct Answer: A

If a person falls in the age group (30-40), he/she should fall in (60-70) age group in 2010. So, in third graph, $(90 + 100) = 190$ would be the answer.

8. Correct Answer: C

Less than 30 years means, we need to take 10-20, 20-30 categories. In 2020, these people would fall in 50-60, 60-70 age group categories. So, answer = $140 + 125 + 50 + 100 + 105 + 60 = 470$. Hence 3rd option.

9. Correct Answer: 40

In 2000, these people will fall in 40-50.

In 2010, these people will fall in 50-60.

In 2000, 205 male survivors were there.

In 2010, 165 male survivors were there.

That means $205 - 165 = 40$ died in the given period.

10. Correct Answer: 30

In 1980, age (20-30) $\Rightarrow$ In 1990, age (30-40)

$\Rightarrow$ In 2000, age (40-50) $\Rightarrow$ In 2010, age (50-60)

From given bar graph, in 2000, 175 females were alive in the age group 40-50

But in 2010, 145 females were alive in the age group 50-60

Hence, females died in the age (50-60) = $175 - 145 = 30$

11. Correct Answer: D

Let the denotation for *Levmisto* = *L*, *Tyhrmisto* = *T*, *Pesmisto* = *P* and *Kitmisto* = *K*

The total number of new cases in the city over five-day period = $12 + 12 + 5 + 14 = 43$

Since the new cases in the city kept on increasing every day with Day 3 is exactly one more case than Day 2, the only possibility of new cases for-

Day 1 = 5, Day 2 = 8, Day 3 = 9, Day 4 = 10 and Day 5 = 11, Total = 43

Further, there is at least one new case on Day 1

Only possibility for Day 1,

L = 1 case, *T* = 1 case, *P* = 1 case and *K* = 2 cases, Total = 5 cases

Also, *K* is the only place to have 3 new cases on Day 2

And to have total of 12 cases in each *L* and *T*

Day 2 = 2 cases, Day 3 = 3 cases, Day 4 = 3 cases and Day 5 = 3 cases

The rest of given information can be gathered as follows-

	Levmisto	Tyhrmisto	Pesmisto	Kitmisto	Total
Day 1	1	1	1	2	5
Day 2	2	2	1	3	8
Day 3	3	3	0	3	9
Day 4	3	3	1	3	10
Day 5	3	3	2	3	11
Total	12	12	5	14	43

The total number of new cases in the city on Day 2 = exactly 8

12. Correct Answer: B

Let the denotation for *Levmisto* = *L*, *Tyhrmisto* = *T*, *Pesmisto* = *P* and *Kitmisto* = *K*

The total number of new cases in the city over five-day period = $12 + 12 + 5 + 14 = 43$

Since the new cases in the city kept on increasing every day with Day 3 is exactly one more case than Day 2, the only possibility of new cases for-

Day 1 = 5, Day 2 = 8, Day 3 = 9, Day 4 = 10 and Day 5 = 11, Total = 43

Further, there is at least one new case on Day 1

Only possibility for Day 1,

L = 1 case, *T* = 1 case, *P* = 1 case and *K* = 2 cases, Total = 5 cases

Also, *K* is the only place to have 3 new cases on Day 2

And to have total of 12 cases in each *L* and *T*

Day 2 = 2 cases, Day 3 = 3 cases, Day 4 = 3 cases and Day 5 = 3 cases

The rest of given information can be gathered as follows-

	Levmisto	Tyhrmisto	Pesmisto	Kitmisto	Total
Day 1	1	1	1	2	5
Day 2	2	2	1	3	8
Day 3	3	3	0	3	9
Day 4	3	3	1	3	10
Day 5	3	3	2	3	11
Total	12	12	5	14	43

The number of new cases in *Levmisto* on Day 3 = exactly 3

13. Correct Answer: A

Let the denotation for *Levmisto* = L, *Tyhrmisto* = T, *Pesmisto* = P and *Kitmisto* = K

The total number of new cases in the city over five-day period = 12 + 12 + 5 + 14 = 43

Since the new cases in the city kept on increasing every day with Day 3 is exactly one more case than Day 2, the only possibility of new cases for-

Day 1 = 5, Day 2 = 8, Day 3 = 9, Day 4 = 10 and Day 5 = 11, Total = 43

Further, there is at least one new case on Day 1

Only possibility for Day 1,

L = 1 case, T = 1 case, P = 1 case and K = 2 cases, Total = 5 cases

Also, K is the only place to have 3 new cases on Day 2

And to have total of 12 cases in each L and T

Day 2 = 2 cases, Day 3 = 3 cases, Day 4 = 3 cases and Day 5 = 3 cases

The rest of given information can be gathered as follows-

	Levmisto	Tyhrmisto	Pesmisto	Kitmisto	Total
Day 1	1	1	1	2	5
Day 2	2	2	1	3	8
Day 3	3	3	0	3	9
Day 4	3	3	1	3	10
Day 5	3	3	2	3	11
Total	12	12	5	14	43

Only on Day 3, *Pesmisto* did not have any new case

14. Correct Answer: B

Let the denotation for *Levmisto* = L, *Tyhrmisto* = T, *Pesmisto* = P and *Kitmisto* = K

The total number of new cases in the city over five-day period = 12 + 12 + 5 + 14 = 43

Since the new cases in the city kept on increasing every day with Day 3 is exactly one more case than Day 2, the only possibility of new cases for-

Day 1 = 5, Day 2 = 8, Day 3 = 9, Day 4 = 10 and Day 5 = 11, Total = 43

Further, there is at least one new case on Day 1

Only possibility for Day 1,

L = 1 case, T = 1 case, P = 1 case and K = 2 cases, Total = 5 cases

Also, K is the only place to have 3 new cases on Day 2

And to have total of 12 cases in each L and T

Day 2 = 2 cases, Day 3 = 3 cases, Day 4 = 3 cases and Day 5 = 3 cases

The rest of given information can be gathered as follows-

	Levmisto	Tyhrmisto	Pesmisto	Kitmisto	Total
Day 1	1	1	1	2	5
Day 2	2	2	1	3	8
Day 3	3	3	0	3	9
Day 4	3	3	1	3	10
Day 5	3	3	2	3	11
Total	12	12	5	14	43

Statement A: There were 2 new cases in *Tyhrmisto* on Day 3: False

Statement B: There were no new cases in *Pesmisto* on Day 2: False

Hence, both Statement A and Statement B are false

15. Correct Answer: B

Let the denotation for *Levmisto* = *L*, *Tyhrmisto* = *T*, *Pesmisto* = *P* and *Kitmisto* = *K*

The total number of new cases in the city over five-day period = $12 + 12 + 5 + 14 = 43$

Since the new cases in the city kept on increasing every day with Day 3 is exactly one more case than Day 2, the only possibility of new cases for-

Day 1 = 5, Day 2 = 8, Day 3 = 9, Day 4 = 10 and Day 5 = 11, Total = 43

Further, there is at least one new case on Day 1

Only possibility for Day 1,

L = 1 case, *T* = 1 case, *P* = 1 case and *K* = 2 cases, Total = 5 cases

Also, *K* is the only place to have 3 new cases on Day 2

And to have total of 12 cases in each *L* and *T*

Day 2 = 2 cases, Day 3 = 3 cases, Day 4 = 3 cases and Day 5 = 3 cases

The rest of given information can be gathered as follows-

	Levmisto	Tyhrmisto	Pesmisto	Kitmisto	Total
Day 1	1	1	1	2	5
Day 2	2	2	1	3	8
Day 3	3	3	0	3	9
Day 4	3	3	1	3	10
Day 5	3	3	2	3	11
Total	12	12	5	14	43

On all 5 days *Levmisto* and *Tyhrmisto* have the same number of new cases

16. Correct Answer: C

Since the total amount among them = Rs. 40
Some of the values can be distributed as follows.

	Pulak	Qasim	Ritesh	Suresh	Total	Players Grouping	
Beginning	Rs.10	Rs.10	Rs.10	Rs.10	Rs.40		
Round 1	+2	-2	0	0		P and Q	R and S
	Rs.12	Rs.8	Rs.10	Rs.10	Rs.40		
Round 2	+1	+2	-1	-2		P and R	Q and S
	Rs.13	Rs.10	Rs.9	Rs.8	Rs.40		
Round 3	+1	-1	-2	+2		P and Q	R and S
	Rs.12	Rs.11	Rs.7	Rs.10	Rs.40		
	-2	+1	-1	+2		P and S	R and Q
	Rs.11	Rs.11	Rs.8	Rs.10	Rs.40		
Round 4	0	0	-2	+2		P and Q	R and S
	Rs.11	Rs.11	Rs.6	Rs.12	Rs.40		
Round 5	-1	-1	+1	+1		P and S	Q and R
	Rs.10	Rs.10	Rs.7	Rs.13	Rs.40		
Round 6	+2	+1	-2	-1		P and R	Q and S
	Rs.12	Rs.11	Rs.5	Rs.12	Rs.40		
Round 7	0	+1	-1	0		P and S	Q and R
	Rs.12	Rs.12	Rs.4	Rs.12	Rs.40		
Round 8	+1	-1	+2	-2		P and Q	R and S
	Rs.13	Rs.11	Rs.6	Rs.10	Rs.40		

Rs.4 is the minimum amount Ritesh has in any round, so he must have won in Round 8 and gained Rs.2. hence, the amount of money that Ritesh had with him at the end of Round 8 = 4 + 2 = Rs.6

17. Correct Answer: D

Since the total amount among them = Rs. 40
Some of the values can be distributed as follows.

	Pulak	Qasim	Ritesh	Suresh	Total	Players Grouping	
Beginning	Rs.10	Rs.10	Rs.10	Rs.10	Rs.40		
Round 1	+2	-2	0	0		P and Q	R and S
	Rs.12	Rs.8	Rs.10	Rs.10	Rs.40		
Round 2	+1	+2	-1	-2		P and R	Q and S
	Rs.13	Rs.10	Rs.9	Rs.8	Rs.40		
Round 3	+1	-1	-2	+2		P and Q	R and S
	Rs.12	Rs.11	Rs.7	Rs.10	Rs.40		
	-2	+1	-1	+2		P and S	R and Q
	Rs.11	Rs.11	Rs.8	Rs.10	Rs.40		
Round 4	0	0	-2	+2		P and Q	R and S
	Rs.11	Rs.11	Rs.6	Rs.12	Rs.40		
Round 5	-1	-1	+1	+1		P and S	Q and R
	Rs.10	Rs.10	Rs.7	Rs.13	Rs.40		
Round 6	+2	+1	-2	-1		P and R	Q and S
	Rs.12	Rs.11	Rs.5	Rs.12	Rs.40		
Round 7	0	+1	-1	0		P and S	Q and R
	Rs.12	Rs.12	Rs.4	Rs.12	Rs.40		
Round 8	+1	-1	+2	-2		P and Q	R and S
	Rs.13	Rs.11	Rs.6	Rs.10	Rs.40		

The money Suresh had in Round 5 = Rs.13 (maximum) and in Round 7 = Rs.12

The only possible way to reach such value is by losing Rs.1 in Round 6 and gaining 0 in Round 7

Also, the money Ritesh had in Round 5 = Rs.7 and in Round 7 = Rs.4

The only possible way to reach such value is by losing Rs.2 in Round 6 and losing Rs.1 in Round 7

Considering that, the amount of money that Pulak had with him at the end of Round 6 = Rs.10 + 2 = Rs.12

18. Correct Answer: 6

Since the total amount among them = Rs. 40
Some of the values can be distributed as follows.

	Pulak	Qasim	Ritesh	Suresh	Total	Players Grouping	
Beginning	Rs.10	Rs.10	Rs.10	Rs.10	Rs.40		
Round 1	+2	-2	0	0		P and Q	R and S
	Rs.12	Rs.8	Rs.10	Rs.10	Rs.40		
Round 2	+1	+2	-1	-2		P and R	Q and S
	Rs.13	Rs.10	Rs.9	Rs.8	Rs.40		
Round 3	+1	-1	-2	+2		P and Q	R and S
	Rs.12	Rs.11	Rs.7	Rs.10	Rs.40		
	-2	+1	-1	+2		P and S	R and Q
	Rs.11	Rs.11	Rs.8	Rs.10	Rs.40		
Round 4	0	0	-2	+2		P and Q	R and S
	Rs.11	Rs.11	Rs.6	Rs.12	Rs.40		
Round 5	-1	-1	+1	+1		P and S	Q and R
	Rs.10	Rs.10	Rs.7	Rs.13	Rs.40		
Round 6	+2	+1	-2	-1		P and R	Q and S
	Rs.12	Rs.11	Rs.5	Rs.12	Rs.40		
Round 7	0	+1	-1	0		P and S	Q and R
	Rs.12	Rs.12	Rs.4	Rs.12	Rs.40		
Round 8	+1	-1	+2	-2		P and Q	R and S
	Rs.13	Rs.11	Rs.6	Rs.10	Rs.40		

The money (in Rs.) Ritesh had at the end of Round 4 = Rs. 6

19. Correct Answer: 6

Since the total amount among them = Rs. 40
Some of the values can be distributed as follows.

	Pulak	Qasim	Ritesh	Suresh	Total	Players Grouping	
Beginning	Rs.10	Rs.10	Rs.10	Rs.10	Rs.40		
Round 1	+2	-2	0	0		P and Q	R and S
	Rs.12	Rs.8	Rs.10	Rs.10	Rs.40		
Round 2	+1	+2	-1	-2		P and R	Q and S
	Rs.13	Rs.10	Rs.9	Rs.8	Rs.40		
Round 3	+1	-1	-2	+2		P and Q	R and S
	Rs.12	Rs.11	Rs.7	Rs.10	Rs.40		
	-2	+1	-1	+2		P and S	R and Q
	Rs.11	Rs.11	Rs.8	Rs.10	Rs.40		
Round 4	0	0	-2	+2		P and Q	R and S
	Rs.11	Rs.11	Rs.6	Rs.12	Rs.40		
Round 5	-1	-1	+1	+1		P and S	Q and R
	Rs.10	Rs.10	Rs.7	Rs.13	Rs.40		
Round 6	+2	+1	-2	-1		P and R	Q and S
	Rs.12	Rs.11	Rs.5	Rs.12	Rs.40		
Round 7	0	+1	-1	0		P and S	Q and R
	Rs.12	Rs.12	Rs.4	Rs.12	Rs.40		
Round 8	+1	-1	+2	-2		P and Q	R and S
	Rs.13	Rs.11	Rs.6	Rs.10	Rs.40		

6 games were played with a bet of Rs.2.

20. Correct Answer: A

Since the total amount among them = Rs. 40
Some of the values can be distributed as follows.

	Pulak	Qasim	Ritesh	Suresh	Total	Players Grouping	
Beginning	Rs.10	Rs.10	Rs.10	Rs.10	Rs.40		
Round 1	+2	-2	0	0		P and Q	R and S
	Rs.12	Rs.8	Rs.10	Rs.10	Rs.40		
Round 2	+1	+2	-1	-2		P and R	Q and S
	Rs.13	Rs.10	Rs.9	Rs.8	Rs.40		
Round 3	+1	-1	-2	+2		P and Q	R and S
	Rs.12	Rs.11	Rs.7	Rs.10	Rs.40		
	-2	+1	-1	+2		P and S	R and Q
	Rs.11	Rs.11	Rs.8	Rs.10	Rs.40		
Round 4	0	0	-2	+2		P and Q	R and S
	Rs.11	Rs.11	Rs.6	Rs.12	Rs.40		
Round 5	-1	-1	+1	+1		P and S	Q and R
	Rs.10	Rs.10	Rs.7	Rs.13	Rs.40		
Round 6	+2	+1	-2	-1		P and R	Q and S
	Rs.12	Rs.11	Rs.5	Rs.12	Rs.40		
Round 7	0	+1	-1	0		P and S	Q and R
	Rs.12	Rs.12	Rs.4	Rs.12	Rs.40		
Round 8	+1	-1	+2	-2		P and Q	R and S
	Rs.13	Rs.11	Rs.6	Rs.10	Rs.40		

Pulak and Suresh made a pair in round 5.

CAT 2022 SLOT 3 QUANT

1. Correct Answer: A

We know that $\frac{\text{Men} \times \text{Days} \times \text{hours}}{\text{work}} = \text{constant}$

$$\text{So, } \frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$$

Now, in given question,

$M_1 = N$	$M_2 = N - 10$
$D_1 = 10$	$D_2 = 14$
$H_1 = 7$	$H_2 = 10$
$W_1 = 35$	$W_2 = 65$

$$\text{So, } \frac{N \times 10 \times 7}{35} = \frac{(N - 10) \times 14 \times 10}{65} \Rightarrow N = 140$$

2. Correct Answer: 12

Let the number of Rs 100, Rs 250 and Rs 500 cheques be x, y and z respectively

$$\text{Given } x + y + z = 100 \Rightarrow 2x + 2y + 2z = 200$$

$$\text{and } 100x + 250y + 500z = 15250 \Rightarrow 2x + 5y + 10z = 305$$

Eliminating x, we get $3y + 8z = 105$

To maximise z, minimise y

Taking, $y = 3$ and $z = 12$.

No other value of z which is greater than 12 satisfies the equation

Hence, the maximum possible number of cheques of Rs 500 = 12

3. Correct Answer: D

We know that if N is an n-digit number containing digit A (a times, say), B (b times, say) then

$$\text{No. of possible numbers made by using the digits of N} = \frac{n!}{a!b! \dots}$$

$$\text{Sum of such nos.} = \frac{n!}{a!b! \dots} (\text{SOD}) \times (11 \dots 1) \text{ n times}$$

Where SOD = sum of digits

$$\text{Required Arithmetic mean} = \frac{\text{Sum of nos.}}{\text{number of nos}} = \frac{\frac{3!}{2!} (1111)(1 + 4 + 2 + 1)}{\frac{4!}{2!}} = 2222$$

4. Correct Answer: 60

Let S_m = steps taken by moody in a second when escalator is not moving'

S_e = step taken by escalator in a second.

Let N = number of steps visible when escalator is not moving

$$\text{So, } S_m + S_e = \frac{N}{30}$$

$$2S_m + S_e = \frac{N}{20}$$

$$\text{By solving, } S_e = \frac{N}{60}$$

So, required time = 60 seconds

5. Correct Answer: B

Sum of the three sides of a quadrilateral is greater than the fourth side.

Therefore, let the fourth side be

$$1 + 2 + 4 > x \text{ or } x < 7$$

$$1 + 2 + x > 4 \text{ or } x > 1$$

Possible values of 'd' are 2, 3, 4, 5 and 6.

6. Correct Answer: B

Since $x < 3$, put $t = 3 - x$, so that $t > 0$ and $x = 3 - t$.

$$\text{Now, } x^2 - 6x + 10 = (3 - t)^2 - 6(3 - t) + 10$$

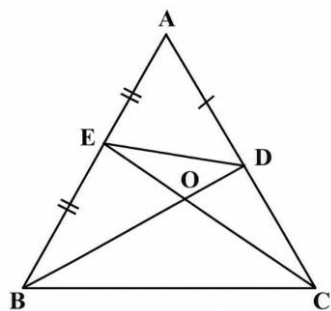
$$= 9 - 6t + t^2 - 18 + 6t + 10 = t^2 + 1$$

So, the given expression becomes: $\frac{t^2 + 1}{t} = t + \frac{1}{t}$

Since $t > 0$, by the AM $\geq$ GM inequality: $t + \frac{1}{t} \geq 2$ with equality when $t = 1$, i.e. $x = 2$, which indeed satisfies $x < 3$. Hence, the minimum possible value of the given expression is 2.

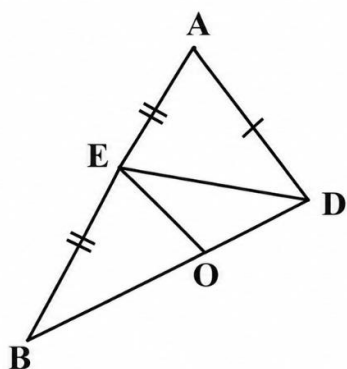


7. Correct Answer: 9



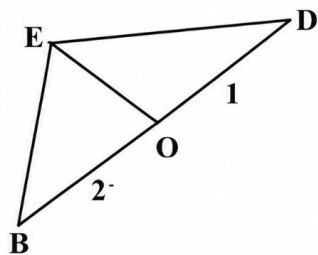
We know that median always divides the triangle into two equal parts area wise.

So, ΔABD 's Area, $\frac{1}{2} \times 108 = 54$ sq units as BD is a median of ΔABC .



If we consider ΔABD , ED is median

So, $\text{Ar}(\Delta BED) = \frac{1}{2} \times 54 = 27$ squnits.



Since O is centroid and divides median in 2: 1.

$\text{Ar}(\Delta EOD) = \frac{1}{3} \times 27 = 9$ squnits.

8. Correct Answer: 11

B can finish job in 40 days. Since A is twice as fast as B. Since A can finish job in 20 days.

Similarly, C can finish job in 60 days.

Let us assume total work is 120 unit

So, A's 1 day work = 6 u

B's 1 day work = 3 u

C's 1 day work = 2 u

Order of their working is,

AB, BC, CA, AB, BC, CA, -----

In span of 3 days, work done = $2 \times (6 + 3 + 2) = 22$ u.

So, in span of 15 (i.e. 3×5) days, work done = $22 \times 5 = 110$ u.

On 16th day, AB together will do 9 units of work.

On 17th day, BC will work together to finish remaining 1 unit of work.

So, in these 17 days, A will work for $2 \times 5 + 1 = 11$ days.

9. Correct Answer: A

We have, $f(x) = \begin{cases} 2x - r & \text{if } x \geq r \\ r & \text{if } x < r \end{cases}$

We need to find when $f(x) = f(f(x))$.

Case 1: $x < r$

Then $f(x) = r$.

Since $r \geq r$, $f(f(x)) = f(r) = 2r - r = r$.

Therefore, $f(x) = f(f(x)) = r$. The equation holds for every $x < r$.

Case 2: $x \geq r$

Then $f(x) = 2x - r$. Since $x \geq r$, we have $2x - r \geq r$, so the first branch applies again.

Thus, $f(f(x)) = 2(2x - r) - r = 4x - 3r$.

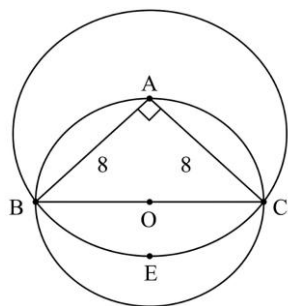
Set $f(x) = f(f(x))$:

$2x - r = 4x - 3r$

$2r = 2x \Rightarrow x = r$. So, in this case, the equation holds only when $x = r$.

Combining both cases, we can say that the equation holds for $x < r$ or $x = r$, which is equivalent to $x \leq r$.

10. Correct Answer: A



Since ABC is an isosceles right angled Δ . So, $BC = \sqrt{8^2 + 8^2} = 8\sqrt{2}$
 So, radius = $4\sqrt{2}$

Area of Semi - circle with diameter BC = $\frac{1}{2} \times \pi(4\sqrt{2})^2 = 16\pi$

Area of the segment BECO = Area of sector - Area of ΔABC

$$= \frac{90}{360} \times \pi(8)^2 - \frac{1}{2} \times 8 \times 8 = 16\pi - 32$$

So, area of the overlapping region = $16\pi + 16\pi - 32 = 32(\pi - 1)$

11. Correct Answer: B

	Glass		Cup	
	Milk	Water	Milk	Water
Original	500	0	0	500
1 st Transfer	350	0	150	500
2 nd Transfer	$350 + \frac{3}{13} \times 150$	$\frac{10}{13} \times 150$	$150 - \frac{3}{13} \times 150$	$500 - \frac{10}{13} \times 150$

$$\text{Required ratio} = \frac{10}{13} \times 150 : 150 - \frac{3}{13} \times 150 = 1 : 1$$

12. Correct Answer: 14

$$\text{We have, } \left(\sqrt{\frac{7}{5}}\right)^{3x-y} = \frac{875}{2401} \Rightarrow \left(\frac{7}{5}\right)^{\frac{3x-y}{2}} = \frac{7 \times 5^3}{7^4} = \left(\frac{5}{7}\right)^3 = \left(\frac{7}{5}\right)^{-3} \dots\dots\dots(1)$$

$$\Rightarrow \frac{3x-y}{2} = -3 \Rightarrow 3x - y = -6$$

$$\text{Also, } \left(\frac{4a}{b}\right)^{6x-y} = \left(\frac{2a}{b}\right)^{y-6x} \Rightarrow (2^2)^{6x-y} \left(\frac{a}{b}\right)^{6x-y} = 2^{y-6x} \left(\frac{a}{b}\right)^{y-6x}$$

$$\text{If we compare alike bases, we get } 6x - y = y - 6x \Rightarrow y = 6x \quad \text{----}(2)$$

Put (2) in (1), $x = 2, y = 12$. So, $x + y = 14$.

13. Correct Answer: 63

Given

	Avg.	No. of students
A	32	x
B	60	x + 10

$$\begin{aligned} \text{Now Average} &= \frac{32x + 60(x + 10)}{x + x + 10} = \frac{92x + 600}{2x + 10} = \frac{46x + 300}{x + 5} \\ &= \frac{46(x + 5) + 70}{x + 5} = 46 + \frac{70}{x + 5} = \text{integer} \end{aligned}$$

So, $x + 5$ is a factor of 70.

$$x + 5 = 70 \text{ (Max), } 7 \text{ (Min)}$$

$$x = 65 \text{ (Max), } 2 \text{ (Min)}$$

$$\text{Required difference} = 65 - 2 = 63.$$

14. Correct Answer: B

$2x^2 + kx + 5 = 0$ has no real roots. So, $D < 0$

$$\Rightarrow k^2 - 40 < 0 \Rightarrow k^2 < 40 \Rightarrow -6 \leq k \leq 6 \quad (\because k \text{ is an integer}) \text{ ---(1)}$$

Also, $x^2 + (k - 5)x + 1 = 0$ has 2 distinct real roots.

$$\text{So, } D > 0 \Rightarrow (k - 5)^2 - 4 \times 1 \times 1 > 0$$

$$\Rightarrow k^2 - 10k + 21 > 0$$

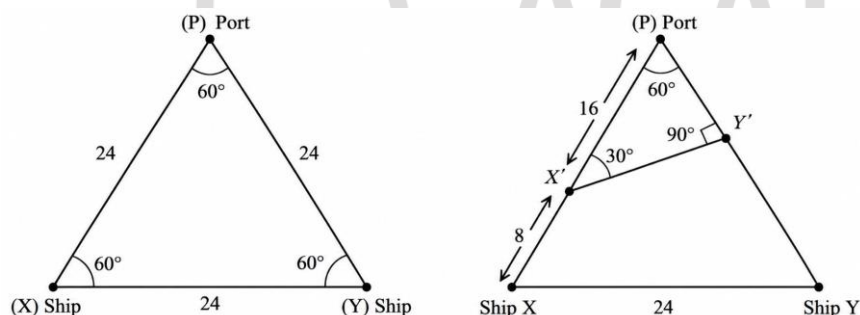
$$\Rightarrow (k - 3)(k - 7) > 0$$

$$\Rightarrow k < 3 \text{ or } k > 7 \text{ ---(2)}$$

So, the common range, $k = 2, 1, 0, -1, -2, -3, -4, -5, -6$ i.e. 9 values.

15. Correct Answer: A

Starting stage of ships



Let ship X is slower than ship Y

When ship X has travelled 8 km, $PX'Y'$ becomes right angled Δ

Of course, $PX' > PY'$

$$\text{So, } \angle PY'X' = 90^\circ$$

$$PY' = 8 \text{ (By } 30^\circ - 60^\circ - 90^\circ \text{ triangle)}$$

i.e., ship Y has covered $24 - 8 = 16$ km

So, ratio of their speeds is 2: 1

When ship Y will reach the port P (i.e. 8 kms); ship X must have covered 4 km

$$\text{So, remaining distance} = 24 - (8 + 4) = 12 \text{ km}$$

16. Correct Answer: 150

By looking at the first line of the question, we can say number of students should be of type $9k + 4$, $10m + 4$, $12l + 4$, $25s + 4$ & $11t$.

So, let us try to find the number which when divided by 9, 10, 12 or 25 is leaving remainder 4.

i.e., number should be of type p ($\text{LCM}(9, 10, 12, 25) + 4 = 900p + 4 = 891p + (9p + 4)$)

i.e., $9p + 4$ should be divisible by 11.

$\Rightarrow p = 2, 13, 24, \dots$ The greatest number of students is 1804.

So, at the most 150 teams can be made.

17. Correct Answer: A

Given speed of slower car = 60 kmph.

It is given that both cars took 1.5 hours to meet if travelling towards each other.

So, Required distance = $60 \times 1.5 = 90$ kms.

18. Correct Answer: A

Let $a < b < c < d < e < f$ be 6 distinct natural numbers.

Given $e + f = 56$, $a + b = 28$

If average of all 6 numbers to be maximised, c & d has to be maximum i.e. 'e' has to be maximum.

So, $e = 27$, $f = 29$. Therefore, we can take $d = 26$, $25 = c$

Reqd. Avg. $\frac{(a+b)+c+d+(e+f)}{6} = \frac{28+26+25+56}{6} = 22.5$

19. Correct Answer: C

Given, $C = 16x/y + 49y/x$

Let $x/y = z \Rightarrow y/x = 1/z$

$C = 16z + 49/z$

$16z^2 - Cz + 49 = 0$

Since, x and y are real numbers

$\Rightarrow \text{Discriminant} \geq 0$

$\Rightarrow C^2 - 4 \times 16 \times 49 \geq 0$

$\Rightarrow C^2 \geq (2 \times 4 \times 7)^2$

$\Rightarrow C \leq -56$ or $C \geq 56$

So, -50 is not possible

20. Correct Answer: 548

Given AP is 38, 55, 72, ...

The common difference of AP = $55 - 38 = 17$

The general term of the given AP = $38 + (n - 1) 17 = 17n + 21$

The first 3-digit number of the AP (at $n = 5$) = 106

Let us find greatest 3-digit term of the given AP

999 when divided by 17 gives remainder 13

So, 986 is the greatest 3-digit number which is divisible by 17, i.e. $986 + 4 = 990$ is the required number. So, the required sum will be the AP $106 + 123 + \dots + 990$

Required average = $(106 + 990)/2 = 548$

21. Correct Answer: D

Since a, b, c, m, n are integers. So, other roots of both equations are $3 - 2\sqrt{2}$ & $4 - 2\sqrt{3}$ respectively.

Eq. having $3 + 2\sqrt{2}$ & $3 - 2\sqrt{2}$ as roots is $x^2 - (3 + 2\sqrt{2} + 3 - 2\sqrt{2})x + (3 + 2\sqrt{2})(3 - 2\sqrt{2}) = 0$

$$\Rightarrow x^2 - 6x + 1 = 0$$

Eq. having $4 - 2\sqrt{3}$ & $4 + 2\sqrt{3}$ as roots is $x^2 - 8x + 4 = 0$

$$a = 1, b = -6, c = 1, m = -8, n = 4$$

$$\text{So, } \frac{b}{m} + \frac{c-2b}{n} = \frac{-6}{-8} + \frac{1-2(-6)}{4} = 4$$

22. Correct Answer: A

$$\text{Interest by bank A} = \frac{8000 \times 5.5}{100}$$

$$\text{Interest by bank B} = \frac{5000 \times 5.6}{100}$$

$$\text{Interest by bank C} = \frac{7000 \times x}{100}$$

$$\text{Given} = \frac{8000 \times 5.5}{100} + \frac{5000 \times 5.6}{100} + \frac{7000 \times x}{100} = \frac{20000 \times 5}{100}$$

$$\Rightarrow 440 + 280 + 70x = 1000 \Rightarrow x = 4$$

$$\text{Required interest} = \frac{20000 \times 4 \times 1}{100} = 800$$

