CAT 2022 SLOT – 2 VARC

DIRECTIONS for questions 1 - 4: The passage below is accompanied by a set of questions. Choose the best answer to each question.

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

It makes sense for these molluscs to have added protection in the form of a higher cognition; they don't have a shell covering them, and pretty much everything feeds on cephalopods, including humans. But how did cephalopods manage to secure their own invisibility cloak? Cephalopods fire from multiple cylinders to achieve this in varying degrees from species to species. There are four main catalysts – chromatophores, iridophores, papillae and leucophores……..

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

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

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

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

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

A. exhibit higher intelligence than other molluscs.
B. have several arms.
C. are consumed by humans and other animals.
D. do not possess an outer protective shell.

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

A. Cephalopods can change their colour.

B. Cephalopods can take on the colour of their predator.
C. Cephalopods can change their texture.
D. Cephalopods can blend into the colour of their surroundings.

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

A. sea snails B. cuttlefish C. polar bears D. squids

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

A. the hydrostatic pressure at the depths at which Cephalopods reside renders radial muscle movements difficult.
B. the temperature of water at the depths at which Cephalopods reside renders the transmission of neural signals difficult.
C. light reflects the colors red, green, and yellow at the depths at which Cephalopods reside.
D. the number of chromatophores in Cephalopods is half the number of iridophores and leucophores.

DIRECTIONS for questions 5 - 8: The passage below is accompanied by a set of questions. Choose the best answer to each question.

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

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

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

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

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

Social justice must be made core to the way engineers are trained. Some universities are working on this ….. Engineers taught this way will be prepared to think critically about what problems we choose to solve, how we do so responsibly and how we build teams that challenge our ways of thinking.
Individual engineering professors are also working to embed societal needs in their pedagogy. Darshan Karwat at the University of Arizona developed activist engineering to challenge engineers to acknowledge their full moral and social responsibility through practical self- reflection. Khalid Kadir at the University of California, Berkeley, created the popular course Engineering, Environment, and Society that teaches engineers how to engage in place-based knowledge, an understanding of the people, context and history, to design better technical approaches in collaboration with communities. When we design and build with equity and justice in mind, we craft better solutions that respond to the complexities of entrenched systemic problems.

5. In this passage, the author is making the claim that:
A. the objective of best solutions in engineering has shifted the focus of pedagogy from humanism and social obligations to technological perfection.
B. Engineering students today are trained to be non-subjective in their reasoning as this best enables them to develop much-needed universal solutions.
C. technical-social dualism has emerged as a technique for engineering students to incorporate social considerations into their technical problem-solving processes.
D. Engineering students today are taught to focus on objective technical outcomes, independent of the social dimensions of their work.

6. The author gives all of the following reasons for why marginalised people are systematically discriminated against in technology-related interventions EXCEPT
A. “But those technical ideals are at their core social and political choices determined by a dominant culture focused on economic growth for the most privileged segments of society.”
B. “Beyond physical failings, subjective beliefs treated as facts by those in decision- making roles can encode social inequities.”
C. “And we hardly question whether devices are built sustainably, which has led to a crisis of medical waste and health care accounting for 10 percent of U.S. greenhouse gas emissions.”
D. “These racially based adjustments are derived from research done by eugenicists who thought these racial differences were biologically determined and who considered non-white people as inferior.”

7. All of the following are examples of the negative outcomes of focusing on technical ideals in the medical sphere EXCEPT the:
A. neglect of research and development of medical technologies for the diagnosis and treatment of diseases that typically afflict marginalised communities.
B. exclusion of non-privileged groups in clinical trials which leads to incorrect drug dosages.
C. incorrect assignment of people as female at birth which has resulted in faulty drug interventions.
D. continuing calibration of medical devices based on past racial biases that have remained unadjusted for changes.

8. We can infer that the author would approve of a more evolved engineering pedagogy that includes all of the following EXCEPT:
A. making considerations of environmental sustainability intrinsic to the development of technological solutions.

B. moving towards technical-social dualism where social community needs are incorporated in problem-definition and solutions.
C. design that is based on the needs of communities using local knowledge and responding to local priorities.
D. a more responsible approach to technical design and problem-solving than a focus on speed in developing and bringing to scale.

DIRECTIONS for the questions 9 - 12: The passage below is accompanied by a set of questions. Choose the best answer to each question.

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

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

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

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

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

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

A. Humans; Musicking; Linguistic capacities; Symbol-making; Modern humanity.
B. Musicking; Cognitive psychology; Antique; Symbol-makers; Modernity.
C. Humans; Psychological vantage; Musicking; Cassirer; Emergence of music.
D. Humans; Capacities; Language; Symbols; Modernity

10. Based on the passage, which one of the following statements is a valid argument about the emergence of music/musicking?
A. 20,000 years ago, human musical capacities were not very different from what they are today.
B. Anyone who can perceive and experience music must be considered capable of musicking.
C. All musical work is located in the overlap between linguistic capacity and music production.
D. Although musicking is not language-like, it shares the quality of being a form of expression.

11. Which one of the following statements, if true, would weaken the author's claim that humans are musicking creatures?
A. Musical capacities are primarily socio-cultural, which explains the wide diversity of musical forms.
B. As musicking is neither language-like nor symbol-like, it is a much older form of expression.
C. Non musical capacities are of far greater consequence to human survival than the capacity for music.
D. From a cognitive and psychological vantage, musicking arises from unconscious dispositions, not conscious ones.

12. "Think beyond all the qualifications that might trail after this bald statement" In the context of the passage, what is the author trying to communicate in this quoted extract?
A. A bald statement is one that is trailed by a series of qualifying clarifications and caveats.
B. Although there may be many caveats and other considerations, the statement is essentially true.
C. Thinking beyond qualifications allows us to give free reign to musical expressions.
D. A bald statement is one that requires no qualifications to infer its meaning.

DIRECTIONS for the questions 13 - 16: The passage below is accompanied by a set of questions. Choose the best answer to each question.

We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterisations overlap but are not congruent. Academic disciplines are social institutions…….. My view is that institutions are all those social entities that organise action: they link acting individuals into social structures. There are various kinds of institutions. Hegelians and Marxists emphasise universal institutions such as the family, rituals, governance, economy and the military. These are mostly institutions that just grew. Perhaps in some imaginary beginning of time they spontaneously appeared. In their present incarnations, however, they are very much the product of conscious attempts to mould and plan them. We have family law, established and disestablished churches, constitutions and laws, including those governing the economy and the military. Institutions deriving from statute, like joint-stock companies are formal by contrast with informal ones such as friendships. There are some institutions that come in both informal and formal variants, as well as in mixed ones. Consider the fact that the stock exchange and the black market are both market institutions, one formal one not. Consider further that there are many features of the work of the stock exchange that rely on informal, noncodifiable agreements, not least the language used for communication. To be precise, mixtures are the norm…….. From constitutions

at the top to by-laws near the bottom we are always adding to, or tinkering with, earlier institutions, the grown and the designed are intertwined.

It is usual in social thought to treat culture and tradition as different from, although alongside, institutions. The view taken here is different. Culture and tradition are sub-sets of institutions analytically isolated for explanatory or expository purposes. Some social scientists have taken all institutions, even purely local ones, to be entities that satisfy basic human needs – under local conditions……..Others differed and declared any structure of reciprocal roles and norms an institution. Most of these differences are differences of emphasis rather than disagreements. Let us straddle all these versions and present institutions very generally……..as structures that serve to coordinate the actions of individuals.……..Institutions themselves then have no aims or purpose other than those given to them by actors or used by actors to explain them……..

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

13. In the first paragraph of the passage, what are the two "characterisations" that are seen as overlapping but not congruent?

A. "individuals" and "social structures".

B. "academic disciplines" and "institutions".

C. "an arena of thought" and "academic disciplines".

D. "the philosophy of the social sciences" and "a set of social institutions".

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

A. the institution of friendship cannot be found in the institution of joint-stock companies because the first is an informal institution, while the second is a formal one.

B. "natural language" refers to that stage of language development where no conscious human intent is evident in the formation of language.

C. institutions like the family, rituals, governance, economy, and the military are natural and cannot be consciously modified.

D. as concepts, "culture" and "tradition" have no analytical, explanatory or expository power, especially when they are treated in isolation.

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

A. The stock exchange and the black market are examples of how, even within the same domain, different kinds of institutions can co-exist.

B. The stock exchange and the black market are both dependent on the market to survive.

C. The stock exchange and the black market are both organised to function by rules.

D. Market instruments can be formally traded in the stock exchange and informally traded in the black market.

16. Which of the following statements best represents the essence of the passage?
A. Language is the fundamental formal institution for social life and for science.
B. It is usual in social thought to treat culture and tradition as different from institutions.
C. The stock exchange and the black market are both market institutions.
D. Institutions are structures that serve to coordinate the actions of individuals.

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

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

1. The trajectory of cheerfulness through the self is linked to the history of the word ‘cheer’ which comes from an Old French meaning ‘face’.
2. Translations of the Bible into vernacular languages, expanded the noun ‘cheer’ into the more abstract ‘cheerful-ness’, something that circulates as an emotional and social quality defining the self and a moral community.
3. When you take on a cheerful expression, no matter what the state of your soul, your cheerfulness moves into the self: the interior of the self is changed by the power of cheer.
4. People in the medieval ‘Canterbury Tales’ have a ‘piteous’ or a ‘sober’ cheer; ‘cheer’ is an expression and a body part, lying at the intersection of emotions and physiognomy.

19. DIRECTIONS for the question: The four sentences (labelled 1,2,3 and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentence and key in this sequence of four numbers as your answer.
1. Women may prioritize cooking because they feel they alone are responsible for mediating a toxic and unhealthy food system.
2. Food is commonly framed through the lens of individual choice: you can choose to eat healthily.
3. This is particularly so in a neoliberal context where the state has transferred the responsibility for food onto individual consumers.
4. The individualized framing of choice appeals to a popular desire to experience agency, but draws away from the structural obstacles that stratify individual food choices.

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

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

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

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

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

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

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

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

22. 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.

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

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

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

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

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

23. 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.

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

A. The role of technology in influencing public behaviour is reminiscent of the manner in which behaviour was manipulated during the Cold War.

B. With big data making personal information freely available, the debate on the nature of freedom and the need for privacy has resurfaced.

C. The notion of freedom and privacy is at stake in a world where artificial intelligence is capable of influencing behaviour through data gathered online.

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

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.

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

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

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

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

D. The role of museums has evolved to ensure that the artworks are preserved forever in addition to guarding and displaying them.

QUANTIFIERS
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CAT 2022 SLOT – 2 DILR

DIRECTIONS for the questions 1 - 5: Study the following information carefully and answer the given questions.

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

The following facts are also known:

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

1. How many foreign products were FDA approved cosmetic products?

2. How many cosmetic products did not have FDA approval?

A. Cannot be determined B. 10 C. 60 D. 50

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

A. At least 10 and at most 60
B. At least 10 and at most 80
C. At least 20 and at most 50
D. At least 20 and at most 70

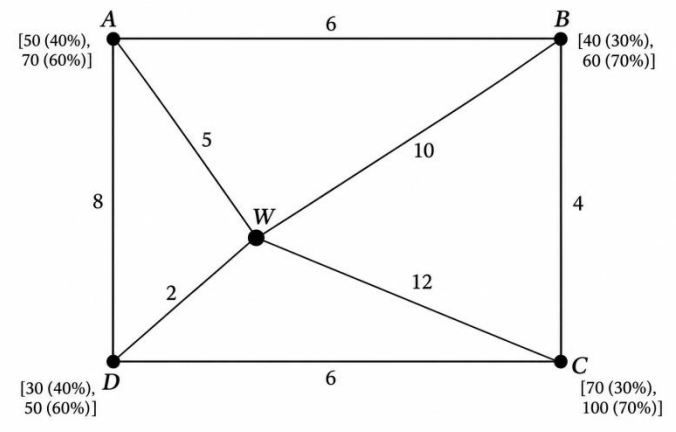
4. If 70 cosmetic products did not have EU approval, then how many nutrition products had both the approvals?

A. 10 B. 50 C. 20 D. 30

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

DIRECTIONS for the question 6 - 10: Study the following information carefully and answer the given questions.

Every day a widget supplier supplies widgets from the warehouse (W) to four locations – Ahmednagar (A), Bikrampore (B), Chitrachak (C), and Deccan Park (D). The daily demand for widgets in each location is uncertain and independent of each other. Demands and corresponding probability values (in parenthesis) are given against each location (A, B, C, and D) in the figure below. For example, there is a 40% chance that the demand in Ahmednagar will be 50 units and a 60% chance that the demand will be 70 units. The lines in the figure connecting the locations and warehouse represent two-way roads connecting those places with the distances (in km) shown beside the line. The distances in both the directions along a road are equal. For example, the road from Ahmednagar to Bikrampore and the road from Bikrampore to Ahmednagar are both 6 km long.



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

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

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

8. What is the chance that the total number of widgets delivered in a day is 260 units and the route ends at Bikrampore?

A. 10.80% B. 17.64% C. 33.33% D. 7.56%

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

A. 3.24% B. 30% C. 18% D. 5.4%

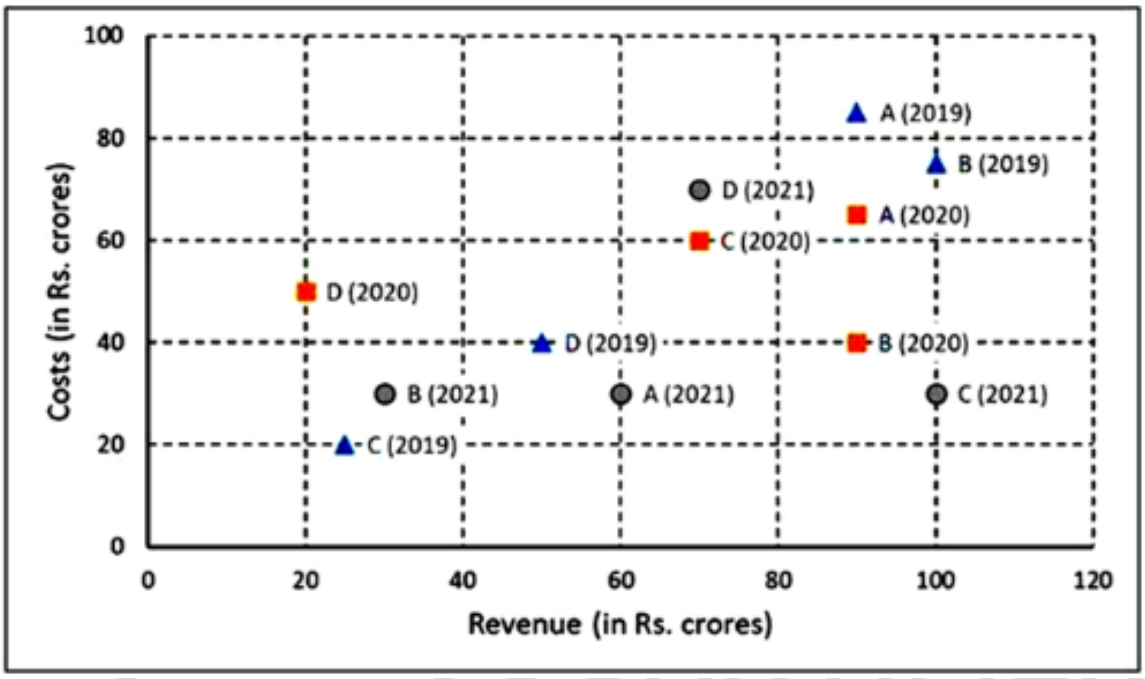
10. If Ahmednagar is not the first location to be visited in a route and the total route distance is 29 km, then which of the following is a possible number of widgets delivered on that day?

A. 220 B. 210 C. 200 D. 250

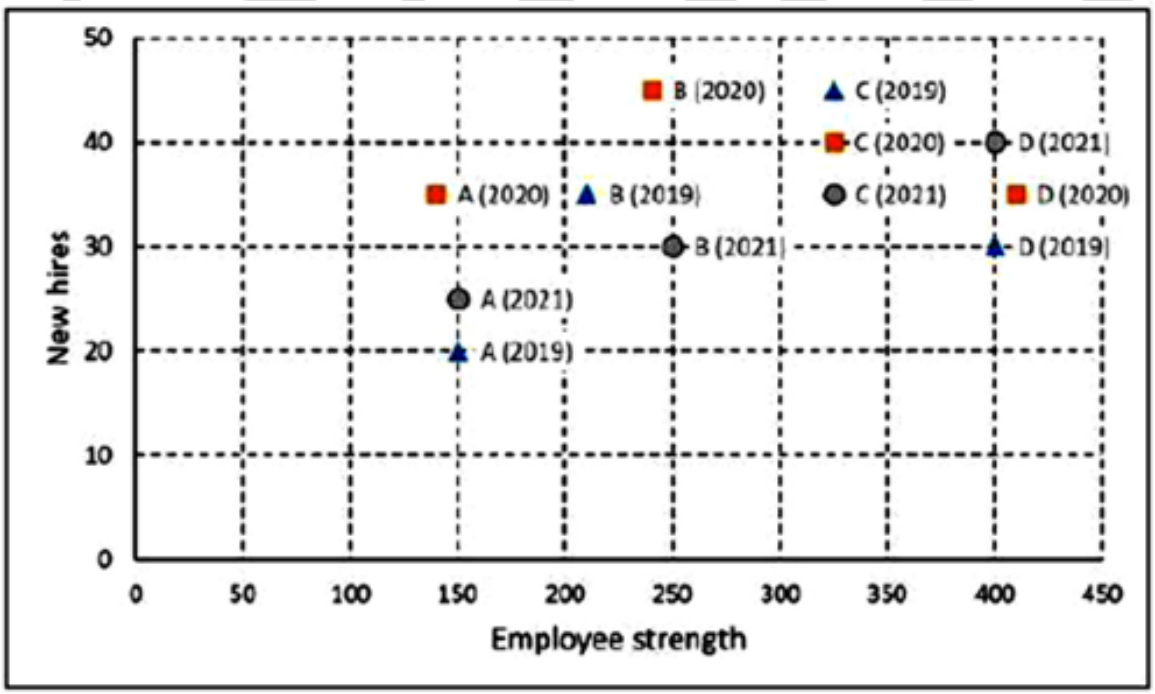
DIRECTIONS for the question 11 - 15: Analyse the graph/s given below and answer the questions that follow.

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

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



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



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

A. Company B B. Company C C. Company A D. Company D

12. Which of the four companies experienced the highest annual loss in any of the years?
A. Company A B. Company C C. Company D D. Company B

13. The ratio of a company's annual profit to its annual costs is a measure of its performance. Which of the four companies had the lowest value of this ratio in 2019?
A. Company A B. Company B C. Company D D. Company C

14. The total number of employees lost in 2019 and 2020 was the least for:
A. Company C B. Company B C. Company A D. Company D

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

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

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

1. Over the two days, all three of them met the same total number of households, and each of them sold a total of 100 items.
2. On both days, Lahur met the same number of households and sold the same number of items.
3. Hokli could not sell any item on the second day because the first household he met on that day complained against him.
4. Tohri met 30 more households on the second day than on the first day.
5. Tohri's success rate was twice that of Lahur's on the first day, and it was 75% of Lahur's on the second day.

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

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

18. How many households did Lahur meet on the second day?
A. 20 or less
B. Between 21 and 29
C. More than 35

D. Between 30 and 35

19. How many households did Tohri meet on the first day?
A. Between 21 and 40
B. 10 or less
C. More than 40
D. Between 11 and 20

20. Which of the following statements is FALSE?
A. Among the three, Tohri had the highest success rate on the second day.
B. Tohri had a higher success rate on the first day compared to the second day.
C. Among the three, Tohri had the highest success rate on the first day.
D. Among the three, Lahur had the lowest success rate on the first day.

QUANTIFIERS CAT ACADEMY

CAT 2022 SLOT – 2 Quant

1. Let f(x) be quadratic polynomial in x such that f (x) ≥ 0 for all real numbers x. if f(2) = 0 and f(4) = 6, then f(-2) is equal to

A. 12 B. 36 C. 24 D. 6

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

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

A. 4350 B. 4200 C. 4300 D. 4400

4. Working alone, the times taken by Anu, Tanu and Manu to complete any job are in the ratio 5: 8: 10. They accept a job which they can finish in 4 days if they all work together for 8 hours per day. However, Anu and Tanu work together for the first 6 days, working 6 hours 40 minutes per day. Then, the number of hours that Manu will take to complete the remaining job working alone is

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

A. 21 B. 20 C. 24 D. 22

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

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

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

A. 6: 5 B. 5: 4 C. 5: 6 D. 4: 5

9. Two ships meet mid-ocean, and then, one ship goes south and the other ship goes west, both travelling at constant speeds. Two hours later, they are 60 km apart. If the speed of one of the ships is 6 km per hour more than the other one, then the speed, in km per hour, of the slower ship is

A. 24 B. 18 C. 12 D. 20

10. The length of each side of an equilateral triangle ABC is 3cm. Let D be a point on BC such that the area of triangle ADC is half the area of triangle ABD. Then the length of AD, in cm, is

A. $\sqrt{7}$ B. $\sqrt{5}$ C. $\sqrt{8}$ D. $\sqrt{6}$

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

A. 1200 B. 1420 C. 1440 D. 1480

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

A. 4 B. $-\frac{9}{2}$ C. $\frac{9}{2}$ D. – 4

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

A. 19 B. 16 C. 17 D. 18

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

A. 40192 B. 62800 C. 50240 D. 60288

15. In triangle ABC, altitudes AD and BE are drawn to the corresponding bases. If ∠BAC = 45° and ∠ABC = θ, then $\frac{AD}{BE}$ equals

A. $\sqrt{2}\cos\theta$ B. 1 C. $\frac{(\sin\theta + \cos\theta)}{\sqrt{2}}$ D. $\sqrt{2}\sin\theta$

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

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

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

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

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

A. 415 B. 442 C. 455 D. 404

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

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

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

A. 3 B. 4.5 C. 3.5 D. 4

QUANTIFIERS CAT ACADEMY

Solutions - VARC

1. Correct Answer: C

This is an EXCEPT question. We need to identify the option that is not presented as a reason for octopuses being "misfits" within their broader biological family. In other words, three options highlight characteristics that make octopuses unusual compared to other molluscs, while one option does not.

The passage begins by describing octopuses as misfits among molluscs. Most molluscs are shelled invertebrates with a dorsal foot, whereas cephalopods such as octopuses are very different in appearance and structure. The author further explains that cephalopods have evolved advanced cognitive abilities partly because they lack the protection that shells provide.

Option C is correct because being consumed by humans and other animals is not a characteristic that makes octopuses unusual among cephalopods. The passage states that "pretty much everything feeds on cephalopods, including humans." This is a condition shared by cephalopods in general and therefore does not distinguish octopuses as misfits.

Option A is incorrect because the passage highlights the relatively large brains and higher cognition of cephalopods. Compared to most molluscs, this greater intelligence contributes to their unusual nature and supports the idea that they are misfits within the larger mollusc family.

Option B is incorrect because cephalopods are described as being "all arms," which clearly sets them apart from the typical body structure of other molluscs. Thus, this feature contributes to their status as misfits.

Option D is incorrect because the passage explicitly contrasts cephalopods with most molluscs by noting that they do not possess protective outer shells. Their lack of a shell is one of the reasons they evolved sophisticated camouflage and higher cognition, making them quite different from their relatives.

Hence, Option C is the only option that does not explain why octopuses are considered misfits, since being preyed upon by humans and other animals is a common feature of cephalopods rather than a distinguishing one.

2. Correct Answer: B

This is a factual RC question that asks us to identify the statement that is not supported by the passage. The passage explains in detail the various mechanisms that cephalopods use to camouflage themselves, including changing color, altering texture, and blending into their surroundings.
Option B is correct because the passage never states that cephalopods can take on the color of their predators. Their camouflage system is described as a way of matching their environment, not imitating the appearance of animals that hunt them. Since this idea is not mentioned anywhere in the passage, the statement cannot be considered true.
Option A is incorrect because the passage clearly explains how chromatophores and iridophores allow cephalopods to change color. Chromatophores expose different pigments, while iridophores reflect light at different wavelengths, enabling a wide range of color changes.
Option C is incorrect because the passage explicitly discusses papillae, which allow cephalopods to alter the texture of their skin. By creating bumps, ridges, and other surface features, they can mimic objects such as rocks and coral reefs.
Option D is incorrect because blending into the surroundings is one of the main purposes of the camouflage mechanisms described. The passage explains how leucophores reflect the filtered light present in the environment, allowing octopuses and cuttlefish to match the color of the surrounding water. Similarly, papillae help them match the texture of nearby surfaces.
Hence, Option B is the only statement that is not true according to the passage, since cephalopods are described as adapting to their surroundings rather than taking on the color of their predators.

3. Correct Answer: A

This is an inference-based question. To answer it, we need to identify the organism whose camouflage techniques would be most unlike those of an octopus based on the information provided in the passage.
The passage explains that octopuses are cephalopods that lack a protective shell and therefore rely heavily on sophisticated camouflage mechanisms. They can change color through chromatophores and iridophores, alter texture through papillae, and blend into their surroundings using leucophores. These adaptations help them avoid predators despite being soft-bodied animals.
Option A is correct because sea snails are described as typical molluscs that possess protective shells. Unlike octopuses, they do not need to rely primarily on advanced camouflage systems involving color and texture changes. Since the passage contrasts cephalopods with most other molluscs, including shelled organisms such as sea snails, their defensive strategies would be the most dissimilar.
Option B is incorrect because cuttlefish are cephalopods and are repeatedly mentioned in the passage as possessing the same camouflage mechanisms as octopuses. In fact, leucophores, texture-changing abilities, and color adaptation are specifically discussed in relation to both cuttlefish and octopuses.
Option C is incorrect because polar bears are mentioned in the passage while explaining leucophores. Just as polar bear fur appears white by scattering light, leucophores help cephalopods achieve similar visual effects. Although the mechanisms are not identical, there is at least a partial similarity in appearance-related adaptation.
Option D is incorrect because squids, like octopuses and cuttlefish, belong to the cephalopod family. The passage specifically notes that squids can use papillae and other camouflage-related adaptations. Therefore, their techniques are quite similar rather than dissimilar.
Hence, Option A is the best answer because sea snails, as shelled molluscs, are the most different from octopuses in terms of their need for and use of camouflage techniques.

4. Correct Answer: D

This is an EXCEPT question. We need to identify the option that would not weaken the camouflaging ability of cephalopods. In other words, three options describe situations that would interfere with the mechanisms responsible for camouflage, while one option does not significantly undermine those mechanisms.

The passage explains that cephalopod camouflage depends on several interconnected systems. Chromatophores change colour through radial muscle movements controlled by neural signals from the brain. Iridophores help reflect light at different wavelengths, papillae alter skin texture, and leucophores assist in matching the colour of the surrounding environment. Any factor that disrupts these mechanisms would reduce camouflage effectiveness.

Option D is correct because it does not necessarily weaken camouflage. The statement merely says that the number of chromatophores is half the number of iridophores and leucophores. The passage never suggests that camouflage depends on these cells existing in equal numbers. As long as chromatophores, iridophores, and leucophores are all present and functional, camouflage can still occur effectively. Therefore, this statement does not directly undermine camouflaging ability.

Option A is incorrect because chromatophores rely on radial muscles to expand pigment sacs and display colours. If hydrostatic pressure makes radial muscle movements difficult, the cephalopod's ability to change colour would be impaired, weakening its camouflage.

Option B is incorrect because the passage states that colour change occurs when the brain sends electrical impulses through nerves to the muscles controlling chromatophores. If water temperature makes neural signal transmission difficult, this process would be disrupted, reducing camouflage effectiveness.

Option C is incorrect because the passage specifically explains that red, yellow, and brown are the colours reflected at the depths where cephalopods live. If light instead reflected red, green, and yellow, the colour-matching system described in the passage would become less effective because one of the key colours available through chromatophores would no longer correspond properly to the surrounding environment.

Hence, Option D is the only statement that would not weaken the camouflaging adeptness of cephalopods and is therefore the correct answer.

5. Correct Answer: D

This question tests your understanding of the author's central argument. Throughout the passage, the author criticizes the way engineering is currently taught, arguing that students are trained to focus primarily on technical efficiency while ignoring the broader social consequences of their work. Option D is correct because it accurately captures the author's main claim. In the opening paragraph, the author explains that engineering students are trained to seek a single "best" solution based on technical criteria such as cost, speed, and scalability. This approach promotes what the author calls "technical-social dualism"—the belief that technical and social dimensions can be separated. As a result, students are encouraged to focus on objective technical outcomes while overlooking the social implications of engineering decisions.

Option A is incorrect because the passage does not argue that engineering education has shifted from a previous focus on humanism to technological perfection. The author criticizes the current system but does not discuss any historical shift in pedagogical priorities.

Option B is incorrect because, although the passage acknowledges that students are trained to view their reasoning as objective and non-subjective, the author does not endorse this approach. In fact, the author argues that this mindset is problematic because it ignores important social considerations.

Option C is incorrect because it completely misrepresents the concept of technical-social dualism. The passage defines technical-social dualism as the belief that technical and social aspects of engineering can be separated. The author views this as a flaw in engineering education, not as a technique for incorporating social concerns into problem-solving.

The examples of drug dosing, spirometers, neglected diseases, and environmental consequences all reinforce the author's broader argument that engineering decisions are never purely technical. Ignoring social dimensions can lead to inequitable, ineffective, and even harmful outcomes. Hence, Option D best reflects the author's central claim that engineering students are taught to prioritize objective technical outcomes while neglecting the social dimensions of their work.

6. Correct Answer: C

This is an EXCEPT question. We need to identify the option that is not presented by the author as a reason for the systematic discrimination of marginalized groups in technology-related interventions. In other words, three options directly relate to social inequities faced by marginalized communities, while one does not.

Option C is correct because it discusses the environmental consequences of technology, specifically the lack of attention to sustainability, which has contributed to medical waste and greenhouse gas emissions. While this is certainly a criticism made by the author, it is not presented as an example of discrimination against marginalized groups. The issue here is environmental sustainability, not social exclusion or inequity.

Option A is incorrect because it directly supports the author's argument that engineering decisions are shaped by social and political choices made by dominant groups. The author argues that technical ideals often reflect the interests of privileged sections of society, which can result in the neglect of marginalized populations.

Option B is incorrect because the author explicitly states that subjective beliefs treated as objective facts can encode social inequities into technologies. The example of spirometers demonstrates how assumptions made by decision-makers can disadvantage particular racial groups.

Option D is incorrect because it provides a concrete example of discrimination embedded in technology. The passage explains that racial adjustments in spirometers originated from research conducted by eugenicists who believed non-white people were biologically inferior. This directly illustrates how marginalized groups can be disadvantaged by biased scientific assumptions.

The author's central concern is that technologies often reflect the values, assumptions, and priorities of powerful groups, leading to unequal outcomes for marginalized communities. Options A, B, and D all support this argument, whereas Option C focuses on environmental harm rather than social discrimination.

Hence, Option C is the only option that is not presented as a reason for the systematic discrimination of marginalized people in technology-related interventions.

7. Correct Answer: C

This is an EXCEPT question. We need to identify the option that is not presented in the passage as a negative consequence of prioritizing technical ideals while ignoring social dimensions in medical technology and healthcare.

Option C is correct because the passage does not discuss the incorrect assignment of people as female at birth. The author states that many FDA-approved drugs are incorrectly dosed for people assigned female at birth because they have been inadequately represented in clinical trials. The problem is not incorrect gender assignment; rather, it is the underrepresentation of these individuals in medical research, which leads to faulty dosage recommendations. Therefore, Option C misrepresents the issue discussed in the passage.

Option A is incorrect because the passage explicitly mentions that many technologies for systemically marginalized groups have not been developed because they were not considered important. The example of inadequate attention to diseases such as endometriosis directly supports this point.

Option B is incorrect because the passage clearly states that people assigned female at birth have been inadequately represented in clinical trials, resulting in incorrect drug dosages and unexpected adverse reactions. This is one of the author's major examples of the consequences of ignoring social considerations.

Option D is incorrect because the passage discusses spirometers that continue to use racially based correction factors derived from outdated and biased research conducted by eugenicists. This illustrates how historical prejudices can remain embedded in medical technologies and produce inequitable outcomes.

The author's argument is that an excessive focus on supposedly objective technical criteria can conceal social biases and lead to harmful consequences in healthcare. Options A, B, and D are all examples used to support this argument, whereas Option C introduces an idea that is not present in the passage.

Hence, Option C is the exception and the correct answer.

8. Correct Answer: B

This is an inference-based EXCEPT question. We need to identify the option that the author would not approve of as part of a more evolved engineering pedagogy. In other words, three options are consistent with the author's recommendations, while one contradicts them.

Option B is correct because it is based on a misunderstanding of the concept of technical-social dualism. The author explicitly criticizes technical-social dualism, defining it as the belief that technical and social aspects of engineering problems can be separated and treated independently. According to the author, this separation is one of the major flaws in current engineering education. Therefore, the author would not support a move towards technical-social dualism. Instead, the author advocates integrating social and technical considerations throughout the problem-definition and solution process.

Option A is incorrect because the author repeatedly emphasizes the importance of considering broader social consequences when designing technologies. The passage specifically criticizes the neglect of sustainability and points to the crisis of medical waste and greenhouse gas emissions. Therefore, incorporating environmental sustainability into technological development would clearly align with the author's views.

Option C is incorrect because the author praises approaches such as Khalid Kadir's concept of place-based knowledge, which encourages engineers to understand local people, contexts, and histories while designing solutions in collaboration with communities. This option directly reflects that idea.

Option D is incorrect because the author criticizes the current emphasis on technical ideals such as speed, low cost, and scalability. The passage argues for a more responsible and socially aware approach to engineering design. Therefore, the author would certainly support moving beyond a narrow focus on speed and scale.

The central message of the passage is that engineering education should integrate social justice, community needs, sustainability, and ethical responsibility into technical problem-solving. Since technical-social dualism represents the very mindset the author opposes, Option B is the only choice that the author would not endorse.

Hence, Option B is the correct answer.

9. Correct Answer: A

This question tests your ability to identify the central themes and recurring ideas of the passage. The best set of keywords should collectively capture the major concepts discussed throughout the passage rather than focusing on isolated details or examples.

Option A is correct because it includes all the key ideas around which the passage is structured. The discussion begins with humans as inherently musical beings and introduces the concept of "musicking" as a fundamental human activity. The author then explores the relationship between musicking and linguistic capacities, discusses humans as symbol-makers, and ultimately argues that musicking is a defining characteristic of modern humanity. These themes appear repeatedly and form the backbone of the passage.

Option B is incorrect because terms such as "cognitive psychology" and "antique" are relatively minor details. While they appear in the passage, they are not central themes. Moreover, the option omits important concepts such as humans and linguistic capacities.

Option C is incorrect because "psychological vantage" and "Cassirer" are merely supporting references rather than core ideas. Cassirer is mentioned only briefly, and the phrase "psychological vantage" is used to explain a perspective rather than to develop a major argument.

Option D is incorrect because although it contains broad concepts such as humans, capacities, language, symbols, and modernity, it omits the most important keyword of the entire passage—"musicking." Since the author's primary purpose is to establish musicking as a defining human trait, any set of keywords that excludes this term cannot adequately represent the passage.

The passage consistently revolves around the idea that musicking is a universal human capacity closely connected to language, symbolism, and the development of modern humanity. Option A is the only choice that successfully brings together all these major themes.

Hence, Option A best serves as the set of keywords for the passage.

10. Correct Answer: A

This question specifically asks for a valid argument about the emergence of music or musicking. Therefore, the correct option must relate to the passage's discussion of how musical capacities developed over time in human history.

Option A is correct because it directly reflects the author's argument in the fourth paragraph. The passage states that if we look back 20,000 years, we reach humans whose musical capacities were "probably little different from our own." This observation is used by the author to support the broader claim that musicking emerged gradually over a very long period rather than appearing suddenly. Since this option relates directly to the historical emergence of music, it is the best answer.

Option B is incorrect because it refers to the author's broad definition of musicking rather than its emergence. The passage argues that anyone who can perceive and experience music participates in musicking, but this idea concerns the nature of musicking, not its historical development.

Option C is incorrect because the passage never claims that all musical activity exists within the overlap between linguistic capacity and music production. In fact, the author explicitly notes that while linguistic capacities are important, only some musical capacities overlap with non-musical ones, and certain capacities may be unique to music.

Option D is incorrect because it focuses on the relationship between musicking, language, and symbolic expression. While the passage discusses these concepts, this option does not address the question of how music emerged over time.

The fourth paragraph is crucial here. The author argues that there is no clear point in history where music suddenly appeared. Instead, musical capacities evolved gradually across tens of thousands of years. Option A is the only choice that directly supports this gradualist account of the emergence of musicking.

Hence, Option A is the correct answer.

QUANTIFIERS CAT ACADEMY

11. Correct Answer: A

This is a strengthening–weakening question. To identify the correct answer, we must first understand the author's main claim. The author repeatedly argues that musicking is a universal human trait and a fundamental marker of modern humanity. According to the passage, humans are naturally "musicking creatures," and the capacities involved in musicking arise from innate human dispositions shared across societies.

Option A is correct because it directly challenges this central claim. If musical capacities are primarily socio-cultural rather than innate and universal, then musicking would not be a fundamental characteristic of all humans. Instead, it would depend largely on cultural upbringing and social context. This weakens the author's argument that musicking is a shared human capacity rooted in our cognitive and psychological makeup.

Option B is incorrect because it actually supports the author's position. The passage suggests that musicking has very ancient origins and may predate many other forms of human expression. If musicking is indeed older than language-like or symbol-like expression, that would reinforce its status as a fundamental human trait.

Option C is incorrect because the author never claims that musicking is the most important capacity for human survival. The argument is that musicking is a universal and defining human characteristic. Even if nonmusical capacities are more crucial for survival, that does not weaken the claim that humans are naturally musicking creatures.

Option D is incorrect because the passage already states that musical capacities arise from innate dispositions. Whether these dispositions are conscious or unconscious does not undermine the author's argument. In fact, describing musicking as emerging from unconscious dispositions is broadly consistent with the idea that it is a deeply rooted human capacity.

The author's case rests on the universality and innate nature of musicking. Option A is the only statement that challenges this foundation by suggesting that musical capacities are primarily products of culture rather than shared human nature.

Hence, Option A is the correct answer.

12. Correct Answer: B

This question tests your understanding of the author's intent behind the phrase "Think beyond all the qualifications that might trail after this bald statement." To answer it correctly, we must examine the context in which the statement appears.

The "bald statement" referred to by the author is: "Humans today make music." Immediately after making this claim, the author acknowledges several possible qualifications or objections—for example, that only some people receive musical training, that many societies distinguish musicians from non-musicians, or that most people today listen to music rather than actively create it. However, the author argues that these qualifications do not undermine the larger truth that musicking is a universal human capacity.

Option B is correct because it captures exactly what the author is trying to convey. The author is saying that although there may be numerous caveats, exceptions, and qualifications, the fundamental statement remains true. At a cognitive and psychological level, humans are naturally musicking creatures.

Option A is incorrect because it misunderstands the meaning of "bald statement." A bald statement is a direct, unqualified assertion. It is not defined by the fact that it is followed by qualifications. The qualifications are added later by the author to address possible objections.

Option C is incorrect because the phrase has nothing to do with giving "free rein" to musical expression. The discussion concerns the universality of musicking, not artistic freedom or creativity.

Option D is incorrect because the author explicitly acknowledges that many qualifications can be attached to the statement. Therefore, the statement is not being presented as one that requires no qualifications whatsoever. Instead, the author is asking readers to look beyond those qualifications and focus on the broader truth.

The key idea is that despite various exceptions and nuances, the author's central claim—that humans are inherently musicking creatures—remains valid. Therefore, the author is asking readers to see past the qualifications and recognize the essential truth of the statement.

Hence, Option B is the correct answer

13. Correct Answer: B

This question tests your understanding of the opening argument of the passage. The author begins by distinguishing between two related ideas and then explains why they overlap but are not exactly the same.

The first sentence states: “We begin with the emergence of the philosophy of the social sciences as an arena of thought and as a set of social institutions. The two characterizations overlap but are not congruent.” The phrase “the two characterizations” refers to the philosophy of social sciences being viewed in two ways: as an intellectual field of study (an arena of thought) and as an institutional reality (a set of social institutions).

Option B is correct because the author immediately follows this statement by explaining that academic disciplines are social institutions. In other words, the philosophy of social sciences exists both as a body of ideas and as institutional structures such as departments, research communities, journals, and universities. These institutional forms overlap with the intellectual field but are not identical to it.

Option A is incorrect because “individuals” and “social structures” are discussed later as components of institutions. They are not the two characterizations referred to in the opening lines.

Option C is incorrect because “an arena of thought” and “academic disciplines” are not being contrasted. In fact, an academic discipline is one way in which an arena of thought becomes institutionalized. The passage does not present them as the two characterizations in question.

Option D is incorrect because it merely repeats the exact wording of the first sentence without identifying what the two characterizations actually correspond to. The author goes on to explain that the overlap is between intellectual fields and their institutional manifestations, which is more accurately captured by Option B.

The key idea is that a philosophy or field of knowledge can exist both as a collection of ideas and as an institution. These two aspects are closely related but not identical, which is why the author says they overlap but are not congruent.

Hence, Option B is the correct answer.

14. Correct Answer: B

This is an EXCEPT question, which means three options are false inferences from the passage, while one is a valid inference. Our task is to identify the only statement that can reasonably be inferred from the author's arguments.

Option B is correct because it is directly supported by the discussion of language in the final paragraph. The author describes natural languages as examples of what Ferguson called "the result of human action, but not the execution of any human design." This means that natural languages evolved through human use and interaction rather than through conscious planning or deliberate design. Therefore, it is reasonable to infer that no conscious human intent guided the initial formation of natural language.

Option A is incorrect because the passage does not suggest that formal and informal institutions are completely separate from one another. In fact, the author explicitly argues that mixtures are the norm. The example of the stock exchange shows that even formal institutions rely on informal practices and agreements. Therefore, we cannot conclude that friendship and joint-stock companies exist in entirely isolated institutional spheres.

Option C is incorrect because it directly contradicts the passage. While institutions such as family, rituals, governance, the economy, and the military may have originated naturally, the author clearly states that their present forms are heavily shaped by conscious human planning and intervention through laws, constitutions, and regulations.

Option D is incorrect because the author does not dismiss culture and tradition as analytically useless. On the contrary, the passage states that culture and tradition are analytically isolated for explanatory and expository purposes. This means they do possess explanatory value even though the author ultimately treats them as subsets of institutions.

The key idea is that natural language emerged through human action without being consciously designed, making Option B the only valid inference among the four choices.

Hence, Option B is the correct answer.

15. Correct Answer: A

This question tests whether you understand why the author uses the example of the stock exchange and the black market while discussing institutions.

The author's broader argument is that institutions can be formal, informal, or a mixture of both. To illustrate this point, he cites the stock exchange and the black market. Both belong to the same broad category of market institutions, yet one operates through officially recognized rules and regulations, while the other functions outside formal legal structures.

Option A is correct because it captures exactly what the example is intended to demonstrate. The stock exchange and the black market show that different kinds of institutions can coexist within the same domain. One is formal and codified, while the other is informal, yet both perform market-related functions.

Option B is incorrect because the author's point is not that both institutions depend on the market for survival. This observation may be true in a general sense, but it does not explain why the example is used in the passage.

Option C is incorrect because it oversimplifies the distinction. While both institutions may have operating norms, the author's focus is not on rules in general but on the contrast between formal and informal institutional arrangements.

Option D is incorrect because the passage is not discussing different methods of trading market instruments. The example is used to classify institutions, not to compare trading practices.

The key takeaway is that institutions need not all be of the same type. Even within a single sphere such as the market, formal and informal institutions can exist side by side. The stock exchange and the black market are used precisely to demonstrate this coexistence.

Hence, Option A is the correct answer.

16. Correct Answer: D

This is a main idea question. To answer it correctly, we need to identify the central argument that runs through the entire passage rather than focusing on specific examples or subtopics.
The passage is fundamentally concerned with the nature of institutions. The author discusses different kinds of institutions—formal and informal, designed and naturally evolved—and argues that institutions are structures that coordinate human action. He further explains that culture, tradition, language, markets, and even academic disciplines can all be understood as institutions. Throughout the passage, the focus remains on defining institutions and explaining their role in organizing social life.
Option D is correct because it captures this broad and recurring idea. The author explicitly states that institutions are "structures that serve to coordinate the actions of individuals." This definition lies at the heart of the passage and unifies all the examples and discussions that follow.
Option A is incorrect because language is discussed primarily as an example of an institution. Although the author calls language a formative institution for social life and science, this is only one part of the larger discussion about institutions in general.
Option B is incorrect because it refers to a specific debate within social thought regarding culture and tradition. The author mentions this issue only to explain his broader conception of institutions. It is not the central theme of the passage.
Option C is incorrect because the stock exchange and the black market are merely illustrative examples used to show that institutions can exist in both formal and informal forms. They do not represent the passage's overall argument.
The passage consistently develops a general theory of institutions, explaining their origins, forms, and functions. All other discussions serve to reinforce this central idea. Therefore, the statement that best captures the essence of the passage is that institutions are structures that coordinate human action. Hence, Option D is the correct answer.

17. Correct Answer: 2143

This is a Parajumble question that tests your ability to identify the opening sentence, establish logical links between sentences, and follow the progression of ideas. The correct sequence emerges by tracking how the argument develops from identifying the problem to proposing a solution.
Sentence 2 is the ideal opening sentence because it introduces the central idea of the paragraph. It states that while discussions on environmental collapse often focus on emissions, biodiversity loss and ecosystem collapse result from numerous and diverse causes. As it presents the broad theme, it naturally begins the paragraph.
Sentence 1 follows Sentence 2. After mentioning that environmental problems have multiple causes, Sentence 1 expands on this idea by listing examples such as chemical pollutants, damming of rivers, and invasive species. It then concludes that there is no single technological solution capable of addressing the crisis. Thus, 2–1 forms a logical pair.
Sentence 4 comes next. It directly builds on the conclusion of Sentence 1. Since there is no single technological fix, the author argues that the crisis requires large-scale political solutions rather than minor technological interventions. Therefore, 1–4 is a natural progression.
Sentence 3 serves as the conclusion. The phrase "This would require" clearly refers to the political solutions discussed in Sentence 4. It explains the kind of legislation needed to implement those solutions, namely laws that protect the rights of future generations and other species and enable stronger environmental protection. Hence, 4–3 forms the concluding pair.
Therefore, the correct sequence is 2 → 1 → 4 → 3, making 2143 the correct answer.

18. Correct Answer: 3142

This Parajumble is built around the evolution of the meaning of the word "cheer" from a physical expression to an internal emotional quality. The correct sequence follows both a conceptual and a chronological progression.
Sentence 3 is the best opening sentence. It introduces the central idea that cheerfulness is not merely an outward expression but can influence a person's inner self. Since it presents the main theme of the paragraph, it serves as an effective starting point.
Sentence 1 follows naturally. After discussing how cheerfulness affects the self, the author traces this idea back to the history of the word "cheer." The phrase "The trajectory of cheerfulness through the self" refers back to the transformation described in Sentence 3. Thus, 3–1 forms a strong logical pair.
Sentence 4 comes next. Having introduced the historical origin of the word, the paragraph moves to its medieval usage. Sentence 4 explains that in the medieval period, "cheer" referred to a facial expression or bodily appearance and existed at the intersection of emotion and physiognomy. This continues the historical discussion initiated in Sentence 1.
Sentence 2 is the concluding sentence. It moves the discussion forward chronologically by describing how Bible translations into vernacular languages expanded the meaning of "cheer" into the more abstract concept of "cheerfulness." This represents the culmination of the word's evolution from an external expression to an internal emotional and social quality.
Therefore, the correct sequence is:
3 → 1 → 4 → 2
Hence, the correct answer is 3142.

19. Correct Answer: 2431

This Parajumble revolves around the idea that food choices are often presented as matters of individual responsibility, while larger structural factors are ignored. The paragraph moves from a general observation to its consequences and finally to a specific example.

Sentence 2 is the best opening sentence because it introduces the central theme of the paragraph: food is commonly viewed through the lens of individual choice. Since it establishes the topic, it naturally begins the paragraph.

Sentence 4 follows Sentence 2. It directly comments on the "individual choice" framework introduced in Sentence 2. The phrase "The individualized framing of choice" clearly refers back to the idea presented in Sentence 2, making 2–4 a strong logical pair. Sentence 4 also points out the drawback of this perspective—it diverts attention from structural barriers that influence food choices.

Sentence 3 comes next. The phrase "This is particularly so" refers to the tendency described in Sentence 4. Sentence 3 explains why such an individualized view has become prominent: in a neoliberal context, the state has shifted responsibility for food onto individual consumers. Thus, 4–3 forms a clear explanatory link.

Sentence 1 serves as the concluding sentence. After discussing the broader issue of individual responsibility, the paragraph narrows its focus to a specific consequence for women. It illustrates how women may internalize this responsibility and feel personally accountable for managing an unhealthy food system. This makes it an appropriate conclusion.

Therefore, the correct sequence is:

$2 \rightarrow 4 \rightarrow 3 \rightarrow 1$

Hence, the correct answer is 2431.

20. Correct Answer: D

This is a sentence-insertion question that tests your ability to identify the most logical position for a given sentence by examining references, continuity of ideas, and contextual flow within the paragraph.

The sentence to be inserted is: "Most were first-time users of a tablet and a digital app." The key clue here is the pronoun "Most". We need to identify a noun or group mentioned immediately before the blank to which "Most" can logically refer.

Blank (4) is the most suitable position. Just before this blank, the paragraph states: "We piloted Aage Badhein in early 2021 with over 400 women from rural areas." The sentence "Most were first-time users of a tablet and a digital app" naturally refers to these 400 rural women. This creates a smooth and logical flow:

"We piloted Aage Badhein in early 2021 with over 400 women from rural areas. Most were first-time users of a tablet and a digital app. The digital solution generated a large amount of interest in the communities."

This sequence effectively highlights the significance of the app's success. The fact that even first-time digital users showed interest in and benefited from the app reinforces the argument that its user-centric design and customization were highly effective.

Why not the other options?

Option 1: At this point, no specific group of people has been introduced. Therefore, the pronoun "Most" lacks a clear antecedent.

Option 2: The discussion here is about the app's interface and audience characteristics. The sentence about first-time tablet users appears abrupt and disconnected.

Option 3: The paragraph is listing different categories of potential beneficiaries. Inserting the sentence here would interrupt that enumeration and create a break in the flow.

Therefore, the sentence fits most naturally after the mention of the 400 rural women in the pilot study. Hence, the correct answer is Option 4 (D).

21. Correct Answer: C

This is a sentence-insertion question that tests your ability to identify the logical flow of ideas and place a sentence where it best supports the surrounding context. The key is to track the discussion about the changing popularity of ghee and identify where the given sentence fits naturally.
The sentence to be inserted is:
"This was years in the making but fast-tracked during the pandemic, when 'people started being more mindful about their food', he explained."
The phrase "This was years in the making" requires a previously mentioned trend or phenomenon to refer to. Similarly, the reference to "he explained" suggests that the preceding sentence should mention a person whose views are being discussed.
Blank (3) is the most appropriate position. Just before it, the paragraph states: "For Karmakar, a renewed interest in ghee is emblematic of a return-to-basics movement in India." The given sentence fits perfectly after this statement because "This" clearly refers to the "return-to-basics movement" and "he" refers to Karmakar. The sentence further explains that this movement had been developing for years but gained momentum during the pandemic.
The flow becomes:
"For Karmakar, a renewed interest in ghee is emblematic of a return-to-basics movement in India. This was years in the making but fast-tracked during the pandemic, when 'people started being more mindful about their food', he explained. This movement is also part of an overall trend towards 'slow food'."
This creates a smooth and coherent progression of ideas.
Why not the other options?
Option 1: At this point, neither Karmakar nor the return-to-basics movement has been introduced. Therefore, the references "This" and "he" would lack clarity.
Option 2: The sentence would appear abruptly after the discussion of changing attitudes toward saturated fats and before the introduction of Karmakar, making the pronoun "he" ambiguous.
Option 4: The paragraph shifts here to explaining what ghee actually is and its historical origins. The given sentence is about the recent revival of ghee's popularity, so placing it here would disrupt the flow.
Therefore, the sentence fits most logically at Blank (3).
Hence, the correct answer is Option 3 (C).

22. Correct Answer: D

This is a Summary question that tests your ability to identify the central idea of the passage while avoiding options that are either too narrow, partially correct, or introduce ideas not supported by the passage.

The passage challenges the common assumption that cities necessarily develop hierarchical political structures. It points out that several of the world's earliest cities functioned along egalitarian lines, often without temples, palaces, ruling elites, or administrative classes. The broader conclusion is that urban life does not inherently require political hierarchy and that evidence from the past opens up the possibility of imagining more egalitarian forms of social organization.

Option D best captures this idea. It highlights the key points of the passage: the existence of egalitarian urban societies in ancient times and the absence of strongly hierarchical political and civic structures. It also reflects the passage's emphasis on emerging evidence about humanity's past.

Why the other options are incorrect:

A) This option is close to the main idea but remains incomplete. It focuses mainly on disproving the assumption that cities require hierarchical structures. However, it misses the passage's larger emphasis on evidence of egalitarian urban life and the possibilities such evidence reveals. Thus, it captures only part of the argument.

B) This option is too narrow. The absence of temples and palaces is merely one piece of evidence used in the passage. The main point is not about religious or regal structures themselves, but about the broader existence of egalitarian forms of urban organization.

C) This option distorts the passage. The author never argues that egalitarian ancient cities eventually transformed into today's hierarchical civic organizations because of the emergence of administrators and rulers. This causal relationship is not discussed in the passage and is therefore an unsupported inference.

Therefore, Option D is the most comprehensive and accurate summary because it captures both the evidence presented and the broader conclusion that ancient urban life could be egalitarian and less hierarchical than commonly assumed.

23. Correct Answer: B

This question tests your ability to identify the most comprehensive summary of the passage. The passage compares present-day concerns about big data and online behavioural manipulation with Cold War-era fears of brainwashing and psychological control. It argues that the widespread collection of personal data has revived debates about privacy, freedom, and individual autonomy.

Option B is the best answer because it captures both central ideas of the passage: the role of big data in making personal information widely available and the renewed debate about freedom and privacy arising from this reality. It is broad enough to include all the major points without introducing exaggeration.

Option A is incomplete. While it correctly identifies the comparison between modern technological influence and Cold War-era behavioural manipulation, it ignores the passage's emphasis on privacy, freedom, and the consequences of data collection.

Option C includes concerns about freedom, privacy, and behavioural influence, but it fails to incorporate the important Cold War comparison that frames the discussion. It also narrows the focus to artificial intelligence, whereas the passage discusses big data and machine-learning algorithms more broadly.

Option D is too extreme and opinionated. The passage discusses fears that digital technologies may threaten freedom, but it does not definitively conclude that technology is enslaving people. It also overlooks the historical parallel that is central to the author's argument.

Therefore, Option B most accurately and comprehensively captures the essence of the passage.

24. Correct Answer: A

This question tests your ability to identify the central idea of the passage without getting distracted by secondary details. The passage focuses on the fact that artworks, despite being displayed in museums and often perceived as timeless, are inherently vulnerable to deterioration. The example of Damien Hirst's shark is used to illustrate the concept of "inherent vice"—the tendency of certain materials to decay over time.

Option A is the best summary because it captures the core message of the passage: artworks are not permanent objects, they naturally deteriorate, and preserving them is an ongoing challenge. It accurately reflects both the general discussion about artistic decay and the specific example provided.

Option B is too narrow and shifts the focus specifically to museums. While museums do deal with deterioration, the passage is primarily about the inherent vulnerability of artworks themselves rather than the role of museums in protecting them.

Option C is incorrect because the passage does not discuss any moral responsibility of museums, nor does it suggest that preservation becomes necessary because artists cannot protect their works after death. This idea is not present in the passage.

Option D goes beyond the passage. The author never claims that museums aim to preserve artworks forever. In fact, the passage emphasizes that decay is inevitable and that some deterioration is built into the very materials used in artworks.

Therefore, Option A most effectively captures the essence of the passage by highlighting the unavoidable decay of artworks and the challenge of preserving them over time.

QUANTIFIERS CAT ACADEMY

DILR

1. Correct Answer: 40

Total number of domestic products = foreign products = 320/2 = 160
Domestic, Cosmetic, FDA approved products = 160/2 = 80
Foreign products having both approvals = 0
Domestic products having both approvals = 60
Let the number of domestic, cosmetic, both the approvals = x
⇒ the number of domestic, nutrition, both the approvals = 60 – x
Total number of nutrition products = 140
⇒ total number of cosmetic products = 320 – 140 = 180
Number of foreign, nutrition products = 70
Let number of foreign, nutrition, FDA products = y
⇒ number of foreign, nutrition, EU products = 70 – y
Also, number of foreign, cosmetic products = 160 – 70 = 90
Total FDA approved products = 200
Total foreign, FDA approved products = 70
Number of foreign, nutrition, FDA products = y
⇒ number of foreign, cosmetic, FDA products = 70 – y
⇒ number of foreign, cosmetic, EU products = 90 – (70 – y) = y + 20
Number of cosmetic, FDA approved products = 120
⇒ number of nutrition, FDA approved products = 200 – 120 = 80
⇒ number of domestic, nutrition, FDA approved products = 80 – y
The rest of the given information can be gathered as follows-

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	70 − y	y + 20	0	90	y	70 − y	0	70	160
Domestic	80	10 + x	x	90	80 − y	50 − x + y	60 − x	70	160
Total	120	x + y + 30	x	180	80	120 − x	60 − x	140	320

Solving, 70 − y + 80 = 120 ⇒ y = 30
The information can be updated as follows:

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	40	50	0	90	30	40	0	70	160
Domestic	80	10 + x	x	90	50	80 − x	60 − x	70	160
Total	120	60 + x	x	180	80	120 − x	60 − x	140	320

The number of foreign products that were FDA approved cosmetic products = 40

2. Correct Answer: C

Total number of domestic products = foreign products = 320/2 = 160
Domestic, Cosmetic, FDA approved products = 160/2 = 80
Foreign products having both approvals = 0
Domestic products having both approvals = 60
Let the number of domestic, cosmetic, both the approvals = x
⇒ the number of domestic, nutrition, both the approvals = 60 – x
Total number of nutrition products = 140
⇒ total number of cosmetic products = 320 – 140 = 180
Number of foreign, nutrition products = 70
Let number of foreign, nutrition, FDA products = y
⇒ number of foreign, nutrition, EU products = 70 – y
Also, number of foreign, cosmetic products = 160 – 70 = 90
Total FDA approved products = 200
Total foreign, FDA approved products = 70
Number of foreign, nutrition, FDA products = y
⇒ number of foreign, cosmetic, FDA products = 70 – y
⇒ number of foreign, cosmetic, EU products = 90 – (70 – y) = y + 20
Number of cosmetic, FDA approved products = 120
⇒ number of nutrition, FDA approved products = 200 – 120 = 80
⇒ number of domestic, nutrition, FDA approved products = 80 – y
The rest of the given information can be gathered as follows-

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	70 − y	y + 20	0	90	y	70 − y	0	70	160
Domestic	80	10 + x	x	90	80 − y	50 − x + y	60 − x	70	160
Total	120	x + y + 30	x	180	80	120 − x	60 − x	140	320

Solving, 70 − y + 80 = 120 ⇒ y = 30
The information can be updated as follows:

	Cosmetic				Nutrition				Total
	FDA	EU	Both	Either	FDA	EU	Both	Either	
Foreign	40	50	0	90	30	40	0	70	160
Domestic	80	10 + x	x	90	50	80 − x	60 − x	70	160
Total	120	60 + x	x	180	80	120 − x	60 − x	140	320

The number of cosmetic products which have FDA approval = 120
The number of cosmetic products which did not have FDA approval = 180 – 120 = 60

3. Correct Answer: A

Total number of domestic products = foreign products = 320/2 = 160
Domestic, Cosmetic, FDA approved products = 160/2 = 80
Foreign products having both approvals = 0
Domestic products having both approvals = 60
Let the number of domestic, cosmetic, both the approvals = x
⇒ the number of domestic, nutrition, both the approvals = 60 – x
Total number of nutrition products = 140
⇒ total number of cosmetic products = 320 – 140 = 180
Number of foreign, nutrition products = 70
Let number of foreign, nutrition, FDA products = y
⇒ number of foreign, nutrition, EU products = 70 – y
Also, number of foreign, cosmetic products = 160 – 70 = 90
Total FDA approved products = 200
Total foreign, FDA approved products = 70
Number of foreign, nutrition, FDA products = y
⇒ number of foreign, cosmetic, FDA products = 70 – y
⇒ number of foreign, cosmetic, EU products = 90 – (70 – y) = y + 20
Number of cosmetic, FDA approved products = 120
⇒ number of nutrition, FDA approved products = 200 – 120 = 80
⇒ number of domestic, nutrition, FDA approved products = 80 – y
The rest of the given information can be gathered as follows-

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	70 − y	y + 20	0	90	y	70 − y	0	70	160
Domestic	80	10 + x	x	90	80 − y	50 − x + y	60 − x	70	160
Total	120	x + y + 30	x	180	80	120 − x	60 − x	140	320

Solving, 70 − y + 80 = 120 ⇒ y = 30
The information can be updated as follows:

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	40	50	0	90	30	40	0	70	160
Domestic	80	10 + x	x	90	50	80 − x	60 − x	70	160
Total	120	60 + x	x	180	80	120 − x	60 − x	140	320

No value of region can be negative ⇒ 60 – x ≥ 0 ⇒ x ≤ 60
The number of domestic, cosmetic products that had both the approvals = x is at most 60
Hence, the best represents is at least 10 and at most 60

4. Correct Answer: A

Total number of domestic products = foreign products = 320/2 = 160
Domestic, Cosmetic, FDA approved products = 160/2 = 80
Foreign products having both approvals = 0
Domestic products having both approvals = 60
Let the number of domestic, cosmetic, both the approvals = x
⇒ the number of domestic, nutrition, both the approvals = 60 – x
Total number of nutrition products = 140
⇒ total number of cosmetic products = 320 – 140 = 180
Number of foreign, nutrition products = 70
Let number of foreign, nutrition, FDA products = y
⇒ number of foreign, nutrition, EU products = 70 – y
Also, number of foreign, cosmetic products = 160 – 70 = 90
Total FDA approved products = 200
Total foreign, FDA approved products = 70
Number of foreign, nutrition, FDA products = y
⇒ number of foreign, cosmetic, FDA products = 70 – y
⇒ number of foreign, cosmetic, EU products = 90 – (70 – y) = y + 20
Number of cosmetic, FDA approved products = 120
⇒ number of nutrition, FDA approved products = 200 – 120 = 80
⇒ number of domestic, nutrition, FDA approved products = 80 – y
The rest of the given information can be gathered as follows-

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	70 − y	y + 20	0	90	y	70 − y	0	70	160
Domestic	80	10 + x	x	90	80 − y	50 − x + y	60 − x	70	160
Total	120	x + y + 30	x	180	80	120 − x	60 − x	140	320

Solving, 70 − y + 80 = 120 ⇒ y = 30
The information can be updated as follows:

	Cosmetic				**Nutrition**				**Total**
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	40	50	0	90	30	40	0	70	160
Domestic	80	10 + x	x	90	50	80 − x	60 − x	70	160
Total	120	60 + x	x	180	80	120 − x	60 − x	140	320

The number of cosmetic products that did not have EU approval = 70
⇒ 180 – (60 + x) = 70 => x = 50
The number of nutrition products that had both the approvals = 60 – x = 10

5. Correct Answer: 50

Total number of domestic products = foreign products = 320/2 = 160
Domestic, Cosmetic, FDA approved products = 160/2 = 80
Foreign products having both approvals = 0
Domestic products having both approvals = 60
Let the number of domestic, cosmetic, both the approvals = x
⇒ the number of domestic, nutrition, both the approvals = 60 – x
Total number of nutrition products = 140
⇒ total number of cosmetic products = 320 – 140 = 180
Number of foreign, nutrition products = 70
Let number of foreign, nutrition, FDA products = y
⇒ number of foreign, nutrition, EU products = 70 – y
Also, number of foreign, cosmetic products = 160 – 70 = 90
Total FDA approved products = 200
Total foreign, FDA approved products = 70
Number of foreign, nutrition, FDA products = y
⇒ number of foreign, cosmetic, FDA products = 70 – y
⇒ number of foreign, cosmetic, EU products = 90 – (70 – y) = y + 20
Number of cosmetic, FDA approved products = 120
⇒ number of nutrition, FDA approved products = 200 – 120 = 80
⇒ number of domestic, nutrition, FDA approved products = 80 – y
The rest of the given information can be gathered as follows-

	Cosmetic				Nutrition				Total
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	70 − y	y + 20	0	90	y	70 − y	0	70	160
Domestic	80	10 + x	x	90	80 − y	50 − x + y	60 − x	70	160
Total	120	x + y + 30	x	180	80	120 − x	60 − x	140	320

Solving, 70 − y + 80 = 120 ⇒ y = 30
The information can be updated as follows:

	Cosmetic				Nutrition				Total
	FDA	**EU**	**Both**	**Either**	**FDA**	**EU**	**Both**	**Either**	
Foreign	40	50	0	90	30	40	0	70	160
Domestic	80	10 + x	x	90	50	80 − x	60 − x	70	160
Total	120	60 + x	x	180	80	120 − x	60 − x	140	320

The number of nutrition products that did not have EU approval = 50
⇒ 140 – (120 – x) = 50 => x = 30
The number of domestic, cosmetic products that did not have EU approval = 90 – (10 + x) = 50

6. Correct Answer: 35

Case	A	B	C	D	Total
1	50	40	70	30	190
2	50	40	70	50	210
3	50	40	100	30	220
4	50	40	100	50	240
5	50	60	70	30	210
6	50	60	70	50	230
7	50	60	100	30	240
8	50	60	100	50	260
9	70	40	70	30	210
10	70	40	70	50	230
11	70	40	100	30	240
12	70	40	100	50	260
13	70	60	70	30	230
14	70	60	70	50	250
15	70	60	100	30	260
16	70	60	100	50	280

While making the route plan, the supplier goes to the locations in decreasing order of demand and if the last location is Ahmednagar, then it must have least demand (50 units)
So, the supplier must have supplied the order in the following manner-
C (70 or 100 units) > B (60 units) > D (50 units) ≥ A (50 units)
The total distance (minimum) covered W – C – B – W – D – W – A = 12 + 4 + 10 + 2 + 2 + 5 = 35 km

7. Correct Answer: 38

Case	A	B	C	D	Total
1	50	40	70	30	190
2	50	40	70	50	210
3	50	40	100	30	220
4	50	40	100	50	240
5	50	60	70	30	210
6	50	60	70	50	230
7	50	60	100	30	240
8	50	60	100	50	260
9	70	40	70	30	210
10	70	40	70	50	230
11	70	40	100	30	240
12	70	40	100	50	260
13	70	60	70	30	230
14	70	60	70	50	250
15	70	60	100	30	260
16	70	60	100	50	280

The total number of widgets delivered in a day = 250 units
Only possible combination: A (70 units) + B (60 units) + C (70 units) + D (50 units) = 250 units
Order of delivery, A (70 units) ≥ C (70 units) > B (60 units) > D (50 units)
The total distance (minimum) covered W – A – W – C – B –W – D = 5 + 5 + 12 + 4 + 10 + 2 = 38 km

8. Correct Answer: D

Case	A	B	C	D	Total
1	50	40	70	30	190
2	50	40	70	50	210
3	50	40	100	30	220
4	50	40	100	50	240
5	50	60	70	30	210
6	50	60	70	50	230
7	50	60	100	30	240
8	50	60	100	50	260
9	70	40	70	30	210
10	70	40	70	50	230
11	70	40	100	30	240
12	70	40	100	50	260
13	70	60	70	30	230
14	70	60	70	50	250
15	70	60	100	30	260
16	70	60	100	50	280

The total number of widgets delivered in a day = 260 units
Also, the route ends at Bikrampore, only order possible
C (100 units) > A (70 units) > D (50 units) > B (40 units)
Required chance = 70% × 60% × 60% × 30% = 7.56%

9. Correct Answer: C

Case	A	B	C	D	Total

1	50	40	70	30	190
2	50	40	70	50	210
3	50	40	100	30	220
4	50	40	100	50	240
5	50	60	70	30	210
6	50	60	70	50	230
7	50	60	100	30	240
8	50	60	100	50	260
9	70	40	70	30	210
10	70	40	70	50	230
11	70	40	100	30	240
12	70	40	100	50	260
13	70	60	70	30	230
14	70	60	70	50	250
15	70	60	100	30	260
16	70	60	100	50	280

If the first location visited from the warehouse is Ahmednagar, possible cases

Case	A	B	C	D	Total
9th	70	40	70	30	210

Distance covered W – A – W – C – B – W – D = 5 + 5 + 12 + 4 + 10 + 2 = 38 km
A (70 units) ≥ C (70 units) > B (40 units) > D (30 units)
Chance = 60% × 30% × 30% × 40% = 2.16%

Case	A	B	C	D	Total
10th	70	40	70	50	230

Distance covered W – A – W – C – D – W – B = 5 + 5 + 12 + 6 + 2 + 10 = 40 km
A (70 units) ≥ C (70 units) > D (50 units) > B (40 units)
Chance = 60% × 30% × 60% × 30% = 3.24%

Case	A	B	C	D	Total
13th	70	60	70	30	230

Distance covered W – A – W – C – B – W – D = 5 + 5 + 12 + 4 + 10 + 2 = 38 km
A (70 units) ≥ C (70 units) > B (60 units) > D (30 units)
Chance = 60% × 30% × 70% × 40% = 5.04%

Case	A	B	C	D	Total
14th	70	60	70	50	250

Distance covered W – A – W – C – B – W – D = 5 + 5 + 12 + 4 + 10 + 2 = 38 km
A (70 units) ≥ C (70 units) > B (60 units) > D (50 units)
Chance = 60% × 30% × 70% × 60% = 7.56%

Total chance = 2.16% + 3.24% + 5.04% + 7.56% = 18%
The chance that the total distance covered is 40 km = 3.24%/18% × 100 = 18%

10. Correct Answer: B

Case	A	B	C	D	Total
1	50	40	70	30	190
2	50	40	70	50	210
3	50	40	100	30	220
4	50	40	100	50	240
5	50	60	70	30	210
6	50	60	70	50	230
7	50	60	100	30	240
8	50	60	100	50	260
9	70	40	70	30	210
10	70	40	70	50	230
11	70	40	100	30	240
12	70	40	100	50	260
13	70	60	70	30	230
14	70	60	70	50	250
15	70	60	100	30	260
16	70	60	100	50	280

If Ahmednagar is not the first location to be visited in a route, possible cases

Case	A	B	C	D	Total
1	50	40	70	30	190

Distance covered W – C – W – A – B – W – D = 12 + 12 + 5 + 6 + 10 + 2 = 47 km

Case	A	B	C	D	Total
2	50	40	70	50	210

Distance covered W – C – D – W – A – B = 12 + 6 + 2 + 5 + 6 = 31 km

Case	A	B	C	D	Total
3	50	40	100	30	220

Distance covered W – C – W – A – B – W – D = 12 + 12 + 5 + 6 + 10 + 2 = 47 km

Case	A	B	C	D	Total
4	50	40	100	50	240

Distance covered W – C – D – W – A – B = 12 + 6 + 2 + 5 + 6 = 31 km

Case	A	B	C	D	Total
5	50	60	70	30	210

Distance covered W – C – B – A – W – D = 12 + 4 + 6 + 5 + 2 = 29 km

Case	A	B	C	D	Total
6	50	60	70	50	230

Distance covered W – C – B – A – W – D = 12 + 4 + 6 + 5 + 2 = 29 km

Case	A	B	C	D	Total
7	50	60	100	30	240

Distance covered W – C – B – A – W – D = 12 + 4 + 6 + 5 + 2 = 29 km

Case	A	B	C	D	Total
8	50	60	100	50	260

Distance covered W – C – B – A – W – D = 12 + 4 + 6 + 5 + 2 = 29 km

Case	A	B	C	D	Total
11	70	40	100	30	240

Distance covered W – C – W – A – B – W – D = 12 + 12 + 5 + 6 + 10 + 2 = 47 km

Case	A	B	C	D	Total
12	70	40	100	50	260

Distance covered W – C – W – A – W – D – W – B = 12 + 12 + 5 + 2 + 10 + 10 + 2 = 58 km

Case	A	B	C	D	Total
15	70	60	100	30	260

Distance covered W – C – W – A – B – W – D = 12 + 12 + 5 + 6 + 10 + 2 = 47 km

Case	A	B	C	D	Total
16	70	60	100	50	280

Distance covered W – C – W – A – B – W – D = 12 + 12 + 5 + 6 + 10 + 2 = 47 km

The total route distance is 29 kms in 5^{th}, 6^{th}, 7^{th} and 8^{th} case having widgets delivered 210, 230, 240 and 260 respectively. The only possible value among options is 210.

11. Correct Answer: B

The given information can be arranged as follows:

Year →	2019				2020				2021			
Particular ↓	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Revenue (in Rs. Crores)	90	100	23	50	90	90	70	20	60	30	100	70
Cost (in Rs. Crores)	85	75	20	40	65	40	60	50	30	30	30	70
Profit (in Rs. Crores)	5	25	3	10	25	50	10	-30	30	0	70	0
Employee Strength	150	210	325	400	140	240	325	410	150	250	325	400
New Hires	20	35	45	30	35	45	40	35	25	30	35	40

Considering all the three years,

Profit of Company C in 2021 = 70 crores is the highest annual profit

12. Correct Answer: C

The given information can be arranged as follows:

Year →	2019				2020				2021			
Particular ↓	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Revenue (in Rs. Crores)	90	100	23	50	90	90	70	20	60	30	100	70
Cost (in Rs. Crores)	85	75	20	40	65	40	60	50	30	30	30	70
Profit (in Rs. Crores)	5	25	3	10	25	50	10	-30	30	0	70	0
Employee Strength	150	210	325	400	140	240	325	410	150	250	325	400
New Hires	20	35	45	30	35	45	40	35	25	30	35	40

Loss of company D in 2020 = 30 crores is the highest annual loss in any of the years

13. Correct Answer: A

The given information can be arranged as follows:

Year →	2019				2020				2021			
Particular ↓	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Revenue (in Rs. Crores)	90	100	23	50	90	90	70	20	60	30	100	70
Cost (in Rs. Crores)	85	75	20	40	65	40	60	50	30	30	30	70
Profit (in Rs. Crores)	5	25	3	10	25	50	10	-30	30	0	70	0
Employee Strength	150	210	325	400	140	240	325	410	150	250	325	400
New Hires	20	35	45	30	35	45	40	35	25	30	35	40

Performance = Annual Profit / Annual Cost
For year 2019:
Performance of A = 5/85 = 1/17
Performance of B = 25/75 = 1/3
Performance of C = 3/20
Performance of D = 10/40 = 1/4
Hence, the company that had the lowest performance ratio is Company A.

14. Correct Answer: B

The given information can be arranged as follows:

Year →	2019				2020				2021			
Particular ↓	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Revenue (in Rs. Crores)	90	100	23	50	90	90	70	20	60	30	100	70
Cost (in Rs. Crores)	85	75	20	40	65	40	60	50	30	30	30	70
Profit (in Rs. Crores)	5	25	3	10	25	50	10	-30	30	0	70	0
Employee Strength	150	210	325	400	140	240	325	410	150	250	325	400
New Hires	20	35	45	30	35	45	40	35	25	30	35	40

	Total number of employees lost in		
	2019	**2020**	**Total**
Company A	150 + 20 − 140 = 30	140 + 35 − 150 = 25	55
Company B	210 + 35 − 240 = 5	240 + 45 − 250 = 35	40
Company C	325 + 45 − 325 = 45	325 + 40 − 325 = 40	85
Company D	400 + 30 − 410 = 20	410 + 35 − 400 = 45	65

The total number of employees lost in 2019 and 2020 was least for company B

15. Correct Answer: B

The given information can be arranged as follows:

Year →	2019				2020				2021			
Particular ↓	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Revenue (in Rs. Crores)	90	100	23	50	90	90	70	20	60	30	100	70
Cost (in Rs. Crores)	85	75	20	40	65	40	60	50	30	30	30	70
Profit (in Rs. Crores)	5	25	3	10	25	50	10	-30	30	0	70	0
Employee Strength	150	210	325	400	140	240	325	410	150	250	325	400
New Hires	20	35	45	30	35	45	40	35	25	30	35	40

For year 2020,

	Profit	**Employee strength**	**Profit per employee**
Company A	25	(140 + 150)/2 = 145	25/145 = 100/580
Company B	50	(240 + 250)/2 = 245	50/245 = 100/490
Company C	10	(325 + 325)/2 = 325	10/325 = 100/3250
Company D	-30	(410 + 400)/2 = 405	-30/405

Hence, for year 2020, company B had the highest profit per employee

16. Correct Answer: 84

Let the total number of households each met over the two days = 2h
Total number of items sold by each over the two days = 100
Let the number of TRICCEK sold on day 1 by Tohri = n
⇒ the number of TRICCEK sold on day 2 by Tohri = 100 − n
The rest of the information can be gathered as follows

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	n	100 − n	100
	Number of households met	h − 15	h + 15	2h
	Success Rate	n/(h − 15)	(100 − n)/(h + 15)	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	2h − 1	1	2h
	Success Rate	100/(2h − 1)	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	h	h	2h
	Success Rate	50/h	50/h	

Tohri's success rate was twice that of Lahur's on the first day,
⇒ n/(h − 15) = 2 × (50/h)
Solving, nh = 100h − 1500
Also, Tohri's success rate was 75% of Lahur's on the second day,
⇒ (100 − n)/(h + 15) = (75/100) × (50/h)
Solving, 200 − 2nh = 75h + 1125
Substituting the value of nh,
⇒ 200h − 2(100h − 1500) = 75h + 1125
⇒ 3000 = 75h + 1125 ⇒ h = 25
Substituting again, 25n = 2500 − 1500 = 1000 ⇒ n = 40

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	40	60	100
	Number of households met	10	40	50
	Success Rate	4	1.5	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	49	1	50
	Success Rate	2.04	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	25	25	50
	Success Rate	2	2	

Total number of households met by Tohri, Hokli and Lahur on the first day = 10 + 49 + 25 = 84

17. Correct Answer: 40

Let the total number of households each met over the two days = 2h
Total number of items sold by each over the two days = 100
Let the number of TRICCEK sold on day 1 by Tohri = n
⇒ the number of TRICCEK sold on day 2 by Tohri = 100 − n
The rest of the information can be gathered as follows

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	n	100 − n	100
	Number of households met	h − 15	h + 15	2h
	Success Rate	n/(h − 15)	(100 − n)/(h + 15)	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	2h − 1	1	2h
	Success Rate	100/(2h − 1)	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	h	h	2h
	Success Rate	50/h	50/h	

Tohri's success rate was twice that of Lahur's on the first day,
⇒ n/(h − 15) = 2 × (50/h)
Solving, nh = 100h − 1500
Also, Tohri's success rate was 75% of Lahur's on the second day,
⇒ (100 − n)/(h + 15) = (75/100) × (50/h)
Solving, 200 − 2nh = 75h + 1125
Substituting the value of nh,
⇒ 200h − 2(100h − 1500) = 75h + 1125
⇒ 3000 = 75h + 1125 ⇒ h = 25
Substituting again, 25n = 2500 − 1500 = 1000 ⇒ n = 40

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	40	60	100
	Number of households met	10	40	50
	Success Rate	4	1.5	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	49	1	50
	Success Rate	2.04	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	25	25	50
	Success Rate	2	2	

The number of TRICCEK items sold by Tohri on the first day = 40

18. Correct Answer: B

Let the total number of households each met over the two days = 2h
Total number of items sold by each over the two days = 100
Let the number of TRICCEK sold on day 1 by Tohri = n
⇒ the number of TRICCEK sold on day 2 by Tohri = 100 − n
The rest of the information can be gathered as follows

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	n	100 − n	100
	Number of households met	h − 15	h + 15	2h
	Success Rate	n/(h − 15)	(100 − n)/(h + 15)	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	2h − 1	1	2h
	Success Rate	100/(2h − 1)	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	h	h	2h
	Success Rate	50/h	50/h	

Tohri's success rate was twice that of Lahur's on the first day,
⇒ n/(h − 15) = 2 × (50/h)
Solving, nh = 100h − 1500
Also, Tohri's success rate was 75% of Lahur's on the second day,
⇒ (100 − n)/(h + 15) = (75/100) × (50/h)
Solving, 200 − 2nh = 75h + 1125
Substituting the value of nh,
⇒ 200h − 2(100h − 1500) = 75h + 1125
⇒ 3000 = 75h + 1125 ⇒ h = 25
Substituting again, 25n = 2500 − 1500 = 1000 ⇒ n = 40

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	40	60	100
	Number of households met	10	40	50
	Success Rate	4	1.5	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	49	1	50
	Success Rate	2.04	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	25	25	50
	Success Rate	2	2	

The number of households Lahur met on the second day = 25.
Hence, between 21 and 29

19. Correct Answer: B

Let the total number of households each met over the two days = 2h
Total number of items sold by each over the two days = 100
Let the number of TRICCEK sold on day 1 by Tohri = n
⇒ the number of TRICCEK sold on day 2 by Tohri = 100 − n
The rest of the information can be gathered as follows

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	n	100 − n	100
	Number of households met	h − 15	h + 15	2h
	Success Rate	n/(h − 15)	(100 − n)/(h + 15)	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	2h − 1	1	2h
	Success Rate	100/(2h − 1)	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	h	h	2h
	Success Rate	50/h	50/h	

Tohri's success rate was twice that of Lahur's on the first day,
⇒ n/(h − 15) = 2 × (50/h)
Solving, nh = 100h − 1500
Also, Tohri's success rate was 75% of Lahur's on the second day,
⇒ (100 − n)/(h + 15) = (75/100) × (50/h)
Solving, 200 − 2nh = 75h + 1125
Substituting the value of nh,
⇒ 200h − 2(100h − 1500) = 75h + 1125
⇒ 3000 = 75h + 1125 ⇒ h = 25
Substituting again, 25n = 2500 − 1500 = 1000 ⇒ n = 40

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	40	60	100
	Number of households met	10	40	50
	Success Rate	4	1.5	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	49	1	50
	Success Rate	2.04	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	25	25	50
	Success Rate	2	2	

The number of households Tohri met on the first day = 10. Hence, 10 or less

20. Correct Answer: A

Let the total number of households each met over the two days = 2h

Total number of items sold by each over the two days = 100
Let the number of TRICCEK sold on day 1 by Tohri = n
⇒ the number of TRICCEK sold on day 2 by Tohri = 100 − n
The rest of the information can be gathered as follows

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	n	100 − n	100
	Number of households met	h − 15	h + 15	2h
	Success Rate	n/(h − 15)	(100 − n)/(h + 15)	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	2h − 1	1	2h
	Success Rate	100/(2h − 1)	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	h	h	2h
	Success Rate	50/h	50/h	

Tohri's success rate was twice that of Lahur's on the first day,
⇒ n/(h − 15) = 2 × (50/h)
Solving, nh = 100h − 1500
Also, Tohri's success rate was 75% of Lahur's on the second day,
⇒ (100 − n)/(h + 15) = (75/100) × (50/h)
Solving, 200 − 2nh = 75h + 1125
Substituting the value of nh,
⇒ 200h − 2(100h − 1500) = 75h + 1125
⇒ 3000 = 75h + 1125 ⇒ h = 25
Substituting again, 25n = 2500 − 1500 = 1000 ⇒ n = 40

Name	Particular	Day 1	Day 2	Total
Tohri	Number of TRICCEK sold	40	60	100
	Number of households met	10	40	50
	Success Rate	4	1.5	
Hokli	Number of TRICCEK sold	100	0	100
	Number of households met	49	1	50
	Success Rate	2.04	0	
Lahur	Number of TRICCEK sold	50	50	100
	Number of households met	25	25	50
	Success Rate	2	2	

Going by options,

1. Among the three, Tohri had the highest success rate on the second day.
   Lahur had the highest success rate on the second day

Hence, statement 1 is false.

2. Tohri had a higher success rate on the first day compared to the second day.
   Statement 2 is true

3. Among the three, Tohri had the highest success rate on the first day.
   Statement 3 is true

4. Among the three, Lahur had the lowest success rate on the first day.
   Statement 4 is true

Quant

1. Correct Answer: C

Since, f(x) ≥ 0 and f(2) = 0
⇒ Both the roots of the quadratic polynomial are equal to 2
Let the quadratic polynomial be $f(x) = ax^2 + bx + c$
Sum of roots = 2 + 2 = -b/a => b = - 4a
Product of roots = 2 × 2 = c/a ⇒ c = 4a
Also, f(4) = 6 ⇒ 16a + 4b + c = 6
Substituting and solving,
16a + 4 (-4a) + 4a = 6
⇒ a = 1.5, b = -6 and c = 6
$f(-2) = 1.5 (-2)^2 + (-6)(-2) + 6 = 24$

2. Correct Answer: 4

We have $(x^2 - 10)^{x^2-3x-10} = 1$.
Whenever $a^b = 1$, We have 3 cases:
Case 1: When b = 0
⇒ x^2 – 3x – 10 = 0 ⇒ x = 5 or x = -2
Case 2: When a = 1
⇒ x^2 – 10 = 1 ⇒ x^2 = 11. Here, x is not an integer.
Case 3: When a = - 1 & b is even.
⇒ x^2 – 10 = –1 ⇒ $x = \pm 3$
For both values of x, $x = \pm 3$, b = x^2 – 3x – 10 is even.
Therefore, x can be 5, -2, +3 or -3. Hence, 4 values are possible.

3. Correct Answer: D

Total income of Manu for 1st nine months = 4000 × 9 = Rs 36000
Total expenditure for 1st nine months = 3500 × 9 = Rs 31500
Total savings for the 1st nine months = 36000 – 31500 = Rs 4500
Total annual saving = 550 × 12 = Rs 6600
Total saving for the last three months = 6600 – 4500 = Rs 2100
Total expenditure for the last three months = 3700 × 3 = Rs 11100
Total income for the last three months = 2100 + 11100 = Rs 13200
Income per month for the remaining 3 months = 13200/3 = Rs 4400

4. Correct Answer: 6

Time taken by Anu = 5t, Tanu = 8t and Manu = 10t (where t is in hours)
Let job = 40t (LCM of 5t, 8t and 10t)
Efficiency of Anu, A = 8 units/hour
Efficiency of Tanu, T = 5 units/hour
Efficiency of Manu, M = 4 units/hour
A + T + M = 40t/(4 × 8)
Solving, total job = 40t = 544 units
Job done by Anu and Tanu in 6 days working 6 hrs 40 mins (= 20/3 hrs) = (8 + 5) × 6 × 20/3 = 520 units
Remaining job = 544 – 520 = 24 units
Time taken by Manu to complete the remaining job = 24/4 = 6 hours

5. Correct Answer: B

Let the marks scored by Amit be A and by other candidates be B, C, D and E
Given, A + B + C + D + E = 38 × 5 = 190
Exactly three of them scored above 32 and no two student scored same marks
Lowest marks scored by Amit, when rest scored the maximum
Let B = 32, C = 48, D = 49 and E = 50
⇒ Lowest marks scored by Amit = 190 – (32 + 48 + 49 + 50) = 11
Highest marks scored by Amit = 31 such that B = 32, C + D + E = 190 – (31 + 32) = 127
Required difference = 31 – 11 = 20

6. Correct Answer: 24
Let the number of correct answered questions = x, wrong = y and unattempted = z
Given, x + y + z = 75
Also, 3x – y + z = 97
Subtracting, 2x – 2y = 22
⇒ x – y = 11
Also, z > x + y
⇒ x + y (maximum) = 37 (such that z = 38)
⇒ 2x = 48 (maximum) ⇒ x = 24 (maximum)

7. Correct Answer: 10

Let the number of sides of A and B be a and 2a respectively
Given, $\frac{(a-2)\times 180^\circ}{a} : \frac{(2a-2)\times 180^\circ}{2a} = 3:4$
⇒ (a – 2)/(a – 1) = 3/4
Solving, 4a – 8 = 3a – 3 ⇒ a = 5
Hence, the number of sides of B = 2a = 10

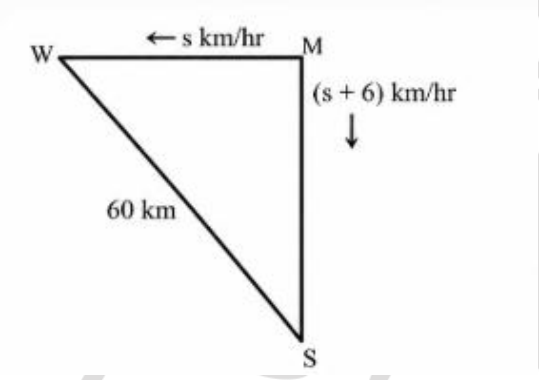
8. Correct Answer: C

Let the volume of each container = 16x

Transferred	1st container		2nd container	
	Sugar Syrup	Milk	Sugar Syrup	Milk
Half filled	8x	0	0	8x
50% of 1st to 2nd	-4x	-0	+4x	+0
Left	4x	0	4x	8x
50% of 2nd to 1st	+2x	+4x	-2x	-4x
Left	6x	4x	2x	4x
50% of 1st to 2nd	-3x	-2x	+3x	+2x
Left	3x	2x	5x	6x

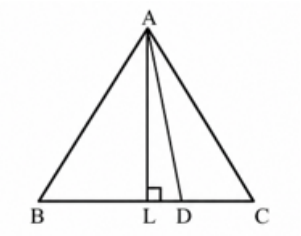
Hence, required ratio = 5:6

9. Correct Answer: B



Let the meeting point is M.
Let the speed of the ship that goes West = s km/hr
⇒ the speed of the ship that goes South = (s + 6) km/hr
In 2 hrs, distance covered by ship (West) MW = 2s
And distance covered by ship (South) MS = 2s + 12
Given, distance between them after 2 hrs, WS = 60 km
Applying Pythagoras theorem,
$MW^2 + MS^2 = WS^2$
⇒ $(2s)^2 + (2s + 12)^2 = 60^2$
⇒ $4s^2 + 4s^2 + 144 + 48s = 3600$
⇒ $8s^2 + 48s - 3456 = 0$
⇒ $s^2 + 6s - 432 = 0$
⇒ (s – 18) (s + 24) = 0
⇒ s = 18 or -24 (rejected)
Hence, the speed of slower ship = 18 km/hr

10. Correct Answer: A



The side of equilateral triangle = 3 cm
Since, area triangle ADC = 1/2 × area triangle ABD
D divides BC in the ratio 2:1
⇒ BD = 2/3 × 3 = 2 cm
The height of equilateral triangle ABC,
AL = $\frac{\sqrt{3}}{2}$ × 3 = $3\sqrt{3}/2$ cm
Also, AL divides BC in the ratio 1:1
⇒ BL = 1/2 × 3 = 3/2 cm
⇒ LD = BD – BL = 2 – 3/2 = 1/2 cm
In triangle ALD,
$AD^2 = AL^2 + LD^2$
$AD^2 = (3\sqrt{3}/2)^2 + (1/2)^2$
AD = $\sqrt{7}$ cm

11. Correct Answer: C

Number of integers > 2000 are
4-digit numbers = 4 × 5 × 4 × 3 = 240
5-digit numbers = 5 × 5 × 4 × 3 × 2 = 600
6-digit numbers = 5 × 5 × 4 × 3 × 2 × 1 = 600
Total = 240 + 600 + 600 = 1440

12. Correct Answer: B

Let the third root of the cubic equation f(x) = $5x^3 + cx^2 – 10x + 9 = 0$ is p
Sum of roots = r – r + p = -c/5 ⇒ p = -c/5
Sum of roots taken two at a time = r(-r) + rp + (-r)p = -10/5 = -2
⇒ $-r^2 = -2$ ⇒ r = ±√2
Product of roots = r (-r) p = -9/5 => p = 9/10
Substituting and solving, 9/10 = -c/5
⇒ c = -9/2

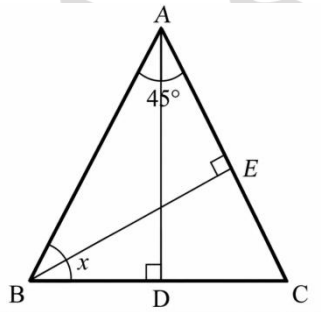
13. Correct Answer: A

Day 1, number of bacteria = 100
Day 2, 1/2 × 100 = 50 more bacteria produce, total = 150
Day 3, 1/3 × 150 = 50 more bacteria produce, total = 200
Day 4, 1/4 × 200 = 50 more bacteria produce, total = 250
And so on,
This forms an AP with 1st term as 100 and common difference = 50
Let the required day = dth day
Solving, $100 + (d - 1)\ 50 \geq 1000$
$\Rightarrow (d - 1) \geq 18$
$\Rightarrow d \geq 19$
Hence, on 19th day, the total number of bacteria will be more than or equal to 1000

14. Correct Answer: B

Let the total number of registered voters = 300x
⇒ total number of votes casted = 240x
Number of votes one candidate received = 30% of 240x = 72x
Remaining votes = 240x – 72x = 168x
Number of votes received by other three candidates
1/6 × 168x = 28x, 2/6 × 168x = 56x and 3/6 × 168x = 84x
Given, 84x – 72x = 2512 ⇒ 12x = 2512 ⇒ 300x = 62800

15. Correct Answer: D



In triangle AEB,
Let AE = BE = a
⇒ AB = $a\sqrt{2}$
In triangle ADB,
sin x = AD/AB
⇒ AD = AB sin x= $a\sqrt{2}$ sin x
Required ratio is, AD/BE = ($a\sqrt{2}$ sin x)/a = $\sqrt{2}$ sin x

16. Correct Answer: 20

Let total investment by Mr. Pinto = 15P
1/5 × 15P = 3P at 6% SI
1/3 × 15P = 5P at 10% SI
Remaining, 15P – (3P + 5P) = 7P at 1% SI
Let the required number of years = t
Total simple interest = (3P × 6/100 + 5P × 10/100 + 7P × 1/100) × t ≥ 15P
Solving, 75P/100 × t ≥ 15P => t ≥ 20
Hence, the minimum number of years = 20 years

17. Correct Answer: B

We know, (7!)! = 5040! and (8!)! = 40320!
Hence, the maximum value that can divide 15000! is (7!)!

18. Correct Answer: 14

Given, $a_1 + a_2 + a_3 + \ldots + a_N = 300N$
Also, $6a_1 + a_2 + a_3 + \ldots + a_N = 400N$
Subtracting, $5a_1 = 100N$
$\Rightarrow a_1 = 20N$
Now, starting from N = 1
$\Rightarrow a_1 = 20$ is the only value, the average required is 300, not possible
N = 2 $\Rightarrow a_1 = 40$ and $a_2 = 560$, such that average = 300, possible
N = 3, 4, …, 15
At N = 15, $a_1 = 300 = a_2 = a_3 = \ldots = a_{15}$, average = 300, possible
At N = 16, $a_1 = 320$ and since the sequence is non-decreasing,
$a_2, a_3, a_4, \ldots \geq 320$ and cannot have average = 300, not possible
Hence, possible values of a_1 = 14 (for N = 2 to 15, inclusive)

19. Correct Answer: C

$A_n = 3 + 7 + 11 + 15 + \ldots$
$A_n = n/2\,[2 \times 3 + (n - 1)\,4]$
$A_n = n/2\,(6 + 4n - 4)$
$A_n = 2n^2 + n$
$\frac{1}{25}\sum_1^{25} A_n = \frac{1}{25}\sum_1^{25}(2n^2 + n) = \frac{1}{25}\left(2\sum_1^{25} n^2 + \sum_1^{25} n\right)$
$= \frac{1}{25}\left[\frac{2 \times 25 \times 26 \times 51}{6} + \frac{25 \times 26}{2}\right] = 442 + 13 = 455$

20. Correct Answer: 12

Given, $f(x^2 - x) = 5$
Putting x = 1, f(0) = 5
$f(1) + f(0) - 1 = 0 \Rightarrow f(1) = -4$
$f(2) + f(1) - 1 = 0 \Rightarrow f(2) = 5$
$f(3) + f(2) - 1 = 0 \Rightarrow f(3) = -4$
$f(4) + f(3) - 1 = 0 \Rightarrow f(4) = 5$
$f(5) + f(4) - 1 = 0 \Rightarrow f(5) = -4$
And so on
f(odd value) = -4 and f(even value) = 5
Also, $g(x) = x^2$
$f(g(5)) + g(f(5)) = f(25) + g(-4) = -4 + 16 = 12$

21. Correct Answer: 47

We have, $(4 - log_2 n)/(3 - log_4 n) < 0$
$(4 - log_2 n)(3 - log_4 n)/(3 - (log_4 n)^2 < 0$
$(4 - log_2 n)(3 - log_4 n) < 0$
$\Rightarrow 4 - log_2 n < 0$ and $3 - log_4 n > 0$
$\Rightarrow 4 < log_2 n$ and $3 > log_4 n$
$\Rightarrow n > 2^4 = 16$ and $n < 4^3 = 64$
$\Rightarrow 16 < n < 64$
Hence, the number of integral solutions for n = 47

22. Correct Answer: B

Given, a + 2b = 6 where a and b are non-negative real numbers
The maximum value of a + b = 6 when a = 6 and b = 0
And the minimum value of a + b = 3 when a = 0 and b = 3
Hence, the required average = (6 + 3)/2 = 4.5