CAT 2021 Slot 1 Question Paper

Conducted by the Indian Institute of Management Ahmedabad (IIM Ahmedabad)

Time Allowed: 2 Hours | **66 Questions** | **Maximum Marks: 198**

General Instructions

(i) This paper contains **66 questions** from **CAT 2021 Slot 1**, held on **28 November 2021**. The original examination was a **computer-based test** with a **120-minute** duration.

(ii) The question groups appear in their original sequence: **Verbal Ability and Reading Comprehension** (24 questions); **Data Interpretation and Logical Reasoning** (20 questions); **Quantitative Ability** (22 questions).

(iii) Each section is timed separately: **40 minutes per section**. A candidate cannot switch between sections during the test.

(iv) The paper has **multiple choice questions (MCQs)**, each with four options and one correct answer, and **Type In The Answer (TITA)** questions.

(v) **Marking scheme: +3** for a correct answer; **-1** for an incorrect MCQ; **no negative marking** for TITA questions; and **0** for an unanswered question.

(vi) For TITA questions, enter the answer in the space provided. An on-screen calculator was available in the original test.

Questions 1 to 4

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

For the Maya of the Classic period, who lived in Southern Mexico and Central America between 250 and 900 CE, the category of 'persons' was not coincident with human beings, as it is for us. That is, human beings were persons - but other, nonhuman entities could be persons, too. . . . In order to explore the slippage of categories between 'humans' and 'persons', I examined a very specific category of ancient Maya images, found painted in scenes on ceramic vessels. I sought out instances in which faces (some combination of eyes, nose, and mouth) are shown on inanimate objects. . . . Consider my iPhone, which needs to be fed with electricity every night, swaddled in a protective bumper, and enjoys communicating with other fellow-phone-beings. Does it have personhood (if at all) because it is connected to me, drawing this resource from me as an owner or source? For the Maya (who did have plenty of other communicating objects, if not smartphones), the answer was no. Nonhuman persons were not tethered to specific humans, and they did not derive their personhood from a connection with a human. . . . It's a profoundly democratising way of understanding the world. Humans are not more important persons - we are just one of many kinds of persons who inhabit this world. . . .

The Maya saw personhood as 'activated' by experiencing certain bodily needs and through participation in certain social activities. For example, among the faced objects that I examined, persons are marked by personal requirements (such as hunger, tiredness, physical closeness), and by community obligations (communication, interaction, ritual observance). In the images I examined, we see, for instance, faced objects being cradled in humans' arms; we also see them speaking to humans. These core elements of personhood are both turned inward, what the body or self of a person requires, and outward, what a community expects of the persons who are a part of it, underlining the reciprocal nature of community membership. .

Personhood was a nonbinary proposition for the Maya. Entities were able to be persons while also being something else. The faced objects I looked at indicate that they continue to be functional, doing what objects do (a stone implement continues to chop, an incense burner continues to do its smoky work). Furthermore, the Maya visually depicted many objects in ways that indicated the material category to which they belonged - drawings of the stone implement show that a person-tool is still made of stone. One additional complexity: the incense burner (which would have been made of clay, and decorated with spiky appliques representing the sacred ceiba tree found in this region) is categorised as a person - but also as a tree. With these Maya examples, we are challenged to discard the person/nonperson binary that constitutes our basic ontological outlook. . . . The porousness of boundaries that we have seen in the Maya world points towards the possibility of living with a certain uncategorisability of the world.

1. Which one of the following, if true about the Classic Maya, would invalidate the purpose of the iPhone example in the passage?

(A) The clay incense burner with spiky appliques was categorised only as a person and not as a tree by the Classic Maya.

(B) Unlike modern societies equipped with mobile phones, the Classic Maya did not have any communicating objects.

(C) Classic Maya songs represent both humans and non-living objects as characters, talking and interacting with each other.

(D) The personhood of the incense burner and the stone chopper was a function of their usefulness to humans.

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2. Which one of the following best explains the "additional complexity" that the example of the incense burner illustrates regarding personhood for the Classic Maya?

(A) The example adds a new layer to the nonbinary understanding of personhood by bringing in a third category that shares a similar relation with the previous two.

(B) The example provides an exception to the nonbinary understanding of personhood that the passage had hitherto established.

(C) The example adds a new layer to the nonbinary understanding of personhood by bringing in a third category that shares a dissimilar relation with the previous two.

(D) The example complicates the nonbinary understanding of personhood by bringing in the sacred, establishing the porosity of the divine and the profane.

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3. On the basis of the passage, which one of the following worldviews can be inferred to be closest to that of the Classic Maya?

(A) A tribe that perceives its hunting weapons as sacred person-artefacts because of their significance to its survival.

(B) A tribe that perceives plants as person-plants because they form an ecosystem and are marked by needs of nutrition.

(C) A futuristic society that perceives robots to be persons as well as robots because of their similarity to humans.

(D) A tribe that perceives its utensils as person-utensils in light of their functionality and bodily needs.

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4. Which one of the following, if true, would not undermine the democratising potential of the Classic Maya worldview?

(A) They believed that animals like cats and dogs that live in proximity to humans have a more clearly articulated personhood.

(B) While they believed in the personhood of objects and plants, they did not believe in the personhood of rivers and animals.

(C) They understood the stone implement and the incense burner in a purely human form.

(D) They depicted their human healers with physical attributes of local medicinal plants.

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5. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer: 1. The work is more than the text, for the text only takes on life, when it is realized and furthermore the realization is by no means independent of the individual disposition of the reader. 2. The convergence of text and reader brings the literary work into existence and this convergence is not to be identified either with the reality of the text or with the individual disposition of the reader. 3. From this polarity it follows that the literary work cannot be completely identical with the text, or with the realization of the text, but in fact must lie halfway between the two. 4. The literary work has two poles, which we might call the artistic and the aesthetic; the artistic refers to the text created by

the author, and the aesthetic to the realization accomplished by the reader.

Type in the answer.

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

1. A popular response is the exhortation to plant more trees.
2. It seems all but certain that global warming will go well above two degrees—quite how high no one knows yet.
3. Burning them releases it, which is why the scale of forest fires in the Amazon basin last year garnered headlines.
4. This is because trees sequester carbon by absorbing carbon dioxide.

Type in the answer.

Questions 7 to 10

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

The sleights of hand that conflate consumption with virtue are a central theme in A Thirst for Empire, a sweeping and richly detailed history of tea by the historian Erika Rappaport. How did tea evolve from an obscure "China drink" to a universal beverage imbued with civilising properties? The answer, in brief, revolves around this conflation, not only by profit-motivated marketers but by a wide variety of interest groups. While abundant historical records have allowed the study of how tea itself moved from east to west, Rappaport is focused on the movement of the idea of tea to suit particular purposes.

Beginning in the 1700s, the temperance movement advocated for tea as a pleasure that cheered but did not inebriate, and industrialists soon borrowed this moral argument in advancing their case for free trade in tea (and hence more open markets for their textiles). Factory owners joined in, compelled by the cause of a sober workforce, while Christian missionaries discovered that tea "would soothe any colonial encounter". During the Second World War, tea service was presented as a social and patriotic activity that uplifted soldiers and calmed refugees.

But it was tea's consumer-directed marketing by importers and retailers - and later by brands - that most closely portends current trade debates. An early version of the "farm to table" movement was sparked by anti-Chinese sentiment and concerns over trade deficits, as well as by the reality and threat of adulterated tea containing dirt and hedge clippings. Lipton was soon advertising "from the Garden to Tea Cup" supply chains originating in British India and supervised by "educated Englishmen". While tea marketing always presented direct consumer benefits (health, energy, relaxation), tea drinkers were also assured that they were participating in a larger noble project that advanced the causes of family, nation and civilization. . . .

Rappaport's treatment of her subject is refreshingly apolitical. Indeed, it is a virtue that readers will be unable to guess her political orientation: both the miracle of markets and capitalism's dark underbelly are evident in tea's complex story, as are the complicated effects of British colonialism. . . . Commodity histories are now themselves commodities: recent works investigate cotton, salt, cod, sugar, chocolate, paper and milk. And morality marketing is now a commodity as well, applied to food, "fair trade" apparel and eco-tourism. Yet tea is, Rappaport makes clear, a world apart - an astonishing success story in which tea marketers not only succeeded in conveying a sense of moral elevation to the consumer but also arguably did advance the cause of civilisation and community.

I have been offered tea at a British garden party, a Bedouin campfire, a Turkish carpet shop and a Japanese chashitsu, to name a few settings. In each case the offering was more an idea - friendship, community, respect - than a drink, and in each case the idea then created a reality. It is not a stretch to say that tea marketers have advanced the particularly noble cause of human dialogue and friendship.

7. Today, "conflat[ing] consumption with virtue" can be seen in the marketing of:

(A) sustainably farmed foods.
(B) natural health supplements.
(C) travel to pristine destinations.
(D) ergonomically designed products.

8. The author of this book review is LEAST likely to support the view that:

(A) tea drinking has become a social ritual worldwide.
(B) the ritual of drinking tea promotes congeniality and camaraderie.
(C) tea became the leading drink in Britain in the nineteenth century.
(D) tea drinking was sometimes promoted as a patriotic duty.

9. According to this book review, A Thirst for Empire says that, in addition to "profitmotivated marketers", tea drinking was promoted in Britain by all of the following EXCEPT:

(A) manufacturers who were pressing for duty-free imports.
(B) tea drinkers lobbying for product diversity.
(C) the anti-alcohol lobby as a substitute for the consumption of liquor.
(D) factories to instill sobriety in their labour.

10. This book review argues that, according to Rappaport, tea is unlike other "morality" products because it:

(A) had an actual beneficial effect on social interaction and society in general.
(B) was actively encouraged by interest groups in the government.
(C) was marketed by a wide range of interest groups.
(D) appealed to a universal group and not just to a niche section of people.

Questions 11 to 14

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

We cannot travel outside our neighbourhood without passports. We must wear the same plain clothes. We must exchange our houses every ten years. We cannot avoid labour. We all go to bed at the same time . . . We have religious freedom, but we cannot deny that the soul dies with the body, since 'but for the fear of punishment, they would have nothing but contempt for the laws and customs of society'. . . . In More's time, for much of the population, given the plenty and security on offer, such restraints would not have seemed overly unreasonable. For modern readers, however, Utopia appears to rely upon relentless transparency, the repression of variety, and the curtailment of privacy. Utopia provides security: but at what price? In both its external and internal relations, indeed, it seems perilously dystopian.

Such a conclusion might be fortified by examining selectively the tradition which follows More on these points. This often portrays societies where . . . 'it would be almost impossible for man to be depraved, or wicked'. . . . This is achieved both through institutions and mores, which underpin the common life. . . . The passions are regulated and inequalities of wealth and distinction are minimized. Needs, vanity, and emulation are restrained, often by prizing equality and holding riches in contempt. The desire for public power is curbed. Marriage and sexual intercourse are often controlled: in Tommaso Campanella's The City of the Sun (1623), the first great literary utopia after More's, relations are forbidden to men before the age of twenty-one and women before nineteen. Communal child-rearing is normal; for Campanella, this commences at age two. Greater simplicity of life, 'living according to nature', is often a result: the desire for simplicity and purity are closely related. People become more alike in appearance, opinion, and outlook than they often have been. Unity, order, and homogeneity thus prevail at the cost of individuality and diversity. This model, as J. C. Davis demonstrates, dominated early modern utopianism. . . . And utopian homogeneity remains a familiar theme well into the twentieth century.

Given these considerations, it is not unreasonable to take as our starting point here the hypothesis that utopia and dystopia evidently share more in common than is often supposed. Indeed, they might be twins, the progeny of the same parents. Insofar as this proves to be the case, my linkage of both here will be uncomfortably close for some readers. Yet we should not mistake this argument for the assertion that all utopias are, or tend to produce, dystopias. Those who defend this proposition will find that their association here is not nearly close enough. For we have only to acknowledge the existence of thousands of successful intentional communities in which a cooperative ethos predominates and where harmony without coercion is the rule to set aside such an assertion. Here the individual's submersion in the group is consensual (though this concept is not unproblematic). It results not in enslavement but voluntary submission to group norms. Harmony is achieved without . . . harming others.

11. Following from the passage, which one of the following may be seen as a characteristic of a utopian society?

(A) A society without any laws to restrain one's individuality.

(B) A society where public power is earned through merit rather than through privilege.

(C) Institutional surveillance of every individual to ensure his/her security and welfare.

(D) The regulation of homogeneity through promoting competitive heterogeneity.

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12. All of the following arguments are made in the passage EXCEPT that:

(A) in More's time, there was plenty and security, so people did not need restraints that could appear unreasonable.

(B) there have been thousands of communities where homogeneity and stability have been achieved through choice, rather than by force.

(C) the tradition of utopian literature has often shown societies in which it would be nearly impossible for anyone to be sinful or criminal.

(D) in early modern utopianism, the stability of utopian societies was seen to be achieved only with individuals surrendering their sense of self.

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13. Which sequence of words below best captures the narrative of the passage?

(A) Utopia - Security - Homogeneity - Intentional community.

(B) Relentless transparency - Homogeneity - Utopia - Dystopia.

(C) Utopia - Security - Dystopia - Coercion.

(D) Curtailment of privacy - Dystopia - Utopia - Intentional community.

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14. All of the following statements can be inferred from the passage EXCEPT that:

(A) utopian and dystopian societies are twins, the progeny of the same parents.

(B) it is possible to see utopias as dystopias, with a change in perspective, because one person's utopia could be seen as another's dystopia.

(C) many conceptions of utopian societies emphasise the importance of social uniformity and cultural homogeneity.

(D) utopian societies exist in a long tradition of literature dealing with imaginary people practicing imaginary customs, in imaginary worlds.

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15. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer: 1. In the central nervous systems of other animal species, such a comprehensive regeneration of neurons has not yet been proven beyond doubt.
2. Biologists from the University of Bayreuth have discovered a uniquely rapid form of regeneration in injured neurons and their function in the central nervous system of zebrafish.
3. They studied the Mauthner cells, which are solely responsible for the escape behaviour of the fish, and previously regarded as incapable of regeneration.
4. However, their ability to regenerate crucially depends on the location of the injury.

Type in the answer.

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16. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer: 1. There is a dark side to academic research, especially in India, and at its centre is the phenomenon of predatory journals.
2. But in truth, as long as you pay, you can get anything published.
3. In look and feel thus, they are exactly like any reputed journal.
4. They claim to be indexed in the most influential databases, say they possess editorial boards that comprise top scientists and researchers, and claim to have a rigorous peer-review structure.
5. But a large section of researchers and scientists across the world are at the receiving end of nothing short of an academic publishing scam.

Type in the answer.

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17. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage. McGurk and MacDonald (1976) reported a powerful multisensory illusion occurring with audio-visual speech. They recorded a voice articulating a consonant 'ba-ba-ba' and dubbed it with a face articulating another consonant 'ga-ga-ga'. Even though the acoustic speech signal was well recognized alone, it was heard as another consonant after dubbing with incongruent visual speech i.e., 'da-da-da'. The illusion, termed as the McGurk effect, has been replicated many times, and it has sparked an abundance of research. The reason for the great impact is that this is a striking demonstration of multisensory integration, where that auditory and visual information is merged into a unified, integrated percept.

(A) Visual speech mismatched with auditory speech can result in the perception of an entirely different message: this illusion is known as the McGurk effect.

(B) When the quality of auditory information is poor, the visual information wins over the auditory information.

(C) The McGurk effect which is a demonstration of multisensory integration has been replicated many times.

(D) When the auditory speech signal does not match the visual speech movements, the acoustic speech signal is confusing and integration of the two is imperfect.

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18. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage. Developing countries are becoming hotbeds of business innovation in much the same way as Japan did from the 1950s onwards. They are reinventing systems of production and distribution, and experimenting with entirely new business models. Why are countries that were until recently associated with cheap hands now becoming leaders in innovation? Driven by a mixture of ambition and fear they are relentlessly climbing up the value chain. Emerging-market champions have not only proved highly competitive in their own backyards, they are also going global themselves.

(A) Competition has driven emerging economies, once suppliers of cheap labour, to become innovators of business models that have enabled them to move up the value chain and go global.

(B) Innovations in production and distribution are helping emerging economies compete with countries to which they once supplied cheap labour.

(C) Developing countries are being forced to invent new business models which challenge the old business models, so they can remain competitive domestically.

(D) Production and distribution models are going through rapid innovations worldwide as developed countries are being challenged by their earlier suppliers from the developing world.

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

1. The legal status of resources mined in space remains ambiguous; and while the market for asteroid minerals is currently nonexistent, this is likely to change as technical hurdles diminish.
2. Outer space is a commons, and all of it is open for exploration, however, space law developed in the 1950s and 60s is state-centric and arguably ill-suited to a commercial future.
3. Laws adopted by the US and Luxembourg are first steps, but they only protect firms from competing claims by their compatriots; a Chinese company will not be bound by US law.
4. Critics say the US is conferring rights that it has no authority to confer; Russia in particular has condemned this, citing the US' disrespect for international law.
5. At issue now is commercial activity, as private firms—rather than nation states — look to space for profit.

Type in the answer.

Questions 20 to 23

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

Cuttlefish are full of personality, as behavioral ecologist Alexandra Schnell found out while researching the cephalopod's potential to display self-control. . . . "Self-control is thought to be the

cornerstone of intelligence, as it is an important prerequisite for complex decision-making and planning for the future," says Schnell . . .

[Schnell's] study used a modified version of the "marshmallow test" . . . During the original marshmallow test, psychologist Walter Mischel presented children between age four and six with one marshmallow. He told them that if they waited 15 minutes and didn't eat it, he would give them a second marshmallow. A long-term follow-up study showed that the children who waited for the second marshmallow had more success later in life. . . . The cuttlefish version of the experiment looked a lot different. The researchers worked with six cuttlefish under nine months old and presented them with seafood instead of sweets. (Preliminary experiments showed that cuttlefishes' favorite food is live grass shrimp, while raw prawns are so-so and Asian shore crab is nearly unacceptable.) Since the researchers couldn't explain to the cuttlefish that they would need to wait for their shrimp, they trained them to recognize certain shapes that indicated when a food item would become available. The symbols were pasted on transparent drawers so that the cuttlefish could see the food that was stored inside. One drawer, labeled with a circle to mean "immediate," held raw king prawn. Another drawer, labeled with a triangle to mean "delayed," held live grass shrimp. During a control experiment, square labels meant "never."

"If their self-control is flexible and I hadn't just trained them to wait in any context, you would expect the cuttlefish to take the immediate reward [in the control], even if it's their second preference," says Schnell . . . and that's what they did. That showed the researchers that cuttlefish wouldn't reject the prawns if it was the only food available. In the experimental trials, the cuttlefish didn't jump on the prawns if the live grass shrimp were labeled with a triangle— many waited for the shrimp drawer to open up. Each time the cuttlefish showed it could wait, the researchers tacked another ten seconds on to the next round of waiting before releasing the shrimp. The longest that a cuttlefish waited was 130 seconds.

Schnell [says] that the cuttlefish usually sat at the bottom of the tank and looked at the two food items while they waited, but sometimes, they would turn away from the king prawn "as if to distract themselves from the temptation of the immediate reward." In past studies, humans, chimpanzees, parrots and dogs also tried to distract themselves while waiting for a reward.

Not every species can use self-control, but most of the animals that can share another trait in common: long, social lives. Cuttlefish, on the other hand, are solitary creatures that don't form relationships even with mates or young. . . . "We don't know if living in a social group is important for complex cognition unless we also show those abilities are lacking in less social species," says . . . comparative psychologist Jennifer Vonk.

20. All of the following constitute a point of difference between the "original" and "modified" versions of the marshmallow test EXCEPT that:

(A) the former had human subjects, while the latter had cuttlefish.

(B) the former correlated self-control and future success, while the latter correlated selfcontrol and survival advantages.

(C) the former used verbal communication with its subjects, while the latter had to develop a symbolic means of communication.

(D) the former was performed over a longer time span than the latter.

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21. Which one of the following, if true, would best complement the passage's findings?

(A) Cuttlefish are equally fond of live grass shrimp and raw prawns.

(B) Cuttlefish live in big groups that exhibit sociability.

(C) Cuttlefish wait longer than 100 seconds for the shrimp drawer to open up.

(D) Cuttlefish cannot distinguish between geometrical shapes.

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22. Which one of the following cannot be inferred from Alexandra Schnell's experiment?

(A) Like human children, cuttlefish are capable of self-control.

(B) Intelligence in a species is impossible without sociability.

(C) Cuttlefish exercise choice when it comes to food.

(D) Cuttlefish exert self-control with the help of diversions.

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23. In which one of the following scenarios would the cuttlefish's behaviour demonstrate self-control?

(A) Asian shore crabs and raw prawns are simultaneously released while a live grass shrimp drawer labelled with a triangle is placed in front of the cuttlefish, to be opened after one minute.

(B) raw prawns are released while a live grass shrimp drawer labelled with a square is placed in front of the cuttlefish.

(C) raw prawns are released while an Asian shore crab drawer labelled with a triangle is placed in front of the cuttlefish, to be opened after one minute.

(D) live grass shrimp are released while two raw prawn drawers labelled with a circle and a triangle respectively are placed in front of the cuttlefish; the triangle-labelled drawer is opened after 50 seconds.

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24. **The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.** Foreign peacekeepers often exist in a bubble in the poor countries in which they are deployed; they live in posh compounds, drive fancy vehicles, and distance themselves from locals. This may be partially justified as they are outsiders, living in constant fear, performing a job that is emotionally draining. But they are often despised by the locals, and many would like them to leave. A better solution would be bottom-up peacebuilding, which would involve their spending more time working with communities, understanding their grievances and earning their trust, rather than only meeting government officials.

(A) Peacekeeping duties would be more effectively performed by local residents given their better understanding, knowledge and rapport with their own communities.

(B) The environment in poor countries has tended to make foreign peacekeeping forces live in enclaves, but it is time to change this scenario.

(C) Extravagant lifestyles and an aloof attitude among the foreigners working as peacekeepers in poor countries have justifiably made them the target of local anger.

(D) Peacekeeping forces in foreign countries have tended to be aloof for valid reasons but would be more effective if they worked more closely with local communities.

Questions 25 to 30

A journal plans to publish 18 research papers, written by eight authors (A, B, C, D, E, F, G, and H) in four issues of the journal scheduled in January, April, July and October. Each of the research papers was written by exactly one of the eight authors. Five papers were scheduled in each of the first two issues, while four were scheduled in each of the last two issues. Every author wrote at least one paper and at most three papers. The total number of papers written by A, D, G and H was double the total number of papers written by the other four authors. Four of the authors were from India and two each were from Japan and China. Each author belonged to exactly one of the three areas — Manufacturing, Automation, and Logistics. Four of the authors were from the Logistics area and two were from the Automation area. As per the journal policy, none of the authors could have more than one paper in any issue of the journal.

The following facts are also known.
1. F, an Indian author from the Logistics area, wrote only one paper. It was scheduled in the October issue.
2. A was from the Automation area and did not have a paper scheduled in the October issue.
3. None of the Indian authors were from the Manufacturing area and none of the Japanese or Chinese authors were from the Automation area.
4. A and H were from different countries, but had their papers scheduled in exactly the same issues.
5. C and E, both Chinese authors from different areas, had the same number of papers scheduled. Further, E had papers scheduled in consecutive issues of the journal but C did not.
6. B, from the Logistics area, had a paper scheduled in the April issue of the journal.
7. B and G belonged to the same country. None of their papers were scheduled in the same issue of the journal.
8. D, a Japanese author from the Manufacturing area, did not have a paper scheduled in the July issue.
9. C and H belonged to different areas.

25. What is the correct sequence of number of papers written by B, C, E and G, respectively?

(A) 1, 2, 2, 3
(B) 1, 3, 3, 1
(C) 3, 1, 1, 3
(D) 1, 2, 2, 1

26. How many papers were written by Indian authors?

Type in the answer.

27. Which of the following statement(s) MUST be true? Statement A: Every issue had at least one paper by author(s) from each country. Statement B: Every issue had at most two papers by author(s) from each area.

(A) Both the statements
(B) Only Statement B
(C) Only Statement A
(D) Neither of the statements

28. Which of the following statements is FALSE?

(A) Every issue had at least one paper by author(s) from Automation area.

(B) Every issue had exactly one paper by a Chinese author.

(C) Every issue had exactly two papers by authors from Logistics area.

(D) Every issue had exactly two papers by Indian authors.

29. Which of the following statements is FALSE?

(A) There were exactly two papers by authors from Manufacturing area in the January issue.

(B) There was exactly one paper by an author from Manufacturing area in the April issue.

(C) There was exactly one paper by an author from Logistics area in the October issue.

(D) There were exactly two papers by authors from Manufacturing area in the July issue.

30. Which of the following is the correct sequence of number of papers by authors from Automation, Manufacturing and Logistics areas, respectively?

(A) 6, 5, 7

(B) 6, 6, 6

(C) 6, 7, 5

(D) 5, 6, 7

Questions 31 to 34

Ganga, Kaveri, and Narmada are three women who buy four raw materials (Mango, Apple, Banana and Milk) and sell five finished products (Mango smoothie, Apple smoothie, Banana smoothie, Mixed fruit smoothie and Fruit salad). Table-1 gives information about the raw materials required to produce the five finished products. One unit of a finished product requires one unit of each of the raw materials mentioned in the second column of the table.

Table-1

Finished product	Raw materials required
Mango smoothie	Mango, Milk
Apple smoothie	Apple, Milk
Banana smoothie	Banana, Milk
Mixed fruit smoothie	Mango, Apple, Banana, Milk
Fruit salad	Mango, Apple, Banana

One unit of milk, mango, apple, and banana cost ₹5, ₹3, ₹2, and ₹1 respectively. Each unit of a finished product is sold for a profit equal to two times the number of raw materials used to make that product. For example, apple smoothie is made with two raw materials (apple and milk) and will be sold for a profit of ₹4 per unit. Leftover raw materials are sold during the last business hour of the day for a loss of ₹1 per unit.

The amount, in rupees, received from sales (revenue) for each woman in each of the four business hours of the day is given in Table-2.

Table-2

Business Hour	Ganga	Kaveri	Narmada
Hour 1	23	19	31
Hour 2	21	22	21
Hour 3	29	30	23
Hour 4 (last hour)	30	27	22

The following additional facts are known.
1. No one except possibly Ganga sold any Mango smoothie.
2. Each woman sold either zero or one unit of any single finished product in any hour.
3. Each woman had exactly one unit each of two different raw materials as leftovers.
4. No one had any banana leftover.

31. What BEST can be concluded about the number of units of fruit salad sold in the first hour?

(A) Either 1 or 2.
(B) Either 0 or 1 or 2.
(C) Exactly 2.
(D) Exactly 1.

32. Which of the following is NECESSARILY true?

(A) Ganga did not sell any leftover mangoes.
(B) Ganga did not sell any leftover apples.
(C) Narmada sold one unit of leftover milk.
(D) Kaveri sold one unit of leftover mangoes.

33. What BEST can be concluded about the total number of units of milk the three women had in the beginning?

(A) Either 19 or 20 units.
(B) Either 18 or 19 or 20 units.
(C) Either 18 or 19 units.
(D) Either 17 or 18 or 19 units.

34. If it is known that three leftover units of mangoes were sold during the last business hour of the day, how many apple smoothies were sold during the day?

Type in the answer.

Questions 35 to 40

Amudha, Bharatan, Chandran, Dhinesh, Ezhil, Fani and Gowtham are seven people in a town. Any pair of them could either be strangers, acquaintances, or friends. All relationships are mutual. For example, if Amudha is a friend of Bharatan, then Bharatan is also a friend of Amudha. Similarly, if Amudha is a stranger to Bharatan, then Bharatan is also a stranger to Amudha.

Partial information about the number of friends, acquaintances, and strangers of each of these people among them is given in the table below.

	No. of Friends	No. of Acquaintances	No. of Strangers
Amudha		1	4
Bharatan			
Chandran		1	
Dhinesh			2
Ezhil			1
Fani	1		
Gowtham		3	2

The following additional facts are also known.
1. Amudha, Bharatan, and Chandran are mutual strangers.
2. Amudha, Dhinesh, and Fani are Ezil's friends.
3. Chandran and Gowtham are friends.
4. Every friend of Amudha is an acquaintance of Bharatan, and every acquaintance of Bharatan is a friend of Amudha.
5. Every friend of Bharatan is an acquaintance of Amudha, and every acquaintance of Amudha is a friend of Bharatan.

35. Who are Gowtham's acquaintances?

(A) Dhinesh, Ezhil and Fani
(B) Amudha, Dhinesh and Fani
(C) Bharatan, Dhinesh and Ezhil
(D) Amudha, Bharatan and Fani

36. Which of these pairs share the same type of relationship?

(A) (Amudha, Gowtham) and (Ezhil, Fani)
(B) (Bharatan, Chandran) and (Dhinesh, Ezhil)
(C) (Chandran, Ezhil) and (Dhinesh, Gowtham)
(D) (Bharatan, Ezhil) and (Fani, Gowtham)

37. Who is an acquaintance of Amudha?

(A) Dhinesh
(B) Fani
(C) Gowtham
(D) Ezhil

38. Who is an acquaintance of Chandran?

(A) Dhinesh
(B) Fani
(C) Ezhil
(D) Bharatan

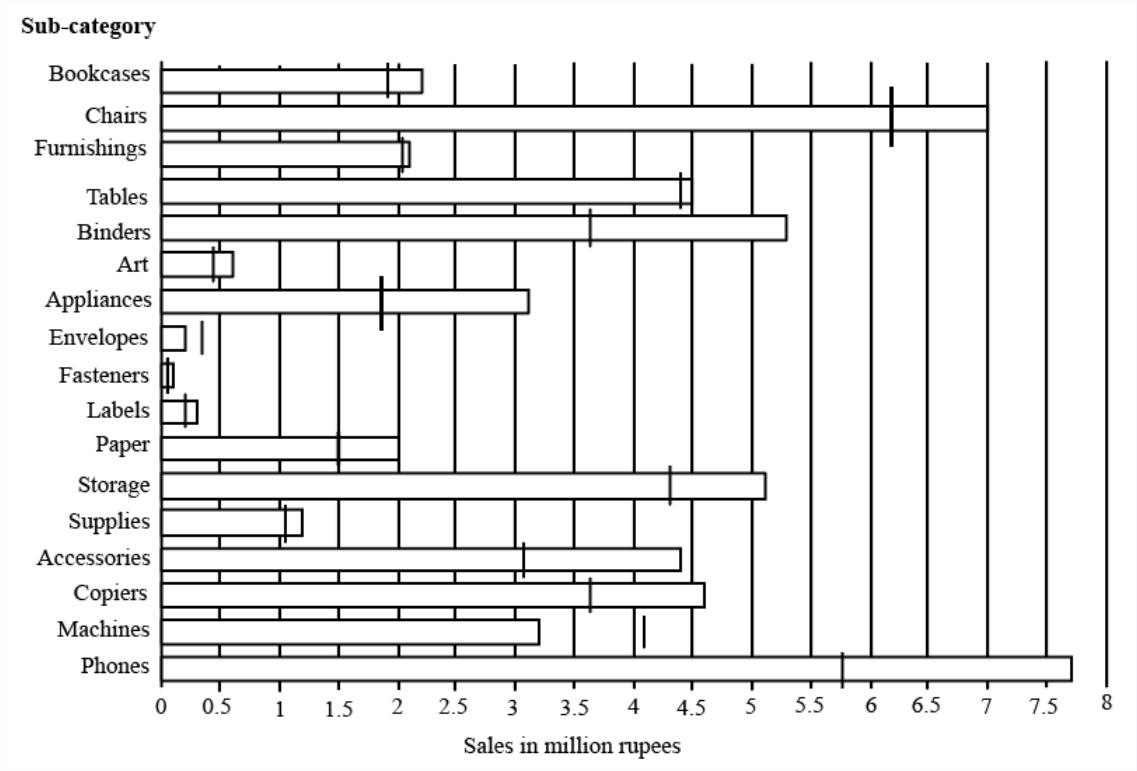
39. How many friends does Ezhil have?

Type in the answer.

40. How many people are either a friend or a friend-of-a-friend of Ezhil?

Type in the answer.

Questions 41 to 44



The horizontal bars in the above diagram represent 2020 aggregate sales (in ₹ million) of a company for the different subcategories of its products. The top four product subcategories (Bookcases, Chairs, Furnishings, Tables) belong to furniture product category; the bottom four product subcategories (Accessories, Copiers, Machines, Phones) belong to the technology product category while all other product subcategories belong to the office supply product category. For each of the product subcategories, there is a vertical line indicating the sales of the corresponding subcategory in 2019.

41. The total sales (in ₹ million) in 2019 from products in office supplies category is closest to

(A) 18.0
(B) 16.5
(C) 13.5
(D) 12.5

42. The percentage increase in sales in Furniture category from 2019 to 2020 is closest to

(A) 20%
(B) 8%
(C) 25%
(D) 1%

43. How many subcategories had sales of ₹ 4 million or more in 2019 and registered an increase in sales in excess of 25% in 2020?

Type in the answer.

44. The improvement index for a category is the maximum percentage increase in sales from 2019 to 2020 among any of its subcategories. The correct order of categories in increasing order of this improvement index is

(A) furniture, technology, office supply
(B) technology, furniture, office supply

(C) office supply, technology, furniture

(D) office supply, furniture, technology

45. Two trains cross each other in 14 seconds when running in opposite directions along parallel tracks. The faster train is 160 m long and crosses a lamp post in 12 seconds. If the speed of the other train is 6 km/hr less than the faster one, its length, in m, is

(A) 184
(B) 192
(C) 190
(D) 180

46. If the area of a regular hexagon is equal to the area of an equilateral triangle of side 12 cm, then the length, in cm, of each side of the hexagon is

(A) $4\sqrt{6}$
(B) $6\sqrt{6}$
(C) $\sqrt{6}$
(D) $2\sqrt{6}$

47. Suppose the length of each side of a regular hexagon ABCDEF is 2 cm.It T is the mid point of CD,then the length of AT, in cm, is

(A) $\sqrt{13}$
(B) $\sqrt{14}$
(C) $\sqrt{12}$
(D) $\sqrt{15}$

48. Anu, Vinu and Manu can complete a work alone in 15 days, 12 days and 20 days, respectively. Vinu works everyday. Anu works only on alternate days starting from the first day while Manu works only on alternate days starting from the second day. Then, the number of days needed to complete the work is

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

49. The amount Neeta and Geeta together earn in a day equals what Sita alone earns in 6 days. The amount Sita and Neeta together earn in a day equals what Geeta alone earns in 2 days. The ratio of the daily earnings of the one who earns the most to that of the one who earns the least is

(A) 3:2
(B) 11:7
(C) 11:3
(D) 7:3

50. Onion is sold for 5 consecutive months at the rate of Rs 10, 20, 25, 25, and 50 per kg, respectively. A family spends a fixed amount of money on onion for each of the first three months, and then spends half that amount on onion for each of the next two months. The average expense for onion, in rupees per kg, for the family over these 5 months is closest to

(A) 26
(B) 18
(C) 16
(D) 20

51. The number of groups of three or more distinct numbers that can be chosen from 1, 2, 3, 4, 5, 6, 7 and 8 so that the groups always include 3 and 5, while 7 and 8 are never included together is

Type in the answer.

52. Amal purchases some pens at ₹ 8 each. To sell these, he hires an employee at a fixed wage. He sells 100 of these pens at ₹ 12 each. If the remaining pens are sold at ₹ 11 each, then he makes a net profit of

₹ 300, while he makes a net loss of ₹ 300 if the remaining pens are sold at ₹ 9 each. The wage of the employee, in INR, is

Type in the answer.

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53. A basket of 2 apples, 4 oranges and 6 mangoes costs the same as a basket of 1 apple, 4 oranges and 8 mangoes, or a basket of 8 oranges and 7 mangoes. Then the number of mangoes in a basket of mangoes that has the same cost as the other baskets is

(A) 11
(B) 13
(C) 10
(D) 12

---

54. The number of integers n that satisfy the inequalities $\mid n-60 \mid < \mid n-100 \mid < \mid n-20 \mid$ is

(A) 21
(B) 19
(C) 18
(D) 20

---

55. How many three-digit numbers are greater than 100 and increase by 198 when the three digits are arranged in the reverse order?

Type in the answer.

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56. Anil invests some money at a fixed rate of interest, compounded annually. If the interests accrued during the second and third year are ₹ 806.25 and ₹ 866.72, respectively, the interest accrued, in INR, during the fourth year is nearest to

(A) 929.48
(B) 934.65
(C) 931.72
(D) 926.84

---

57. Suppose hospital A admitted 21 less Covid infected patients than hospital B, and all eventually recovered. The sum of recovery days for patients in hospitals A and B were 200 and 152, respectively. If the average recovery days for patients admitted in hospital A was 3 more than the average in hospital B then the number admitted in hospital A was

Type in the answer.

---

58. A circle of diameter 8 inches is inscribed in a triangle ABC where $\angle ABC = 90^\circ$. If BC = 10 inches then the area of the triangle in square inches is

Type in the answer.

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59. $f(x) = \dfrac{x^2+2x-15}{x^2-7x-18}$ is negative if and only if

(A) -5 < x < -2 or 3 < x < 9
(B) x < -5 or -2 < x < 3
(C) -2 < x < 3 or x > 9
(D) x < -5 or 3 < x < 9

---

60. If $5-\log_{10}\sqrt{1+x}+4\log_{10}\sqrt{1-x}=\log_{10}\dfrac{1}{\sqrt{1-x^2}}$, then 100x equals

Type in the answer.

---

61. Amar, Akbar and Anthony are working on a project. Working together Amar and Akbar can complete the project in 1 year, Akbar and Anthony can complete in 16 months, Anthony and Amar can complete in 2 years. If the person who is neither the fastest nor the slowest works alone, the time in months he will take to complete the project is

Type in the answer.

---

62. If $x_0 = 1, x_1 = 2$, and $x_{n+2} = \dfrac{1 + x_{n+1}}{x_n}, n = 0, 1, 2, 3, ...$, then x_{2021} is equal to

(A) 4
(B) 1
(C) 3
(D) 2

---

63. The strength of an indigo solution in percentage is equal to the amount of indigo in grams per 100 cc of water. Two 800 cc bottles are filled with indigo solutions of strengths 33% and 17%, respectively. A part of the solution from the first bottle is thrown away and replaced by an equal volume of the solution from the second bottle. If the strength of the indigo solution in the first bottle has now changed to 21% then the volume, in cc, of the solution left in the second bottle is

Type in the answer.

---

64. Identical chocolate pieces are sold in boxes of two sizes, small and large. The large box is sold for twice the price of the small box. If the selling price per gram of chocolate in the large box is 12% less than that in the small box, then the percentage by which the weight of chocolate in the large box exceeds that in the small box is nearest to

(A) 144
(B) 127
(C) 135
(D) 124

---

65. The natural numbers are divided into groups as (1), (2, 3, 4), (5, 6, 7, 8, 9), ….. and so on. Then, the sum of the numbers in the 15th group is equal to

(A) 6119
(B) 6090
(C) 4941
(D) 7471

---

66. If r is a constant such that $| x^2 - 4x - 13 | = r$ has exactly three distinct real roots, then the value of r is

(A) 17
(B) 21
(C) 15
(D) 18

- End of Question Paper -
