Actual CAT 2025

Slot – I

hitbullseye

BULLS EYE KNOWLEDGE SYSTEM LIMITED

Answer Key Actual CAT Slot - I

Q. No	Key	Q. No	Key	Q. No	Key
1.	4	**25.**	2	**47.**	4
2.	3	**26.**	50 (TITA)	**48.**	4
3.	2	**27.**	80 (TITA)	**49.**	1
4.	1 (TITA)	**28.**	40 (TITA)	**50.**	1
5.	4 (TITA)	**29.**	60 (TITA)	**51.**	3
6.	1	**30.**	4 (TITA)	**52.**	16 (TITA)
7.	3	**31.**	0 (TITA)	**53.**	3
8.	4	**32.**	5 (TITA)	**54.**	900 (TITA)
9.	2	**33.**	4 (TITA)	**55.**	1
10.	4	**34.**	1	**56.**	3
11.	3	**35.**	4 (TITA)	**57.**	4
12.	1	**36.**	4	**58.**	3 (TITA)
13.	4	**37.**	4	**59.**	2
14.	3	**38.**	1	**60.**	6 (TITA)
15.	3421 (TITA)	**39.**	7 (TITA)	**61.**	15 (TITA)
16.	3142 (TITA)	**40.**	4	**62.**	1
17.	2	**41.**	4	**63.**	4
18.	2	**42.**	6 (TITA)	**64.**	55 (TITA)
19.	2	**43.**	2	**65.**	4
20.	4	**44.**	3	**66.**	175 (TITA)
21.	2	**45.**	4	**67.**	60 (TITA)
22.	1	**46.**	3	**68.**	4
23.	4				
24.	1				

Explanation Actual CAT Slot - I

Q. No	Explanation
1.	The sentence to be inserted is a direct quote from Ava that summarizes the core theme of the paragraph: the use of historic, manual techniques from Mexico. To maintain logical flow and coherence, the quote should be placed where it can immediately introduce or emphasize this theme before specific details are provided. Position 1 follows the opening sentence, which states that the sisters "embrace the ways their great-grandfather" worked. Inserting Ava's quote here allows her statement to act as a thematic bridge, emphasizing the "old-world, traditional" nature of those ways before the paragraph elaborates with concrete examples (using hand saws, chisels, sandpaper, etc.). This creates a natural progression from general principle to specific practices. Position 2 comes after the description of techniques. While not entirely illogical, placing the quote here makes it feel more like an afterthought or repetition rather than an introductory emphasis. Position 3 and 4 are too far removed from the discussion of techniques. The paragraph shifts to topics like waitlists, clientele, and personal history, so inserting the quote there would disrupt the flow and weaken the connection to the relevant context. Therefore, Option 1 provides the most coherent and effective placement for the given sentence.
2.	Option 1 is incorrect because it misstates the choice as being between “respectfully acknowledging works” and appropriation, which does not accurately reflect the passage’s focus on the act of drawing inspiration itself. Option 2 captures the contrast between inspiration and appropriation and lists specific negative outcomes, but it omits the globalized context and the broader societal impacts (power imbalances) highlighted at the end of the passage. Option 3 successfully incorporates all key elements: the globalized setting, the need to navigate between respectful inspiration and appropriation, the definition of appropriation, and—most importantly—the extension of its impact to societal power imbalances. While it does not enumerate every specific consequence (e.g., commodification, stereotypes), the phrase “broader societal impacts” effectively encompasses them. Option 4 is too simplistic and misleading; it suggests artists “must” draw from diverse cultures to appeal to everyone, which is not stated, and it fails to address the distinction between respectful and disrespectful borrowing or the serious consequences of appropriation.
3.	Option 1: This is partially correct but incomplete and slightly misleading. It correctly states that a younger immune system clears the cells and that aging leads to accumulation. However, it says the cells "resist apoptosis," which the passage does not claim. The passage states the immune system's clearance process becomes less efficient, not that the cells actively resist. Option 2: This is the most accurate and complete summary. It correctly links aging to less effective apoptosis, which leads to accumulation, which in turn causes inflammation and chronic diseases. It captures the essential cause-and-effect chain described in the passage. Option 3: This is merely a definition of the cells. It fails entirely to address the main point of the passage, which is the process of how their accumulation with age leads to health problems. Option 4: This is incorrect on several points. It calls the cells "dead" (they are senescent/alive but not dividing). It also reverses causality, suggesting inflammation weakens the immune system, while the passage states that a weakened immune system (less effective apoptosis) allows the cells to accumulate and cause inflammation.
4.	Sentences 3, 5, 2, and 4 form a coherent paragraph discussing how the Bayeux tapestry was displayed to create an immersive viewer experience. The logical flow is: Sentence 3 introduces Linda Neagley's argument about how pre-Renaissance people interacted with art. Sentence 5 explains that the Bayeux tapestry was hung at eye level to enable such interaction. Sentence 2 presents Gale Owen-Crocker's idea about the tapestry being hung in a square arrangement. Sentence 4 describes how that arrangement created an immersive 11th-century space. Sentence 1, which states the tapestry's purpose as a storytelling medium about the Norman conquest, does not fit this sequence. It begins with "therefore," implying a conclusion from prior information not present in the other sentences, and its focus on the tapestry's narrative function is separate from the paragraph's theme of physical display and viewer interaction.
5.	Sentences 5, 2, 1, and 3 form a coherent paragraph that introduces the philosophical concept of freedom, narrows it to "freedom over death," explains how developments have increased this freedom, and concludes that legalizing assisted dying is a further step in realizing it. Sentence 4, while related, introduces the specific idea of public endorsement of a right to medical assistance in hastening death, which disrupts the logical flow and is not necessary for the core argument presented in the other four sentences.
6.	The last paragraph states that physicians and lawyers were bound together by shared class, race, gender, and various social networks, but their professional connection centered on their shared concern with the mind and criminal responsibility. Although the passage notes they were "divided by contests over the borders of criminal

	responsibility," this very contestation indicates that this domain was their common professional ground. The other options are incorrect: Option 2 ("Eccentricity and aggression") refers to symptoms some alienists classified as mental disease, not a connecting quality. Option 3 ("Empathy and imagination") relates to how jurors made inferences in the first paragraph, not to the connection between physicians and lawyers. Option 4 ("The opinions of family and neighbours") describes pre-expert methods of assessing sanity mentioned earlier, not a bond between these professionals. Thus, their shared engagement with the borders of criminal responsibility best describes their connection among the given choices.
7.	The passage's central concern is the challenge of assessing a defendant's mental state in criminal law, the evolving role of medical experts (alienists) in defining insanity, and how these intersect with legal notions of responsibility and punishment. Each concept in option 3 is directly and repeatedly addressed in the text: Judgement: The passage begins by discussing how judgements about mental state are made through inference, empathy, and imagination, especially in court. Insanity: The role of alienists (early psychiatrists) in diagnosing insanity and testifying in court is a major theme in the second and fourth paragraphs. Punishment: Criminal responsibility is explicitly linked to "liability to punishment" in the third paragraph. Responsibility: The passage repeatedly examines the legal concept of criminal responsibility and its entanglement with medical views of insanity. The other options include concepts that are either peripheral (patronage, business, patriotism) or only partially relevant (empathy, prosecution) without capturing the core legal-medical debate that defines the passage's argument.
8.	The passage explicitly defines the term "alienist" in the second paragraph: "In the nineteenth century…….neurologists, and psychologists." This directly matches option 4. The other options misinterpret the term: Option 1 is too broad and does not capture the specific medical specialty. Options 2 and 3 incorrectly associate "alienist" with immigrants or extraterrestrials, which is not supported by the passage. Therefore, according to the passage, an alienist was a physician specializing in mental illness.
9.	In the sentence, "confession" is listed alongside disease, gender, and race as characteristics that could make a defendant appear "unlike" the officials judging them. In this context, "confession" does not refer to admitting guilt (a legal confession) but rather to professing a religious faith—a meaning rooted in its historical use to denote religious affiliation or creed (e.g., "the Protestant confession"). The sentence suggests that a defendant's religion, like their gender, race, or health, could mark them as different from the typically white, middle-class, Protestant legal officials of the era, thereby making judgments about their mental state seem more precarious. Thus, the word is used metaphorically to stand for the defendant's religion. The other options are incorrect: Option 1 incorrectly treats "confession" as synonymous with "professing" gender, race, or disease, which distorts the list of distinct categories. Option 3 misreads "struck" as physical violence and inserts an unrelated legal confession. Option 4 invents a false etymology for "dint" and misinterprets "confession" as a false admission of crime, which does not fit the context.
10.	The passage's second argument links inequality to growth through incentives and moral hazard. It states that when compensation is not tied to economic performance, agents may not provide optimum effort. Therefore, performance-based pay — which naturally creates income differences between more and less productive workers — is seen as a way to enhance motivation and spur growth. Option 4 directly embodies this idea: rewarding verifiable performance creates inequality (higher pay for high performers) but aligns incentives with productivity, thereby raising growth. Option 1 refers to the third argument in the passage (concentration of stock ownership for corporate governance), not the incentive/moral hazard argument. Option 2 (wages by tenure) ignores performance and would likely reduce incentives for effort, contradicting the argument. Option 3 (rents protected by market power) describes inequality that is not linked to results, so it does not fit the incentive rationale described. Thus, only option 4 is consistent with the claim that some inequality can raise growth by improving incentives.
11.	Option 1 is one-sided. The passage does not "argue that income inequality accelerates economic growth"; it neutrally presents both supporting and opposing evidence. Option 2 is inaccurate. The passage does not confine itself to financing and corporate control; it covers a broader range of factors (incentives, human capital, political effects). It also explicitly uses cross-country evidence and

	discusses human capital, fertility, and democratization, so it does not overlook these concerns. Option 4 is too narrow. While the passage does mention short- and long-term consequences, this option misses the passage's core structure—the systematic outlining of the three channels through which inequality might affect growth, as well as the balanced presentation of both positive and negative evidence. Option 3 correctly captures the passage's balanced, survey-like structure: it outlines the pro-growth channels, acknowledges short-term gains, and notes the long-term drawbacks and negative correlations reported in other studies.
12.	The passage explicitly notes that empirical studies associated with these arguments show a positive impact of inequality on growth in the short or medium term (with long-term correlations turning negative). Thus, the primary function of this three-part case is to demonstrate the contextual mechanisms and settings—high sunk costs, incentive alignment, and concentrated ownership—through which inequality may temporarily support growth. Why the other options are incorrect: Option 2 directly contradicts the passage, which argues that dispersed ownership slows decision-making and creates free-rider problems. Option 3 is an overstatement; the passage does not claim inequality boosts growth in "every period and type of economy" but specifies certain conditions and notes the effect reverses in the long run. Option 4 mentions mature stock markets making wealth concentration unnecessary—a point loosely related to the first argument—but this is not the primary function of the three-part case; moreover, the option's second clause ("might still be harmful to investment") is not supported by the presented case for a positive link.
13.	This option directly describes a reduction in suffrage and suppression of political pluralism—key features of de-democratization or autocratization, the clear opposite of the expansion of voting rights and inclusion highlighted in the passage. The other options either mislabel democratic practices as authoritarian (option 3), focus on entrenching autocracy without explicitly reducing suffrage (option 1), or discuss campaign finance reforms in the context of oligarchy (option 2), which do not as directly capture the reversal of the democratization process described.
14.	The paragraph first discusses how changes in lighting and domestic habits reduced the traditional need for silver display, yet the trade remained buoyant due to collector demand. The missing sentence, placed at position (3), effectively explains this sustained interest by asserting silver's enduring role in the "business of 'show'" across various settings. It then naturally leads into the next factor—systematic collecting by American museums—which is another manifestation of silver's continued importance for display and status. Placing the sentence earlier (e.g., at Option 1) would disrupt the logical flow from Schroder's specific observation to the broader market analysis.
15.	Sentence 3 introduces the main idea: the social expectation that women suppress anger, unlike men. Sentence 4 continues this idea by providing a concrete example from a coach's experience, showing how this suppression manifests (women "pull their punches"). Sentence 2 presents the next step: the sense of liberation women feel when they do express their anger ("letting their fists fly"). Sentence 1 concludes by broadening the focus, stating that how we handle anger shapes our life and character—a point that applies to everyone, regardless of gender. When read in the order 3-4-2-1, the paragraph flows logically from describing a socialized behavior, to its practical effect, to the release from that behavior, and finally to a universal observation about anger management.
16.	Sentence 3 introduces the panoptic mechanism as a way of embedding power relations within functions. Sentence 1 elaborates with specific examples of how it can be integrated into various functions and increase their effects. Sentence 4 summarizes the idea, emphasizing that power is subtly embedded rather than externally imposed. Sentence 2 concludes with a reflective comment on the mechanism's apparent simplicity in the political sphere. When arranged as 3-1-4-2, the paragraph logically progresses from definition to detailed examples, then to a concise summary, and ends with a broader observation.
17.	The two basic questions recounted at the start of the passage reflect a listener's potential difficulty in recognizing electronic music as legitimate music and in accepting it as human expression. The "communication problem" in paragraph 2—caused by electronic music's unfamiliar "language of forms" and technical terms—directly addresses the first of those questions. It explains why people might initially struggle to see electronic music as music, but the paragraph also states that this barrier can be overcome once the new structural procedures are understood. Thus, the communication problem is the specific obstacle that underlies the initial skepticism, but one that is surmountable.
18.	The phrase "sui generis" (Latin for "of its own kind") is used in the context of electronic music composers exploring new languages and forms that are unique to the medium—distinct from traditional musical structures.

	The term implies something particular, distinctive, and not derived from existing models. "Indescribable" (option 1) is not accurate, as the passage suggests these forms can be understood and explored, not that they are beyond description. "Unaesthetic" (option 3) contradicts the passage, which mentions "aesthetic magic." "Generic" (option 4) is the opposite of "sui generis," which denotes uniqueness. Thus, "particular" best captures the meaning of "sui generis" in this context.
19.	The passage is structured as a direct response to the two basic questions posed at the outset: whether electronic music qualifies as genuine music and whether it is "inhuman." The author systematically addresses these charges by explaining how a modern understanding of music (paragraph 1), overcoming communication barriers through familiarity (paragraph 2), the serious composer's creative exploration (paragraph 3), and the composer's essential human role in the process (paragraph 4) all counter these criticisms. While the passage does touch on distinctions between modern and 19th-century composers and between electronic and traditional music, these points serve the larger purpose of defending electronic music against the initial doubts. The author does not aim primarily to differentiate composers or musical forms, nor to defend composers from Hiller or Stravinsky (indeed, the author cites them supportively). Therefore, the overarching goal is to defend electronic music from the common charges of being non-musical and inhuman.
20.	Stravinsky's description of music as "a form of speculation in terms of sound and time" serves in the passage to: Complicate our notion of what is communicated through music (option 1) by shifting from a 19th-century emotional-expression model to a more abstract, speculative one. Allow us to classify electronic music as music (option 2) because this broader, objective definition accommodates non-traditional forms. Respond to and expand upon earlier understandings of music (option 3) by offering a characteristically 20th-century view that contrasts with the earlier Romantic ideal. However, Stravinsky's definition does not provide a criterion for distinguishing musical from non-musical sounds (option 4). It redefines the nature of musical composition but does not establish a test for which specific sounds qualify as music. Therefore, option 4 is the one that Stravinsky's mention does not accomplish according to the passage.
21.	The passage discusses the stock-market rebound during COVID-19 as follows: "Some of these dynamics are potentially attributable to former sports bettors … The arrival of these new players might have increased inefficiencies…" The language is speculative and tentative, presenting the bettors' entry as one possible factor among others. It does not state or imply that this was the sole or overriding cause of the rapid recovery across all assets and time horizons. Therefore, the inference drawn in option 2 is not supported by the passage. The other options are supported: Option 1 reflects the discussion of how a rare shock can change rules and raise the odds of second-order tail events. Option 3 captures the idea that contagion can amplify local choices into unintended system-wide cascades, illustrated by runs on banks and toilet-paper scrambles. Option 4 accurately summarizes the passage's point about heavy-tailed distributions making extreme outcomes more frequent and complicating forecasting.
22.	The passage claims that a first-order tail event (e.g., a stock-market crash) raises the probability of further tail events (second-order tail events). Option 1 directly supports this by describing empirical evidence: after a major crash, large daily moves cluster together and extreme days occur much more frequently than usual. This matches the passage's description of how an initial tail event changes the rules and increases the likelihood of subsequent extreme events. The other options do not strengthen the claim: Option 2 describes a return to baseline with no elevated aftershocks, which contradicts the claim. Option 3 states that initial super-spreading episodes do not raise the frequency or size of later extreme clusters, again weakening the claim. Option 4 discusses normal distributions with thin tails, which is irrelevant to the claim about tail events increasing subsequent tail-event probability. Thus, only option 1 provides observational evidence that would strengthen the passage's claim.
23.	The passage systematically develops three key ideas about complex systems: Noise can create order – illustrated by the fish-schooling example and the unintended consequences of contact-tracing apps. Vulnerability to heavy-tailed events – in collective settings where contagion shapes behavior, extreme events (like bank runs or infection surges) occur more frequently than a normal distribution would predict. Cascades and rule-changes – a first-order tail event raises the probability of further tail events (second-order events) because it changes the perceived costs and rules of the system (nonstationarity), exemplified by the COVID-19 stock-market rebound and the coevolutionary arms race of hosts and parasites. Option 4 accurately captures this progression and scope. The other options misrepresent the passage:

Option 1 overstates the role of speculative bettors and claims long-term investors "invariably profit," which the passage does not assert.
Option 2 contradicts the passage, which emphasizes that extreme events are not negligible in complex systems.
Option 3 incorrectly limits the concept of adaptation to parasite-host systems and denies its relevance to technology-mediated social dynamics, whereas the passage uses the coevolution example to illustrate a general complex-systems concept.
Thus, option 4 provides the most complete and accurate summary of the passage.

24. The passage's suggestion that contact-tracing apps could inadvertently raise risky interactions rests on the idea that individual responses to local information can interact and produce unintended collective outcomes—similar to how noise (misalignment) among fish feeds back on itself to produce orderly schooling. For this to happen, the system must exhibit interdependence and feedback: people's movement choices must be influenced both by infection information and by others' behavior, so that many small adjustments aggregate into a large-scale pattern that may counter the app's goal. Option 1 explicitly states this necessary assumption.
The other options are not necessary for the suggestion to hold:
Option 2 (most users uninstall apps quickly) would likely prevent the emergence of any systematic collective pattern.
Option 3 (perfect technical accuracy of apps) is not required; even with imperfect data, local behavioral adjustments could still interact.
Option 4 (uniform traffic conditions making interdependence negligible) would actually undermine the suggestion, as it denies the feedback mechanism central to the passage's reasoning.

25 - 29. Let the number of tickets booked from various stations are as follows:

Station		Destination				
		A	**B**	**C**	**D**	**E**
Start	**A**	–	p	q	r	s
	B	–	–	t	u	v
	C	–	–	–	w	x
	D	–	–	–	–	y
	E	–	–	–	–	–

Considering point 3, $s + v = 4/7 \times (s + v + x + y)$
$\Rightarrow (s + 30)/(x + y) = 4/3$
Considering point 2, $t = 40$ and $v = 30$
Considering point 5, $p = u = y = 0$
Solving, $(s + 30)/(x + 0) = 4/3$
$\Rightarrow 3s + 90 = 4x$
Considering point 4, $q = s > v = 30$
Also in point 6, the number of tickets booked for any segment = multiple of 10
Let $s = 40 \Rightarrow x = 52.5$ (not possible)
Let $s = 50 \Rightarrow x = 60$ (possible)
Let $s = 60 \Rightarrow x = 67.5$ (not possible)
Let $s = 70 \Rightarrow x = 75$ (not possible)
Let $s = 80 \Rightarrow x = 82.5$ (not possible)
Let $s = 90 \Rightarrow x = 90$, but that makes $s + v + x + y = 210 > 200$ (maximum seating capacity (not possible)
So, only possibility, $s = 50 = q$ and $x = 60$

Station		Destination				
		A	**B**	**C**	**D**	**E**
Start	**A**	–	0	50	r	50
	B	–	–	40	0	30
	C	–	–	–	w	60
	D	–	–	–	–	0
	E	–	–	–	–	–

Considering point 1, segment C – D had an occupancy factor = 95% of 200
So, Tickets (A-E + A-D + B-E + B-D + C-E + C-D) = 190
$\Rightarrow 50 + r + 30 + 0 + 60 + w = 190$
$\Rightarrow r + w = 50$
Also, segment B – C had an occupancy factor > 190 = 200 (only multiple of 10)

So, Tickets (A-E + A-D + A-C + B-E + B-D + B-C) = 200
=> 50 + r + 50 + 30 + 0 + 40 = 200
=> r = 30 and => w = 20

Station		Destination				
		A	B	C	D	E
Start	A	–	0	50	30	50
	B	–	–	40	0	30
	C	–	–	–	20	60
	D	–	–	–	–	0
	E	–	–	–	–	–

25. The occupancy for segment D – E = s + v + x + y = 140
Hence, the occupancy factor = 140/200 × 100 = 70%

26. Number of tickets booked from Station A – E = s = 50

27. Number of tickets booked from station C = Tickets (C-D + C-E + D-E) = 20 + 60 + 0 = 80

28. Number of tickets booked to station C = Tickets (A-C + B-C) = 50 + 40 = 90
Number of tickets booked to station D = Tickets (A-D + B-D + C-D) = 30 + 0 + 20 = 50
Required difference = 90 – 50 = 40

29. Number of tickets booked to travel in exactly one segment
= Tickets (A-B + B-C + C-D + D-E) = 0 + 40 + 20 + 0 = 60

30 - 34. Considering point 3, Bunty received a rating of 1 from Lalu in Quarter 2. But in Quarter 1, he was in group Elite led by Kuku, so he must got the lowest rating and was demoted to Novice led by Lalu in Quarter 2. Asha and Chintu is still part of group Elite at the end of Quarter 1 with rating either 2 or 3.
Considering point 2, Dolly and Falguni got the same rating across all the quarters, and Dolly received ratings of 2 in Quarter 3 by Lalu. So, she must received rating 2 throughout each Quarter.
Now if Falguni got the rating of 1 at the end of each Quarter, she will not able to promote to Elite group, but considering point 1, Asha, Bunty and Chintu, all are part of Novice group at the beginning of Quarter 4. So, each one of them must demoted to Novice group one by one. Similarly, Dolly, Eklavya and Falguni must be promoted to Elite group one by one.
So, Falguni must get the rating of 3 at the end of Quarter 1 and promoted to Elite group and Eklavya got the rating of 1 at the end of quarter 1.
At the end of Quarter 2, among Novice group, Bunty received rating 1, Dolly received rating 2 (being same throughout). So, Eklavya received rating 3. Now the cumulative score of Dolly and Eklavya becomes same, but Eklavya has he higher rating at the end of Quarter 2, so he must be promoted to Elite group in Quarter 3.
Also in Quarter 3, Asha received rating of 1 from Lalu (manager of Novice group). So, at the end of Quarter 2, among Elite group, Asha must be demoted to Novice with minimum cumulative score.
Now for Asha having minimum cumulative score, Asha must has rating 1 and Chintu must has rating 2 in Quarter 2. Also, rating of Asha in Quarter 1 can be 2 or 3 and rating of Chintu in Quarter 1 can be 2 or 3 such that cumulative score after Quarter 2 of Asha is 3 or 4 and Chintu is 4 or 5.
Now in Quarter 3, Chintu demoted to Novice group with minimum cumulative score, so his cumulative score can be 5 or 6 after Quarter 3 having rating 1 in Quarter 3 and Dolly promoted to Elite group having highest cumulative rating 6 after Quarter 3.
The rest of the information can be gathered as follows:

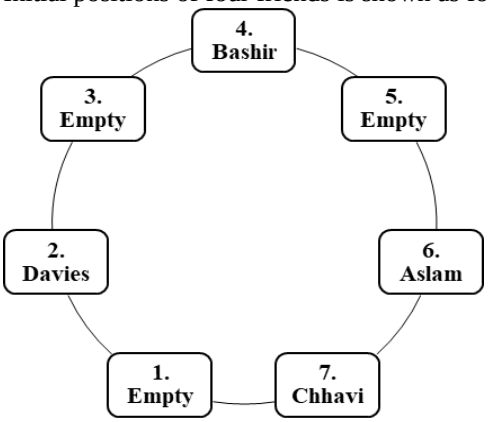
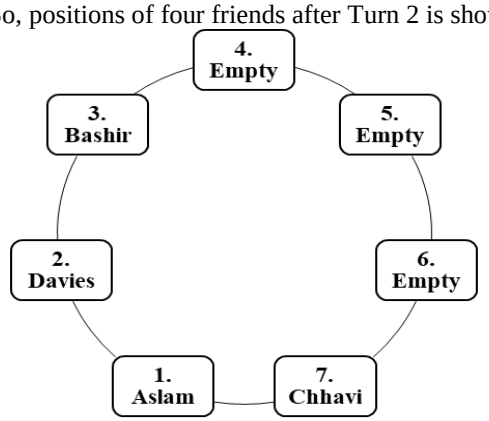
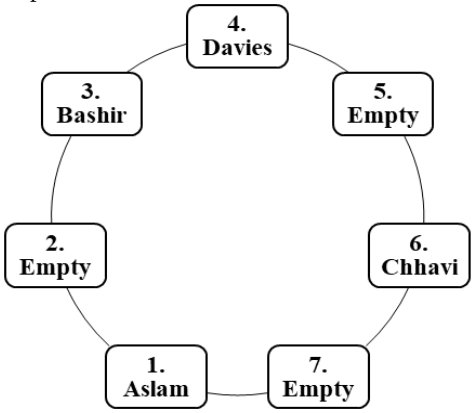
Employee		Asha	Bunty	Chintu	Dolly	Eklavya	Falguni
Quarter 1	Group	Elite	Elite	Elite	Novice	Novice	Novice
	Rating	2/3	1	3/2	2	1	3
Quarter 2	Group	Elite	Novice	Elite	Novice	Novice	Elite
	Rating	1	1	2	2	3	3
Cumulative Rating		3/4	2	4/5	4	4	6
Quarter 3	Group	Novice	Novice	Elite	Novice	Elite	Elite
	Rating	1	3	1	2	2	3
Cumulative Rating		4/5	5	5/6	6	6	9
Quarter 4	Group	Novice	Novice	Novice	Elite	Elite	Elite
	Rating				2	1	3

30. Eklavya's score at the end of Quarter 2 is 4

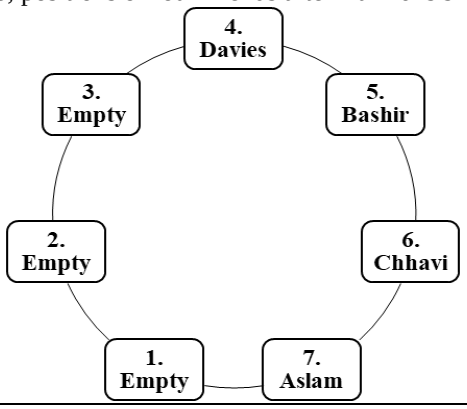
31. No employee changed group more than once up to the beginning of Quarter 4

32. Bunty's score at the end of Quarter 3 is 5

33. The scores at the end of Quarter 3 can be determined with certainty for 4 employees

34.	Statement I. Asha received a rating of 2 in Quarter 1 is not true as she received either rating 2 or 3 in Quarter 1 Statement II. Asha received a rating of 1 in Quarter 2 is true
35 - 38.	Considering point 2, Davies occupies Chair 2 after Turn 1 (which is moved by Aslam), so Davies must be seated on Chair 2 initially. Also, initially the chairs on either side of Davies are empty. So, Chair 1 and Chair 3 are empty initially. Chhavi occupies Chair 7 after Turn 2 (which is moved by Bashir), so Chhavi must be seated in Chair 7 initially. Also, initially Aslam and Chhavi are seated next to each other, so Aslam must be seated on Chair 6 initially. So, Bashir must be seated on Chair 4 initially (only empty chairs left on either side) Initial positions of four friends is shown as follows:  Considering point 1, the four friends occupies adjacent chairs at the end of Turn 2. Now if Aslam (having Turn 1) moved counterclockwise to the empty Chair 5 followed by Bashir (having Turn 2) moved to either Chair 3 (counterclockwise) or Chair 6 (clockwise), the four friends would not be occupying adjacent chairs. So, Aslam (having Turn 1) must moved clockwise to occupy the Chair 1 followed by Bashir (having Turn 2) moved to Chair 3such that the four friends occupies adjacent chairs. So, positions of four friends after Turn 2 is shown as follows:  Again considering point 2, Davies occupies Chair 4 after Turn 5. So, Chhavi having Turn 3 must move to Chair 6 followed by Davies having Turn 4 must move to Chair 4. So, positions of four friends after Turn 4 is shown as follows: 

Again considering point 1, the four friends occupy adjacent chairs at the end of Turn 6. So, Aslam (having Turn 5) must move counterclockwise to occupy Chair 7 and Bashir (having Turn 6) must move clockwise to occupy Chair 5 such that the four friends occupy adjacent chairs at the end of Turn 6.
So, positions of four friends after Turn 6 is shown as follows:



35. The number of the chair initially occupied by Bashir is Chair 4

36. Since, Davies moved to Chair 4 having Turn 4, so at the end of Turn 3, Chair 4 must be empty and no one sits on the Chair numbered 4

37. At the end of Turn 6, chairs occupied are Chairs numbered 4, 5, 6, and 7

38. At the end of Turn 7, Chhavi from Chair 6 moved to either empty Chair 1 or empty Chair 3 and Bashir is sitting on Chair 5. So, the friends sitting on chairs adjacent to Bashir are Chair 4 occupied by Davies and Chair 6 must be empty

39 - 42. Following points are given:
1. 5 players (A, B, C, D, E) asks a unique question to the other players.
2. Total Responses = 5 × 4 = 20
3. Responses: Yes (1Tap), No (2 Taps), Maybe (3 Taps)
4.Total taps heard = 40
Let Y, N, M be the total number of Yes, No and Maybe responses respectively.
So, Y + N + M = 20 and Y + 2N + 3M = 40
By solving these 2 equations, we can get Y = M
So, Y + N + M = 20 implies N = 20 – 2Y.
Now, use the constraint: **Each question received at least one "Yes", one "No", and one "Maybe."** This means that for the **4 responses** to any question (i.e., for any column in the response matrix), Since there are 5 questions, minimum values of Y, N and M are 5 each.
So there can be following possible cases:

Y	N	M
5	10	5
6	8	6
7	6	7

Now let us consider remaining informations:
Alia tapped a total of 6 times and received 9 taps to her question. She responded “Yes” to the questions asked by both Clive and Dilshan.
Dilshan and Ehsaan tapped a total of 11 and 9 times respectively. Dilshan responded “No” to Badal.
Badal, Dilshan, and Ehsaan received equal number of taps to their respective questions.
No one responded “Yes” more than twice i.e. every row can have at most two Y’s. It also implies that Alia must have said two No’s for B’s and E’s question.

Respondents	A	B	C	D	E	Taps Tapped
A	-	N (2)	Y (1)	Y (1)	N (2)	6
B		-				
C			-			
D		N (2)		-		11
E					-	9
Taps recieved	9	p	q	p	p	40

Now total taps received are 40. Hence 9 + 3p + q = 40 i.e. 3p + q = 31.
(p, q) = (7, 10) or (8, 7) or (9, 4).
Since Each question received at least one "Yes", one "No", and one "Maybe" means every column should contain at least one Y, N and M i.e. total of 6. So (9, 4) is rejected.
Since B's question already has got 2 N's and every column should contain at least one Y, N and M; So, p cannot be 7.
Hence p = 8, q = 7. Also, By observing the taps received we can judge taps given to each player's question.
e.g. Badal received 8 taps for her question.
By taking all above conditions in mind, it is possible only if he got one Y, two N's, 1 M.
Similarly we can judge for C, D and E.
Let us assume total taps responded by B and C are s and w.
So, s + w = 14 where w > s. So, (w, s) = (8, 6); (9, 5); (10, 4)….and so on.
But if we consider s = 5, there is only one way to make B's row's total as 5 i.e. (1, 1, 1, 2) which is a contradiction to the given fact that No one responded "Yes" more than twice.
So, s = 8; w = 6. Also, alia can get 9 taps in only one way i.e. Y, N, M, M. Let us update the table:

Respondents	A	B	C	D	E	Taps Tapped
A	-	N (2)	Y (1)	Y (1)	N (2)	6
B	1/3	-				s = 6
C	2/3	1/3	-			w = 8
D	2/3	N (2)		-		11
E	1/3	3/1			-	9
Taps recieved	9 (Y, N, M, M)	8 (Y, N, N, M)	7 (Y, Y, N, M)	8 (Y, N, N, M)	8 (Y, N, N, M)	40

39. Clive received 7 taps for his question.

40. Alia and Badal tapped an equal number of times in total

41. D's total taps are 11. D tapped twice in response to B's question. That means the only possible way is (3, 3, 3, 2). B's total taps are 6 i.e. 1, 1, 2, 2 is the only way to get a 6 (Keep in mind that No one responded "Yes" more than twice). So, we can fill in the remaining table as follows:

Respondents	A	B	C	D	E	Taps Tapped
A	-	N (2)	Y (1)	Y (1)	N (2)	6
B (1,1,2,2)	1	-	2	2	1	s = 6
C	2	1	-	3	2	w = 8
D	3	N (2)	3	-	3	11
E	3	3	1	2	-	9
Taps recieved	9 (Y, N, M, M)	8 (Y, N, N, M)	7 (Y, Y, N, M)	8 (Y, N, N, M)	8 (Y, N, N, M)	40

So, Clive's response to Ehsaan's question is No.

42. 6 "Yes" responses were received across all the questions.

43 - 46. The given information in the charts can be gathered as follows:

	Import tariff % on country				
By ↓	**US**	**France**	**India**	**Japan**	**UK**
US	–	20%	40%	30%	30%
France	30%	–	40%	30%	40%
India	40%	50%	–	50%	20%
Japan	40%	30%	50%	–	40%
UK	20%	30%	30%	40%	–

	Import tariff in Billion USD charged on country				
By ↓	**US**	**France**	**India**	**Japan**	**UK**
US	–	6	4.5	7	3
France	5.5	–	6.5	4	4.5
India	9	5	–	3.5	5
Japan	4	3	8	–	3
UK	2.5	4	3	6	–

Imports from France by US × Tariff rate = Import Tariff
⇒ Imports from France by US × 20% = 6 Billion USD
⇒ Imports from France by US = 6/20 × 100 = 30 Billion USD

Similarly, it can be calculated for others as follows:

	Imports from country in Billion USD				
By ↓	**US**	**France**	**India**	**Japan**	**UK**
US	–	30	11.25	23.33	10
France	18.33	–	16.25	13.33	11.25
India	22.5	10	–	7	25
Japan	10	10	16	–	7.5
UK	12.5	13.33	10	15	–

43. Japan's export to India worth = India's import from Japan = 7 Billion USD

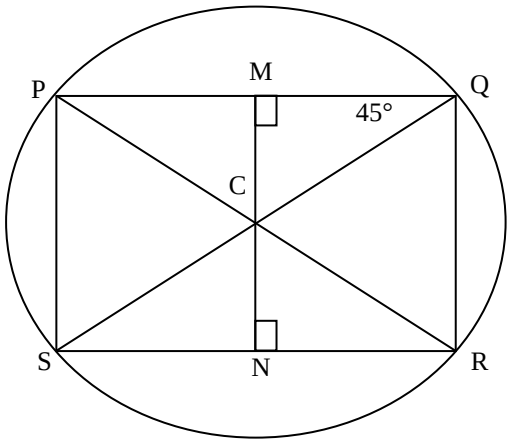
44. Going by options,
1. Exports by France to Japan = Imports by Japan from France = 10 Billion USD
2. Imports by France from India = 16.25 Billion USD
3. Imports by US from France = 30 Billion USD, highest
4. Exports by Japan to UK = Imports by UK from Japan = 15 Billion USD

45. Trade surplus/trade deficit of India with UK = Exports from India to UK – Imports from India from UK
= Imports from UK to India – Imports from India to UK
= 10 – 25 = -15 Billion USD (deficit)

46. Trade surplus/trade deficit of France with US = Exports from France to US – Imports from France to US
= Imports from US to France – Imports from France to US
= 30 – 18.33 = 11.67 Billion USD (surplus)
Trade surplus/trade deficit of UK with US = Exports from UK to US – Imports from UK to US
= Imports from US to UK – Imports from UK to US
= 10 – 12.5 = -2.5 Billion USD (deficit)

47. Let the initial number of students in the morning shift be M_1 and the initial number of students in the afternoon shift be A_1
ATQ: $M_1/A_1 = 13/9$
So, $M_1 = 13x$, $A_1 = 9x$
21 students moved from the morning shift to the afternoon shift. The new number of students in the morning shift, M_2, is:
$M_2 = M_1 - 21 = 13x – 21$
The new number of students in the afternoon shift, A_2, is:
$A_2 = A_1 + 21 = 9x + 21$
The new ratio is given as 19 : 14,
$M2/A2 = 19/14 \Rightarrow \frac{13x - 21}{9x - 21} = \frac{19}{14}$
$\Rightarrow 14(13x - 21) = 19(9x + 21)$
$\Rightarrow 182x - 294 = 171x + 399$
$\Rightarrow 182x - 171x = 399 + 294$
$\Rightarrow x = 63$
So, $M_2 = 798$ and $A_2 = 588$
Let N_M be the number of new students who joined the morning shift, and N_A be the number of new students who joined the afternoon shift.
AT Q $N_M/ N_A = 3/8 \Rightarrow N_M = 3y$ and $N_A = 8y$
The total number of new students is $3y + 8y = 11y$
The final number of students in the morning shift, M_3, is:
$M3 = M2 + N_M = 798 + 3y$, The final number of students in the afternoon shift, A3, is:
$A3 = A2 + N_A = 588 + 8y$.
As final ratio is $5 : 4 \Rightarrow M3/A3 = 5/4$
$\frac{798 + 3y}{588 + 8y} = \frac{5}{4} \Rightarrow y = 9$
The number of new students who joined = $11y = 11 \times 9 = 99$

48. $\log_{1/4}(n^2 - 7n + 11) > 0$
Since the base of the logarithm, b = 1/4 is between 0 and 1, the inequality sign must be reversed when converting the logarithm to an exponential form
$n^2 - 7n + 11 < (1/4)^0 \Rightarrow n^2 - 7n + 11 < 1$
$\Rightarrow n^2 - 7n + 11 < 0$

	$\Rightarrow (n - 2)(n - 5) < 0$ This quadratic is negative only between its roots, n = 2 and n = 5. Therefore, the solution for the inequality is $2 < n < 5$ So, distinct integers n, the possible values are n = 3, 4 The distinct integers are 3 and 4, so the count is 2.
49.	Since radius = $6\sqrt{2}$ cm PQ and SR are parallel and separated by a diameter. This means they lie on opposite sides of the center C. Also $\angle$ PQC = 45° and ratio of perpendicular distance of PQ and SR from C is 3:2. Let M be the midpoint of PQ, and N be the midpoint of SR, then CM $\perp$ PQ and CN $\perp$ SR. Consider Δ PQC. Since CP and CQ are both radii, CP = CQ = R = $6\sqrt{2}$. Thus, ΔPQC is an isosceles triangle. In Δ PQC, the sum of angles is 180° $\angle$ PCQ + $\angle$ CPQ + $\angle$ PQC = 180°. Since CP = CQ, $\angle$ CPQ = $\angle$ PQC = 45° $\angle$ PCQ + 45° + 45° = 180° $\Rightarrow$ $\angle$ PCQ = 180° – 90° = 90° ΔPQC is an isosceles right triangle. CM is the altitude to the base PQ in the isosceles ΔPQC. cos ($\angle$MQC) = CM/CQ $\Rightarrow d_{PQ}$ = CM = CQ × cos 45° = $6\sqrt{2} \times 1/\sqrt{2}$ = 6 cm As d_{PQ}/d_{SR} = 3/2 $\Rightarrow$ 6 /d_{SR} = 3/2 $\Rightarrow$ d_{SR} = 4cm In triangle CMQ, $CM^2 + MQ^2 = CQ^2 \Rightarrow 6^2 + MQ^2 = (6\sqrt{2})^2$ $\Rightarrow$ MQ = 6cm PQ = 2MQ = 12 cm In ΔCNR, $CN^2 + NR^2 = CR^2 \Rightarrow$ CR = R = $6\sqrt{2} \Rightarrow 4^2 + NR^2 = (6\sqrt{2})^2 \Rightarrow$ NR = $2\sqrt{14}$ The length of chord SR is 2 NR $\Rightarrow$SR = $4\sqrt{14}$ The quadrilateral PQRS is a trapezoid because PQ is parallel to SR. The height of the trapezoid is the distance between the parallel chords, which is h = $d_{PQ} + d_{SR}$ since they are on opposite sides of the center. h = 6 + 4 = 10 cm The area of a trapezoid = 1/2 (PQ + SR) × h = ½(12 + $4\sqrt{14}$) × 10 = 20(3 + $\sqrt{14}$) sq cm 
50.	The initial volume of the solution is 200 litres, and it is 30% acid by volume. So. acid volume is 60lt and volume of water is 200 - 60 = 140lt. Atul replaces 20% of the 200lt solution with water. Vol removed is 40lt. The removed solution has the same concentration as the initial solution (30% acid). Acid removed= 30% of 40 = 12 lt. Now after removal acid is 60-12 = 48lt 40 lt of pure water is added back. Since pure water is added, the amount of acid does not change in this step. Acid vol. after step I = 48 lt. The total volume is back to 200 lt. The concentration of acid is now 48/200 = 24% Atul replaces 10% of the current 200 lt solution with pure acid. So, vol. removed is 20lt. The removed solution has a concentration of 24% acid (from Step 1). So, acid removed is 24% of 20 = 4.8 lt. Acid remaining after removal = 48 - 4.8 = 43.2lt. Acid volume after Step 2 = 43.2 + 20 = 63.2 lt. The concentration of acid is now 63.2/200 Atul replaces 15% of the current 200 lt solution with pure water. Volume removed = 15% of 200 = 30lt. Acid concentration = 63.2/200 = 31.6% Acid removed = 31.6% of 30lt = 9.48 lt. Acid remaining after removal = 63.2 - 9.48 = 53.72 lt The final volume of the solution is 200 litres, and the final volume of acid is 53.72 litres. The final percentage of acid by volume = $\frac{53.72}{200} \times 100$ = 26.86% which is nearest to 27%.
51.	Total Distance = 224km = 224000m. Total Time = 3h = 180min. speed in first part S1 = 960 m/min. Time taken in first part t1 = 30min. First part Distance D1 = = 960 × 30 = 28800 m Let the times be t1, t2, t3, t4 with first term t1 = 30 and common difference d. The sum of the four terms is the total time = 180 minutes. Also Sn = $\frac{n}{2}(2t1 + (n-1)d)$

$\Rightarrow 180 = \frac{4}{2}(2\times 30+(4-1)d) \Rightarrow d = 10$ min

Since time covered is A.P. So, time will be 30, 40, 50, 60, 70

Let the speeds be S1, S2, S3, S4 with first term S1 = 960 and common difference D.

Total distance = $S_1t_1 + S_2t_2 + S_3t_3 + S_4t_4 = 224000$ m

Substitute the known values $S_i = 960 + (i - 1)D$

224000 = (960 × 30) + ((960 + D) × 40) + 48000 + 2D) ×50) + ((960 + 3D) × 60)

224000 = 28800 + 38400 + 40D + 48000 + 100D+ 57600 + 180D

224000 = 172800 + 320D $\Rightarrow$ 320D = 51200 $\Rightarrow$ D = 160 m/min^2

Now speed for 4th part = $S_4 = S_1 + 3D = 960 + 3(160) = 960 + 480 = 1440$ m/min

Distance for the fourth part = 1440 × 60 = 86400 m

52. Here x > y …..(1), y≥ 3 ….. (2), x + y < 14 …..(3)

From inequality (2), smallest possible integer value for y is 3. From inequality (1), we know that x must be strictly greater than y, so x ≥ y + 1.

Substituting y with its minimum value, the smallest possible integer for x is x ≥ 3 + 1 = 4.

From inequality (3), x + y < 14 $\Rightarrow$ y + 1 + y < 14 $\Rightarrow$ y < 6.5

Since y is an integer, the largest possible value for y is 6.

Combining this with inequality (2), the possible integer values for y are 3, 4, 5, 6.

y	Conditions for x	Range for x	Possible values for x	Number of pairs (x, y)
3	x > 3 and x < 14 - 3 ⇒ x < 11	4 < x < 11	4, 5, 6, 7, 8, 9, 10	10 - 4 + 1 = 7
4	x > 4 and x < 14 - 4 ⇒ x < 10	5 < x < 10	5, 6, 7, 8, 9	9 - 5 + 1 = 5
5	x > 5 and x < 14 - 5 ⇒ x < 9	6 < x < 9	6, 7, 8	8 - 6 + 1 = 3
6	x > 6 and x < 14 - 6 ⇒ x < 8	7 < x < 8	7	7 - 1 + 1 = 1

The total number of distinct pairs (x, y) is the sum of the number of pairs found in the table = 7 + 5 + 3 + 1 = 16

53. Given, $3 \le x \le 6$, $[x^2] = [x]^2$

Since $[x]$ is constant on each interval between consecutive integers, we split [3, 6] into [3, 4), [5, 6), {6}

Case 1: $3 \le x < 4$, Here, $[x] = 3$, so$[x]^2 = 9 \Longrightarrow 9 \le x^2 < 10$, $3 \le x < \sqrt{10}$.

This lies inside [3, 4) since $\sqrt{10} \approx 3.16$. So solutions in this case $[3, \sqrt{10})$.

Case 2: $4 \le x < 5$, Here, $[x] = 4$, so $[x]^2 = 16 \Longrightarrow 16 \le x^2 < 17 \Longrightarrow 4 \le x < \sqrt{17}$. So, solution is $[4, \sqrt{17})$

Case 3: $5 \le x 6$, Here, $[x] = 5$, so $[x]^2 = 25 \Rightarrow 25 \le x^2 < 26$, $5 \le x < \sqrt{26}$, solution is $[5, \sqrt{26})$

Case 4: x = 6, $[x] = 6$, $[x]^2 = 36$, $x^2 = 36 \Rightarrow [x^2] = 36$, so the equality holds and x = 6 is a solution.

Option (A): $(3, \sqrt{10})$ is contained in $[3, \sqrt{10})$; $[5, \sqrt{26})$ matches exactly a part of S; {6} is ins S.

Hence (A) ⊆ S; valid

54. The total investment = S + B + G = 100000 ….(1)

Also B = 0.25G, The annual returns are 10% on stocks, 6% on bonds, and 8% on gold, and the total gain was Rs 8200

$\Rightarrow$ 0.10S + 0.06B + 0.08G = 8200 …(2)

From (1): S + 0.25G + G = 100000 $\Rightarrow$ S + 1.25G = 100000 ….(3)

From (2): 0.10S + 0.06(0.25G) + 0.08G = 8200 $\Rightarrow$ 0.10S + 0.095G = 8200 ….(4)

From (3): S = 100000 - 1.25G

Substituting value of S in (4), 0.10(100000 - 1.25G) + 0.095G = 8200

10000 - 0.125G + 0.095G = 8200 $\Rightarrow$ 10000 - 0.03G = 8200

$\Rightarrow$ G = 60000 $\Rightarrow$ B = 0.25G = 0.25 × 60000 = 15000

Since, the annual return on bonds is 6% of the investment. Gain from Bonds = 0.06 B

Gain from Bonds = 0.06×15000 = 900

The amount that she gained from the bonds was Rs 900.

Ans. 900

55. Let the Principal be P, the Simple Rate of Interest be R% (per annum), and the Time be T.

Amount A_1 = Rs13920 when T_1 = 3years. $\Rightarrow 13920 = P + \frac{P\times R\times 3}{100}$

Amount A_2 = Rs 18960 when T_2 = 6years and 6 months = 6.5 years

$18960 = P + \frac{P\times R\times 6.5}{100}$

Time difference = 6.5 - 3 = 3.5 years. Interest earned in 3.5 years= $A_2 - A_1$ = 18960 - 13920 = 5040

Simple Interest = 5040/3.5 = 1440
Interest for 3 years = 3 × 1440 = Rs 4320
P = A_1 – Si (for 3years) = 13920 - 4320 = 9600

$SI = \frac{PRT}{100} \Rightarrow 1440 = \frac{9600 \times R \times 1}{100} \Rightarrow R = 15\%$

Rate per period R = 15% p.a, compounded semi-annually. So, interest = 7.5%
$A = P(1+int)^n = 9600(1 + 0.075)^4 = 12820.5$
Total CI earned = A-P = 12820.5 – 9600 = 3220.5, which is nearest to 3221.

56. The customer can add up to 2 out of 6 available sauces, meaning they can choose 0, 1, or 2 sauces. Now, to choose '0' sauces there is 1way. To choose '1' sauces there are 6 ways. To choose '2' sauces there is $^6C_2 = 15$ ways. So, total number of ways = 1 + 6 + 15 = 22 ways
Total Ways = Sandwich Types × Breads types × Sizes × Sauce = 5 × 4 × 2 × 22 = 880 ways

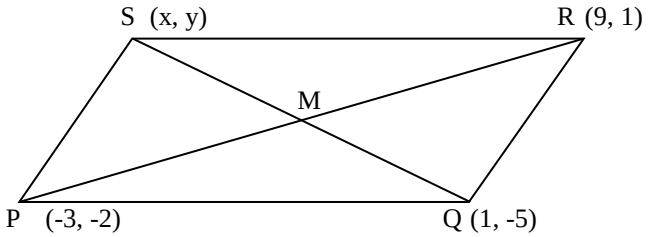
57. Arun, Varun and Tarun, if working alone, can complete a task in 24, 21, and 15 days, respectively.
Arun's cost for per unit work =24 × 2160 = 51840
Vrun's cost for per unit work =21 × 2400 = 50400
Tarun's cost for per unit work =15 × 2160 = 32400
To minimize the total cost, we must prioritize employing the worker(s) who have the lowest cost per unit of work. The task must be completed in 10 days or less. We should employ the cheapest worker first until the 10-day limit is reached or the work is done. Tarun is the cheapest worker. We must employ him every day for the maximum possible work until the 10-days limit.
Work done by Tarun in 10 days = 10 × 1/15 = 2/3
Cost = 10 × 2160 = Rs 21600, Remaining work = 1/3
Days needed for Varun to complete 1/3 of the task = 1/3 × 21 = 7 days
Cost for Varun= 7 × 2400 = 16800
Total Minimum Cost = Cost (Tarun) + Cost (Varun) = 21600 + 16800 = 38400

58. The eq is $x^2 - 5x + k = 0$. let α and β be the roots of this eq.
Sum of roots = 5 and Product of roots = k
The possible pairs of integers α and β that satisfy α + β = 5 are:

α	β	α + β	αβ = k
5	0	5	0
4	1	5	4
3	2	5	6

Since αβ = k, the order of the roots doesn't matter, e.g. (4, 1) and (1, 4) both give k = 4.
The possible values for k = αβ that are non-negative integers are (0, 4, 6).
So, 3 values.

59. Let M be the bisecting point of PR and SQ. $M = \left(\frac{-3+9}{2}, \frac{-2+1}{2}\right) = (3, -1/2)$



Now, equate M to midpoint of SQ. $3 = \frac{1+x}{2} \Rightarrow x = 5$ and $-1/2 = \frac{-5+y}{2} \Rightarrow y = 4$
The coordinates of S are (5, 4). The diagonal SQ passes through S(5, 4) and Q(1, -5). The line SQ intersects the x-axis at a point (a, 0). The slope from S to Q must equal the slope from S to (a, 0).

Slope SQ = $\frac{-5-4}{1-5} = \frac{9}{4}$, Slope S at (a, 0) = $\frac{0-4}{a-5} = \frac{-4}{a-5}$

$\Rightarrow \frac{-4}{a-5} = \frac{9}{4} \Rightarrow 9(a - 5) = 4(-4)$
$\Rightarrow 9a - 45 = -16 \Rightarrow a = 29/9.$

60. The digits of must be non-zero, so they come from 1 to 9. The digits cannot be perfect squares i.e., 1, 4, 9. The set of allowed digits (digits that are not perfect squares) is {2, 3, 5, 6, 7, 8}. The digits must be distinct and

	exactly one of them must be a prime number. Since we need two distinct non-prime digits, and the only available non-prime digits are 6 and 8, and the smallest number that following the given condition is 268. The prime factors of 268 are $2^2 \times 67$. So, the total factors are $3 \times 2 = 6$. Answer is 6
61.	Price of stocks A, B and C is Rs 120, Rs 90 and Rs 150 respectively. Shares of stock A =10. Total portfolio value = Rs 3300. Total shares of B and C = 20. Now, the value of the shares of Stock A = 10×120 =Rs 1200 The total value of the shares of Stocks B and C = 3300 -1200 = Rs 2100 Let the shares of stock B be S_b and price of B is P_b. P_c is the price of stock C and S_c is the shares of stock C. So, $S_c = 20 - S_b$ Now, total value of the shares of Stocks B and C = $S_b \times P_b + S_c \times P_c$ $\Rightarrow 2100 = S_b \times 90 + (20 - S_b) \times 150 \Rightarrow 2100 = 90\ S_b + 3000 - 150\ S_b \Rightarrow S_b = 900/60 = 15$ Answer is 15
62.	Equations are: $a - 6b + 6c = 4$ ….(1) and $6a + 3b - 3c = 50$ ….(2) From (2), $3b - 3c = 50 - 6a$ Now, $2a + 3b - 3c = 2a + 50 - 6a = 50 - 4a$ Multiplying eq (2) by 2, $12a + 6b - 6c = 100$ ….(3) Now adding (1) and (3) we have, $a - 6b + 6c + 12a + 6b - 6c = 104 \Rightarrow 13a = 104 \Rightarrow a = 8$ Now, $2a + 3b - 3c = 50 - 4a \Rightarrow 2a + 3b - 3c = 50 - 32 = 18$
63.	The general form of a quadratic function is $ax^2 + bx + d$. The extreme value (minimum if $a > 0$, maximum if $a < 0$, occurs at the vertex, where $x = -b/2a$. The extreme value is the function evaluated at this x is $a\left(-\frac{b}{2a}\right)^2 + b\left(-\frac{b}{2a}\right) + d$ The quadratic function $f(x) = x^2 - 4cx + 8c$. Since $a > 0$, the function has a minimum value. Then, $x_f = = -b/2a = -(-4c)/2 = 2c$. So, mini value is 2c. $f_{min} = (2c)^2 - 4c(2c) + 8c$ $f_{min} = 4c^2 - 8c^2 + 8c$ $f_{min} = 4c^2 + 8c$ Now, $g(x) = -x2 + 3cx - 2c$. Since $a < 0$, the function has a maximum value. $x_g = = -b/2a = -3c/-2$. So, max value is = 3c/2. $g_{max} = -\left(\frac{3c}{2}\right)^2 + 3c\left(\frac{3c}{2}\right) - 2c$ $g_{max} = -\frac{9c^2}{4} + \frac{9c^2}{2} - 2c$ $g_{max} = -\frac{9c^2}{4} + \frac{18c^2}{4} - 2c$ $g_{max} = \frac{9c^2}{4} - 2c$ Since, $f_{min} > g_{max}$ $-4c^2 + 8c > \frac{9c^2}{4} - 2c$ $-4c^2 - \frac{9c^2}{4} + 8c + 2c > 0$ $\left(-4 - \frac{9}{4}\right)c^2 + 10c > 0$ $-\frac{25}{4}c^2 + 10c > 0,\ c\left(\frac{25}{4}c - 10\right) < 0$ The critical points where the expression equals zero are c = 0 and when $25c/4 - 10 = 0 \Rightarrow c = 8/5 = 1.6$ So, $0 < c < 1.6$. From options, only 4th option is in this range.
64.	Let the initial number of boys be *B* and girls be *G*. After some students leave, Remaining girls = $(1-0.40)G = 0.6G$ Remaining boys=$(1-0.60)B = 0.4B$ Given that the remaining number of girls is 8 more than the remaining number of boys.

	$0.6G = 0.4B + 8 \Rightarrow 6G = 4B + 80 \Rightarrow 3G = 2B + 40$ Since 40% of girls and 60% of boys leave, the numbers leaving must be integers. $0.4G = 2G/5 \Longrightarrow G$ is a multiple of 5, $0.6B = 3B/5 \Longrightarrow$ B is a multiple of 5 Let B = 5x and G = 5y Eq (1) $\Rightarrow 3(5y) = 2(5x) + 40 \Rightarrow 15y = 10x + 40 \Rightarrow y = \frac{2x+8}{3}$ Total initial students = 5(x + y) To find the mini possible students, we have to minimize (x + y). $B > 10 \Longrightarrow 5x > 10 \Longrightarrow x > 2$ and y must be an integer. $x=3 \Rightarrow 2(3) + 8 = 14$ (not divisible by 3) $x=4 \Rightarrow 2(4) + 8 = 16$ (not divisible by 3) $x=5 \Rightarrow 2(5) + 8 = 18 \Rightarrow y = 6$ So, total students = $B + G = 5 \times 5 + 5 \times 6 = 55$ Answer is 55
65.	The sequence is 1,3,5,……,57 Number of terms $n = (57-1)/2 + 1 = 29$. Sum of first n odd numbers = $29^2 = 841$ Let k be the mth term. Sum of terms before k is $(m-1)^2$. Sum of terms after k also $(m-1)^2$. Total sum is $841 = 2(m-1)^2 + (m - 1) \Rightarrow (m - 21)(m + 20) = 0$ So, m = 21. Then, $k = 2m-1 = 41$
66.	Let the marked price of one chair be M. Total CP = $13 \times 100 = 1300$ Since profit is 26%. Total SP = $1300 \times 1.26 = 1638$ Discounted price per chair = $M(1-0.22) = 0.78M$ Total amount $= 12 \times 0.78M = 9.36M$. This must equal the total SP $\Rightarrow 9.36M = 1638$ $M = 1638/9.36 = 175$ Answer is 175
67.	s = 36cm, Area = 396 sq cm Area $= 1/2 d_1 d_2 \Rightarrow 396 = 1/2 d_1 d_2 \Rightarrow d_1 d_2 = 792$ $d_1^2 + d_2^2 = 4s^2 = 4 \times (36)^2 = 4 \times 1296 = 5184$ $(d_1 - d_2)^2 = (d_1^2 + d_2^2) - 2(d_1 d_2) \Rightarrow (d_1 - d_2)^2 = 5184 - 2(792) = 3600 \Rightarrow d_1 - d_2 = 60$ The absolute value of the difference between the lengths of the diagonals is 60 cm. Answer is 60
68.	Given $a_k = 3^k$ $(a_k)^k = (3^k)^k$ $(a_1)^1 (a_2)^2 \ldots (a_{20})^{20} = 3^{1^2} \cdot 3^{2^2} \ldots\ldots 3^{20^2} = 3^{1^2+2^2+\ldots+20^2}$ $1^2 + 2^2 + \ldots\ldots + n^2 = \frac{n(n+1)(2n+1)}{6}$ For n = 20, $\frac{20 \times 21 \times 41}{6} = 2870$ Thus LHS = 3^{2870} RHS = $a_{21}\, a_{22} \ldots a_{20+m} = 3^{21}.3^{22}\ldots.3^{20+m}$ The exponent is the sum of an A.P. with first term = 21 last term = 20 + m, number of terms = m $21 + 22 + 23 + \ldots\ldots + (20 + m) = \frac{m}{2}(21 + (20 + m)) = \frac{m}{2}(41 + m)$ So, RHS = $3^{\frac{m(m+41)}{2}}$ $3^{2870} < 3^{\frac{m(m+41)}{2}}$ i.e. $2870 < \frac{m(m+41)}{2} \Rightarrow 5740 < m^2 + 41m$ or $m^2 + 41m - 5740 > 0$ On solving this inequality, m > 57.98 The quadratic is positive for m > 57.98, so the smallest natural number that satisfying the inequality $2870 < \frac{m(m+41)}{2}$ is m = 58

Actual CAT 2025

Slot – II

hitbullseye

BULLS EYE KNOWLEDGE SYSTEM LIMITED

Answer Key Actual CAT Slot - II

Q. No	Key	Q. No	Key	Q. No	Key
1.	4	25.	4	47.	3
2.	3	26.	2	48.	2
3.	4	27.	4	49.	4
4.	2	28.	2	50.	1
5.	3 (TITA)	29.	4 (TITA)	51.	2
6.	2413 (TITA)	30.	60 (TITA)	52.	340 (TITA)
7.	1	31.	40 (TITA)	53.	1
8.	3 (TITA)	32.	84 (TITA)	54.	3
9.	4	33.	3	55.	1
10.	2	34.	45 (TITA)	56.	80° (TITA)
11.	3	35.	35 (TITA)	57.	4
12.	1	36.	50 (TITA)	58.	2 (TITA)
13.	4	37.	3	59.	49 (TITA)
14.	3	38.	9 (TITA)	60.	2
15.	4	39.	4 (TITA)	61.	12 (TITA)
16.	1423 (TITA)	40.	3	62.	4
17.	4	41.	4	63.	4
18.	2	42.	3 (TITA)	64.	8 (TITA)
19.	4	43.	6 (TITA)	65.	4
20.	1	44.	1	66.	25 (TITA)
21.	2	45.	2	67.	1
22.	1	46.	4	68.	17 (TITA)
23.	2				
24.	2				

Explanation Actual CAT Slot - II

Q. No.	Explanation
1.	Riddle's inference, based on the cross-breeding experiment, is that there is no link between eye presence/absence and the accumulation of carotenoids (which turn fat yellow). This conclusion is supported by the observation that some eyeless cavefish had white fat (low carotenoids), showing that eye loss does not necessarily lead to carotenoid buildup. If the experiment instead showed that only eyeless offspring had yellow fat, this would establish a strict correlation between the absence of eyes and high carotenoid levels. Such a result would directly contradict Riddle's inference that there is no connection, because it would suggest that eye loss is consistently associated with carotenoid accumulation. Therefore, this outcome would invalidate her conclusion. The other options are consistent with Riddle's inference: Options 1 and 2 show that fish with eyes can have either white or yellow fat, indicating no clear link. Option 3 (some eyeless offspring with white fat) is explicitly mentioned in the passage as evidence supporting Riddle's view. Thus, only option 4 would undermine Riddle's inference.
2.	The "apparent inefficiency" refers to the fact that cavefish embryos begin to form eyes, only for the eye cells to die later. According to Riddle, this is unavoidable because the early development of the brain and the eye are completely intertwined—they occur together in all members of the species. Since the basic developmental program is shared with surface fish, the least disruptive evolutionary path to eyelessness is to start the eye-formation process and then abort it, rather than trying to eliminate eye development from the outset. Option 3 correctly identifies this shared early developmental stage as the reason the inefficiency cannot be avoided. Option 1 is incorrect; the passage does not attribute eye-cell death to the lack of light. Option 2 describes a compensation for losing eyes, but does not explain why the inefficient process itself is unavoidable. Option 4 addresses the ecological pressure that favors losing eyes, but not why the developmental process remains inefficient.
3.	The passage explicitly states that Riddle hypothesizes carotenoids "may be another adaptation to suppress inflammation," which is important because cavefish often overeat when food is available, leading to enlarged fat cells that can burst and cause inflammation. This directly supports option 4. Option 1 describes a visible effect (yellow color) but not the functional purpose. Option 2 is considered and rejected by the experiment showing no link between eye loss and carotenoid accumulation. Option 3 is not mentioned; the passage discusses nutrient absorption and storage as separate adaptations, not linked to carotenoids. Thus, based on the passage, the most likely function of carotenoids is to control inflammation.
4.	The question asks which statement does not describe an adaptation in Mexican tetra cavefish. Adaptations are specific traits that have evolved through natural selection to enhance survival in the cave environment. Option 1 describes the cave environment and the fish's diet. While it doesn't name a trait, it describes the selective pressure (scarce food) that drove adaptations like efficient nutrient absorption. It is part of the adaptive narrative. Option 2 is a general biological statement about fat cells and inflammation in humans and other animals. It is used to introduce a common problem, not to describe a specific adaptation of the cavefish. The adaptation is revealed in the next sentence, where the passage states that cavefish have fewer signs of inflammation despite this general risk. Therefore, this quoted line itself is not about cavefish adaptation. Option 3 directly explains the adaptive rationale for losing eyes—maintaining unused "expensive tissues" is a disadvantage in a resource-poor cave. Option 4 describes the cavefish's behavioral and physiological adaptation of overeating and storing fat when food is available, a crucial survival strategy in their feast-or-famine environment. Thus, only Option 2 does not describe an adaptation in the cavefish; it provides a comparative biological context.
5.	Sentences 4, 1, 2, and 5 form a coherent paragraph that introduces the show's format, describes Torres's appearance and delivery style, and details the content of his comedy. Sentence 3, with its evaluative tone and reference to a "colour-scouting mission" that isn't mentioned elsewhere, breaks this descriptive flow and reads like a concluding remark or external review rather than part of the same descriptive sequence.

6.	We need a logical flow. Probably start with introducing the scent of old books (sentence 2). Then sentence 4 can follow, clarifying that it's not dust but chemical changes. Then sentence 1 explains the chemical changes: breakdown of cellulose and lignin releasing compounds. Then sentence 3 lists the specific compounds. So order: 2, 4, 1, 3.
7.	The missing sentence describes Western customers' disbelief in the human origin of Dhaka muslin, attributing it to mythical weavers like mermaids or fairies. This fits best at position 1, immediately after the opening description of the fabric as a "miracle" and "woven air." Placing it here logically extends the sense of wonder and introduces the rumor before the paragraph details the actual, intricate human process involved in creating the muslin. Inserting it later would disrupt the flow of the technical and historical details that follow.
8.	Sentences 1, 2, 4, and 5 form a coherent paragraph focused on the health implications of PFAS exposure and the significance of recent research: Sentence 1 introduces PFAS and their common uses. Sentence 2 presents new research linking PFAS to health problems via changes in gene activity. Sentence 4 extends the research by suggesting it may reveal other unidentified diseases. Sentence 5 discusses the practical importance of the findings for diagnosis and treatment. Sentence 3, while factually correct, shifts the focus to the environmental persistence of PFAS (why they are called “forever chemicals”). This interrupts the logical flow of the paragraph, which is centered on health effects and research outcomes rather than environmental characteristics. Therefore, sentence 3 is the odd one out.
9.	The passage explicitly contrasts astronomy as a “receptive” science, dependent on detecting emissions, with biology’s “interventional” instrumentation, such as gene-splicing. This direct comparison makes option 4 a valid inference from the text. Option 1 is incorrect because the passage attributes the observations of Venus’s phases and Jupiter’s satellites to Galileo, not to Newton’s later improvements. Option 2 is incorrect because the “new astronomy” refers to observations beyond the optical spectrum (e.g., radio astronomy), which postdate Newton’s reflecting telescopes. Option 3 is invalid because the passage does not contrast “interventionist instruments” and “embodied instruments” as separate categories; it presents instrumentation as embodying science, with varying styles (receptive vs. interventional).
10.	The quoted statement emphasizes that modern sciences are “highly instrumentalized” and that progress depends on “constant improvements upon the respective instrumental trajectories.” This directly leads to the conclusion that advances in these fields result from better instruments. The passage illustrates this with astronomy (from Galileo’s telescopes to modern electromagnetic-spectrum telescopes) and biology (from microscopes to interventional biotechnologies), making option 2 a valid inference. Option 1 distorts the idea: the passage speaks of science being “instrumentally embodied,” not of progress being “embodied in trajectories of improvement.” Option 3 introduces “scientific constants,” which are not discussed in the passage and are unrelated to instrument improvement. Option 4 injects a normative notion (“must be respected”) that goes beyond the descriptive claim that progress requires instrument improvement. Thus, only option 2 is a valid conclusion drawn from the given statement.
11.	The passage characterizes scientific instruments as either receptive (detecting/receiving emissions, like telescopes) or interventional (actively manipulating subjects, like gene-splicing tools). Both types are integral to scientific progress. A kitchen oven can be seen as an interventional instrument in food science or chemistry (applying heat to transform materials). A scalpel is a clear example of an interventional instrument in biology or medicine. A saxophone, while primarily a musical instrument, could be used receptively in acoustics research or interveningly in sound-wave experiments. A milestone, however, is neither receptive nor interventional in a scientific sense. It is a marker of distance or achievement, not a tool for observation or manipulation in any scientific discipline. Thus, the passage’s characterizations of instruments are least applicable to a milestone.
12.	At first glance, this might appear to contradict the passage, since mathematics is an ancient discipline with a long intellectual tradition. However, a closer reading shows that the passage’s concept of “scientific culture” is closely tied to instrumental embodiment. The passage argues that different sciences have different “cultures and practices” shaped by their instruments—astronomy’s receptive culture and biology’s interventional culture. It then notes that mathematics “perhaps the last of the scientific disciplines to move into such technical embodiment” and that it “only contemporarily has come to rely more and more upon the computational machinery now in common use.”

	Thus, the passage defines a "scientific culture" in this context not merely as a tradition of inquiry, but as a technoscientific culture—one that is deeply mediated by instruments. From this perspective, mathematics is indeed only now developing a scientific culture in the instrumental sense because it is only recently becoming dependent on computational machinery. The statement in option 1, therefore, aligns with the passage's narrower definition of "scientific culture" as an instrumentally embodied practice. It does not contradict the passage; rather, it echoes the idea that mathematics is late in adopting the instrumental trappings that characterize modern technoscience.
13.	The paragraph follows a logical sequence: Introduces Denneny's focus on taste as a way to highlight a historical change. Describes that historical change—the expanded meaning of "taste" in the 17th–18th centuries. The missing sentence now clarifies the conceptual relationship between taste and judgment during that period, noting that while the terms were often used interchangeably, taste retained a connection to pleasure and embodiment that later theories of judgment lost—a link Arendt sought to restore. This elaboration fits naturally after the description of the historical shift and before the final sentence about recovering neglected thinkers. Concludes by noting that tracing this history helps recover overlooked thinkers. Placing the sentence at position 3 allows it to build on the historical context just provided and set up the final point about why this recovery matters. Inserting it earlier (position 1 or 2) would interrupt the flow from Denneny's focus to the historical explanation; placing it at the end (position 4) would disconnect it from the discussion of taste's historical meaning and make the reference to "thinkers at the time" less clear.
14.	The passage makes three central claims: Human-created landscapes (meadows, gardens, forests) have historically formed ecological "mosaics" that support diverse species. Research shows that human presence has often increased biodiversity (e.g., hay meadows preserved more species than meadows cultivated for biodiversity). Therefore, the old idea that humans are inherently antithetical to nature is wrong, and visions of thriving, human-free environments are often imaginary. Option 3 incorporates all these elements: it directly challenges the notion that humans always harm nature, cites historical evidence that human action has equally likely increased biodiversity, and mentions the creation of varied ecological landscapes that support many species. The other options are incomplete or slightly misrepresent the passage: Option 1 focuses only on the success of human-shaped landscapes in preserving species but omits the broader argument against the "humans as antithetical to nature" idea. Option 2 mentions that human action can assist preservation but lacks the historical context and the comparison with explicitly biodiversity-focused efforts. Option 4 is too narrow, anchoring the argument mainly in the early Holocene study and not fully capturing the passage's critique of the "human-free" ideal. Thus, option 3 provides the most comprehensive and accurate summary.
15.	The Irony: Elizabeth Magie, a left-wing feminist, created a game to critique capitalism (anti-capitalist message). The game was later co-opted, stripped of its message, and turned into a symbol of capitalist accumulation (Monopoly), while she was erased from its history. The Act of Plagiarism: While the passage doesn't use the word "plagiarised," it clearly states Darrow sold a simplified version of Magie's game and was credited as the sole inventor. This accurately describes an act of plagiarism—taking someone else's work and claiming it as one's own. The Financial Injustice: The passage highlights she received only $500 with no royalties, a "meagre sum" compared to the game's later success, which Darrow and Parker Brothers profited from. Option 4 directly captures the ironic reversal, the act of taking credit, and the unfair outcome that the passage emphasizes. It aligns with the passage's tone of revealing a hidden injustice. Therefore, Option 4 is the best summary.
16.	Sentence 1 introduces the concept of "literature on screen" as a dual-citizenship idea. Sentence 4 follows by revealing the deeper, contradictory assumption underlying adaptation studies: that adaptations are primarily studied within the context of literature. Sentence 2 provides evidence for this assumption by contrasting the wide range of source materials in film with academia's persistent focus on literature. Sentence 3 then offers an interpretation of why adaptation studies cling to literature: to borrow its cultural prestige while keeping adaptations subordinate. This order creates a logical flow from concept to underlying assumption, to illustrative evidence, and finally to critical analysis.

17.	The quoted statement explicitly argues that bridging arts and sciences produces "valuable knowledge" leading to a better understanding of the human condition. A direct and valid conclusion is that such interdisciplinary combination yields the most comprehensive understanding. Option 1 is vague and does not mention the arts–sciences bridge. Option 2 only mentions literary descriptions contributing to arts and sciences, reversing the direction of contribution. Option 3 inverts the logic, suggesting that studying the human condition helps us understand the arts and sciences, which is not what the statement says. Thus, option 4 correctly captures the intended conclusion: combining arts and sciences offers the best path to a full understanding of the human condition.
18.	The second paragraph argues that the emotional or spiritual component of a place is no less real than a surveyor's map, but it does not suggest that the emotional experience can replace the map. The passage consistently emphasizes that literary and scientific approaches are complementary and both are necessary for a complete understanding. Therefore, the claim that one can replace the other contradicts the paragraph's argument. The other options are supported by the paragraph: Option 1 reflects the statement that the emotional component is "no less 'real' than a surveyor's map." Option 3 aligns with the idea that literature provides the emotional component missing from scientific records. Option 4 corresponds to the sentence that "Histories of places live on in many forms, one of which is the human memory or imagination."
19.	In the fourth paragraph, the author gives the example of a literary description of place that includes "how people from different races or classes can experience the same place in different ways linked to those racial or class disparities." This directly illustrates literature's capacity to capture varied, subjective human experiences of a single location—highlighting its role in conveying social and perceptual diversity. Option 1 is incorrect; the passage does not mention architects calibrating noises and lights. Option 2, while true, is a separate example provided later in the same paragraph, not the primary illustration being asked about. Option 3 contradicts the passage's argument that literary and scientific approaches are both necessary and complementary. Thus, the author uses the example to show that literature can represent how different people experience the same place differently.
20.	The question asks which statement, if false, would not contradict the passage. If statement 1 is false, it means humans do interact with places in subjective, emotional ways. This aligns with the passage's argument that places have emotional/spiritual components and are not merely physical topography. Thus, its falsehood does not contradict the passage. The other options, if false, would contradict the passage: Option 2: If false, literature does not provide insights into movement/migration's effects on geography—contradicts the passage's claim that literature offers valuable perspectives on cultural geography. Option 3: If false, descriptions do need satellite imagery to give a "real" sense of place—contradicts the passage's argument that literary descriptions (using sensory language) can convey a real experience of place. Option 4: If false, vivid sensory writing cannot capture the multi-modal human experience of place—directly contradicts the passage's emphasis on sensory language as primary for knowing physical space. Hence, only option 1, when false, does not conflict with the passage's arguments.
21.	The author compares AI-generated texts to "a beige office building" to illustrate that they are bland, generic, safe, and inoffensive—qualities that help foster trust and appear professional. This comparison is directly linked to the AI's tone (polite, collegial) and its generic, non-specific output, which correspond to options 1, 3, and 4. However, option 2 describes how AI responds when criticized for biases—a defensive explanation that is separate from the characteristics of its everyday textual output. While the passage mentions that ChatGPT blames training data for biases, this is not a reason for the "beige office building" comparison; it is a separate observation about accountability. Therefore, option 2 is not a reason for the simile.
22.	The other examples (options 2, 3, and 4) are all specific instances where AI outputs demonstrate bias or inaccuracy: Option 2: ChatGPT edits the author's text to be more favorable toward big tech. Option 3: Bing Image Creator produces a gender-biased image (all-male engineers/explorers). Option 4: ChatGPT replaces Indian English with American English, showing cultural bias. These are concrete illustrations of the problems the passage highlights—AI reinforcing stereotypes, cultural norms, or influencing users.

	Option 1, however, is not an example of a biased or inaccurate output. Instead, it is ChatGPT's self-description of its communication strategy—an explanation of how it aims to build trust. This serves to reveal the design intent behind the "collegial neutrality" that the author critiques, rather than exemplify a harmful outcome. Thus, in terms of purpose, option 1 is the odd one out.
23.	The question asks which statement does NOT affirm the gap between tech companies' claims about AI and AI's actual behavior. Option 1: Directly highlights the disjunct. AI claims a "collegial neutrality," but this veneer can "lull us into absorbing false or biased responses." This affirms the gap. Option 2: Does NOT affirm the disjunct. It expresses the author's personal uncertainty and lack of confirming research about a perceived bias. It does not state that a gap between claim and reality has been verified. It is a statement of speculation, not evidence. Option 3: This statement is about the user's role and complicity, not about a specific AI claim or its performance. While it describes a dynamic of exploitation, it doesn't directly address the disjunct between a specific claim made by a tech company and an AI's actual output. It is more about the human-complicity framework than the claim/reality gap, which makes it a weaker candidate than Option 2. Option 4: Provides clear evidence of gender bias, directly contradicting claims of neutrality and objectivity. This affirms the disjunct. Therefore, Option 2 is the correct answer as it is the only one that explicitly refrains from affirming the disjunct due to a lack of confirmed evidence. My initial selection of Option 3 was incorrect. Thank you for the correction.
24.	The passage explicitly argues that AI's "veneer of collegial neutrality" actually lulls users into absorbing false or biased responses without much critical engagement. This directly contradicts the idea that AI's neutrality promotes critical thinking. The other claims align with the author's views: Option 1 reflects the author's core argument about complicity. Option 3 is supported by the passage's discussion of economic motives behind building trust. Option 4 is treated as a plausible observation (though the author notes a lack of definitive research). Thus, the author would strongly disagree with the claim that AI's neutrality fosters critical thinking.
25 - 29.	Ananya Raga, Bhaskar Tala, Charu Veena, and Devendra Sur are musicians. Let us denote them by A, B, C and D Respectively. Each of them started and completed their training as students under each of three Gurus — Pandit Meghnath, Ustad Samiran, and Acharya Raghunath between 2013 and 2024. Let us denote them by PM, US and AR respectively. When two students train under the same Guru at the same time, they are referred to as Gurubhai and from point 1 "Ustad Samiran never trained more than one of these students in the same year." it means guru bhai are possible under training of PM and AR Only. Now possible pair of gurubhai are AB, AC, AD, BC, BD and CD and from point 3, AD and BC are nevergurubhai.so possible combination of gurubhai are AB, AC ,B D and CD Now Each Guru trains any student for consecutive years only, for a span of 2, 3, or 4 years, with each Guru having a different span and also it is given that Acharya Raghunath did not train any of these students during 2015-2018, as well as during 2021-24. So possible training years for AR are 2013-14 and 2019-20. So his training span is 2 years So span for PM and US are 3 or 4 years in any order Now from point 4 In 2013, Ananya and Bhaskar started their trainings under Pandit Meghnath and under Ustad Samiran, respectively. So in 2013-14 the C and D are gurubhai under AR Also All other pairs except AD and BC of musicians were Gurubhai for exactly 2 years. IN 2013 A is under PM and CD are occupied with AR so A alone under PM for 2013-14 and with someone else for 2014-15 and hence span for PM is 4 years and for US is 3 years. Now in 2014 -15 the C and D are free as B wound be with US till 2015 also AD is not possible pair. So AC are gurubhai under PM for 2015-16. So after B, D will be under US from 2016-2018. Now under PM, C will be alone for 2017-18 and with D in 2019 -20. Also AB will with AR in 2019-20.keeping all constraint and to have no clash so that all may get trained under each guru and fulfilling gurubhai possible pair we get the following arrangement:

GURU / YEAR	Acharya Raghunath (AR)	Ustad Samiran (US)	Pandit Meghnath (PM)
2013	C,D	B	A
2014	C,D	B	A
2015	X	B	A,C
2016	X	D	A,C
2017	X	D	C
2018	X	D	C
2019	A,B	C	D
2020	A,B	C	D
2021	X	C	D,B
2022	X	A	D,B
2023	X	A	B
2024	X	A	B

25. As shown among given options 2020 is the answer

26. As shown Charu begin her training under Pandit Meghnath in 2015.

27. As shown Bhaskar and Devendra were Gurubhai in 2022

28. As shown option 2 is true.

29. He years are 2017,2018,2023 and 2024

30 - 33. As given in Point 1 In 2016, B, C, E, and A, had ranks 1, 2, 3, and 4 respectively. graph first we can find the values for E and in point 2 F had lower SI than any other country in 2016, 2020, and 2024.means D is rank 5 in 2026 and F is rank 6 in 2016 . Also F is ranked 6 in year 2020 and 2024
So we get the following table:

Rank / year	1	2	3	4	5	6
2016	B	C	E	A	D	F
2020						F
2024						F

Now from point 4 it is given, E was the only country with SI of 90.also
Y-coordinate representing % increase in 2024 from 2020which is 20 % for E 1.2 of SI of E of 2020 = 90
So SI of E of 2020 = 90/1.2 = 75

X-coordinate representing % increase in 2020 from 2016,which is 25% for E
1.25 of SI of E of 2024 = 75
So SI of E of 2024 = 75/1.25 = 60

Now we get the following table:

Rank 2016	1	2	3	4	5	6
Country / SI in 2016	B	C	E (60)	A	D	F
Rank 2020	---	---	---	---	-	6
Country / SI in 2020	B	C	E(75)	A	D	F
Rank 2024	---	---	---	---	-	6
Country / SI in 2024	B	C	E(90)	A	D	F

Now The range of SI of the six countries was 60 in 2016 as well as in 2024.
So in 2024 the Si for F is 30(As for more than 90 for any other contradicts integral condition) and taking % changes from X and y Axis as done For E we get the value of SI for F as 40 and 20 for year 2020 and 2016 respectively.

Also range for 2016 is 60 so value of Si of B for 2016 is 20 +60 = 80 and taking % from X and Y axis the value of Si for B are 60 and 45 for year 2020 and 2024 respectively

<table>
<tr><td></td><td>Further one question requires value for C we can see Y-coordinate representing % increase in 2024 from 2020 which is 40 % for C So IT IS 1.4 of value of SI of C for 2020 and keeping condition of ranking of 2016 and integral condition only value that fits for SI of C for 2024 is 84

So we get the following table:

<table>
<tr><td>Rank 2016</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Country / SI in 2016</td><td>B (80)</td><td>C</td><td>E (60)</td><td>A</td><td>D</td><td>F(20)</td></tr>
<tr><td>Rank 2020</td><td>---</td><td>---</td><td>---</td><td>---</td><td>-</td><td>6</td></tr>
<tr><td>Country / SI in 2020</td><td>B(60)</td><td>C</td><td>E(75)</td><td>A</td><td>D</td><td>F (40)</td></tr>
<tr><td>Rank 2024</td><td>---</td><td>---</td><td>---</td><td>---</td><td>-</td><td>6</td></tr>
<tr><td>Country / SI in 2024</td><td>B (45)</td><td>C</td><td>E(90)</td><td>A</td><td>D</td><td>F (30)</td></tr>
</table>
</td></tr>
<tr><td>30.</td><td>As shown SI of E in 2016 is 60</td></tr>
<tr><td>31.</td><td>As shown SI of F in 2020is 40</td></tr>
<tr><td>32.</td><td>For calculating the SI of C in 2024
we can see Y-coordinate representing % increase in 2024 from 2020 which is 40 % for C So IT IS 1.4 of value of SI of C for 2020 and keeping condition of ranking of 2016 and integral condition only value that fits for SI of C for 2024 is 84</td></tr>
<tr><td>33.</td><td>As shown ,was the SI of B in 2024</td></tr>
<tr><td>34 - 38.</td><td>Let the NUR of Whimshire, Fogglia, and Humbleset are W, F and H respectively.
Given that, there is only one pair of an NUR and a city (considering all cities and all NURs) where the PM of the NUR is greater than that of the city and that NUR and the city both belong to Humbleset.
Also, Humbleset and Fogglia having the highest and the lowest PI respectively, we get the following:
The nine PMs to be assigned to the six cities : Blusterburg, Noodleton, Splutterville, Quackford, Mumpypore, Zingaloo and three NUR : W, F and H are 10, 20, 30, 40, 50, 60, 70, 80, 90, where 10,20,30,40 are to be assigned to W,F,H and Blusterburg……(i)
Blusterburg , Zingaloo and the NUR with PMs = 40 are in Humbleset….(ii)
So, PMs of H = 40…..(iii)
PMs of Blusterburg = 30….(iv)
PMs of W and F are 20 and 10 respectively….(v)
The remaining PMs are 50, 60, 70, 80, 90. Given that the six cities in increasing order of their PMs are: Blusterburg, Noodleton, Splutterville, Quackford, Mumpypore, Zingaloo, we get their PMs as follows:
PMs of Blusterburg = 30. (From (iv))
PMs of Noodleton = 50.
PMs of Splutterville = 60.
PMs of Quackford = 70.
PMs of Mumpypore = 80.
PMs of Zingaloo = 90.
Since the PIs of all three states are distinct integers, with Humbleset and Fogglia having the highest and the lowest PI respectively, so the sum of the PMs of the two cities in a state is a multiple of 4. So we get:
Splutterville with PMs = 60 and Mumpypore with PMs = 80 are in Whimshire.
andNoodleton with PMs = 50 and Quackford with PMs = 70 are in Fogglia.
From (v): PMs of W and F are 20 and 10 respectively. So,
PI of Whimshire = ½ (20) + ¼ (60 + 80) = 45.
PI of Fogglia = ½ (10) + ¼ (50 + 70) = 35.
PI of Humbleset = ½ (40) + ¼ (30 + 90) = 50….(using (ii))</td></tr>
<tr><td>34.</td><td>PI of Whimshire = 45.</td></tr>
<tr><td>35.</td><td>PI of Fogglia = 35.</td></tr>
<tr><td>36.</td><td>PI of Humbleset = 50.</td></tr>
<tr><td>37.</td><td>Noodleton with PMs = 50 and Quackford with PMs = 70 are in Fogglia.</td></tr>
<tr><td>38.</td><td>For all the cities and NURs we are able to identify their PM and the state they belong to.</td></tr>
<tr><td>39 - 42.</td><td>First we write the information from graphs in following tables:

<table>
<tr><td>Author</td><td>Total Papers</td></tr>
<tr><td>A</td><td>5</td></tr>
<tr><td>B</td><td>8</td></tr>
<tr><td>C</td><td>12</td></tr>
<tr><td>D</td><td>10</td></tr>
</table>
</td></tr>
</table>

Type of Article	No. of Articles
Single-author	10
Two-author	4
Three-author	3
Four-author	2

From Table 2: Four author articles = 2 (as there are only four authors so that means every author wrote 2 four author articles.)
Point 1: Every author wrote at least 1.
So, A who wrote 5 articles must have 1 (single) + 1 (two) + 1 (three) + 2 (four) making total 5

Point 3 : C and D wrote more articles than B.
As three author articles are only 3 in number so,
So only logical option for 3 author article is C, D = 3 and B = 2.

So till now we get the following table :

	Single Authored	Two authored	Three	Four Authored
A	1	1	1	2
B	2	2	2	2
C				2
D				2

Point 2 : all author wrote different no of single articles that means
1 + 2 + 3 + 4 = 10. So 1, 2, 3 and 4 articles as till now 1 and 2 are for A and B res. 3 and 4 in this category for C and can be in any order making following two final possibilities:

Case 1:

	Single Authored	Two authored	Three	Four Authored
A	1	1	1	2
B	2	2	2	2
C	3	4	3	2
D	4	1	3	2

Case 2 :

	Single Authored	Two authored	Three	Four Authored
A	1	1	1	2
B	2	2	2	2
C	4	3	3	2
D	3	2	3	2

39. the total number of two-author and three-author papers written by Brajen = 2 + 2 =4

40. As shown neither of statement is necessarily true

41. Three authored papers are A C D, B C D & B C D
So both I and II are necessarily true

42. This is true for case 1. Hence 3

43 - 46. Representing, the ball passes through the hoop and makes a "ping" by: √
Representing, the ball gets stuck on the hoop and does not make a ping by: ×

Using the given additional information in the question we get the following table:

	B1	B2	B3	B4	B5	B6
H1	√	√	×	√	√	√
H2	×	√	×	×	×	×
H3	×			√		
H4	√				×	√

The given statement (3) $\Rightarrow B_3$ has the largest diameter ….(A)
The given statement (4) $\Rightarrow B_2$ has the smallest diameter ….(B)
Since each row has at least one '×' so there is always a ball which gets stuck on the hoops and hence B_3 is stuck on all the hoops. [By using (A)]
Similarly, since each row has at least one '√' so there is always a ball which passes through the hoops and hence B_2 passes through all the hoops. [By using (B)]

So we get the following table:

	B_1	B_2	B_3	B_4	B_5	B_6
H1	√	√	×	√	√	√
H2	×	√	×	×	×	×
H3	×	√	×	√		
H4	√	√	×		×	√

On H_3, B_4 marks a ping and B_1 does not $\Rightarrow B_1$ has a larger diameter than B_4.
$\Rightarrow B_1 > B_4$…… (C)
On H_4, B_1, B_6 make a ping but B_5 does not $\Rightarrow B_5$ has a larger diameter than B_1 and B_6.
$\Rightarrow B_5 > B_1$ and $B_5 > B_6$ …… (D)
$\Rightarrow B_5 > B_1 > B_4$ and $B_5 > B_6$ [Using (C) & (D)]
$\Rightarrow B_3 > B_5 > B_1 > B_4 > B_2$ and $B_5 > B_6$…… (E)
On H_4, B_1 makes a ping and $B_1 > B_4$ so B_4 will also make a ping.
On H_3, B_1 does not make a ping and $B_5 > B_1$ so B_5 also will not make a ping.

So we get the following table:

	B_1	B_2	B_3	B_4	B_5	B_6
H_1	√	√	×	√	√	√
H_2	×	√	×	×	×	×
H_3	×	√	×	√	×	√ or ×
H_4	√	√	×	√	×	√

Number of pings on $H_1 = 5$
Number of pings on $H_2 = 1$
Number of pings on $H_3 = 2$ or 3
Number of pings on $H_4 = 4$

So comparing the diameters of hoops:
$H_1 > H_4 > H_3 > H_2$…… (F)
Number of pings by the balls: $B_1 = 2$, $B_2 = 4$, $B_3 = 0$, $B_4 = 3$, $B_5 = 1$ and $B_6 = 2$ or 3…….. (G)

43. 2 + 4 + 0 = 6 (By using (G))

44. $B_3 > B_5 > B_1 > B_4 > B_2$ and $B_5 > B_6$ (By using (E))
$\Rightarrow B_2 < B_1 < B_5$ is true
$B_4 < B_5 < B_3$ is true
$B_1 < B_5 < B_3$ is true
But $B_1 < B_6 < B_3$ is not necessarily true.

45. $H_1 > H_4 > H_3 > H_2$ (By using (F))

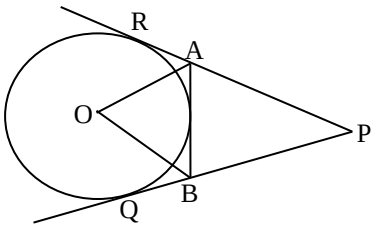
46. 2 + 4 + 0+ 3 + 1 + 2 = 12
or
2 + 4 + 0 + 3 + 1 + 3 = 13
(By using (G))

47. Let the common root be α. Call the other roots β for $3x^2 - 5x + p = 0$ and γ for $2x^2 - 2x + q = 0$.
- $\alpha + \beta = 5/3$ (since sum of roots of $3x^2 - 5x + p = 0$ is 5/3),
- $\alpha + \gamma = 1$ (since sum of roots of $2x^2 - 2x + q = 0$ is 1).

So the sum of the other roots is
$\beta + \gamma = (5/3 - \alpha) + (1 - \alpha) = 8/3 - 2\alpha$.
Multiply the first by 2 and the second by 3:
$6\alpha^2 - 10\alpha + 2p = 0$, $6\alpha^2 - 6\alpha + 3q = 0$.
Subtracting gives $-4\alpha + 2p - 3q = 0$, so $\alpha = (2p - 3q)/4$.

	Hence $\beta + \gamma = 8/3 - 2\cdot[(2p - 3q)/4] = 8/3 - p + 3/2q$.
48.	Take the regular hexagon ABCDEF with side length 'S'. Recall two standard facts about a regular hexagon: • It can be split into 6 congruent equilateral triangles by joining the center O to the vertices; call the area of one such equilateral triangle T. Thus $T = \sqrt{3}/4S^2$, $A_{hex} = 6T = 3\sqrt{3}/2S^2$. • Opposite sides of the hexagon are parallel and the figure has the usual 60°/120° symmetry axes. The line PQ is parallel to BC and finds the perpendicular distance (height) between them. By symmetry of the regular hexagon the midpoints P of AB and Q of CD lie on a line which is parallel to the side BC; moreover this line is halfway (perpendicularly) between the line through BC and the centre O. The altitude of one of the equilateral center-triangles (for example triangle OBC) is $\sqrt{3}/2S$; half of that altitude is $h = 1/2\cdot\sqrt{3}/2S = \sqrt{3}/4S$, and this is exactly the perpendicular distance between the parallel lines BC and PQ. The lengths of the two parallel sides of the trapezium PBCQ. The top base is BC = S. The bottom base PQ equals 1/2AB+BC+1/2C when taken as the projection along the direction parallel to BC (intuitively: from midpoint of AB to midpoint of CD you cross half of AB, the full side BC, and half of CD); hence $PQ = S/2 + S + S/2 = 3S/2$ Area of trapezium PBCQ. $APBCQ=1/2(PQ+BC)\cdot h =1/2(3S/2 + s)\cdot \sqrt{3}/4S = 1/2\cdot5S/2\cdot\sqrt{3}/4S=5\sqrt{3}/16S^2$. Ratio to the whole hexagon. The whole hexagon area is $A_{hex} = 3\sqrt{3}/2S^2$. Therefore $APBCQ / A_{hex} = (5\sqrt{3}/16S^2)/(3\sqrt{3}/2S^2) =5/24$.
49.	$\log_{64}x^2 + \log_8 y + 3\log_{512}(z\sqrt{y}) = 4$. Convert all logs to base 2 (since $64 = 2^6$, $8 = 2^3$, $512 = 2^9$): $\log_{64}x^2 = (2\log_2 x)/6 =1/3\log_2 x$,$\log_8\sqrt{y} = ½(\log_2 y)/3 = 1/6\log_2 y$, and $3\log_{512}(z\sqrt{y}) = 3\cdot\log_2(z\sqrt{y})/9 =1/3(\log_2 z + 1/2\log_2 y) = 1/3\log_2 z + 1/6\log_2 y$ Adding the three pieces gives $1/3\log_2 x + 1/6\log_2 y + (1/3\log_2 z + 1/6\log_2 y) = 1/3(\log_2 x + \log_2 y + \log_2 z) = 4$. So, $\log_2(xyz) =12 \Longrightarrow xyz =2^{12}$. By AM – GM for positive x, y, z $x + y + z \geq 3(xyz)^{1/3} = 3\cdot2^4 = 48$,with equality when x = y = z = 16. Hence the minimum possible value of x + y + z is 48.
50.	Case 1: $x + 9 \geq 0$ (i.e. $x \geq -9$) Then $\lvert x + 9\rvert = x + 9$. The inequality becomes: $x^2 - (x + 9) + x > 0$ Simplify: $x^2 - 9 > 0$ $(x - 3)(x + 3) > 0$ This is positive when: $x < -3$or $x > 3$ But in this case we also need $x \geq -9x$. Combining: • $x < -3$ and $x \geq -9$ gives: $(-9,-3)$ • $x > 3$ unchanged gives: $(3,\infty)$ So case 1 produces: $(-9, -3)\cup(3, \infty)$ Case 2: $x + 9 < 0$ (i.e. $x < -9$) Then $\lvert x + 9\rvert = -(x + 9)$. The inequality becomes: $x^2 - (-(x+9)) + x > 0$ This quadratic has discriminant: $\Delta = 4 - 36 = -32 < 0$ So it is always positive for all real x Thus every $x < -9$ Case 2 gives: $(-\infty,-9)$

	(combine both cases) $(-\infty,-9) \cup (-9,-3) \cup (3,\infty)$ Notice that $(-9, -3)$ = the missing piece that joins $(-\infty, -9)$ through -3 Thus the full solution is: $(-\infty, -3) \cup (3, \infty)$
51.	Let the total amount be 100 units Pinu receives 20% of total: P = 20 Remaining: 100 - 20 = 80 Meena receives 40% of the remaining: M = 40% × 80 = 32 Remaining: 80 − 32 = 48 Seema receives 20% less than Pinu: S = P − 20% P = 20 − 4 =16 Remaining (this must be Rinu's amount): R= 48 − 16 = 32 Required Ratio (Pinu : Rinu) P : R = 20 : 32 = 5 :8
52.	Let Chandan's efficiency be x (job/day). Then Bipin = 2x, Ankita = 4x. Work done in first 20 days (all three working): 20(4x + 2x + x) = 20·7x =140x. After Bipin leaves, Ankita and Chandan work for the remaining 60 − 20 = 40days 40(4x + x) = 40·5x = 200x. Total work =140x + 200x = 340x which equals 1 job, so x = 1/340. Time for Chandan alone =1/x = 340 days.
53.	Let the first term be a and common ratio r with $0 < r < 1$ (decreasing infinite GP). Then $a_1 + a_2 + a_3 = a + ar + ar^2 = a(1 + r + r^2) = 52$, and $a_1a_2 + a_2a_3 + a_3a_1 = a\cdot ar + ar\cdot ar^2 + ar^2\cdot a = a^2(r + r^2 + r^3) = 624$. Note $r + r^2 + r^3 = r(1 + r + r^2)$. From the two equations $a(1 + r + r^2) = 52$, $a^2(r(1 + r + r^2)) = 624$, divide the second by the square of the first (or simply observe) ra = 624/52 ⇒ a = 12/r. Substitute into $1 + r + r^2 = 52/a = 52r/12 = 13r/3$ $1 + r + r^2 = 13r/3 \Longrightarrow 3r^2 - 10r + 3 = 0$. Solve: r = (10 ± 8)/6r so, r = 3 or r = 1/3r. Since the progression is decreasing we take r = 1/3. Then, a = 12/r = 36. The sum of the infinite GP is a/(1 − r) = 36/(1 − 1/3) = 36/(2/3) = 54.
54.	Basic restrictions from f and g For f(x) = x/(2x − 1): Denominator cannot be zero: 2x − 1 = 0 ⇒ x = 1/2. For g(x) = x/(x−1): Denominator cannot be zero: x − 1 = 0 ⇒ x = 1 So far forbidden values: x = 1/2, 1. Restrictions from f(g(x)) We need g(x) ≠ 1/2, because f(y) is undefined at y = 1/2. Solve: g(x) = x/(x − 1) = 1/2 Cross multiply: 2x = x−1 So x = −1 is NOT allowed. Also must ensure g(x) ≠ 1/2: done.

	Restrictions from g(f(x)) We need $f(x) \neq 1$, because g(y) is undefined at y = 1. Solve: $f(x) = x/(2x-1) = 1$ $x = 2x - 1$ x = 1 was already excluded. FINAL DOMAIN RESTRICTIONS Forbidden values are: $-1,\ 1/2,\ 1$
55.	Let the annual interest rate be r%. Grow the loan to the end of Year 1 Loan at start: 1000 After 1 year at interest r%, it becomes: $1000(1 + r)$ You pay Rs 530 at the end of Year 1, so remaining amount is: $1000(1 + r) - 530$ Grow this remaining balance to the end of Year 2 Remaining amount at end of Year 1: $1000(1 + r) - 530$ After 1 more year: $(1000(1 + r) - 530)(1 + r)$ At end of Year 2, you pay Rs 594 which fully clears the loan: $(1000(1 + r) - 530)(1 + r) = 594$ Expand $1000(1 + r)^2 - 530(1 + r) = 594$ Try the given options instead of solving. Try r = 8% ⇒ 1 + r = 1.08 Left side: $1000(1.08)^2 - 530(1.08) = 1000(1.1664) - 572.4$ $= 1000(1.1664) - 572.4 = 1166.4 - 572.4 = 594$ So r = 8%
56.	The three lines PQ, PR, and AB are all tangents to the same circle, so they form a triangle PAB for which the given circle is the incircle. Hence the centre O of the circle is the incenter of triangle PAB. A standard incenter fact: for any triangle the angle at the incenter between the rays to two vertices equals $90^\circ - 1/2$ of the angle at the third vertex. Applied to triangle PAB this gives $\angle AOB = 90^\circ - 1/2\ \angle APB$. Given $\angle AOB = 50^\circ$ we get $50^\circ = 90^\circ - 1/2\ \angle APB$ $\Longrightarrow 1/2\angle APB = 40^\circ$, so $\angle APB = 80^\circ$. 
57.	Let coffee price = C (Rs/kg) and cocoa price = K (Rs/kg). From the two given mixtures: $0.16C + 0.84K = 240,\ 0.36C + 0.64K = 320.$ Subtract the first from the second: $0.20C - 0.20K = 80 \Longrightarrow C - K = 400$ Substitute C = K + 400 into the first: $0.16(K + 400) + 0.84K = 240 \Longrightarrow K + 64 = 240 \Longrightarrow K = 176,$ so C = 576 For the new mixture costing 376 per kg with coffee fraction f: $f \cdot 576 + (1 - f) \cdot 176 = 376 \Longrightarrow 400f = 200 \Longrightarrow f = 0.5.$ So the new mixture is 50% coffee. In 10 kg there are $0.5 \times 10 = 5$ kg of coffee.
58.	Given a + b + c + d = 46 with integers a, b, c, d. We minimize $S = (a - b)^2 + (a - c)^2 + (a - d)^2$ by keeping the values as close to each other as possible. If all four were equal then $4a = 46 \Rightarrow a = 11.5$ not integer, so perfect equality impossible. The closest integer distribution: 12, 12, 11, 11 (sum = 46). Take a = 12, b = 12, c = 11, d = 11 ⇒ $S = (12 - 12)^2 + (12 - 11)^2 + (12 - 11)^2 = 0 + 1 + 1 = 2$. S cannot be 0 or 1 because that would require all four equal or three equal and one off by 1, both

	impossible with sum 46. Therefore, the minimum possible value is 2.
59.	Total copies sold in initial 7 days = 60 × 7 = 420 Total copies sold in initial 8 days = 63 × 8 = 504 Copies sold on 8th day = 84 Copies sold on 9th day = 73 Total copies sold from the 2nd to the 9th day = 8 × 66 = 528 Copies sold on 1st day = Total Copies sold in 9 days - Total Copies sold in last 8 days = 577 - 528 = 49
60.	Let y = 3^(x^2 + 2x − 2). Then 9^(x^2 + 2x − 3) = 3^(2(x^2 + 2x − 3)) = (1/9)·3^(2(x^2 + 2x − 2)) = (1/9)y^2. Equation becomes: (1/9)y^2 − 4y + 27 = 0 ⇒ y^2 − 36y + 243 = 0 ⇒ y = 27 or 9. If y = 27: 3^(x^2 + 2x − 2) = 3^3 ⇒ x^2 + 2x − 5 = 0 ⇒ Product of roots = −5. If y = 9: 3^(x^2 + 2x − 2) = 3^2 ⇒ x^2 + 2x − 4 = 0 ⇒ Product of roots = −4. Product of all possible x values = (−5)(−4) = 20. Final Answer = 20.
61.	Given distinct natural numbers a,b,c with 3ac = 8(a + b). Rearrange: 3ac−8a = 8b ⇒ a(3c−8) = 8b ⇒ b = a(3c−8)/8, so b must be a positive integer and a,b,c are distinct. Test smallest natural a to minimize 3a+2b+c: For a = 1 ⇒ (3c−8) must be multiple of 8 ⇒ smallest c = 8 ⇒ b=2 ⇒ (a, b, c) = (1, 2, 8) gives 3a + 2b + c = 3 + 4 + 8 = 15. For a = 2 ⇒ (3c−8) must be multiple of 4 ⇒ smallest c = 4 ⇒ b = 1 ⇒ (a, b, c) = (2, 1, 4) gives 3a + 2b + c = 6 + 2 + 4 = 12. Check a = 3 ⇒ 3c − 8 must be multiple of 8 ⇒ smallest valid c gives larger results. Therefore smallest possible value of 3a + 2b + c is **12** (at a = 2 ,b = 1, c = 4).
62.	Place A = (0,0), C = (1,0), B = (0,1). Let D on BC : D = B + s(C − B) = (s, 1 − s), so BD : DC = s : (1−s). Let E on AC : E = (t, 0). T is on AD with AT : TD = 3:1 ⇒ T = A + (3/4)(D − A) = (3s/4, 3(1 − s)/4). T is on BE with BT : TE = 4:1 ⇒ T = B + (4/5)(E − B) = (4t/5, 1/5). Equate y-coordinates: 3(1−s)/4 = 1/5 ⇒ 15(1−s) = 4 ⇒ s = 11/15. Hence BD:DC = s:(1−s) = 11/15 : 4/15 = 11:4.
63.	Divisors are of the form 2^a · 3^b · 5^c · 7^e. Given 3^b ≡ 0 (mod 3) for any b ≥ 1, such divisors cannot be ≡ 1 (mod 3), so b = 0. Now 2 ≡ −1 (mod 3), 5 ≡ −1 (mod 3), 7 ≡ 1 (mod 3). Thus, divisor d ≡ (−1)^(a+c) (mod 3). For d ≡ 1 (mod 3), we need a + c even. Exponent ranges: a = 0..6 (7 choices), c = 0..3 (4 choices), e = 0..2 (3 choices). Total (a,c) pairs = 28; exactly half have a+c even ⇒ 14. Multiply by 3 values of e ⇒ 14 × 3 = 42. Final Answer = 42.
64.	Let River speed = v km/hr. For Sneha (speed 6 km/h): 14/(6−v) − 14/(6+v) = 48 min = 0.8 h. Compute: 14·[2v]/(36−v^2) = 0.8 ⇒ 28v = 0.8 x 36 - 0.8 v^2 ⇒ 7v = 0.2 x 36 - 0.2 v^2 ⇒ 2v^2 + 70v -72 = 0 ⇒ v^2 + 35v -36 = 0 ⇒ (v+36) (v-1) = 0 ⇒ v = -36, 1 Speed can't be negative. So River speed(v) = 1 km/hr Rita's still-water speed = 5 km/h Upstream Speed = 5−1 = 4 km/h, Downstream Speed = 5 + 1 = 6 km/h. If she goes x km upstream and returns x km downstream, total time = x/4 + x/6 = x(5/12) hours.

	Given total time = 100 min = 100/60 = 5/3 h. So x(5/12) = 5/3 ⇒ x = 4 km. Total distance = 2x = 8 km. Final Answer = 8 km.
65.	CP = 1650 Profit = 20% SP = 1650 * 1.20 = 1980 Let MP = M and original discount = r M - r = 1980 ……..…..(1) When discount is doubled: New SP = 1650 + 110 = 1760 M - 2r = 1760 ……....(2) By solving (1) and (2): ⇒ M = 2200 Required discount % = profit% Let x be new required SP profit% = discount % [(2200-x)/2200] * 100 = [(x-1650)/1650] * 100 ⇒ x = 1885 Now Discount % = [(2200-1885)/2200] * 100 Nearest percentage = 14%
66.	(625)^65 = (5^4)^65 = 5^260. (128)^36 = (2^7)^36 = 2^252. Product = 2^252 × 5^260 = 2^252 × 5^252 × 5^8 = 10^252 × 5^8 = 390625 × 10^252. So the number is 390625 followed by 252 zeros. Sum of digits = 3 + 9 + 0 + 6 + 2 + 5 = 25. Final Answer = **25**.
67.	Let expenditures be EL : EM = 2:3 ⇒ EL = 2x, EM = 3x. Given IL : EM = 6:7 ⇒ IL = 6y, EM = 7y ⇒ 3x = 7y ⇒ x = (7/3)y. So EL = 2x = 2·(7/3)y = (14/3)y. Savings: SL = IL − EL = 6y − (14/3)y = (4/3)y. Let IM be Meenakshi's income. SM = IM − EM = IM − 7y. Given SL : SM = 4 : 9 ⇒ (4/3)y : (IM − 7y) = 4 : 9 ⇒ 9·(4/3)y = 4(IM − 7y) ⇒ 12y = 4IM − 28y ⇒ 4IM = 40y ⇒ IM = 10y. Thus incomes IL: IM = 6y : 10y = 3 : 5. Final answer = 3:5.
68.	Let x = m + 2n and y = 2m + n, so xy = 27. Solve: 3m = 2y − x and 3n = 2x−y ⇒ m = (2y−x)/3, n = (2x−y)/3. Therefore, m, n are integers only if 2y−x and 2x−y are multiples of 3. Check integer factor pairs of xy = 27: (3, 9), (9, 3), (-3, -9), (-9, -3) give integer m, n. Compute 2m −3 n: (3, 9) →13; (9, 3) → −17; (-3,-9) → −13; (-9,-3) →17. Thus, the maximum possible value of 2m−3n is **17** (when m =1, n = -5).

Actual CAT 2025

Slot – III

hitbullseye

BULLS EYE KNOWLEDGE SYSTEM LIMITED

Answer Key Actual CAT Slot - III

Q. No	Key	Q. No	Key	Q. No	Key
1.	1	**25.**	50 (TITA)	**47.**	2
2.	1 (TITA)	**26.**	525 (TITA)	**48.**	4
3.	3	**27.**	350 (TITA)	**49.**	1
4.	2	**28.**	1	**50.**	1
5.	3	**29.**	41000 (TITA)	**51.**	4
6.	2	**30.**	13000 (TITA)	**52.**	1
7.	3	**31.**	1500 (TITA)	**53.**	1
8.	2	**32.**	2	**54.**	1
9.	4	**33.**	1	**55.**	4
10.	4	**34.**	3	**56.**	444 (TITA)
11.	4	**35.**	2 (TITA)	**57.**	4
12.	1	**36.**	6 (TITA)	**58.**	126 (TITA)
13.	1	**37.**	3	**59.**	16 (TITA)
14.	3	**38.**	48 (TITA)	**60.**	65 (TITA)
15.	2143 (TITA)	**39.**	200 (TITA)	**61.**	205 (TITA)
16.	1	**40.**	1008 (TITA)	**62.**	272 (TITA)
17.	4312 (TITA)	**41.**	1	**63.**	3
18.	3 (TITA)	**42.**	2	**64.**	3
19.	1	**43.**	1	**65.**	2
20.	1	**44.**	2	**66.**	112 (TITA)
21.	4	**45.**	1	**67.**	700 (TITA)
22.	4	**46.**	4	**68.**	3
23.	1				
24.	1				

Explanation Actual CAT Slot - III

Q. No	Explanation
1.	The passage argues that memory-beliefs exist in the present moment and are not necessarily connected to actual past events. It suggests that even if no past existed, the memory-belief could still exist in the present, making it logically independent of the past. B. This option incorrectly implies that memory-beliefs are based on imagination, whereas the passage focuses on the independence of memory-beliefs from the past, not the role of imagination. C. While this option touches on the idea of memory-beliefs not requiring past events, it does not clearly capture the central point about memory-beliefs being independent of past occurrences, including the possibility of no past at all. D. This option introduces the example of the world beginning five minutes ago, which is true in the passage, but it doesn't fully emphasize the logical independence of memory-beliefs from the past as clearly as Option 1.
2.	Sentence 1 talks about ongoing research into the relationship between music and emotions, which is somewhat out of place when compared to the other sentences, which describe music's universal nature, its cognitive demands, and its connection to human identity. The other sentences focus on the general qualities of music and its significance across cultures, while sentence 1 introduces the idea of research, which does not directly align with the rest of the paragraph's theme.
3.	Option 3 does not weaken the claim. The mention of shamanic rituals and conversing with the dead aligns with the passage's idea of tribal imagination being deeply connected to ritualistic and sensory memory, as it suggests an element of spiritual or transcendent experience that fits within the dreamlike and fluid nature of their imagination. 1. This would weaken the passage's claim because it contradicts the idea that tribal stories merge elements of nature in a dreamlike, irrational, or hallucinatory manner, without adhering to scientific or logical principles. 2. This would also weaken the passage's claims, as it suggests that tribal stories follow a clear, structured sequence of events, which contrasts with the passage's depiction of fluid, non-sequential narratives in tribal imagination. 4. This weakens the passage's argument because it implies that tribal art does not reflect the reality of daily life, but the passage suggests that tribal art blends the ordinary with the extraordinary, creating a hallucinatory or dreamlike quality.
4.	The passage distinguishes between imagination and memory, stating that imagination is linked to the perception of space, helping humans understand and create images of the world around them, while memory is related to time, helping humans retain continuity and recall the past. 1. This answer is incorrect because the passage does not claim that imagination needs cultivation, nor does it define memory as purely intuitive based on race or sensory input. Instead, the passage suggests that tribal art stems more from sensory and racial memory. 3. This option is not entirely accurate because the passage doesn't directly suggest that tribal groups value memory over imagination. It discusses how tribal art may be based more on sensory memory but doesn't frame this as a value judgment over imagination. 4. While the passage mentions that imagination is a genetic gift, it doesn't make memory central to consciousness in the same way. Instead, the focus is on how memory helps humans understand time, not how it is "central" to consciousness.
5.	The passage emphasizes that tribal narratives are flexible and fluid, allowing various elements (like non-human living forms) to exhibit human emotions. This fluidity in the representation of different planes of existence and time is a characteristic of tribal imagination, allowing non-human beings to take on human-like emotions. 1. This is incorrect because the passage does not describe tribal narratives as rudimentary or underdeveloped. It highlights the imaginative and unique qualities of these narratives. 2. This is incorrect because the passage contrasts tribal imagination with a secular, self-conscious form of creativity. Tribal narratives are more fluid and dreamlike, not self-conscious. 4. This is incorrect because, although tribal narratives allow for a high degree of fluidity, they still have conventions or rules, just not the rigid structure found in other forms of creativity. The passage emphasizes flexibility, not the complete abandonment of rules.
6.	The passage explains that tribal communities have developed a ritualistic practice of conversing with their dead ancestors, seeking a trance-like state to connect with them. This is tied to their desire for control over time, as they have realized that domination over territorial space is not their focus, and thus, they turn to controlling time.

	1. This is partially true, but the primary reason for worshiping ancestors is not just respect but an attempt to gain control over time by conversing with them, as explained in the passage. 3. While the passage mentions the sharp memory of tribal communities, it does not connect this directly to the worship of ancestors, which is more about time control than knowledge preservation. 4. This is incorrect because the passage specifically states that tribal communities have realized that domination over space was not their lot, and instead, they focus on gaining control over time.
7.	The passage discusses both the appeal and the limitations of AI in making moral decisions. It acknowledges the potential benefits of AI in automating decisions but raises concerns about AI's ability to truly understand morality. The passage also warns that formalizing ethics might flatten its complexity, making ethical reflection too rigid. Additionally, it uses the analogy of physics to explain how different moral theories, like physical theories, can start from basic assumptions and lead to various conclusions. 1. This is incorrect because the passage does not reject formal methods outright but critiques the challenge of formalizing ethics. It does not conclude that AI should never serve in decision-making roles, but rather questions its ability to fully replicate human moral judgment. 2. This is incorrect because the passage does not present reproducing human moral judgment as progress. Instead, it highlights concerns about AI merely replicating human biases and limitations, and it questions whether AI can truly understand or improve moral reasoning. 4. This is incorrect because the passage does not claim that codified schemes retain case nuance or predict convergence on a unified framework. Instead, it warns that codification might erode case-sensitive judgment and cautions that formalizing ethics could strip away the depth of moral reflection, rather than leading to a unified framework.
8.	This option incorrectly suggests that the passage predicts convergence on a single ethical system and treats contextual judgment as unnecessary. In reality, the passage warns against oversimplifying ethics by formalizing it, noting that AI might replicate human moral shortcomings, and emphasizes the importance of context, intuition, and historical awareness in ethical decision-making. 1. This reflects the passage's concern about AI's ability to replicate moral understanding, despite its potential to be impartial and consistent. 3 This aligns with the passage's main point that formalizing ethics could diminish its depth and result in machines merely reflecting human limitations. 4. This is aligns with the passage that uses the analogy of physics to show how different ethical theories can coexist and diverge, just as physical theories do.
9.	For the analogy between ethics and physics to guide practice, there must be a way to decide which ethical framework applies to a particular case, similar to how different physical theories apply to different aspects of the universe. This allows AI to select the appropriate framework and reason from that starting point, just as physical theories are chosen based on the context of the problem. 1. This assumption is incorrect because the passage suggests that ethical theories can diverge and that multiple frameworks can coexist, not that a single framework replaces all others. 2. This is incorrect because the passage does not suggest that real cases will always fit neatly into one framework. In fact, it implies that ethical decisions might involve more complexity and overlapping frameworks, much like how physical theories apply to different domains. 3. This assumption is incorrect because the passage highlights that different ethical theories can lead to different recommendations for the same issue. Selection among frameworks is necessary based on the context, not redundant.
10.	Utilitarianism focuses on maximizing the total welfare or happiness of the entire population. In contrast, prioritarianism emphasizes giving greater moral weight to improving the condition of the worst-off individuals, rather than just maximizing total welfare. This makes prioritarianism closer to being the opposite of utilitarianism, as it does not prioritize the total sum of well-being but instead focuses on helping those in the most need. 1. This option does not directly oppose utilitarianism, as it focuses on strict adherence to rules (an absolutist stance), which could still align with utilitarian principles in some cases, especially when evaluating societal benefit. However, it does not provide a strong opposition. 2. This option aligns more closely with utilitarianism because it focuses on overall social welfare, similar to utilitarian principles. Non-egoism is a broader framework but does not directly oppose utilitarianism. 3. Deontological ethics, while opposite to utilitarianism in many aspects, is not fully represented here. This option talks about choosing the option with the highest benefit, which aligns more with utilitarian thinking, even though it mentions duty as secondary. This option doesn't directly oppose utilitarianism.
11.	The author mentions the Hoover and Aswan dams as examples of grand, iconic infrastructure projects that embody the human drive to conquer nature. The passage then emphasizes that this drive is not limited to these mega-structures but extends to the smaller dams that are widespread across the globe. This highlights the pervasive nature of the desire to control water, even in less-publicized projects.

	1. This is incorrect because the passage does not focus on the charisma of the designers or builders, but rather on the impact and symbolism of the dams themselves. 2. This is a misinterpretation, as the reference to "thin blue lines" is used to suggest that what might appear as natural water features (like rivers or lakes) are actually reservoirs due to the dams, not to indicate the rivers as being depicted on maps. 3. This is incorrect because the passage does not focus on large-scale employers or their messianic status but rather discusses how the dams themselves symbolize the broader drive to control nature.
12.	In the first paragraph, "instantiation" refers to the physical embodiment or realization of the idea of controlling nature through dams. It is used to describe how large-scale infrastructure projects like the Hoover and Aswan dams exemplify the larger drive to conquer nature. "Exemplification" and "manifestation" both relate to the idea of showing or making something tangible, which aligns with the meaning of "instantiation" in this context. 2. This is unrelated to the meaning of "instantiation" in the context. Durability and timeliness refer to the longevity and timing of projects, not the concept of making an abstract idea tangible. 3. While this pair refers to aspects of building infrastructure, it does not capture the abstract or symbolic aspect of "instantiation" that is conveyed in the paragraph. "Instantiation" refers more to making something real or concrete, not just the act of development or construction. 4. Though "concreteness" relates to making something real, "viability" does not fit as a good substitute in this context. "Viability" refers to the feasibility or practicality of something, which does not align well with the sense of embodiment or realization implied by "instantiation."
13.	The passage does not make any direct comparison between the safety of smaller dams and large dam projects. Instead, it highlights the consequences and issues related to dam-building in general, such as displacement, ecological harm, and the lack of thorough analysis of costs and benefits. It does not specifically claim that smaller dams are safer. 2. This is a valid inference because the passage refers to the $2 trillion investment in dams and questions whether the costs justify the benefits, especially given the negative consequences and the lack of comprehensive analysis. 3. This is a valid inference, as the passage mentions that in the western United States, dams were used as an instrument of colonialism, displacing Indigenous people and supporting settler agriculture. 4. This is a valid inference, as the passage notes that while there is opposition and alternative energy sources, a wave of new dam constructions continues globally, suggesting the persistence of dam-building projects.
14.	This set of terms best maps the key arguments of the passage. The passage discusses "mega-infrastructure" (such as large dams), which represents the grand scale of dam projects; "sacrifice zone", describing the negative consequences these dams have on lives, livelihoods, and ecosystems; "worshipping modernity", referring to how these projects have been justified as offerings to progress and modernity; and "water impoundment", which is the technical aspect of what dams do, impounding water in reservoirs. 1. While this set includes sacrifice zone and expected lives (referring to the aging dams), it does not focus as much on the central theme of controlling nature and the broader consequences of dam-building, making it less aligned with the passage's key points. 2. This set partially matches terms in the passage, such as partisan act, but the concept of "decided democratically" does not align with the passage, which criticizes the lack of democratic decision-making about dams. Alternative energy is briefly mentioned but isn't a core argument of the passage. 4. While this set does mention important points like partisan act and threatened livelihoods, it does not fully capture the larger themes of modernity, sacrifice, and global trends in dam construction, making it less comprehensive than option 3.
15.	Sentence 2 starts the discussion by introducing how candidates use portraits (photography) in their campaigns, which then leads to a deeper exploration of the topic. Sentence 1 follows logically by explaining how the effigy (portrait) creates a personal connection between the candidate and voters. Sentence 4 follows next, discussing how photography restores the paternalistic nature of elections and its greater usage by the Right. Sentence 3 ends the paragraph with a deeper analysis of photography's role in reducing complex political issues to a socio-moral status, connecting it to the broader implications of using portraits in campaigns.
16.	The passage highlights the shift among mindful Indian shoppers from fast fashion, which is homogeneous and wasteful, to a more personalized and sustainable approach to clothing. The focus is on the desire for customisation, fit, and avoiding the waste associated with fast fashion, while also avoiding the high prices of bespoke tailoring or indie brands. 2. While this option captures some elements of the passage, it misses the broader shift away from fast fashion and the concern about waste, which is central to the passage. 3. This statement overgeneralizes by claiming that all Indian shoppers are opting for customisation, which is

	not implied in the passage. The passage specifically discusses mindful shoppers, not the entire population. 4. This option focuses too narrowly on expensive branded clothes and does not fully capture the broader motivations of moving away from waste, homogeneity, and towards customisation, which are key points in the passage.
17.	Sentence 4 introduces the term Latinx as a recent invention aimed at making the label more inclusive for LGBTQ members. Sentence 3 then provides context by explaining how gender in languages is a grammatical, not sociological or sexual concept, highlighting the broader linguistic debate. Sentence 1 follows, bringing in a personal anecdote about Cherie Moraga, who rejects the term Latinx in favor of Xicana, reflecting on the struggle with the evolution of these terms. Sentence 2 concludes with statistics about how the different terms (Hispanic, Latino, Latinx) are used by the ethnic population, showing the diversity in how individuals identify.
18.	Sentence 1 introduces the topic of oxygen production by phytoplankton in the ocean. Sentence 2 builds on this by stating that a team of scientists has discovered oxygen is also produced on the seafloor. Sentence 4 explains why this discovery is surprising—because oxygen is typically produced with the help of sunlight, not by rocks on the ocean floor. Sentence 5 adds more information about the deep-sea rocks, called polymetallic nodules, which are host to sea creatures. Sentence 3, however, describes the methodology used by the scientists, which, while related, doesn't directly contribute to the overall flow of the paragraph regarding the discovery. It seems more technical and is the odd one out in the sequence.
19.	The sentence fits best in blank 4 as it logically follows the earlier discussion about how wealth and income inequality are linked. The mention of how capital income (derived from profits, rents, and interest) has been boosted by design fits naturally after the statement about capital income. The sentence about productivity gains directly ties into the idea that while productivity was once expected to benefit broader living standards, it now mainly increases wealth, aligning well with the argument about capital income and wealth inequality.
20.	Blank 3 is the most logical place for the sentence because it follows the mention of the "undesirable behavior" of the males in the family (impulsive aggression, arson, exhibitionism). The next step is to specify the genetic defect responsible for these behaviors, making the sentence about the defect's location on the X chromosome an ideal fit here. Blank 1 introduces the study but doesn't provide genetic specifics, so the missing sentence about the X chromosome defect would be too detailed here. Blank 2 would be better suited to introducing the behavior description or further clarifying the family context. Blank 4 comes after the mention of the point mutation in the MAOA gene, which would not make sense after a detailed description of the genetic defect location.
21.	The passage explains that the 1982 draft forest act was closely modeled on the Forest Act of 1878, which was originally designed during the colonial period. The 1878 Act was based on the usurpation of rights from peasants and tribals and was geared towards revenue generation and commercial exploitation, excluding villagers from access to forests. The similarity of the 1982 draft to colonial measures of control over forest resources led to the larger controversy, as critics felt that the act continued colonial policies that disregarded the rights of local communities. 1. While commercial exploitation is mentioned in the passage, the reason for the larger controversy is the replication of colonial control, not solely the commercial exploitation. 2. This is true, but it focuses only on one aspect of the controversy. The larger controversy arose because the act replicated colonial control measures, not just because it violated rights. 3. This focuses on the defense of the act, but the larger controversy was driven by the fact that the act mirrored colonial-era measures, not just the opposition to it.
22.	The passage discusses the origins of the Indian Forest Department, which involved the introduction of systematic forest management by German experts due to the deforestation caused by railway construction. If it were true that the German forestry experts were infamous for violating the rights of indigenous communities, it would support the passage's narrative about the colonial roots of forest control and the subsequent exclusion of local communities from forest resources. Therefore, this statement does not weaken the narrative. 1. This would weaken the narrative because it suggests that the denial of access to forest resources was not a colonial innovation but a pre-existing practice, which contradicts the argument that the British colonial state initiated the extensive control over forest resources. 2. If true, this would weaken the passage's argument about the direct role of deforestation in India to meet railway timber needs. The claim that timber was imported from China would undermine the idea that

deforestation in India was driven by railway expansion.
3. This would weaken the narrative because it implies that the tribal groups themselves were contributing to deforestation, potentially contradicting the passage's focus on the colonial state and forest bureaucracy as the primary agents responsible for forest control and ecological harm.

23. The passage does not directly state that the 1982 draft forest act resulted in large-scale deforestation, but rather it focuses on how the act gave more powers to forest bureaucracy, restricted access to forest areas, and replicated colonial-era policies. The 1982 draft was criticized for continuing a colonial legacy, but the act itself was not described as causing deforestation. The focus was more on its control over forest resources and the rights of local populations, not its direct contribution to deforestation.
2. This is correct because both the 1878 Forest Act and the 1982 draft act sought to concentrate control of forest resources within the state, limiting the rights of local communities.
3. This is also correct, as the 1982 draft act was criticized for being modeled on the 1878 Forest Act, which was based on colonial policies and the usurpation of local rights.
4. This is correct because both the 1878 Forest Act and the 1982 draft act sparked significant debate, with opposition from local communities, activists, and various stakeholders about the control of forest resources and the rights of local populations.

24. The passage mentions that one of the major demands of critics of the forest policy has been to abandon the principle of state monopoly over forest land and to hand over areas of degraded forests to individuals and communities for afforestation. This indicates that involving local people in cultivating forests has not yet been fully implemented in India's forest policies.
2. While the government has made some changes in forest policy, such as stopping ecologically harmful practices like the clear felling of natural forests, a complete ban on deforestation is not specifically mentioned as a reform that is yet to happen.
3. This is not a reform that is still needed, as the passage discusses how the state already has control over forest resources, and critics are calling for the state to relinquish some of that control by allowing communities to manage the land.
4. The passage mentions that the government has stopped ecologically harmful practices, indicating that the significance of forests to ecology is already recognized in some aspects of the policy.

25 - 28. We can divide the outgoing and incoming calls among six friends in four categories:

I. Xitel to Xitel
This may happen among Anu and Bijay only as only these two friends uses the operator Xitel

Xitel to Xitel	Outgoing minutes to		
Incoming minutes from ↓	Anu	Bijay	Total
Anu	–	100	100
Bijay	50	–	50
Total	50	100	150

II. Xitel to Yocel
This may happen from Anu and Bijay to Chetan, Deepak, Eshan and Faruq. Now, together Chetan, Deepak, Eshan and Faruq recieves incoming calls from operator Xitel = 250 + 275 + 100 + 100 = 725 minutes
They got calls from Bijay = 200 minutes. So, remaining = 725 – 200 = 525 minutes calls from Anu
Also from point (i), Bijay to Eshan = 0 minutes => Anu to Eshan = 100 minutes

Xitel to Yocel	Outgoing minutes to				
Incoming minutes from ↓	Chetan	Deepak	Eshan	Faruq	Total
Anu			100		525
Bijay			0		200
Total	250	275	100	100	725

III. Yocel to Xitel
This may happen from Chetan, Deepak, Eshan and Faruq to Anu and Bijay
Now, together Anu and Bijay recieves incoming calls from operator Yocel = 225 + 125 = 350 minutes
They got calls from Chetan = 50 minutes, Deepak = 100 minutes and Faruq = 0 minutes.
So, remaining = 350 – (50 + 100 + 0) = 200 minutes calls from Eshan
Also, from point (ii) and (iii), Chetan to Anu = 0 minutes and Deepak to Bijay = 0 minutes.
So, the rest of the information can be filled as follows:

Yocel to Xitel	Outgoing minutes to		
Incoming minutes from ↓	Anu	Bijay	Total
Chetan	0	50	50
Deepak	100	0	100
Eshan	125	75	200
Faruq	0	0	0
Total	225	125	350

IV. Yocel to Yocel

This may happen among Chetan, Deepak, Eshan and Faruq. Now, together Chetan, Deepak, Eshan and Faruq recieves incoming calls among themselves = 150 + 100 + 375 + 150 = 775 minutes

So, Faruq's outgoing calls = 775 – (175 + 150 + 100) = 350 minutes

Also, Faruq to Eshan = 200 minutes, Chetan to Deepak = 0 minutes, Deepak to Faruq = 0 minutes, Eshan to Chetan = 0 minutes and Eshan to Deepak = 0 minutes. And the rest of the information can be filled as follows:

Yocel to Yocel	Outgoing minutes to				
Incoming minutes from ↓	Chetan	Deepak	Eshan	Faruq	Total
Chetan	–	0	125	50	175
Deepak	100	–	50	0	150
Eshan	0	0	–	100	100
Faruq	50	100	200	–	350
Total	150	100	375	150	775

25. The duration of calls from Bijay to Anu = 50 minutes

26. The total duration of calls made by Anu to friends having mobile numbers from Operator Yocel = 525 minutes

27. The total duration of calls made by Faruq to friends having mobile numbers from Operator Yocel = 350 minutes

28. The duration of calls from Deepak to Chetan = 100 minutes

29 - 33. It is given that 1 Crown = 0.5 Zentars ⇒ Z = 2C. As per the given information, we can make an initial table:

Traveler	Aurevia	Brelosia	Cyrenia	Flight Cost	Money Spent	Travel Cost
Jano	Yes	No	Yes	4000Z		3500A
Kira	Yes	Yes	No		2000B	8000A
Lian	No	Yes	Yes		3000B	36000C

As we are given that Z = 2C, so 36000C = 18000Z.

Also it is known that Travel Cost = Flight Cost + Money Spent.

We can see that each of these travelers have visited two countries, so they must have spent two times whose values are given as 1000, 2000 and 3000 in their respective currency.

It is given that each traveler had different spending (in the country's local currency) in the two countries he/she visited. Across all the visits, there were exactly two spends of 1000 and exactly one spend of 3000 (in the country's local currency). As the value of 3000B is already mentioned in the table, so we will have 2 values of 1000 and 3 values of 2000 in the table. It is given that Kira's Travel Cost was 4000B, so we can say that 8000A = 4000B. Hence we get that 2A = B.

So now we will some more values in this table and try to convert everything in Zentars:

Traveler	Aurevia	Brelosia	Cyrenia	Flight Cost	Money Spent	Travel Cost
Jano	Yes	No	Yes	4000Z	1000A + 2000C or 1000C + 2000A	3500A
Kira	Yes	Yes	No		2000B + 1000A	8000A = 4000B
Lian	No	Yes	Yes		3000B + 2000C	18000Z

It is given that the Flight Cost of the other two travelers were 5000 and 6000 Zentars, not necessarily in that order, so using Hit & Trial, if we allot 5000Z to Lian, then we get the equation as 5000Z + 3000B + 2000C = 18000Z. Also 2000C = 1000Z, so 5000Z + 3000B + 1000Z = 18000Z

$\Rightarrow$ 3000B = 12000Z $\Rightarrow$ B = 4Z. So Travel Cost of Kira = 4000B = 16000Z.
Hence Flight Cost of Kira = 6000Z. So 6000Z + 2000B + 1000A = 16000Z.
$\Rightarrow$ 6000Z + 8000Z + 1000A = 16000Z $\Rightarrow$ A = 2Z.
Hence we get the final table as:

Traveler	Aurevia	Brelosia	Cyrenia	Flight Cost	Money Spent	Travel Cost
Jano	Yes	No	Yes	4000Z	3000Z	7000Z
Kira	Yes	Yes	No	6000Z	10000Z	16000Z
Lian	No	Yes	Yes	5000Z	13000Z	18000Z

Now we will answer all the questions:

29. The sum of Travel Costs for all travelers in Zentars = 7000 + 16000 + 18000 = 41000

30. Lian spend 3000B + 2000C = 12000Z + 1000Z = 13000Z in the two countries he visited.

31. Jano spent 3000Z = 1500A in the two countries he visited.

32. As B = 4Z and Z = 2C, so we can say that B = 8C.

33. As A = 4C, so Jano spent 1000A + 2000C = 1000A + 500A = 1500A. It means he did not spend 2000A in local currency.

34 - 37. As per the given information, we can see that all the 4 people solved 4 visual puzzles and 6 number based puzzles. So we have to find the time taken (in minutes) by each of them to solve both the types of puzzles and so we can make the following table:

Puzzle Number	Time taken by A	Time taken by C	Time taken by K	Time taken by S
1	4	4	2	5
2	9	6	4	7
3	11	10	7	12
4	14	13	12	18
5	19	17	14	21
6	22	21	16	23
7	27	23	19	26
8	29	26	25	28
9	33	28	29	30
10	37	30	31	35

Lets make a table of total time consumed while solving visual puzzles:

Puzzle Number	Time taken by A	Time taken by C	Time taken by K	Time taken by S
1	4	4	2	5
2	14	13	12	18
3	29	26	25	28
4	33	28	29	30

Now we can see that for each of them, the 1st, 4th, 8th and 9th puzzle were visual puzzles.
Now we can answer all the questions.

34. Number of puzzles solved by the 20th minute from the start of the competition is:
A – 5, C – 5, K – 7 and S – 4. Hence the highest number of puzzles were solved by K.

35. For S, the total time consumed when he solved 3rd visual puzzle = 28 min. This was his 8th puzzle overall.
Time taken to complete 7th puzzle = 26 min.
So time taken to complete his 3rd visual puzzle = 28 – 26 = 2 min

36. The fourth number-based puzzle was actually their 6th puzzle overall.

37. From the table, we can find the time taken by A to solve the number-based puzzles as :
1st number-based puzzle = 9 – 4 = 5 min
1st number-based puzzle = 11 – 9 = 2 min
1st number-based puzzle = 19 – 14 = 5 min
1st number-based puzzle = 22 – 19 = 3 min
1st number-based puzzle = 27 – 22 = 5 min
1st number-based puzzle = 37 – 33 = 4 min.

Hence average time taken = $\frac{5+2+5+3+5+4}{6} = \frac{24}{6} = 4$ min

38 - 42.

It is given that normalized trade balances of P, X and C are 0%, 10%, and –20%, respectively. It means Exports and Imports are equal for country P. So we have assumed them as a.
For country X, trade balaance is 10%. If we take Trade Balance as 10b and Total Trade as 100b, and Exports as x and Imports as y, then x + y = 100b…….(1) and x – y = 10b……(2). So we get the value of x as 55b and y as 45b.
For country C, trade balaance is -20%. If we take Trade Balance as -c and Total Trade as 5c, and Exports as 2c and Imports as 3c, then m + n = 5c…….(3) and m – n = 3c……(4). So we get the value of m as 2c and y as 3c.
So we can make a table and fill some values in it :

Country	Exports	Imports	Trade Balance	Total Trade
P	a	a	0	2a
X	55b	45b	10b	100b
C	2c	3c	-c	5c
ROW	100d			

Using the data for Exports::
P to X = 600 and P to C = 1200. Hence exports from P to ROW = a – 1800
X to P = 0.4 of 55b = 22b and X to C = 0. Hence exports from X to ROW = 55b – 22b = 33b
C to P = 0.9 of 2c = 1.8c, C to ROW = 0.04 of 2c = 0.08c. Hence C to X = 2c – (1.8c + 0.08c) = 0.12c
Let the total exports from ROW to all the countries = 100d
So, ROW to X = 12d, ROW to P = 40d, ROW to C = 0 and ROW to ROW = 48d
Now it is given that 22% of imports of P are from X $\Rightarrow$ 0.22a. And exports from X to P = 22b.
Hence 0.22a = 22b $\Rightarrow$ a = 100b
Also, Imports of C from P = 1200, Imports of C from X = 0 and Imports of C from ROW = 0.
Hence total of imports = 1200 + 0 + 0 = 1200 which is equal to 3c. Hence 1200 = 3c $\Rightarrow$ c = 400.
Hence exports of C = 2c = 800, Trade Balance of C is -400 and Total Trade of C = 2000.
The rest of the information can be gathered as follows:

	P	X	C	ROW	Total Exports
P	–	600	1200	a – 1800	a = 100b
X	22b	–	0	33b	55b
C	1.8c = 720	0.12c = 48	–	0.08c = 32	2c = 800
ROW	40d	12d	0	48d	100d
Total Imports	a = 100b	45b	3c = 1200		

Using the data for Imports::
22b + 720 + 40d = 100b and 600 + 48 + 12d = 45b
=> 78b = 40d + 720 and 45b = 12d + 648
Solving, b = 20 and d = 21 and a = 100b = 2000

	P	X	C	ROW	Total Exports
P	–	600	1200	200	2000
X	440	–	0	660	1100
C	720	48	–	32	800
ROW	840	252	0	1008	2100
Total Imports	2000	900	1200	1900	6000

38. Exports from C to X = 48 IC

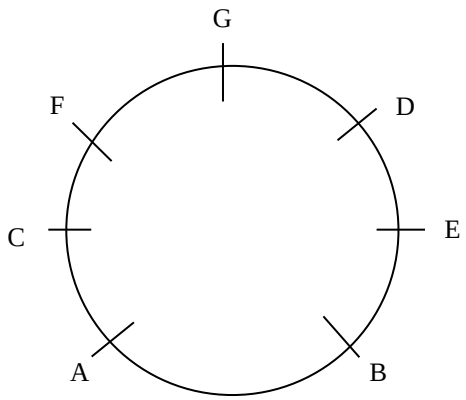
39. Exports from P to ROW = 200 IC

40. Exports from ROW to ROW = 1008 IC

41. Trade balance of ROW = Exports – Imports = 2100 – 1900 = 200 IC

42. Total Trade of P = 2000 + 2000 = 4000 IC
Total Trade of X = 1100 + 900 = 2000 IC
Total Trade of C = 800 + 1200 = 2000 IC
Hence, the least total trade is of both X and C

43 - 46. After going the information, we can make the diagram as follows::



Now we can fill some missing values in this table:

Round	Pass Type	Received by
1	Immediately to the left	Aarav
2	Second to the right	Eshan
3	Immediately to the right	Diya
4	?	Eshan or Bina or Farhan
5	?	Aarav
6	Second to the left	Farhan
7	Immediately to the left	Gaurav
8	Immediately to the left	Diya
9	Second to the right	Farhan
10	Immediately to the right	Chirag

Now we can answer all the questions:

43. From the diagram, we can see that Eshan is sitting immediately to the right of Bina

44. From the diagram, we can see that Chirag is sitting third to the left of Eshan

45. The total number of occurrences can be uniquely determined for :: Immediately to the right. They are 2 in number.

46. For 4 children, Aarav, Diya, Gaurav and Chirag, it is possible to determine how many times they received the Buck.

47. $x^2 + 1/x^2 = 25$
As we know, $(x + 1/x)^2 = x^2 + 1/x^2 + 2 = 25 + 2 = 27$
So, $(x+ 1/x)^2 = 27 \Rightarrow x + 1/x = \sqrt{27} = 3\sqrt{3}$ since $x > 0$ implies
$x + 1/x > 0$.
$x^7 + 1/x^7 = (x^3 + 1/x^3)(x^4 + 1/x^4) – (x + 1/x)…(1)$
If $x + 1/x = K$ then $x^3 + 1/x^3 = K^3 - 3K$
So, $x^3 + 1/x^3 = (3\sqrt{3})^3 - 3\times3\sqrt{3} = 81\sqrt{3} - 9\sqrt{3} = 72\sqrt{3}$
Similarly, if $x + 1/x = K$, then $x^2 + 1/x^2 = K^2 – 2 = M$, $x^4 + 1/x^4 = M^2 – 2$
So, $x + 1/x = 3\sqrt{3}$, $x^2 + 1/x^2 = (3\sqrt{3})^2 - 2 = 25 = M$
Therefore, $x^4 + 1/x^4 = 25^2 - 2 = 625 – 2 = 623$
Hence, from (1)
$x^7 + 1/x^7 = (72\sqrt{3})(623) - 3\sqrt{3} = 44856\sqrt{3} - 3\sqrt{3} = 44853\sqrt{3}$. Option 2 is the answer.

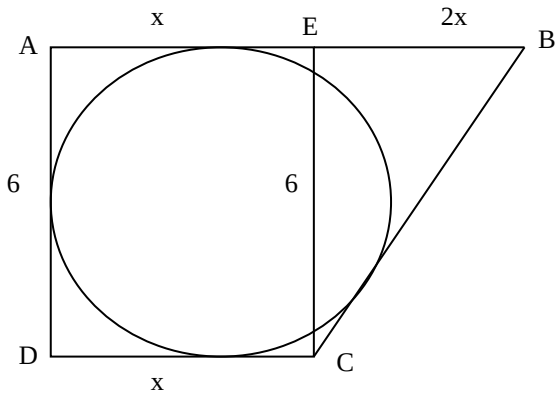
48. Let the range be all real y such that the equation
$y = f(x) = (2x – 3)/(2x^2 + 4x – 6)$
$y(2x^2 + 4x - 6) = 2x – 3$
$2yx^2 + 4xy – 6y = 2x – 3$
$2yx^2 + (4y – 2)x + (-6y + 3) = 0$
For real x, discriminant ≥ 0 :
$(4y – 2)^2 – 4(2y)(-6y +3) \geq 0$
As we know, $(4y – 2)^2 = 16y^2 – 16y + 4$

	$16y^2 - 16y + 4 - 8y(-6y + 3) = (16y^2 - 16y + 4) + (48y^2 - 24y) = 64y^2 - 40y + 4 = 16y^2 - 10y + 1 \geq 0$ $16y^2 - 2y - 8y + 1 \geq 0$ $2y(8y - 1) - 1(8y - 1) \geq 0$ $(2y - 1)(8y - 1) \geq 0$ Product of two linear factors ≥ 0 when both are positive or both are negative. Case 1 : Both are positive $(2y - 1) \geq 0 \Rightarrow 2y \geq 1 \Rightarrow y \geq ½$ $(8y - 1) \geq 0 \Rightarrow 8y \geq 1 \Rightarrow y \geq 1/8 \Rightarrow y \geq ½ \Rightarrow y \in [1/2, \infty)$ Case 2 : Both are negative $(2y - 1) \leq 0 \Rightarrow 2y \leq 1 \Rightarrow y \leq ½$ $(8y - 1) \leq 0 \Rightarrow 8y \leq 1 \Rightarrow y \leq 1/8 \Rightarrow y \leq 1/8 \Rightarrow y \in (-\infty, 1/8]$ The solution becomes $(-\infty, 1/8] \cup [1/2, \infty)$. Option 4 is the answer.
49.	Let the four digit number be abcd $a + b + c = 15$….(1) $b + c + d = 16$…(2) $c = d + 6 \Rightarrow d = c - 6$…(3) substitute (3) in (2) $b + c + (c - 6) = 16 \Rightarrow b + 2c - 6 = 16 \Rightarrow b + 2c = 22 \Rightarrow b = 22 - 2c$…(4) use (1) to express a in terms of c $a + b + c = 15 \Rightarrow a + (22 - 2c) + c = 15 \Rightarrow a + 22 - c = 15 \Rightarrow a = 15 - 22 + c = c - 7$ ….(5) Now, $a \geq 1$, from (5), $a = c - 7 \geq 1 \Rightarrow c \geq 8$. Also, $a \leq 9 \Rightarrow c - 7 \leq 9 \Rightarrow c \leq 16$. Since, c is a single digit, $c \in \{8,9\}$, means c has 2 cases. Case 1 : If c = 8 $a = c - 7 = 8 - 7 = 1$, $b = 22 - 2c = 22 - 16 = 6$, $d = c - 6 = 2$ Number: abcd =1682. Case 2 : If c = 9 $a = c - 7 = 9 - 7 = 2$, $b = 22 - 2c = 22 - 18 = 4$, $d = c - 6 = 3$ Number: abcd = 2493. Largest number possible = 2493, Smallest number possible = 1682 Required difference = 2493 – 1682 = 811. Option 1 is the answer.
50.	Let the total work be LCM (40,50,4) = 200 units Efficiency of 5 members of team A = 200/40 = 5 Efficiency of each member of team A = 5/5 = 1 Efficiency of 8 members of team B = 200/50 = 4 Efficiency of each member of team B = 4/8 = ½ = 0.5 Efficiency of 10 members of team C = 200/4 = 50 Efficiency of each member of team C = 50/10 = 5 Now, as per the question (2 members of A + 3 members of B + 1 member of C)'s 23 hours work = $[2\times1 + 3\times0.5 + 1\times5]\times23 = [2 + 1.5 + 5]\times23 = 8.5\times23 = 195.5$ units Remaining work = 200 – 195.5 = 4.5 units Time left to finish the work = 1 hr. Let the new member in team B be x who will replace the member of team C. [2 members of A + (3+x) members of B) to finish the remaining work in 1 hour. $[2\times1 + (3+x) \times 0.5] \times 1 = 4.5$ $2 + (3+x)\ 0.5 = 4.5 \Rightarrow (3+x)\ 0.5 = 4.5 - 2 = 2.5$ $\Rightarrow (3+x)/2 = 2.5 \Rightarrow 3 + x = 5 \Rightarrow x = 2$. Option 1 is the answer.
51.	Let the average salary of each manager be M, and that of each engineer be E. $5M + 25E = 60000 \times 30 = 1800000$…(1) $(5\times1.2)M + 25E = 60000 \times 1.05 \times 30 = 1890000$ $6M + 25E = 1890000$…(2) Subtract (1) from (2), we get M = 90000, Putting in (1) we get $5\times90000 + 25E = 1800000$ $450000 + 25E = 1800000$ $25E = 1800000 - 450000 = 1350000$

	E = 54000. Option 4 is the answer.
52.	Let the marked price per unit be M rupees. Cost price per unit is Rs. 240. January: Discount = 20%, Selling price = 0.8M, Profit per unit = 0.8M−240, Units sold =120 Profit in Jan =120(0.8M −240) February: Discount =10%, Selling price = 0.9M Profit per unit = 0.9M – 240, Units sold = 135 Profit in Feb = 135(0.9M−240) March: Discount =5%, Selling price = 0.95M, Profit per unit = 0.95M − 240, Units sold = 150 Profit in March = 150 (0.95M−240) April: No discount, Selling price =M, Profit per unit = M−240, Units sold = 165 Profit in April = 165(M−240) Total profit: 120(0.8M−240)+135(0.9M−240)+150(0.95M−240)+165(M−240)=138825 ⇒ 96M – 120(240) + 121.5M – 135(240) + 142.5M – 150(240) + 165M – 165(240) = 138825 ⇒ 96M + 121.5M + 142.5M + 165M -240(120 + 135+150 + 165)=525M − 240 × 570 ⇒ 525M – 136800 = 138825 ⇒ 525M = 138825 + 136800 = 275625 M = 275625/525 = 525. Option 1 is the answer.
53.	Let the sets be: P = Physics, M = Mathematics, C = Chemistry. Given: |P|=75,|M|=111,|C|= 40,|P∪M∪C|=150. |P∩C|=|M∩C|=u, |P∩M|=2u, and let x = |P∩M∩C| ≥ 1. Break the regions as: a = |P∩M only|, b = |P∩C only|, c =|M∩C only|, p= |P only|, m =|M only|, q =|C only|. Then: |P∩C| = b + x = u, |M∩C| = c+x = u, |P∩M| = a + x=2u. So, b + x = c + x ⇒ b = c, a + x = 2u = 2(b+x) ⇒ a = 2b + x. Using: |P∪M∪C|=|P|+|M|+|C|−|P∩M|−|P∩C|−|M∩C|+|P∩M∩C|. Substitute: 150 = 75 + 111 + 40 −(2u)− u − u + x ⇒150 = 226 −4u + x ⇒4u − x =76.⋯(1) Since u = b + x, clearly u ≥ x and all variables are non-negative integers. From (1), x ≥ 1⇒ 4u−76 ≥1 ⇒ u ≥ 20. x ≤ u⇒ 4u−76 ≤ u ⇒ 3u ≤ 76⇒u ≤ 76/3 ⇒u ≤ 25. So u is an integer with 20 ≤ u ≤25. Express the required quantity in terms of u. We want the number of students who chose physics but not mathematics: $\|P∩M\|^c$ = p + b. From set totals: |P|= p + a + b + x = 75 ⇒ p = 75 − a − b −x. p + b = 75 – a – b – x + b = 75 − a− x. But a = 2b + x, and u = b + x, so b = u – x, hence a = 2(u−x) + x = 2u − x. Therefore: p+b = 75 − (2u−x) – x = 75−2u. So, for any feasible u, |P but not M| = 75 − 2u. To {maximize} this, we need to {minimize} u, i.e., take the smallest feasible u, which is u = 20 max(p + b)=75 − 2×20 = 75 − 40 = 35. Check feasibility for u=20. For u = 20; x = 4u − 76 = 80 − 76 = 4, b = u – x = 16, c = b = 16, a = 2b + x = 36. Now: |P| : p + a + b + x = p + 36 + 16 + 4 = p + 56 = 75 ⇒ p = 19, |M| : m + a + c + x = m + 36 + 16 + 4 = m + 56 = 111 ⇒ m =55, |C| : q + b + c + x = q + 16 + 16 + 4 = q + 36 = 40 ⇒ q = 4. All are non-negative integers, so this configuration is valid. Thus the maximum possible number of students who chose physics but not mathematics is: p + b = 19 + 16 = 35. Option 1 is the answer.
54.	$f(x) = (x^2 + 3x)(x^2 + 3x + 2)$ Let $t = (x^2 + 3x)$, then $f(x) = t(t+2) = t^2 + 2t$,

	So, $f(x) + 1 = t^2 + 2t + 1 = (t+1)^2$ $\sqrt{f(x)+1}$ = 9701 => $\sqrt{(t+1)^2}$ = 9701. Since the square root is non-negative, $\|t+1\|$ = 9701 => t + 1 = 9701 or t + 1 = -9701. Thus, t = 9700 or t = -9702. So, $x^2 + 3x = 9700 \Rightarrow x^2 + 3x - 9700 = 0$, & $x^2 + 3x = -9702 \Rightarrow x^2 + 3x + 9702 = 0$. Solving $x^2 + 3x - 9700 = 0$, discriminant = $D = 3^2 + 4\times9700 = 4 + 38800 = 38809$. $\sqrt{38809} = 197$, The roots are : $x = (-3 \pm 197)/2 \Rightarrow x_1 = (-3 + 197)/2 = 194/2 = 97$ & $x_2 = (-3 - 197)/2 = -100$ Solving $x^2 + 3x + 9702 = 0$, Discriminant $D = 3^2 - 4\times9702 = 9 - 38808 = -38799 < 0$, So, this quadratic equation has no real roots. Therefore, the only real solutions are : x = 97 & x = 100 Sum of real roots = 97 + (-100) = -3.
55.	Let: v=initial speed (km/h), S=total distance (km). If he goes at constant speed v for 6 hours: S=6v. Suppose he travels for t hours at speed v before stopping. He: travels for t hours at speed v, stops for 20 minutes = 1/3 hour, Then travels the remaining distance at speed v+3 km/h. Distance covered before stop: vt. Remaining distance: S−vt = 6v − vt. Time for remaining distance: (6v –vt)/(v +3) Total time = t + 1/3 + (6v –vt)/(v +3) = 6 (6v –vt)/(v +3) = 6 – t – 1/3 = 17/3 – t …(1) Now he stops 10 minutes more, so the stop is 30 minutes= 0.5 hour, and then increases speed by 5 km/h (to v+5). Similarly, t + ½ + (6v –vt)/(v +5) = 6 ⇒ (6v –vt)/(v +5) = 6 – t – ½ = 11/2 – t …(2) Let 6v – vt = M, from (1) and (2) M/(v + 3) = 17/3 – t ⇒ M = (17/3 – t) (v + 3) …(3) M/(v + 5) = 11/2 – t ⇒ M = (11/2 – t) (v + 5) …(4) Equating (3) and (4) t = 21/4 – v/12 …(5) Substitute in (1) to get v (6v – vt)/ (v+3) = 17/3 – t => 6v – vt = v(6-t) 6 – t = 6 – (21/4 – v/12) = 24/4 – 21/4 + v/12 = ¾ + v/12 Thus 6v – vt = v(6 – t) = v(3/4 + v/12) = 3v/4 + v^2/12 So, [3v/4 + v^2/12]/(v + 3) = 17/3 – (21/4 – v/12) = 68/12 – 63/12 + v/12 = (5 + v)/12 (9v + v^2)/(v + 3) = v + 5 v^2 + 9v = (v+3)(v + 5) = v^2 + 8v + 15 9v = 8v + 15 v = 15. So, v = 15 kmph.
56.	Let Ankita's walking speed be w km/h. Her running speed be r = 1.4w (40% more) 3 hours 30 minutes = 3.5 hours =210 minutes. Walking from B→C: BC/w = 3.5 ⇒ BC = 3.5w….(1) Running from B→A: BA/r = 3.5 ⇒ BA = 3.5r = 3.5×1.4w = 4.9w….(2) Walking from A→B using speed w: Time (A→B) walk = AB/w = 4.9w/w (from 2) = 4.9 hours = 4.9 × 60 = 294 minutes. Time : (B→C) Running using speed r = 1.4w BC/r = 3.5w/1.4w (from 1) = 3.5/1.4 = 2.5 hours = 2.5 × 60 = 150 minutes Total required time = 294 + 150 = 444 minutes.
57.	$10^{50} + 10^{25} - 123$ 10^{50} means 1 followed by 50 zeros 10^{25} means 1 followed by 25 zeros. $10^{50} + (10^{25} - 123)$ $(10^{25} - 123)$ means 10000000000…00000 – 123 = 99999999…..9999877 means this is a 25-digit number: 22 nines followed by 877. Sum of digits

	1 + (50 × 0) + (22 × 9) + 8 + 7 + 7 = 1 + 198 + 8 + 7 + 7 = 1 + 198 + 22 = 221. So, the required sum of digits is: 221.
58.	To solve this question we will first calculate the area of the triangle using **Heron's formula**. To do so, we need the semi-perimeter (S) of the triangle. S = (AB+AC+BC)/2 = 50+50+80 = 90cm Now, we apply Heron's formula for the area A: A = $\sqrt{S(S-AB)(S-AC)(S-BC)}$ Substituting the values: A = $\sqrt{90(90-50)(90-50)(90-80)}$ = $\sqrt{90\times40\times40\times10}$ A = $\sqrt{90\times16000}$ = $\sqrt{1440000}$ = 1200cm^2 Now we can calculate the altitudes corresponding to each base i.e. AB, BC and CA respectively. Since AB and AC are equal so both will have the same height say h_A. We know area of a triangle = $\frac{1}{2}\times$ base × height So, 1200 = $\frac{1}{2}\times$ AB× h_A 1200 = $\frac{1}{2}\times$ 50× h_A h_A = 48 Let the altitudes corresponding to BC be h_B So, 1200 = $\frac{1}{2}\times$ BC× h_B 1200 = $\frac{1}{2}\times$ 80× h_B h_B = 30 Therefore, the sum of all the altitudes will be h_A + h_A + h_B = 48 + 48+ 30 = 126 cm. The sum of the lengths of all three altitudes of the triangle ABC is 126 cm.
59.	Total volume in A at the end is 60L and alcohol: water = 15 : 4, so alcohol in A finally is 60·15(15 + 4) = 60·15/19 = 900/19. Net alcohol lost from A = 60 − 900/19 = (1140 − 900)/19 = 240/19. Net alcohol lost also equals alcohol removed first minus alcohol returned: net loss = x − (x^2)/(60 + x) = 60x/(60+x). So 60x/(60 + x) = 240/19. 60·19·x = 240(60 + x) → 1140x = 14400 + 240x 900x = 14400/900 = 16
60.	Given, sum of 4th, 7th & 10th term = 99. So, [(a + 3d) + (a + 6d) + (a + 9d)] = 99 3a + 18d = 99 a + 6d = 33 .....(1) Also given, sum of first 14 terms of the AP = 497 So, S14 = 14/2 * (2a + (14 - 1) * d) = 497 S14= 7(2a + 13d) = 497 2a +13d = 71 .....(2). Solving (1) & (2) together a + 6d = 33 2a + 13d = 71 By elimination method multiplying 2 with equation (1) and subtracting it from equation (2) (2a + 13d) - (2a + 12d) = 71 - 66 d = 5 Now we need to find a Substitute d=5d into Equation 1: a + 6 × 5 = 33 a + 30 = 33 a = 3 To find the sum of the first 5 terms, we use S5 = 5/2 * (2a + (5 - 1) * d) Substituting the values of 'a' and 'd' S5 = 5/2 * (2×3 + (5 - 1)*5) = 5/2 * (6 + 4*5) = 5/2 * 26 = 65 So, the sum of the first 5 terms is 65
61.	Given, sum of p, q & r = 900

	& r is a perfect square between 150 & 500 Therefore r can take the values 169, 196, 225, 256, 289, 324, 361, 400, 441 & 484. Also, $0.3q \leq p \leq 0.7q$ We need to find the difference between the maximum and minimum value of p. So, to maximise p we can take its value as 0.7q & then we will have to minimise r (i.e. 169) So, $0.7q + q + 169 = 900$ $1.7q = 731$ $q = 731/1.7 = 430$ So, $p_{max} = 0.7q = 0.7*430 = 301$ Say, $p_{max} = 301$ Similarly, to minimise p we can take its value as 0.3q & then we will have to maximise r (i.e. 484) So, $0.3q + q + 484 = 900$ $1.3q = 416$ $q = 416/1.3 = 320$ So, $p_{min} = 0.3q = 0.3*320 = 96$ $p_{min} = 96$ Now, $p_{max} - p_{min} = 301 - 96 = 205$ So the difference between the maximum and minimum value of p is 205.
62.	Let the coins in bags A and B be in the ratio 17x : 7x After transferring 108 coins from bag A to bag B we get $(17x - 108) : (7x+108) = 37:20$ $(17x - 108)/(7x + 108) = 37/20$ $20 * 17x - 108 * 20 = 37 * 7x + 37 * 108$ $20 * 17x - 37 * 7x = 108(37 + 20)$ $340x - 259x = 108*(57)$ $81x = 108 * 57$ $x = (108 * 57)/81$ $x = 76$ Now there are 17x - 108 coins in 'A' & 7x + 108 coins in 'B' i.e. 17 x 76 - 108 = 1184 coins in bag A & 7 x 76 + 108 = 640 coins in bag B To make the ratio of coins in bag A and bag B as 1:1 we will have to transfer y coins from A to B. So, $\frac{1184 - y}{640 + y} = \frac{1}{1}$ $1184 - y = 640 + y$ $2y = 1184 - 640$ $y = 544/2 = 272$ So, the number of coins needed to be transferred from bag A to bag B to make the ratio 1:1 is 272.
63.	Given, the rates of water flow through three pipes A, B, and C are in the ratio 4 : 9 : 36 and Pipe A can fill the tank completely in 15 hours. We know that, work = efficiency × time So, work = 15 × 4 = 60 &, time = $\frac{\text{work}}{\text{efficiency}}$ So, the time taken by all three pipes to fill the tank = $\frac{60}{4+9+36} = \frac{60}{49}$ = 1.2244 hrs Time in minutes = 1.2244 × 60 = 73.46 minutes ≈ 73 minutes
64.	The height of the trapezium, which is the side AD, is equal to the diameter the circle inscribed in the trapezium. The radius of the circle is 3 cm so the diameter becomes 6 cm. Therefore AD is 6 cm. For a circle to be inscribable in a trapezium, the sum of opposite sides must be equal: AB + DC = AD + BC Since, AB = 3.DC We can let DC as x so, AB becomes 3x. Therefore, $3x + x = 6 + BC$ $4x = 6 + BC$ $BC = 4x - 6$ ……..(1) Drop a perpendicular from C to AB, meeting at E. In the right angled triangle BEC, the height CE = AD = 6, and the base BE = AB – AE = AB – DC = 3x – x = 2x. 

	Applying Pythagoras Theorem $BC^2 = BE^2 + CE^2$ Using (1) in the equation above $(4x - 6)^2 = (2x)^2 + 6^2$ $16x^2 – 48x + 36 = 4x^2 + 36$ $12x^2 – 48x = 0$ $12x(x - 4) = 0$ Since x cannot be zero, x = 4 cm. Thus, DC = 4cm and AB = 12 cm. The area of the trapezium is given by the formula: Area = $\frac{1}{2}$ (sum of parallel sides) × (distance between the parallel sides) Area = $\frac{1}{2}$ (AB + DC) CE Area = $\frac{1}{2}$ (12 + 4) × 6 = 48 cm^2
65.	Place D at the origin and the line BC on the x-axis. Put A straight above D at A= (0,8) (so AD = 8. Let B = (−x, 0) and C = (y, 0). From AB = AC =12 we get $x^2 + 8^2 = 144, y^2 + 8^2 = 144$, so $x^2 = y^2 = 144 − 64 = 80$. Thus BD = x = $\sqrt{80}$ and DC = y = $\sqrt{80}$, hence BD·DC = $(\sqrt{80})(\sqrt{80}) = 80$.BD. Because ∠AEB=∠ACB, points A,B,C,E are concyclic, and by the intersecting-chords (power of a point) theorem at D, BD·DC = AD·DE ⇒ 80 = 8·DE ⇒ DE = 10. Therefore AE = AD+DE = 8+10 =18. So AE = 18cm
66.	Given, $12^{12x} \times 4^{24x+12} \times 5^{2y} = 8^{4z} \times 20^{12x} \times 243^{3x-6}$ $(3\times4)^{12x} \times (2^2)^{24x+12} \times 5^{2y} = (2^3)^{4z} \times (5\times4)^{12x} \times (3^5)^{3x-6}$ $3^{12x}\times(2^2)^{12x} \times 2^{48x+24} \times 5^{2y} = (2^3)^{4z} \times 5^{12x} \times(2^2)^{12x} \times (3^5)^{3x-6}$ $3^{12x}\times(2^{24x} \times 2^{48x+24}) \times 5^{2y} = (2^{12z} \times 2^{24x}) \times 5^{12x} \times (3^5)^{3x-6}$ $3^{12x} \times 2^{72x+24} \times 5^{2y} = 2^{12z+24X} \times 5^{12x} \times 3^{15x-30}$ On comparing the indices: $3^{12x} = 3^{15x-30}$ 12x = 15x – 30 3x = 30 x = 10 ……(1) $2^{72x+24} = 2^{12z+24X}$ 72x + 24 = 12z + 24x 12(6x + 2) = 12(z + 2x) 6x + 2 = z + 2x 4x = z – 2 Since x = 10 z = 40 + 2 = 42 ……(2) $5^{2y} = 5^{12x}$ 2y = 12x y = 6x y = 60 ……..(3) So, x + y + z = 10 + 42 + 60 = 112
67.	Let S, A, and C be the number of students in science, arts, and commerce streams respectively. The total number of students is 1500 S + A + C = 1500 The total fee collected is Rs 15,50,000, with individual fees of Rs 1100, Rs 1000, and Rs 800: 1100S + 1000A + 800C = 1550000 The given constraint is that the number of science students is not more than the number of arts students: S≤A Divide the total fee equation by 100 to simplify: 11S + 10A + 8C = 15500 Substitute the expression for C from the first equation (C=1500−S−A) into the simplified fee equation: 11S + 10A + 8(1500 - S - A) = 15500 11S + 10A + 12000 - 8S - 8A = 15500 3S + 2A = 15500 – 12000

	3S + 2A = 3500 Express A in terms of S: A = $\frac{3500-3S}{2}$ = 1750 – 1.5S For A to be an integer (as it represents a number of students), S must be an even number. Apply the constraint S ≤ A S ≤ 1750 - 1.5S 2.5S ≤ 1750 S ≤ $\frac{1750}{2.5}$ S ≤ 700
68.	$\log_{x-3}(x^2-9) = \log_{x-3}(x+1) + 2$ $\log_{x-3}(x^2-9) = \log_{x-3}(x+1) + 2\log_{x-3}(x-3)$ $\log_{x-3}(x^2-9) = \log_{x-3}(x+1) + \log_{x-3}(x-3)^2$ $\log_{x-3}(x^2-9) = \log_{x-3}((x+1) \times (x-3)^2)$ $x^2 - 9 = (x+1) \times (x-3)^2$ $(x-3)(x+3) = (x+1) \times (x-3)^2$ $(x+3) = (x+1) \times (x-3)$ $x + 3 = x^2 - 3x + x - 3$ $x + 3 = x^2 - 2x - 3$ $x^2 - 3x - 6 = 0$ss We can now solve the above equation using determinants method: On comparing the equation with the standard form $ax^2 + bx + c = 0$, we get the coefficients as a = 1, b = -3, and c = -6. The determinant of a quadratic equation is given by the formula $D = b^2 - 4ac$ We calculate the value of $D = (-3)^2 - 4(1)(-6) = 9 + 24 = 33$ The roots of the quadratic equation are found using the quadratic formula, which incorporates the determinant: $x = \frac{-b \mp \sqrt{D}}{2a} = \frac{3+\sqrt{33}}{2}$ & $\frac{3-\sqrt{33}}{2}$ $\frac{3+\sqrt{33}}{2}$ is given in options, hence it is the answer.