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

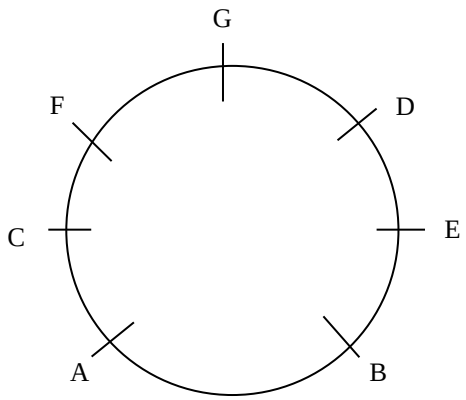
39. Exports from P to ROW = 200 IC

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.

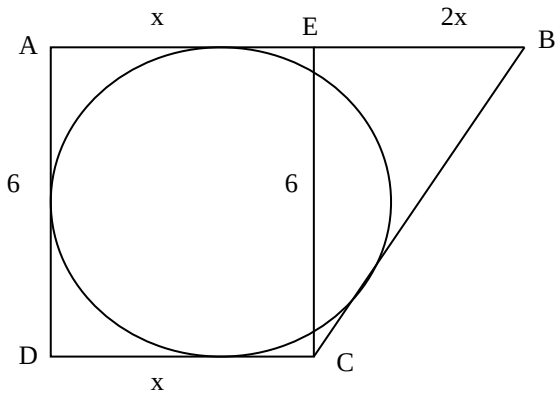
48. Let the range be all real y such that the equation
$y = f(x) = (2x – 3)/(2x^2 + 4x – 6)$
$y(2x^2 + 4x - 6) = 2x – 3$
$2yx^2 + 4xy – 6y = 2x – 3$
$2yx^2 + (4y – 2)x + (-6y + 3) = 0$
For real x, discriminant ≥ 0 :
$(4y – 2)^2 – 4(2y)(-6y +3) \geq 0$
As we know, $(4y – 2)^2 = 16y^2 – 16y + 4$

	$16y^2 - 16y + 4 - 8y(-6y + 3) = (16y^2 - 16y + 4) + (48y^2 - 24y) = 64y^2 - 40y + 4 = 16y^2 - 10y + 1 \geq 0$ $16y^2 - 2y - 8y + 1 \geq 0$ $2y(8y - 1) - 1(8y - 1) \geq 0$ $(2y - 1)(8y - 1) \geq 0$ 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.