Unproctored - Mock CAT 13
Answers and Explanations

1	d	2	a	3	b	4	a	5	c	6	b	7	d	8	d	9	c	10	a
11	a	12	b	13	d	14	c	15	d	16	c	17	b	18	c	19	c	20	a
21	d	22	d	23	c	24	b	25	c	26	c	27	c	28	b	29	b	30	c
31	d	32	a	33	b	34	b	35	d	36	b	37	c	38	b	39	c	40	c
41	c	42	c	43	d	44	b	45	d	46	a	47	b	48	b	49	d	50	c
51	a	52	b	53	c	54	d	55	d	56	a	57	b	58	a	59	c	60	b
61	d	62	c	63	d	64	b	65	b										

1. d **From statement A:**
Lets assume that C was x years old when A was 4 years old and hence B must have been 3x years old at that time. After x years, the ages of A, B and C would become 4 + x, 4x and 2x years respectively (thus B would be twice as old as C). But, we don't know the value of x and hence cannot answer the question.

From statement B:
Lets assume that the ages of A, B, and C were y, 5y, and 2y years respectively at some stage. y years later, their ages would be 2y, 6y and 3y years and thus B would be twice as old as C. But we don't know the value of y and hence cannot answer the question.

Combining both the statements:
Age difference of B and C = 4x–2x = 2x (from statement I) and the age difference of B and C = 6y – 3y = 3y (from statement II)

Hence 2x = 3y or $y = \dfrac{2x}{3}$ (as age difference of two people always remains the same).
Age difference of A and B = 3x – 4 (from statement I) and age difference of A and B = 4y (from statement II)

$\therefore$ 3x – 4 = 4y or, 3x – 4 = 4. $\dfrac{2x}{3}$ or x = 12.

$\therefore$ We can now say that A was 4 + 12 = 16 years of age when B was twice as old as C.

2. a Let, the discriminant of the given equation
$(2A + B)x^2 + (A + 2B)x + (2A + 3B) = 0$ be D.
$D = (A + 2B)^2 - 4(2A + B)(2A + 3B) = -(15A^2 + 8B^2 + 28AB)$.

Using statement A:
Given that the equation $2Ax^2 + (2A + 3B)x + 3B = 0$ has equal roots.
So, the discriminant (D) of this equation must be equal to zero.
Therefore, $(2A + 3B)^2 - 24AB = 0$
Or, 2A = 3B.
Substituting, 2A = 3B we get that

$D = -\left(15 \times \dfrac{9}{4}B^2 + 8B^2 + 42B^2\right)$

Therefore, D = 0 when B = 0 and D < 0 for all non-zero values of B.
Hence, statement A alone is not sufficient to answer the question.

Note: When B = 0, A also becomes zero (as 2A = 3B) and the equation reduces to an identity. An identity is an equation of infinite roots, real or imaginary. Thus, when B = 0, x can take any value, real or imaginary.

Using statement B:
It is given that A < 0 and B = –1.

Hence, $D = 28A - 15A^2 - 8 = -(15A^2 - 28A + 8)$

Since, it is given that A < 0, therefore D will always be less than 0.
Hence, the roots of the equation will not be real.
Hence, statement B alone is sufficient to answer the question.

3. b **Using statement A:**
Since, it is given that triangle CBD is isosceles, the only possibility we can have is that the length of CD is equal to the length of CB.
Note: The length of CB cannot be equal to the length of BD because the measure of $\angle ABD$ will become more than 90°, which is not possible.
Therefore, the measure of $\angle ABD = 40°$.
Hence, statement A alone is sufficient to answer the question.

Using statement B:
Considering the triangle ODA, we can see that OD = OA, which implies that the measure of $\angle ODA = \angle OAD = 50°$.

Therefore, the measure of $\angle ABD = 180° - (90° + 50°) = 40°$.
Hence, statement B alone is also sufficient to answer the question.

4. a Given that if the percentile of any candidate is more than or equal to 99.998, then he/she is awarded 100 percentile.
This means that (100 – 99.998 = 0.002)% of the total number of candidates(X) that appeared for BAT are awarded '100 percentile'.
So, for every 50000 candidates, there will be exactly 1 candidate who is awarded 100 percentile.

Using statement A:
Given that 90000 < X < 160000.
If X < 100000, then there will be 1 candidate, who will be awarded 100 percentile.
If $100000 \le X < 150000$, then there will be exactly 2 candidates, who will be awarded 100 percentile.
If $150000 \le X < 160000$, then there will be exactly 3 candidates, who will be awarded 100 percentile.
Hence, statement A alone is not sufficient to answer the question.

Using statement B:
Given that 160000 < X < 190000.
We can conclude that there will be exactly 3 students, who will be awarded 100 percentile.
Hence, statement B alone is sufficient to answer the question.

5. c Magic Number for P, Q, R, and S is 0 and magic number for T and U is 1. (T - R) and (U - S) Required sum is 2.

6. b Since out of the number of persons who voted for P in any round, the number of persons who voted for S should be least, we need to maximize the number of persons who voted for P in any round and then voted for T in the next round. (Additional Information (1)).
34 persons who voted for P in round I, voted for T in round II.
Out of the 39 persons who voted for P in round II, 36 voted for T in round III and 3 voted for S in round III.
Out of the 43 persons who voted for P in round III, 35 voted for T in round III and only 8 can vote for S in round IV as out of the 29 persons who voted for S in round IV, 21 have to be those who voted for S in round I. (Additional Information IV)
Out of the 29 persons who voted for P in round IV, 29 voted for T in round V)
Therefore, out of the persons who voted for P in any round, the number of persons who voted for S is at least 3 + 8 = 11.

7. d Number of persons who voted for P in every round
= 0.
Number of persons who voted for Q in every round is at most = 9 (In round II number of persons voting for Q and U is 39 and 13 respectively and the number of persons voting for P in round III is 43). This is possible when the persons who voted for U in any round always voted for P in the next round.
Number of persons who voted for R in every round is at most = 2 (Number of persons who voted for T in round I is 43 and the sum total of persons who voted for R and U in round II is 45).

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Therefore, the number of persons who voted for the same nominee in every round is at most 9 + 2 + 21(S) = 32.
Note: 21(S) means votes for S.

For questions 8 to 10:
It is given that except for last match played by C, every other match is either played or deemed to have been played for 50 overs.
At the end of first match we get that A won by {50 × 0.8} = 40 runs and C won by {50 × 1} = 50 runs, and B and D lost by 40 runs and 50 runs in any order.

Let run difference = Total runs scored by the team till that match – Total runs scored against that team till that match.

At the end of second match C is having a run difference of {0.25 × 100} = 25 runs. [100 overs are considered because two matches of 50 overs each is played by C.]

Hence, we can say that C lost its second match by 50 – 25 = 25 runs.

Similarly at the end of second match B has a run difference of – 40 runs and D has a run difference of – 50 runs. So C cannot lose its match against either B or C because their respective run difference is either 0 or 10.

Hence, we can say that A played its second match against C and won by 25 runs. So, his run difference at the end of second match will be 65 and the net run rate will be $\frac{65}{100}$ = 0.65 i.e. A2 = 0.65.

So now we can have only two combinations:

Case I:

1st match	2nd match	3rd match
A vs D	A vs C	A vs B
C vs B	B vs D	C vs D

Case II:

1st match	2nd match	3rd match
A vs B	A vs C	A vs D
C vs D	B vs D	C vs B

Case I is not possible because we see that net run rate of both A and B are increasing and hence, A and B cannot play against each other in this round.

In both the combinations we see that A has not played with C so we can surely say that by the end of third match A has played full 150 matches and hence its run difference by then is equal to 150 × 0.6 = 90 runs. Hence, it won the match by 25 runs.

Hence the second match of B and D ended up in tie.

8. d

9. c

10. a

For questions 11 to 13:
-It is clear that C + F + H + B + S + V = 18
Also, from the bar – graph, the value of C, F, B, H and V is 3, 2, 5, 2 and 4 respectively.
Therefore, S = 18 – (3 + 2 + 5 + 2 + 4) = 2.
Since, the number of siblings who chose Basketball is 5 and there are exactly three sports that have not been chosen by Aslam as well as

Ahmad (Additional information II), therefore, Aslam as well as Ahmad chose Basketball. Also, form additional information II, Aslam and Azhar chose Cricket and Swimming. Since, the number of siblings who chose Volleyball is 4, therefore except for Ahmad and Azhar, every other sibling chose Volleyball. Since, Armaan did not choose Basketball and there is one sport that has not been chosen by Armaan but is chosen by Atif, therefore that sport is Basketball. Also, the three sports chosen by Armaan are Football, Hockey and Volleyball.

	Azhar	Atif	Aslam	Aaqib	Armaan	Ahmad
Cricket	Yes	No	Yes	No	No	Yes
Football	No		No		Yes	No
Hockey	No		No		Yes	No
Basketball	Yes	Yes	Yes	Yes	No	Yes
Swimming	No	No	Yes	No	No	Yes
Volleyball	Yes	Yes	No	Yes	Yes	No

11. a   The value of 6 – S = 6 – 2 = 4.

12. b   Aslam did not play Volleyball.

13. d   It cannot be uniquely determined.

For questions 14 and 15:
Let x be the number of girls who got exactly three oranges and y be the number of boys who got atleast two oranges.

	At least 1 orange	At least 2 oranges	Exactly 3 oranges
Boys	100 – x	y	40 – x
Girls	100 – y	60 – y	x
Total	200 – (x + y)	60	40

Now, $100 - x \geq y \geq 40 - x$ ...(i)

$100 - y > 60 - y \geq x$ ...(ii)

$200 - (x + y) \geq 60 > 40$ ...(iii)

(i) implies that $40 \leq x + y \leq 100$

(ii) implies that $x + y \leq 60$,

(iii) implies that $x + y \leq 140$

Combining all three results we get that $40 \leq x + y \leq 60$.
Also, $40 \times 3 + (60 - 40) \times 2 + (200 - (x + y) - 60) \times 1 = K$

$\Rightarrow 300 - (x + y) = K$

$\Rightarrow x + y = 300 - K$

$\therefore 40 \leq 300 - K \leq 60 \Rightarrow 240 \leq K \leq 260$

14. c   Only option (c), i.e. 255 lies within the permissible range of values of 'K'.

15. d   From the table, the number of girls who got exactly two oranges
= 60 – y – x = 60 – (x + y)
= 60 – (300 – K) = K – 240
We know that $240 \leq K \leq 260$ or $0 \leq K - 240 \leq 20$
So, the number of girls who got exactly two oranges definitely lies between 0 and 20 and hence can be either 17 or 19 but not 23.
Hence, option (d) is the correct choice.

16. c   Lets say, Himesh's great grand father lived for x yrs

$\Rightarrow$ Reshamiya's daughter's age = $\frac{x}{6}$ yrs

$\Rightarrow$ Himesh's wife's age $= \left(\dfrac{x}{6}\right) + 6$

Let Reshamiya's eldest son's age be b.
$\therefore$ Reshamiya's second wife's age = b + 8
According to Reshamiya,

$\dfrac{b+8}{\dfrac{x}{6}+6} = \dfrac{8}{7} \Rightarrow 21b + 24 = 4x$ … (i)

and $b = \dfrac{x+6}{6} \Rightarrow 6b - x = 6$ … (ii)

Solving (i) and (ii), x = 90
Himesh's great grand father's age at the time of conversation
= 90 + 6 = 96 years.

17. b Let A, B, C, D and E denote the weight of Amir, Bhutal, Chetali, Dhani and Esha respectively.

Given that C = 2 + E, B = 8 + A and D = 78.

Also, the total weight of the couples = 2 × (79 + 82) = 322 kg and that of all the five persons = 5 × 80 = 400 kg.

Therefore, the weight of the unmarried person = 400 − 322 = 78 kg which is that of Dhani.
If Amir = A $\Rightarrow$ Bhutal = A + 8
if Esha = E
Chetali = E + 2

Given that
A + (A + 8) + E + (E + 2) = 322

$\Rightarrow \dfrac{(A+E)}{2} = 78$

$\Rightarrow \dfrac{A+C}{2} = 79$

$\Rightarrow$ Amir and Esha cannot be couples but (Amir, Chetali) are couples as average weight of Amir and Chetali is 79.
As weight of each of the person in the group is distinct the only possibilities of couples are: (Amir, Chetail)(Bhutal, Esha).

For questions 18 to 20:
The number of people cannot be in decimals, so they should be in integers only. Now consider the two digits after the decimal point in every figure of population density column.

Out of the given states for all those states which have an odd number (except multiple of 5) after the decimal, the population density must be multiplied by 100 to get minimum possible number of people living in that state. e.g. Maryland.

For all those states which have an even number (except multiple of 10 and multiple of 4) after the decimal, the population density must be multiplied by 50, if the even number after the decimal is a multiple of 4 the population density must be multiplied by 25 to get minimum possible number of people living in that state. e.g. New York.

If the even number after the decimals is a multiple of 4 as well as 10, the population density must be multiplied by 5, to get minimum possible number of people living in the state.

For all those states which have odd multiples of 5 after the decimal, the population density must be multiplied by 20 to get minimum possible number of people living in that state. e.g. Rhode Island.

For all those states which have multiples of 20 after the decimal, the population density must be multiplied by 5 to get the minimum possible number of people living in that state. e.g. Pennsylvania.

18. c Rhode Island $\rightarrow$ population density = 387.35
For integral number of people in Rhode Island it must have atleast an area of 20 km^2. In this case population of Rhode Island will be 387.35 × 20 = 7747

New York $\rightarrow$ population density = 195.18
For integral number of people in New York must have at least an area of 50 km^2. In this case population of New York will be 195.18 × 50 = 9759

New Hampshire $\rightarrow$ population density = 53.20
For integral number of people New Hampshire must have atleast an area of 5 km^2. In this case population of New Hampshire will be 53.20 × 5 = 266

Minimum possible aggregate of these four states population = 7747 + 9759 + 266 = 17772

19. c All those states which have an odd number (except multiple of 5) after the decimal will have an area of at least 100 km^2 Among the given states 1 state will definitely have an area of 100 km^2, i.e. Maryland.

20. a Total population of New York = 195.18 × 150 = 29277

Total number of families in New York = $\dfrac{29277}{3}$ = 9759

21. d The paragraph defines technical writing in the beginning and its last two sentences talk about functional roles of technical writers and SMEs. Option (a) is negated as it jumps onto describing the needs of a good technical writer, rather than furthering the flow of the paragraph. Most likely, option (a) would follow option (d). Option (b) is also negated as it discusses mistakes made by inexperienced technical writers; hence, it goes adrift from the flow of the paragraph. Option (c) is also ruled out as it talks about the relationship between the technical writers and SMEs thus, it becomes disjoint from the flow of the discussion.

22. d D will follow A because it talks about the mode of 'two 19th century Victorian writers with disparate styles collaborating ...'. B will follow C, since C brings up the topic of 'staging' of the plays and B is being more specific and tells about the 'first staging'.

23. c The western countries are seeking to force emission norms on India and the reason cited is India's profligate reproductive behaviour manifested in huge population growth. Option (a) slightly weakens the move of the western countries since it gives the impression that India's population growth need not result in environmental pollution or hazard. Option (b) does not affect the move of the western countries. Option (d) is incorrect as it just highlights the reason for India's population growth. In doing so, it negates the 'profligate behaviour', which serves as the main reason for western nations forcing Delhi to accept emission norms. Option (c), if true strengthens the case for the move of the western nations. If population growth can lead to environmental imbalance, the western nations obtain further support to penalise India through emission norms for its huge population growth.

24. b The examples of the Italian Renaissance, 21st century and Britain illustrate a tendency to become anxious or imagine a downfall or doom when things are at a peak. The Italian Renaissance was at its height when people believed that things would decline. In the 21st century. where the majority are having a superlative standard of living, they are victims of self-pity. Britain which was full of self-congratulation is now a victim of moral anxiety. Option (a) talks about criticism, which

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is not apparent in the paragraph. In none of the examples do we see criticism being faced . Option (c) again talks about criticism –which is not apparent. Option (d) talks about 'introspection when things are looking up'. But the paragraph is predominantly about things not just 'looking up', but things at a height or that there is a feeling of self-congratulation.

25. c   'Ogre' is a man eating animal. 'Busker' is a street entertainer; 'buffon' is a fool. But 'Seraph', the best choice is a member of the order of angels.

26. c   Only option (c) can be inferred. The words " it will come and hover over us again, sooner or later" confirm this. The author, while writing includes 'Indian companies' in his discussion. The use of 'us' and 'we', when the author makes suggestions (in the 6th and 7th paragraph) clearly show that the author considers himself as a part of the set of 'Indian companies'. Option 1 cannot be inferred as "the dollar stabilizing" may not mean " the dollar going up". Options (b) and (d) also cannot be inferred though one can infer that both variables need to be corrected.

27. c   The passage is not predominantly descriptive. The author's tone is not merely factual; indeed, he gives facts but he expresses his opinion at the end of nearly each paragraph. The tone is also not predominantly humorous, though a tinge of sarcasm can be discerned at some places. But yes, the author is definitely giving suggestions through a major portion of the passage.

28. b   It can be inferred that knowledge workers in IT have become used to a good raise every year. But it cannot be inferred that they are arrogant. So option (a) is out. Option (c) cannot be inferred. Option (d) which talks about interest rates cannot definitely be inferred from the passage. Option (b) can be inferred from the fifth paragraph.

29. b   Option (b) is correct. The author first discusses and dismisses the easy and common solutions and then talks about the Indian context. Options (a) and (c) are incorrect. Option (d) is incorrect ; the author is suggesting solutions and not talking about solutions which have been adopted by Indians.

30. c   The information given in the question statement can be paraphrased as follows: Individuals, those who are willing to follow moral codes, are essentially compassionate; civilized society cannot exist without individuals with compassion. Now, option (a) is incorrect as it states 'some civilized societies' only. But the need of the people who are willing to follow moral codes is the need for all, and not some civilized societies. Option (b) is incorrect as we do not have information about the agents that are detrimental to civilized society. Option (d) is incorrect as it is not an assumption. It is a generalization about the people who are compassionate. Option (c) is the correct answer as it clearly states that the people with compassion are required for the civilized societies to exist.

31. d   Option (d) is most appropriate as 'bookish' goes with 'scholar's habits'

32. a   B is obviously the one which follows the opening sentence as it introduces the subject-'Uncia uncia'. It should be followed by D because the latter gives additional details. DE will be the mandatory pair since 'these peaceable folk ...' in E obviously refers to 'high-altitude pastoral communities....'.

33. b   The passage largely focuses on the fact that sensation and perception are separable. The initial portions talk about sensation and the latter part of the passage talks about perception. Refer to the last para where perception becomes a new system within the body separate from the existing system of sensation – the existing stimulus-response system. It must be said that physically both systems may use the same pathways. Options (1), (3) and (4) talk about only one system.

34. b   According to the passage the body was initially bound by the sensory phase,, which was a very stiff-stimulus response stage, perception subsequently followed. Hence if perception had preceded sensation then option (2) would have been true. Option (1) is far-fetched. Options (3) and (4) need more discussion and substantiation in the passage.

35. d   According to the passage the process gets enclosed and is now more personal and private, making option (d) correct. Options (a), (b) and (c) are too general. They do not come close to the meaning of "privatised".

36. b   (a) is incorrect: the author talks about atrocities caused by Israelis and not Palestinians. (c) is incorrect: the author talks about Israeli occupation and not of Palestinian occupation. (d) is incorrect: the author doesn't support Israel at all. Option (b) goes with the theme and development of the paragraph. Moreover, it is completely in sync with the last line of the paragraph.

37. c   The paragraph starts with the mention of the welfare thrust which occurred after 1947 and raised primary education till 1981. The paragraph moves further, illustrating the National Policy on Education and its aims or goals. Option (a) is a surmised view and seems like a sketchy summary of some of the main points of the paragraph. The last line of the paragraph talks about improvement in women's condition. Option (d) is negated as it does not match with the flow of the paragraph and talks about the shift in emphasis and people's attention towards enrollment and retention. Rather than matching with the flow of the paragraph, option (b) seems to reiterate the facts mentioned in the fourth line of the paragraph. However, option (c) furthers the ideas mentioned in the last two sentences of the paragraph, and hence, serves the purpose by winding up the text aptly.

38. b   Option (a) is incorrect because the author does not mention the Act in order to highlight that the US governments have been incapable of dealing with economic issues in the past. Throughout the passage the author conveys that the methods and means adopted by the US government to protect trade and domestic jobs are going to hamper the global economy and strain the relations with countries across the world. Hence, the competence of the US government is not questioned by the author who is more concerned with the methods adopted by the government to tackle the issue. Option (b) is the best choice because the author is concerned about the global effects of trade protectionism policies adopted by US government. He/she mentions the example of Smoot- Hawley Act in order to explain the global impact of protecting domestic trade. At the end of the first paragraph, the author explains that when US raised import tariffs many other countries followed suit resulting in paralysing the global economy. Similar action is hinted in the fifth paragraph where the EU has warned US of retaliatory action. Also, the author states in the second last paragraph that 'the integrated nature of the global economy would ensure that trade protectionism seen in the 1930s does not repeat itself, recent events do not provide a great deal of comfort'. This depicts a sense of urgency and a lack of calm in the author's mind. Also, he/she is not sure that such an occurrence will not repeat ever. Hence, this reveals the true aim of the author behind mentioning the 1930s Act. Option (c) has an extremely narrow scope as it tries to focus solely on the divide between the opinions of the policymakers and the analysts. It may seem like a close choice; however,

the intention of the author is to focus on the global impact of adopting such trade protectionist policies. Hence, this option cannot be considered as the appropriate choice. Option (d) is incorrect because firstly the author is against the actions taken by the US government. So, there is no way that he/she would attempt to justify such actions which he/she is questioning in the first place. Secondly, the author's views can be confirmed from the sixth paragraph where he/she mentions the flaws in the 'Buy American' provision where the author states that such measures 'could severely restrict trade'.

39. c   Option (a) can be inferred from the first paragraph of the passage. The author states that some people may argue that such multilateral commitments with other countries would stop one and all from taking steps towards protecting domestic trade. However, this view is refuted by the tactics of 'policymakers' who   'in several countries have found imaginative ways of protecting their domestic industries and jobs of local people'. Hence, this justifies the weakness of multilateral commitments between countries. Option (b) can be inferred from the above passage. In the second line of the first paragraph, the author states that 'analysts have been reminding the policymakers of the ills of adopting measures to protect their domestic industries.' Also, in the second paragraph the author states that policymakers have found creative ways to protect domestic trade and jobs. This explains that the Analysts' warnings are falling short of affecting the policymakers' actions and hence their opinions are divided on this issue. Option (c) is the correct choice because it is wrongly inferred from the passage. The author explains the negative implications of the 'Buy American' provisions on global economy. The author states that 'major trading partners of the US, including Canada and EU have cautioned the US Administration against supporting measures that discriminate against imports'. The 'Buy American' provisions depict exactly the opposite – greater significance to domestic trade and jobs. Hence, this option is an incorrect interpretation of the actions of US Administration within the context of the above passage. Option (d) can be inferred from the given passage. The passage clearly mentions in the first line that the US economy is responsible for contaminating the growth prospects of the global economy.

40. c   Option (a) is incorrect because firstly, the author does not mention 'financial aid' anywhere in the passage. Secondly, the author mentions in the first paragraph that the global economy lapsed into a state of 'virtual paralysis'. This indicates that the global economy was paralyzed and hence could not function. Option (b) is incorrect because this option suggests a somewhat optimistic outcome of adopting the Smoot- Hawley Act. Also, the author does not refer to self-sufficiency of the economies within the given context. Option (c) correctly suggests the intended meaning of the phrase 'brought most economies to their knees. Option (d) is an extreme choice; economies being 'virtually paralysed' and coming down to their knees nowhere suggest that they lapsed into a state of complete inactivity.

41. c   Option (a) is incorrect: It does not create a contrast to the idea in the last line of the paragraph. Option (b) is incorrect as the pragraph highlights the contrast between the 'erotic life of antiquity' and the 'erotic life' of his times. Option (b) negates the possession of 'instinct' in the modern times, which is contrary to what is mentioned in the paragraph. The author clearly states that the emphasis has shifted from 'instinct' in the ancient times to 'instinct's' object in the modern times. Option (d) is incorrect: 'the ancients' in the last line of the paragraph can be contrasted with 'the presents' (we people/ us) but not with Freud. Option (c) creates the relevant contrast.

42. c   Considering that something sad had transpired with the master during the past week, 'sally' a witty remark would be surprising. So (c) is correct. Euphemism means to express something harsh in a milder manner by choosing appropriate words. 'Sarcasm', which includes bitterness, is possible after a loss. So the disciple would not be surprised at a sarcastic remark. 'Insularity' which means narrow-mindedness is inappropriate here. Hence choice (c) is the appropriate choice.

43. d   The line "Her years of travel have so broadened her vision of the world that one quick glance at Florentino is enough to blot out every trace of her former passion and dreamy-eyed innocence." leads directly to option (d). Options (a) is incorrect. Option (b) is what Fermina does and not why she rejects Florentino. Option (c) is not directly evident from the passage.

44. b   Only option (b) cannot be inferred from the passage. The novel, exclusively does not hinge on the hallucinatory quality but one cannot say that the novel does not have that quality. Option (a) is clear from the end of the sixth para. Option (c) is clearly evident in the fourth para.

45. d   'Interstices' refers to interval in the passage - a short space of time between events. The passage mentions various events and the author, while stating 'dark interstices' means dark intervals. 'Raison d' etre' means reason or justification for existence. This helps us to eliminate all the options but (d).

46. a $y = x^2 - 6x + 8$

$= (x-3)^2 - 1$

$y = x^2 - 6x + 8$ has minimum value at $x = 3$ and the minimum value is $y = -1$.
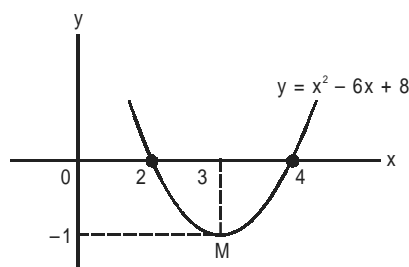
At $x = 3$, curve $y = -x^2 + bx + c$ has it's maximum value i.e. -1.
The two curves can be plotted, as shown below.

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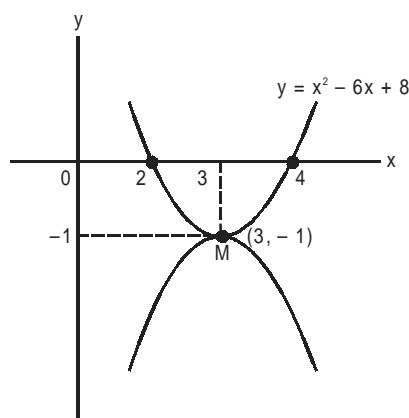
Maximum value of the curve $y = -x^2 + bx + c$, will be at $x = \dfrac{b}{2}$

$$\Rightarrow \dfrac{b}{2} = 3$$

$$\therefore b = 6.$$

47. b

Date	Bank Balance
18th Nov 2007	4000
19th Nov 2007	2000
20th Nov 2007	−2000
21st Nov 2007	−4000
22nd Nov 2007	−2000
23rd Nov 2007	2000
24th Nov 2007	4000
25th Nov 2007	2000
26th Nov 2007	−2000

Thus, we see that Bank Balance repeats after a cycle of 6 days
The number of days from 18th November 2007 to 16th November 2008 (including the extremes) is 365 (As 2008 was a leap year).
The remainder when 365 is divided by 6 is 5
Therefore, his bank balance on 16th November 2008 = −Rs.2000.

48. b Total surface area of one fourth portion of the solid sphere having radius 'r' units = (curved surface area + plane surface area) $= \dfrac{1}{4}\left(4\pi r^2\right) + 3\left(\dfrac{1}{4}\pi r^2\right) = 1\dfrac{3}{4}\pi r^2$ square units.

Sum of the areas of one-fourth portion of each of the two solid spheres having radii 4 units and 6 units is

$1\dfrac{3}{4}\left(\pi(4)^2 + \pi(6)^2\right) = 91\pi.$

We have to subtract the area of one of the plane surfaces of circle with radius 4 units from the area of one of the plane surfaces of circle with radius 6 units as they partially overlap

$\dfrac{1}{4}\pi 6^2 - \dfrac{1}{4}\pi 4^2 = 5\pi$.

Total surface area of the solid given in the question will be $91\pi - 4\pi - 9\pi + 5\pi = 83\pi$

49. d Let 'r' be the common ratio of the infinite G.P. Then we have:

$$\dfrac{100}{1-r} = S \qquad\qquad ...(i)$$

also, $|r| < a$ ...(ii)
From (i) and (ii);
as r tends to 1, S tends to ∞
and as r tends to −1; S tends to 50.
$\Rightarrow 50 < S < \infty$

Note:
Option 3 has an equality sign also but $S \neq 50$.

50. c One number should be chosen from each of the rows to satisfy the mentioned condition.
From the first row we can choose any of the six numbers in 6 ways.

From the second row we can choose one number in only 5 ways as one of the chosen number from the first row will belong to one of the columns.
Similarly, numbers from 3rd, 4th, 5th and 6th row can be chosen in 4 ways, 3 ways, 2 ways and 1 way respectively.
$\Rightarrow$ Total number of ways = 6 × 5 × 4 × 3 × 2 × 1 = 720.
One of the possible cases:

1	2	3	4	⑤	6
7	8	⑨	10	11	12
13	⑭	15	16	17	18
19	20	21	22	23	㉔
㉕	26	27	28	29	30
31	32	33	㉞	35	36

51. a Suppose the time for which he usually drives at 'a' km/hr, '2.5a' km/hr and '4a' km/hr be t_1, t_2 and t_3 minutes respectively.
Distance between the school and the house
$= at_1 + 2.5at_2 + 4at_3$
Since the boy starts 20 minutes late, time left with him
$= t_1 + t_2 + t_3 - 20$.
Time for which he drives at '4a' km/hr and '2.5a' km/hr is $(t_3 + x)$ and $(t_2 + 6)$ minutes respectively.
Time for which he drives at 'a' km/hr $= t_1 - 20 - x - 6$.
Or, $at_1 + 2.5at_2 + 4at_3 = a(t_1 - 20 - x - 6) + 2.5a(t_2 + 6) + 4a(t_3 + x)$.

Therefore, $x = \dfrac{11}{3}$ minutes.

52. b In right-angled $\triangle ABC$,
$BC^2 + AB^2 = AC^2$ (Pythagoras' theorem)
$\Rightarrow BC = \sqrt{AC^2 - AB^2} = \sqrt{65^2 - 25^2} = 60$ units
But, BC = BF + FC
$\therefore$ FC = 36 units and BF = 24 units. (given, BF : FC = 2 : 3)
$\therefore AF = \sqrt{24^2 + 25^2}$ (in $\triangle ABF$, $AB^2 + BF^2 = AF^2$)
$= \sqrt{1201}$ units = 34.66 units.

Area of $\triangle ABF = \dfrac{AB \times BF}{2} = \dfrac{BD \times AF}{2}$

Hence, in $\triangle ABF$, BD $= \dfrac{BF \times AB}{AF} = \dfrac{24 \times 25}{34.66} = 17.3$ units.

53. c Let $6a^2 - 4a + \dfrac{12a}{b} + \dfrac{6}{b^2} - \dfrac{4}{b}$ be equal to S.

$$\Rightarrow S = 6\left(a^2 + 2\dfrac{a}{b} + \dfrac{1}{b^2}\right) - 4\left(a + \dfrac{1}{b}\right)$$

$$\Rightarrow S = 6\left(a + \dfrac{1}{b}\right)^2 - 4\left(a + \dfrac{1}{b}\right)$$

From the given expression $b(a-1) = \sqrt{3}\,b - 1$

We can get that $a + \dfrac{1}{b} = \sqrt{3} + 1$

Now putting the value of $\left(a + \dfrac{1}{b}\right)$, we get

$S = 6\left(\sqrt{3} + 1\right)^2 - 4\left(\sqrt{3} + 1\right)$

$\Rightarrow S = 6(4 + 2\sqrt{3}) - 4\sqrt{3} - 4 = 20 + 8\sqrt{3}$.

54. d Let the two-digit number be denoted by 'ab', where a and b are single digit numbers. Of course, the value of ab = 10a + b.
Let the remainder when 'ab' and 'ba' are divided by (a + b) be R.
Therefore, $10a + b = (a + b)k_1 + R$.
Also, $10b + a = (a + b)k_2 + R$.
$9(b - a) = (k_2 - k_1)(a + b)$.

$k_2 - k_1 = \dfrac{9(b - a)}{(b + a)}$

As $k_2 - k_1$ is an integer, 9(b – a) is a multiple of b + a.
But b – a cannot be a multiple of b + a.
$\Rightarrow$ b + a is a multiple of 3.
$\Rightarrow$ b + a can be 3, 6, 9, 12.
b + a cannot be 15 as then the smallest value of b – a will be 5 and b and a come out to be 10 and 5 respectively which is impossible.
b + a can obviously not be greater than or equal to 18 as b and a are distinct single digit numbers.
Possible values of a and b are given in the following table.

Values of 'a'	1	2	3	4	5	6	7	8
Values of 'b'	8, 5 and 2	1, 4 and 7	6	2, 5 and 8	1 and 4	3	2	1 and 4
Number of such two-digit numbers	3	3	1	3	2	1	1	2

Therefore, there are 16 such two-digit numbers.

55. d

Draw MN such that MN is perpendicular to DC.
Let the radius of the circle with center at 'M' be 'r' units.
$\Rightarrow MN = BC - r = a - r$

$NC = \dfrac{BC}{2} = \dfrac{a}{2}$ and $CM = r + \dfrac{3a}{4}$

$CM = \sqrt{MN^2 + NC^2} = \sqrt{(a - r)^2 + \left(\dfrac{a}{2}\right)^2}$

$\Rightarrow \left(r + \dfrac{3a}{4}\right)^2 = (a - r)^2 + \left(\dfrac{a}{2}\right)^2 = \dfrac{5a^2}{4} - 2ar + r^2$

$\Rightarrow r^2 + \dfrac{2.(3ar)}{4} + \dfrac{9a^2}{16} = \dfrac{5a^2}{4} - 2ar + r^2$

$\Rightarrow \dfrac{11a^2}{16} = \dfrac{7ar}{2} \Rightarrow r = \dfrac{11a}{56}$ units.

56. a The value of n has to be less than 20.
When 20 copies bought $\Rightarrow$ total cost = \$13 × 20
When n copies bought $\Rightarrow$ total cost = \$16 × n
Now, as per the given condition, we have
$13 × 20 < 16 × n$
$\Rightarrow$ n > 16.
Hence, 'n' can take three values 17, 18 and 19.

57. b Let the number of balls with $A_i = a_i$ (i = 1 to 11)
$a_1 + a_3 + a_5 \ldots + a_{11} = 6(a_6) = 72$.
As a_6 would be the arithmetic mean of these 11 numbers and

$a_6 = \dfrac{a_1 + a_{11}}{2} = \dfrac{a_2 + a_{10}}{2} = \dfrac{a_3 + a_9}{2} = \dfrac{a_4 + a_8}{2} = \dfrac{a_5 + a_7}{2}$

$a_1 + a_6 + a_{11} = 3(a_6)$. So it must be 36.

58. a Let 'x' and 'y' be the cost price of 1 pen and 1 pencil respectively.
Let the selling price of 1 pen be 'z'.
Cost price of 3 pencils and 5 pens = 5x + 3y
Therefore 5z = 1.2(5x + 3y) or z = 0.24(5x + 3y).

Also, $2z = 0.75(2x + 6y)$

or, 2(0.24(5x + 3y)) = 0.75(2x + 6y) a loss of 25%]
Or, 5x = 17y.
Selling price of 6 pens = 6z = 1.44 (5x + 3y)
= 1.44 (20y) = 28.8y
Cost price of 6 pens and 4 pencils = 6x +4y = 24.4y
Profit percent = [(28.8y − 24.4y)/ 24.4y] x 100
= 18.03%.

59. c

Join AF and BE
Since DE : EC = 5 : 4 and CF : DF = 8 : 1,
$\Rightarrow$ 4DF = FE = EC = 4x units (assume)
Therefore, DC = 9x units
$\Delta FPE \sim \Delta BPA$

$\Rightarrow \dfrac{Ar(\Delta FPE)}{Ar(\Delta BPA)} = \dfrac{FE^2}{BA^2} = \dfrac{16}{81}$,

Let, $Ar(\Delta FPE) = 16y$ and $Ar(\Delta BPA) = 81y$ square units

$Ar(ABCD) = 2 \times \dfrac{13}{9} \times 81y = 234y$,

$Ar(\Delta APF) = Ar(\Delta BPE)$ and 4 $Ar(\Delta ADF) = Ar(\Delta BEC)$

$Ar(\Delta BEC) = \dfrac{1}{2} \times \dfrac{4}{9} \times 234y = 52y$

$Ar(\triangle ADF) = 13y$

$Ar(\triangle ADE) = Ar(\triangle ADF) + Ar(\triangle APF) + 16y = \dfrac{5}{9} \times 117y = 65y$

$Ar(\triangle APF) = 65y - 29y = 36y$

$Ar(APFD) = Ar(\triangle APF) + Ar(\triangle ADF) = 49y = 49$

$\therefore\ Ar(BPEC) = 52y + 36y = 88y = 88$ square units.

60. b   Probability that Arabian Knight wins = x
Probability that Silver Streak wins = 2x
Probability that Kanishka wins = 4x
Since they are the only horses competing,
$\Rightarrow 4x + 2x + x = 1$

$\Rightarrow x = \dfrac{1}{7}$

$\Rightarrow$ The probability of Arabian Knight losing the race = $1 - \dfrac{1}{7} = \dfrac{6}{7}$.

61. d $\left|[x + 3]\right| < 5$

$-5 < [x + 3] < 5$

If we take x = 2, [x + 3] = 5 and if we take x = −8
[x + 3] = −5.
Therefore all integer value of 'x' which are greater than −8 and less than 2 satisfy the given inequality.
Therefore, 9 integer values of x satisfy the inequality.

62. c
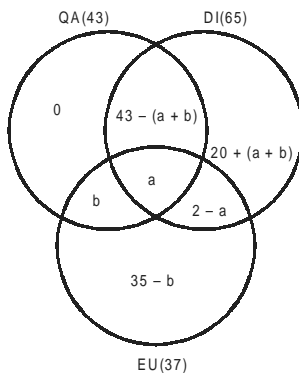
Here, number of students who cleared cut-off in QA only is zero. Therefore number of students clearing cut-off in both EU and DI would be 65 + 37 − 100 = 2. Number of students not clearing cut-off in DI would 100 − 65 = 35. Number of students clearing cut-off in DI only would be 20 + (a + b). We need to minimize a + b and the minimum value of a + b is zero.
$\therefore$ The required value is 20 + 0 = 20.

63. d
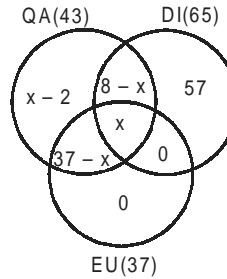
Atleast 8 students (65 + 43 − 100) would clear cut-off in both QA and DI and atleast 2 of them would clear cut off in both EU and DI. To maximize the number of students who clear cut-off in DI only, we have to consider the above diagram.
Here $2 \le x \le 8$.

64. b   Just the data that the total number of diamonds is between 500 and 600 is enough to find n. This would mean that there exists a number between 500 and 600 that can be uniquely split into 2 factors. This can happen if the number is a product of two prime numbers. But "n" can be uniquely identified. This implies that both the prime numbers are equal, otherwise we would not know what is n and what is the number of diamonds in each of the necklaces.

Hence look for a square of a prime number between 500 and 600. This happens to be 529. Hence the number of necklaces = n = number of diamonds in each necklace = 23.

65. b
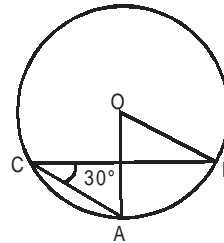
$\angle ACB = 30°$

$\angle AOB = 2\angle ACB$
[Angle subtended by a segment at the centre of a circle is twice the angle subtended on the circumference]

$\therefore \angle AOB = 2 \times 30° = 60°$
AO = BO; (radius)
$\therefore \triangle AOB$ is equilateral triangle
Hence, area of $\triangle AOB$

$= \dfrac{\sqrt{3}}{4}\left(OB^2\right) = \dfrac{\sqrt{3}}{4} \times 8 \times 8 = 16\sqrt{3}$ cm^2 .