

# Unproctored - Mock CAT 12

## Answers and Explanations

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1	d	2	c	3	b	4	a	5	d	6	a	7	c	8	d	9	d	10	b
11	c	12	b	13	d	14	a	15	c	16	c	17	c	18	a	19	c	20	a
21	d	22	a	23	d	24	d	25	b	26	b	27	d	28	c	29	a	30	c
31	c	32	a	33	b	34	d	35	c	36	b	37	b	38	c	39	b	40	a
41	d	42	a	43	b	44	c	45	b	46	d	47	d	48	c	49	c	50	d
51	a	52	d	53	b	54	a	55	b	56	d	57	c	58	a	59	d	60	d
61	d	62	d	63	a	64	d	65	c	66	d	67	d	68	b	69	d	70	c

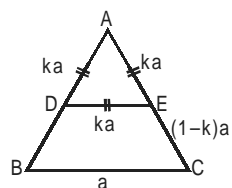
1. d Let the side of the square be 3 units.  
Anshu and Bhanu met for the first time at P, such that  $AP = 2$  and  $PB = 1$   
Anshu covered some rounds of the square (say,  $k$  rounds) plus 2 units.  
Since Bhanu was slower than Anshu, she covered exactly 3 units less than what Anshu did since they met for the first time at P.  
Ratio of their speeds =  $(12k + 2) : (12k - 1)$   
Now moving on with this ratio of speeds, Bhanu has to cover exactly one less round (or 12 units) than Anshu, to meet her for the second time.  
Anshu : Bhanu =  $(12k + 2) : (12k - 1)$   
and Anshu - Bhanu = 12  
 $\Rightarrow$  Anshu : Bhanu =  $(48k + 8) : (48k - 4)$   
 $\Rightarrow$  Anshu covered 48 complete squares + 8 units when they met for the second time.  
From point P, 8 units anticlockwise would be a point Q on DA such that  $DQ : QA = 1 : 2$ .  
Third meeting point would be 8 units ahead of Q.  
 $\Rightarrow$  Third meeting point, K, is co-incident with C.

**Alternative Method:**

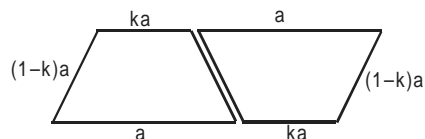
They started from A and B respectively and they diminished the initial distance between them (3 units) by meeting at P, which is 2 units ahead of A. Now, when they meet for the third time, they have to diminish the distance between them (two full squares = 24 units). For that, A will have to move 16 units ahead of P. Hence, their third meeting point would be C.

2. c If  $9x^2 + 3ax + (a + 5) > 0$  for all values of  $x$ , then the discriminant of this quadratic expression must be negative.  
 $\Rightarrow (3a)^2 - 4(9)(a + 5) < 0$   
OR  $a^2 - 4a - 20 < 0$   
OR  $(a - 2)^2 < 24$   
 $\Rightarrow -2.89 < a < 6.89$   
 $\Rightarrow a = -2, -1, 0, 1, 2, 3, 4, 5, 6$   
 $\Rightarrow$  there are 9 such integral values.

3. b The only way a trapezium could be formed is when the triangular portion ADE is cut such that DE is parallel to BC. Let the length of the side of the equilateral triangle ABC be 'a' units. Let the length of the line segment AE be 'ka' units. Since, the measure of  $\angle DAE = 60^\circ$  and  $AD = AE$ , therefore  $DE = ka$  units.

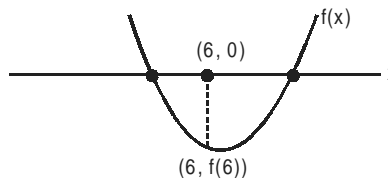


The parallelogram that is formed is shown in the figure given below.



Therefore, the perimeter of the parallelogram is  $2 \times (1 - k) \times a + 2 \times (k + 1) \times a = 4a$  units.  
Given that the value of 'a' is equal to 20 cm, therefore the perimeter of the parallelogram is 80 cm.

4. a Let  $f(x) = x^2 + 2(p - 3)x + 9$   
As the co-efficient of  $x^2$  in ' $x^2 + 2(p - 3)x + 9$ ' is greater than zero, we can say that  $f(x)$  must be represented by an upward parabola. So either it would cut the  $x$ -axis at two points (in case of real distinct roots for  $f(x) = 0$ ) or it won't.  
If 6 lies between the roots of  $f(x) = 0$ , then this means that the parabola does cut the  $x$ -axis and the position of  $(6, 0)$  can be shown as-



Definitely  $f(6)$  is less than zero (see figure).

Hence,  $(6)^2 + 2(p - 3)6 + 9 < 0$

$\therefore p < -\frac{3}{4}$

**Note:** We do not need to consider  $D > 0$  (i.e. the condition for real roots) as  $f(6) < 0$  itself ensures that the upward parabola of  $f(x)$  cuts the  $x$ -axis at some points and hence  $f(x) = 0$  has real roots.

5. d Let Initial amount with 'A' and 'B' be Rs.A and Rs.B. The following Table can be prepared as per the data in the question.

Amount	A	B
Initially	A	B
After 1st game	$\left(A + \frac{B}{2} + 1\right)$	$\left(\frac{B}{2} - 1\right)$
After 2nd game	$\frac{2A + B + 2}{4} + 1$	$\left(\frac{B}{2} - 1\right) + \frac{(2A + B + 2)}{4} - 1$

As per the Question difference in the amounts of A and B after two games is Rs.16 and obviously B must have a larger amount.

$\therefore$  The difference =  $\left(\frac{B}{2} - 1\right) - 1 - 1 = 16$

$\Rightarrow B = 38$

Initial Amount of 'A' is not playing any role in getting the value of B

$\Rightarrow$  'A' can have any amount in the beginning

6. a Sum of all the three-digit numbers

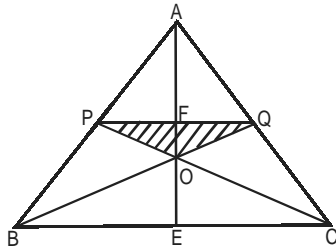
$= \frac{900(100 + 999)}{2} = 494550$

Number of three-digit numbers such that there are no odd digits in them =  $4 \times 5 \times 5 = 100$ .

The sum of all the three-digit numbers such that there are no odd digits in them =  $(2 + 4 + 6 + 8) \times 25 \times 100 + (2 + 4 + 6 + 8) \times 20 \times 10 + (2 + 4 + 6 + 8) \times 20 \times 1 = 54400$ .

$\therefore$  The sum of all the three-digit numbers such that there is atleast one odd digit in them =  $494550 - 54400 = 440150$ .

7. c



Here side of the equilateral triangle is 60 m. (Using area of equilateral triangle with side 'a' =  $\frac{\sqrt{3}}{4} a^2$ )

In the equilateral triangle,  $PQ \parallel BC$  because P and Q are the midpoints of sides AB and AC.

So,  $BC = 2PQ \Rightarrow PQ = 30$  m

Now  $AE = \frac{\sqrt{3}}{2} \times 60 = 30\sqrt{3}$  m.

'O' is the centroid, So  $AO : OE = 2 : 1$ .

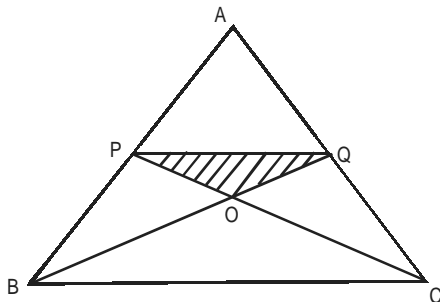
$OE = 10\sqrt{3}$  m and  $AO = 20\sqrt{3}$  m.

$AF = \frac{1}{2} AE = 15\sqrt{3}$  m and  $FO = AO - AF = 5\sqrt{3}$  m.

Therefore area of  $\triangle PQO = \frac{1}{2} \times PQ \times FO$

$= \frac{1}{2} \times 30 \times 5\sqrt{3} = 75\sqrt{3}$  m<sup>2</sup>.

**Alternative method:**



Area of  $\triangle ABQ = \frac{1}{2}$  (area of  $\triangle ABC$ )

$= \frac{1}{2} \times 900\sqrt{3} = 450\sqrt{3}$  m<sup>2</sup>.

(as BQ is a median of  $\triangle ABC$ ).

Area of  $\triangle BQP = \frac{1}{2}$  (area of  $\triangle ABQ$ )  $= \frac{1}{2} \times 450\sqrt{3} = 225\sqrt{3}$  m<sup>2</sup>.

(as QP is a median of  $\triangle AQB$ ).

Area of  $\triangle POQ = \frac{1}{3}$  (area of  $\triangle PBQ$ )  $= \frac{1}{3} \times 225\sqrt{3} = 75\sqrt{3}$  m<sup>2</sup>.

Because  $BO : OQ = 2 : 1 \Rightarrow OQ = \frac{1}{3} BQ$ . (O is the centroid of the  $\triangle ABC$  which divides median BQ in the ratio 2 : 1).

8. d Let the cost of 1 desk, 1 chair and 1 table be 'D', 'C' and 'T'.  
 $6D = 6C + T$  ... (i)  
 $12C = 6D + 3T$  ... (ii)

Solving equation (i) and (ii) we get that  $T = \frac{6}{5} (D)$

$\Rightarrow T = \frac{3}{2} (C) \Rightarrow C : T : D = 4 : 6 : 5$

Let, the value of C, T and D be 4x, 6x and 5x respectively.

9. d Let the the number of boys and girls in 1<sup>st</sup> section are  $B_1$  and  $G_1$  and in the 2<sup>nd</sup> section are  $B_2$  and  $G_2$ .

$\Rightarrow \frac{B_1}{G_1} = \frac{65 - 64}{68 - 65} = \frac{1}{3} \Rightarrow$  If  $B_1 = x$  then  $G = 3x$

$\Rightarrow \frac{B_2}{G_2} = \frac{71 - 65}{80 - 71} = \frac{6}{9} = \frac{2}{3} \Rightarrow$  If  $B_2 = 2y$  then  $G_2 = 3y$

As per the question:

$3y = \frac{x}{2} \Rightarrow x : y = 6 : 1$

$\Rightarrow x = 6y$

$\Rightarrow$  Ratio number of students of 1<sup>st</sup> section to 2<sup>nd</sup> section  
 $= 4x : 5y = 24 : 5$

$\Rightarrow$  Required Average =  $\frac{65 \times 24 + 71 \times 5}{29} = 66$

10. b  $2x + 5y + 3z = 4$  ... (i)  
 $4x + 3y = -1$  ... (ii)  
 $2y + 5z = 19$  ... (iii)  
 $5(ii) - 3(i) : 14x - 9z = -17$  ... (iv)  
 $5(iii) - 2(i) : 19z - 4x = 87$  ... (v)

Solving (iv) and (v), we get that  $z = 5$  and  $x = 2$ .

Putting the value of  $x = 2$  in (ii), we get  $y = -3$ .

Therefore  $x + y + z = 2 - 3 + 5 = 4$ .

11. c If a number is divisible by 3, then the sum of the digits of that number is divisible by 3.  
 Similarly, a number is divisible by 9 if the sum of the digits of the that number is divisible by 9.  
 For a number to be divisible by 3 but not by 9, the sum of the digits of the number should be 6 or 12 or 15 or 21 or 24.

We exclude the case of the sum of the digits being 9 and 18 as the number should not be divisible by 9.

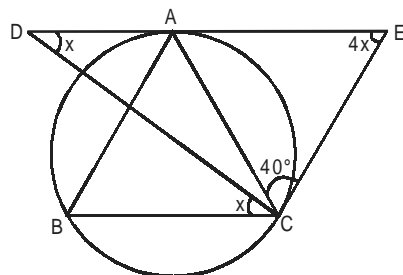
Also, maximum possible sum of a four-digit number that can be formed =  $9 + 7 + 6 + 4 = 26$ .

Sum	Possible number	Possible cases
21	9 7 4 1	4!
21	9 6 4 2	4!
24	9 7 6 2	4!

Therefore, the number of such four-digit numbers =  $4! \times 3 = 72$ .

**Note:** No such number can be formed where the sum of the digits is 6, 12 or 15.

12. b



$$\angle DAB = \angle ACB = 60^\circ = \angle EAC$$

Also, DE is parallel to BC.

$$\therefore \angle ADC = \angle DCB = x \text{ (suppose)}$$

$$\therefore \angle AEC = 4\angle CDE$$

$$\therefore \angle AEC = 4x$$

$$\text{In } \triangle AEC: \angle EAC + 40^\circ + 4x = 180^\circ$$

$$\Rightarrow 4x = 180^\circ - 40^\circ - 60^\circ = 80^\circ$$

$$\therefore x = 20^\circ$$

$$\therefore \angle DCB = 20^\circ.$$

13. d

Let the distance be  $630x$  km

So the time taken by the fastest man =  $9x$  hours

Similarly the time taken by the slowest man =  $21x$  hours

So the time taken by the other two men must be  $13x$  and  $17x$  hours in that order.

So the speeds of the other two men are  $\frac{630}{13}$  and  $\frac{630}{17}$  km/hr in that order.

14. a Given:

$$\frac{x^3 - 3x^2 + 4}{x^2 - 1} \geq x + 5 \Rightarrow \frac{x^3 - 3x^2 + 4}{x^2 - 1} - (x + 5) \geq 0$$

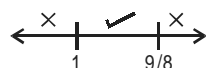
$$\Rightarrow \frac{x^3 - 3x^2 + 4 - (x^3 + 5x^2 - x - 5)}{x^2 - 1} \geq 0$$

$$\Rightarrow \frac{-8x^2 + x + 9}{x^2 - 1} \geq 0$$

$$\Rightarrow \frac{8x^2 - x - 9}{x^2 - 1} \leq 0 \Rightarrow \frac{8x^2 - 9x + 8x - 9}{x^2 - 1} \leq 0$$

$$\Rightarrow \frac{(8x - 9)(x + 1)}{(x - 1)(x + 1)} \leq 0 \Rightarrow \frac{(8x - 9)}{(x - 1)} \leq 0 \quad (\text{given, } x \neq -1)$$

Representing the above on number line –



$$\text{Hence, } x \in \left[1, \frac{9}{8}\right] \quad (\text{given, } x \neq -1)$$

$$\therefore \text{Maximum possible value of } x \text{ is } \frac{9}{8}.$$

15. c

It can be easily concluded that ABCD is a rhombus. Now, if  $AO + BO = 20$  units, then  $AC + BD = 40$  units.

$$\text{We know that area of rhombus} = \frac{1}{2} \times AC \times BD$$

Area of ABCD will be maximum when  $AC = BD$ .

$$\text{Hence, the maximum possible area} = \frac{1}{2} \times 20 \times 20 = 200 \text{ square units.}$$

16. c

$$S = \frac{4}{5} + \frac{4}{45} + \frac{4}{117} + \frac{4}{221} + \frac{4}{357} + \dots$$

$$\Rightarrow S = \frac{4}{1.5} + \frac{4}{5.9} + \frac{4}{9.13} + \frac{4}{13.17} + \frac{4}{17.21} + \dots$$

$$\Rightarrow S = \left(1 - \frac{1}{5}\right) + \left(\frac{1}{5} - \frac{1}{9}\right) + \left(\frac{1}{9} - \frac{1}{13}\right) + \left(\frac{1}{13} - \frac{1}{17}\right) + \dots$$

$$S_{20} = \left[1 - \frac{1}{(4.20)+1}\right]; S_{40} = \left[1 - \frac{1}{(4.40)+1}\right]$$

$$\text{Required Ratio} = \frac{\left(1 - \frac{1}{81}\right)}{\left(1 - \frac{1}{161}\right)} = \frac{80}{81} \times \frac{161}{160} = \frac{161}{162}.$$

17. c

Out of four, a group of  $n$ , can be made in  ${}^4C_n$  number of ways.

**Case I:**

$n = 1$ , i.e. all of them weigh their weights, one by one.

${}^4C_1 = 4$  different readings are noted and we must have:

$$R_1 + R_2 + R_3 + R_4 = (A + B + C + D) = 882$$

( $R_1, R_2, R_3$  and  $R_4$  are the readings)

$$\Rightarrow \text{The average weight of the four friends} = \frac{882}{4} = 220.5 \text{ kg.}$$

As each of them weighs less than 100 kg, this is an invalid case.

**Case II:**

$n = 4$ , i.e. all of them weigh their weights, simultaneously.

${}^4C_4 = 1$ , reading is noted and we must have:

$$R_1 = (A + B + C + D) = 882$$

$$\Rightarrow \text{The average weight of the four friends} = \frac{882}{4}$$

$= 220.5$  kg. As each of them weighs less than 100 kg, this also is an invalid case.

**Case III:**

$n = 2$ , i.e. they weigh their weights in groups of two each.

${}^4C_2 = 6$ , different readings are noted and we must have:

$$R_1 + R_2 + R_3 + R_4 + R_5 + R_6 = (A + B) + (B + C) + (C + D) + (A + D) + (A + C) + (B + D) = 882$$

$$\text{Or } 3 \times (A + B + C + D) = 882$$

$$\Rightarrow \text{The average weight of the four friends} = \frac{882}{4 \times 3}$$

$= 73.5$  kg. As each of them weighs less than 100 kg, this also is a valid case.

**Case IV:**

$n = 3$ , i.e. they weigh their weights in groups of three each.  
 ${}^4C_3 = 4$ , different readings are noted and we must have:  
 $R_1 + R_2 + R_3 + R_4$   
 $= (A + B + C) + (A + B + D) + (A + C + D) + (B + C + D)$   
 $= 882$   
 Or  $3 \times (A + B + C + D) = 882$

$\Rightarrow$  The average weight of the four friends  $= \frac{882}{4 \times 3} = 73.5$  kg.

As each of them weighs less than 100 kg, this also is a valid case.

Hence the friends can weigh their weight in groups of 2 or 3, and their average weight is 73.5 kg.

18. a **Case 1:**

3 students get 1 book each and other two get none. This is

possible in  $\frac{5!}{3! \times 2!} = 10$  ways.

**Case 2:**

One particular student gets 2 books, another student gets 1 book and the rest of the students get none.

This is possible in  $\frac{5!}{3!} = 20$  ways.

Total number of ways  $= 10 + 20 = 30$ .

## 19. c The first five composite numbers are – 4, 6, 8, 9 and 10

Sum of the first three  $= 4 + 6 + 8 = 18$

Hence, sum of any three distinct composite numbers must be greater than or equal to 18.

Therefore, out of the given options only 16 cannot be expressed as a sum of 3 distinct composite numbers. Also,  $21 = 4 + 8 + 9$ ,  $23 = 6 + 8 + 9$  and  $18 = 4 + 6 + 8$ .

$$20. a \quad T_n = \frac{n^2 - n - 2}{n^2 + 3n} = \frac{(n-2)(n+1)}{n(n+3)} = \left[ \frac{n-2}{n} \right] \left[ \frac{n+1}{n+3} \right]$$

$$S = T_3 \times T_4 \times T_5 \times T_6 \times \dots \times T_{99} \times T_{100}$$

$$\Rightarrow S = \left[ \frac{1}{3} \times \frac{4}{6} \right] \times \left[ \frac{2}{4} \times \frac{5}{7} \right] \times \left[ \frac{3}{5} \times \frac{6}{8} \right] \times \dots \times \left[ \frac{97}{99} \times \frac{100}{102} \right] \times \left[ \frac{98}{100} \times \frac{101}{103} \right]$$

$$\Rightarrow S = \frac{(1 \times 4 \times 2 \times 5)}{99 \times 102 \times 100 \times 103} = \frac{1}{99 \times 103 \times 255}$$

$$\therefore S = \frac{1}{99 \times 103 \times 255}$$

## 21. d Only option (d) cannot be inferred from the passage. All the other options are mentioned in the passage.

## 22. a The author points out that physics, in the 2nd half of 20th century, became so evolved that it had a world of its own and was self contained in the theories and discoveries propounded by it. This leads us to option (a). All the other options are far-fetched.

## 23. d The hidden dimension has remained unknown and unexplained for very long and in fact it remains a mystery till date. Option (a) is incorrect. Option (c) is exaggerated. Option (b) cannot be inferred from the passage.

## 24. d In A, the expression 'a trend that becomes increasingly common' is not apt. It has to be either 'a trend that has become' or 'a trend that is becoming'. In C, 'has been now' is an incorrect construction. It has to be either 'has been' or 'is being now'. In D, 'an aim to discover' should be corrected to 'discovering' to conserve parallelism in the sentence.

## 25. b In B, 'his' should be corrected to 'its' as the antecedent for the pronoun is spectre and not Jinnah. Spectre belongs to the neuter gender and will take an 'its'. In C, the latter part of the sentence is not parallel. The correct sentence part would read 'what Jinnah did or did not do, or Patel said or did not say?'

26. b Options (a) and (c) are incorrect. The phrasal verb '*all along the line*' means ever since the beginning of a relationship or process. If this is used, the sentence would mean that the scientist was ready to put his reputation ever since the beginning of the research of the phenomenon: *allergy* desensitization. The phrasal verb '*on the line*' means at risk of failing or being harmed. This is correctly used in options (b) and (d). However option (d) is negated for having some other flaws which are illustrated in the following explanation. This question also tests you on using the colon and semicolon correctly. In the given sentence, usage of a semicolon is incorrect. Use a colon to introduce a list, or provide an explanation. If the material following the colon constitutes a full sentence, capitalize the first word. If the material following the colon is a dependent clause or phrase, do not capitalize the first word. Option (d) disregards these basic rules and hence is negated. None of the options apart from (b) uses a comma after 'who' in sync with the comma after 'medical research'.

## 27. d Option (a) is incorrect. Modal verb 'could' conveys a different meaning. Moreover, to maintain the parallel structure of the sentence usage of 'should' is needed. Option (b) is erroneous. It seems that United States necessitates the employment of laborers or mechanics. The usage of expression 'not any of...' is also incorrect. We prefer – 'none of' rather than - 'not any of', in formal written English. Hence Option (c) is also negated.

## 28. c Option (a) is incorrect as the campaigners confused the sense of 'good' and 'better'. Option (b) is incorrect as the passage, in the last line of the 3rd paragraph, represents only the possibility of the voters agreeing to the proposed constitution being better than the current treaty whereas the option turns the possibility into a certainty. Option (d) is the reverse of what the author is trying to intend. The author is indicating that the campaigners sent the message that the constitution was good for Europe when it was just better than an earlier treaty. Option (c) is correct. The proposed constitution did not grant initiative to the parliament, though it made certain improvements over the previous treaty. So the improvements could not be seen as 'good' by the people, though they could have been seen as 'better'.

## 29. a Option (b) is incorrect as the author has not commented on Mr. Bot's conception of logic. But the author definitely feels that Mr. Bot handled things tactlessly. The author would call Aristotle's concept limited when it comes to political discourse as it is based on 'logic'. 'What is logical?' can become very subjective as two people may not accept that the same argument is logical. So the author is concerned with the aspect of 'logic' in Aristotle's theory whereas tact is just mentioned with a specific reference to the example in the passage. So to conclude option (c) is far-fetched. Option (d) is exaggerated and too definitive. The author would agree with the fact that everything cannot be left to logic. But he does not completely negate the use of logic. The limitations of logic in the political sphere would hold even if one is a philosopher or a sage. Hence option (d) is an incorrect inference. Option (a) is in line with the author's views and this is what he is trying to highlight in the discussion in Para 4.

30. c Option (a) is incorrect. The campaigners failed probably because they confused the meanings of 'good' and 'better'. Also in the passage, the author raises questions about Aristotle's theory itself. Hence the failure is not just because of what the campaigners did. Option (b) has not been strongly stated by the author. The example shows the difficulty or the flaw in applying the theory. But to say that it is irrelevant would require more discussion and more examples. Option (d) is not specific as it leaves out Aristotle and his theory. Option (c) is specific and correct to describe the primary purpose of the author. The author did not completely negate the 'better' aspect of Aristotle's theory. He has reservations about the 'logically convincing' part. The author is illustrating through a specific example, how applying Aristotle's theory posed problems. This is due to confusion or ambiguity which arose in the meanings of the terms in the theory when it was applied to a specific context. Option (c) also encompasses the scope of the passage.
31. c Option (a) is incorrect as we cannot infer that humanity has benefited from the war. Moreover, this does not go with the flow of the paragraph. Option (b) is incorrect as we cannot infer that now the balance is in favour of science. Option (c) is the correct answer as it goes with the flow of the paragraph. War still continues and it is not a sideshow is suitably followed by option (c). Option (d) is incorrect as it is not in flow with the paragraph. The last statement which states that it is not a sideshow implies that the sentence should be followed by a statement that reflects the intensity of war.
32. a Option (a) is the correct answer as it continues the idea illustrated in the last sentence of the paragraph. The tone conveyed by the author, using the word 'suddenly' in the last sentence, matches the tone conveyed by 'abrupt' in option (a). Options (b), (c) and (d) are beyond the scope of the information in the paragraph.
33. b The author defines the superiority of the whole over the part based on the logic of functionality and efficiency. This logic when applied to human beings and the state makes the latter superior. This makes option (b) correct. The other options do not capture the essence of the paragraph.
34. d The author mentions that paranormal investigations show the difference between what people say has happened and what actually took place. This makes option (d) correct.
35. c The meaning of the word 'conflate' is to merge/fuse/melt two things. Here, classical empiricism merges the meanings of two terms and interprets it as one. So conflate is used in the sense of 'to merge' or 'to combine'. Options (a), (b) and (d) give a totally different sense from the intended meaning.
36. b Statement A is not true. The positivists' denial of the existence of the generative domain is not because of the reason in Statement A but due to their adherence to empiricism. Refer to the line "In other words, due to the empiricist ontology of Positivism, a scientific law cannot refer to unobservable causes." Statement B is true. Refer to the line "This "constant conjunction" conception of scientific laws, first developed by David Hume, derives directly from the empiricism of early Positivism because it refers to the empirical instantiation of the law itself." and also the opening lines of the passage "I now want to have a close look at positivism, using the work of Jorge Rivas. Rivas links positivism back to classical empiricism". Statement C also is not true. We cannot conclude that the events referred to are just 'experienced'. They are events which have to be 'observed'. 'Experienced' is not mentioned as a criterion in the context. Refer to the line "In this nomological model of explanation, a scientific law is seen to reflect the actual constant conjunction of empirically observable events".
37. b The opening statement "Rivas links positivism back to classical empiricism." and the discussion in the passage show how positivism has been influenced by classical empiricism and also how branches have emerged within positivism through divergences from empiricism. Option (a) is not the primary purpose as the passage does not 'laud' Jose or pass any subjective comments about his ability or clarity as a philosopher. Option (c) is again only a part of the discussion. Option (d) is incorrect as classical empiricism is still seen to have its influence when dealing with social phenomena as also with scientific explanations. The author is attempting to study positivism through the work of Jose Rivas who connects positivism to classical empiricism.
38. c The paradox in the argument is that despite the fact the rate of TB has declined 15% within the past 15 years in Bihar, the cost of caring for TB sufferers in Bihar is now roughly equal to what it was 15 years ago. Option (a) does not help to resolve the paradox as it deals with the overall cost of health care in Bihar. Option (b), if at all increases the paradox as it talks of Bihar's overall health care costs haven't increased in the past 7 years. Option (c) helps to resolve the paradox as it addresses both parts of the paradox.
39. b The first sentence establishes the cause and effect situation between bank deposits being insured and this in turn leading to bank failures. The second sentence describes a situation where this would not hold true.
40. a The argument highlights that for an improvement in results, teachers must perform their duties efficiently just as the doctors and nurses must also perform their duties well for the people's health to improve. The argument further highlights the shabbiness of the system. The implicit assumption in the argument is that due to the shabbiness prevalent in the system, the motivation for performing their duties is almost absent among the employees. Option (a) weakens the assumption. Option (b) is distorted. Option (c) does not weaken the assumption. Option (d) is a generic statement and lies beyond the scope of the argument.
41. d 'Regime' refers to a government in power and esurient means hungry or greedy. The clue here comes from the second blank. The word 'even' leads us to an adjective that shall describe Shumiatsky, in all probabilities the word should have a contrast with 'had left'. 'Esurient' does the trick. The other options are out of context.
42. a 'Tenebrous' means dark or gloomy or obscure and 'reality' refers to a fact or state of being. The other options fall out of context.
43. b 'Dazzling' means amazingly impressive. The word agrees with the tone of the sentence. 'Glaring' is incorrect as it means obvious. 'Lambent' means flickering with a glow. 'Homely' means unattractive.
44. c Option (c) is correct here as 'mingling' would result in a 'discourse', which means a conversation. 'Grandiloquence', which means a pompous speech, would not fit in here. 'Monologue' is out of context with the theme of the sentence. 'Sermon', which means a religious discourse delivered as a part of the church service or a lengthy and tedious speech, doesn't fit the context.

45. b Structuralism believes that all elements of human culture are parts of a system of signs - in a way this is understanding the unity permeating the diversity. (a) is opposite of what structuralism seeks to do. (c) is part of structuralism's method but not the primary purpose. We cannot conclude that structuralism seeks to eliminate things-as-in (d).
46. d A was not the main aim of structuralists. It is something which was discovered or observed by structuralists in their process of research. B cannot be affirmed as data is insufficient. C cannot be inferred. Saussure's work was useful to structuralists. But his absence may not have led to the premature death of structuralism.
47. d Option (d) is evident from the fourth paragraph which states that Strauss applied Saussure's theory in his study of "mythemes". The last sentence of the fourth paragraph clearly states that Saussure's could be applied across verticals. Options (a), (b) and (c) cannot be inferred from the passage
48. c B will follow the opening statement, since it is contradicting the 'claim' made in statement A. EC is the mandatory pair because C is the extension of E which stresses on the fact that 'they were not alone' and C talks about the other protests.
49. c A will be followed by C because it takes the idea forward by saying 'it has not fallen far enough ...'. BE is the mandatory pair because E talks about 'their concern'; and here 'their' refers to the policymakers.
50. d D will follow A because 'much of it ...' refers to '...the reasons Mr. Hirst wants to risk his reputation ...'. E should follow B because it refers to the 'habit' of the dealers which irks Mr. Thompson. EC is the mandatory pair because C explains as to why 'Auction rooms' more democratic.
51. a A starting '0' is given to start the machine. After that, if the machine stops, it must start immediately before getting '1' to produce the product. Hence, except being in the first and the last place, all other 0's should exist in pairs. Input in option (a) is the only exception.
52. d Breaking the input strings into two-two bits,  
**I. 00 10 10 10 10 10 10 10 10 11 11 01 10 01 10 00 01 01 01 01**  
**II. 00 11 01 01 00 10 00 01 00 10 01 00 00 01 10 00 00 11 11 10 10 10**  
**III. 00 11 10 00 01 01 01 00 01 01 10 01 00 01 00 10 11 00 11 10 11 00**  
 Thus, it can be seen that
- |     | Units of A produced | Units of B produced |
|-----|---------------------|---------------------|
| I   | 5                   | 9                   |
| II  | 3                   | 3                   |
| III | 7                   | 2                   |
53. b **Consider the following case –**  
 There was a demand of products of two different kinds – product A and product B. To achieve this objective, the machine was configured to read two bits at a time. An input of 00 starts the machine, input of 01 produces a unit of product A, input of 10 produces a unit of product B and input of 11 stops the machine.  
 2 different kinds of products along with start instruction and stop instruction are 4 different processes that the machine can execute. For these 4 processes, 2 bits were required. Similarly with 3 bits, combinations **000, 001, 010, 011, 100, 101, 110, 111** can make the machine execute 8 different processes. Therefore, for 1802 processes including start

and stop, we require at least 11 bits, because  $2^{11} > 1802 > 2^{10}$ .

#### For questions 54 to 56:

Let the revenue generated by the companies P,Q,R,S and T in that particular quarter be p,q,r,s and t million respectively.

Based on the additional information we can have this table:-

Owner of the company	Turnover
Michelle	$q + 10$
Luc	
Niki	$p - 5$
William	$r + 10$
Sophia	$s - 5$

Now, we know that the combined turnover of all these companies is  $p + q + r + s + t$  but the combined turnover of the companies owned by Michelle, Niki, William and Sophia is  $q + 10 + p - 5 + r + 10 + s - 5 = p + q + r + s + 10$ . Therefore turnover of the company owned by Luc is  $p + q + r + s + t - (p + q + r + s + 10) = t - 10$ .

The new table is:-

Owner of the company	Turnover
Michelle	$q + 10$
Luc	$t - 10$
Niki	$p - 5$
William	$r + 10$
Sophia	$s - 5$

So, we now know that  $q + 10$ ,  $t - 10$ ,  $p - 5$ ,  $r + 10$  and  $s - 5$  are 30, 35, 40, 45 and 50(not necessarily in the order).

None of t, p and s can be 30 as otherwise revenue of one of the companies will become less than 30 which is impossible.

Hence one of q and r has to be 30.

Again None of  $t - 10$ ,  $p - 5$  and  $s - 5$  can be 50 as otherwise one of p, t and s will become more than 50, which again is impossible.

∴ One of  $q + 10$  and  $r + 10$  has to be 50.

⇒ one of q and r is equal to 40.

∴ q and r are 30 and 40 (not necessarily in the order).

∴ Turnovers of the companies owned by Michelle and William are  $30 + 10$  and  $40 + 10$  millions (not necessarily in the order).

Now the turnover of the company owned by Luc can be one of 30, 35 and 45 millions.

but if  $t - 10 = 30$ ,  $t = 40$  (impossible, as one of q and r is 40).

if  $t - 10 = 45$ ,  $t = 55$  (impossible, as it is not the revenue of any of these companies).

⇒  $t - 10 = 35$  or  $t = 45$ .

Therefore a total of four cases are possible:-

	p	q	r	s	t
<b>Case I</b>	35	30	40	50	45
<b>Case II</b>	50	30	40	35	45
<b>Case III</b>	35	40	30	50	45
<b>Case IV</b>	50	40	30	35	45

Accordingly we can prepare the table below:-

	Case I	Case II	Case III	Case IV
Michelle	40 (R)	40 (R)	50 (S)	50 (P)
Luc	35 (P)	35 (S)	35 (P)	35 (S)
Niki	30 (Q)	45 (T)	30 (R)	45 (T)
William	50 (S)	50 (P)	40 (Q)	40 (Q)
Sophia	45 (T)	30 (Q)	45 (T)	30 (R)

Alphabets in the parentheses indicate the company owned by the person in that particular case.

54. a Irrespective of the company owned by Michelle, the revenue generated by T is always 45 millions.
55. b Statement I can be true in case III.  
Statement II can never be true.  
Statement III can be true in case III.  
Statement IV can never be true.  
Statement V can be true in case IV.
56. d Sophia can own company Q in case II.  
She can own company R in case IV.  
She can own company T in cases I and III.
57. c Since, 83 is a prime number, therefore the age of one out of the 3 people A, C and E has to be equal to 83 years.

**Using statement A:**

Given that Age of E > Age of C.

**Case I:**

E = 83, C = 4, B = 2, (A, D) = (2, 4) not necessarily in this order.

**Case II:**

A = 83, E = 3, C = 2, B = 1 and A = 6.

Similarly, there will be more cases possible.

Hence, statement A alone is not sufficient to answer the question.

**Using statement B:**

Given that the ages of 4 of the friends are the same.

**Case I:**

A = 83, B = C = D = E = 3

**Case II:**

C = 83, B = A = D = E = 3

**Case III:**

E = 83, B = C = D = A = 3

Hence, statement B alone is also not sufficient to answer the question.

**Combining both the statement together:**

The only sets of values of A, B, C, D and E that satisfies both the statements is 3, 3, 3, 3 and 83 respectively.

Therefore, the age of C is 3 years.

58. a Sum of all the terms in an Arithmetic progression

$$= \frac{n}{2} \times (a_1 + a_n)$$

where n is the total number of terms

$a_1$  is the first term in the series.

' $a_n$ ' is the last term in the series.

$$\text{Mean} = \frac{(a_1 + a_n)}{2}$$

It implies, sum of an A.P =  $n \times \text{mean}$

**Using statement A:**

We have the total number of terms of all the A.P.'s.

Hence, the sum of all the A.P.'s can be found.

Hence, statement A alone is sufficient to answer the question.

**Using statement B:**

If the total number of terms in all the four mentioned series are in a A.P. and two out of the four are 2 and 4, then the remaining two terms can be 1, 3 or 6, 8.

Hence, we cannot uniquely determine the sum of all the four A.P.'s.

Hence, statement B alone is not sufficient to answer the question.

59. d Let the two sides of rectangle ABCD are 'x' and 'y'.

**Using statement A:**

$$x + y = 71$$

which is not sufficient to answer the question.

**Using statement B:**

$$x^2 + y^2 = 61^2$$

which is not sufficient to answer the question.

**Combining statements A and B:**

We get  $(x + y)^2 = x^2 + y^2 + 2xy$

$$(x - y)^2 = x^2 + y^2 - 2xy = 71^2 - 1320 = 2401$$

$$x - y = 49 \quad \dots(i)$$

$$\text{also, } x + y = 71 \quad \dots(ii)$$

solving we get 'x' and 'y' as 60 feet and 11 feet respectively.

Since we do not know that AB is 60 feet or 11 feet, we cannot find the answer.

60. d The following table lists down all the possibilities when the total number of candies with all the kids is an integer, which is less than 600.

	Himanshu	Prachi	Veena
Case I	1	1	1
Case II	2	4	16
Case III	3	9	81
Case IV	4	16	256

**Using statement A:**

Even if the number of candies with Himanshu is a perfect square, he can have 1 or 4 candies.

Therefore, statement (A) alone is not sufficient to answer the question.

**Using statement B:**

Possible cases are Case II and Case IV.

Therefore, statement (B) alone is not sufficient to answer the question.

**Combining statements A and B together:**

Then the only case that is possible is Case IV.



**For questions 61 and 62:**

61. d Q and T can attend only meeting  $M_2$  together. Hence possible cases are:

Meetings	Number of Members	
	Case 1	Case 2
M1	3	4
M2	5	3
M3	1	2

62. d The complete list of combinations possible are:

Meeting		
$M_1$	$M_2$	$M_3$
R, X, P, W	Q, V, U	S, T
R, X, P, U	Q, V, T	S, W
R, X, U, W	Q, V, S	T, P
R, X, U, W	Q, V, T	S, P
R, X, P, U	Q, V, S	T, W
R, X, P	Q, V, S, T, U	W
R, X, W	Q, V, S, T, U	P

Hence R and X are definitely in meeting  $M_1$ .

**For questions 63 to 65:**

Given that the price tags on all the packs labeled as "Diamond Pack" and "Pearl Pack", summed to Rs.640000 and Rs.450000 respectively.

Therefore, out of the 25 packs, the number of packs labeled as "Diamond

Pack" is  $\frac{640000}{80000} = 8$

Similarly, out of the 25 packs, the number of packs labeled as "Pearl

Pack" is  $\frac{450000}{50000} = 9$

Therefore, out of the 25 packs, the number of packs labeled as "Mixed Pack" is  $25 - 9 - 8 = 8$ .

Total number of rings with Mr. Gold Smith  $2 \times 25(\text{In Packs}) + 25(\text{Single}) = 75$

**From additional information II:**

Total number of diamond rings with Mr. Gold Smith  $= 15 \times 2 = 30$

Total number of pearl rings with Mr. Gold Smith  $= 75 - 30 = 45$ .

Also, the number of diamond rings for gentlemen and ladies' is 15 each.

**From additional information I:**

Given that out of the 25 rings that remained single, the number of gentlemen's diamond rings is 5.

Therefore, in the 25 packs made by Mr. Gold Smith there are 10 gentlemen's diamond rings.

63. a Out of the 25 packs made by Mr. Gold Smith, the number of packs labeled as "Mixed Pack" = 8.

64. d Total number of pearl rings in the 25 rings that remained single  $= 25 - 5$  (gentlemen's diamond rings)  $- 1$  (ladies' diamond rings)  $= 19$ .

Assuming these 19 rings are all gentlemen's pearl rings.

Number of gentlemen's pearl rings in the 25 packs made by Mr. Gold Smith  $= 15$

Therefore, maximum possible number of gentlemen's pearl rings  $= 19 + 15 = 34$ .

65. c Required percentage  $= \left( \frac{30}{45 + 30} \right) \times 100 = 40\%$

**For questions 66 and 67:**

Since 'Iqbal' has been watched only by Bimal, therefore Beckham has watched No Entry, Page 3 and Salam Namaste.

Also, 'Iqbal' is screened at Plaza (statement 4). Salaam Nameste is screened at Priya (statements 2 and 5).

'No Entry' and 'Page 3' are being screened at Satyam and Chanakya (but not necessarily in this order).

66. d

67. d

**For questions 68 to 70:**

From the bar – graph we get to know that the number of competitors of C1, C2, C3, C4, C5, C7 and C8 is 1, 3, 6, 4, 7, 3 and 6 respectively. Since C5 is the competitor of each of the other companies, therefore the only competitor of C1 is C5.

Lets consider C3: Number of competitors is 6.

We know for sure that C1 is not the competitor of C3; therefore the six competitors of C3 are C2, C4, C5, C6, C7 and C8.

Similarly C8: Number of competitors is 6 and the competitors of C8 are C2, C3, C4, C5, C6 and C7.

Therefore competitors of C7 are C5, C3 and C8 and competitors of C2 are C5, C3 and C8.

Now consider C4: Out of the four competitors it has, three are C5, C3 and C8.

Since the competitors of C1, C2, C3, C5, C7 and C8 are known and fixed by us, the fourth competitor has to be C6.

Therefore the competitors of C6 are C5, C3, C8 and C4.

68. b Number of competitors of C6 is 4.

69. d Since the number of competitors of C1, C2 and C7 is 1, 3 and 3 respectively, therefore the number of competitors who sell furniture in the regions in which either of C1, C2 and C7 sell furniture can at the most be 4.

So, the region in which maximum possible numbers of competitors sell furniture is the one that sells C4 or C6.

So, such a region could possibly have C5, C4, C6, C3 and C8. Hence at most 5 competitors can sell furniture in one region.

If six companies were to sell furniture in a single region then there should be 6 companies with at least 5 competitors each but we have only 3 companies (C3, C5, and C8) with at least 5 competitors.

$\therefore$  We cannot have six or more companies selling furniture in a single region.

70. c It has been concluded that no two among C2, C4 and C7 are 'Competitors'. Also each of C2, C4 and C7 are competitors of C5. So definitely each of C2, C4 and C7 sells furniture in a different region. Also, C1 cannot sell furniture in any of these three regions as its only competitor is C5. So for maximum number of regions in which the company C1 sells furniture, we can have the following table.

Region	Company
R1	C1, C5
R2	C5, C7, C3, C8
R3	C5, C2, C3, C8
R4	C1
R5	C5, C4, C6, C3, C8

Hence, the number of regions in which C1 sells furniture is at the most 2.