

**XAT-2014**  
**EXPLANATORY**  
**ANSWERS**

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**PART - I**  
**SECTION - A**

1. If the prosecution rejected something that did 'indeed' take place, it could have only rejected it as being 'apocryphal' (which means 'false'), implying that it did not take place. 'Cavalierly' means 'haughtily or disdainfully' and is appropriate for the first blank. Hence, [B].
2. To bind up the nation's wound, an absence of something negative or undesirable would be required. This eliminates [D]. 'Religion' makes no sense in the second blank, so [B] and [C] can also be eliminated. 'Camaraderie' and 'insight' both seem appropriate for the second blank. 'Retribution' means 'requitual or a return or compensation for a good or bad action' and it has a positive connotation. If we use 'retribution' to fill the first blank, the sentence would imply that people should not be given rewards or punishments according to their actions. So, 'recrimination' (meaning 'the act of countercharging') is the best option. Hence, [E].
3. As the first sentence mentions that "one has to deal simultaneously with..." and the third sentence mentions that "...includes bosons and fermions", [B] is the only option that makes sense. Hence, [B].
4. There cannot be an 'increase' or 'decline' in 'notions'. Only 'improvement' makes sense here. Hence, [C].
5. The first blank requires 'have' as 'were integrated mindfulness' and 'could integrated mindfulness' do not make any sense. 'Treatment' needs to be preceded by 'the' as a specific treatment is being talked about here. So, we are left with options [A] and [B]. The subject of the last sentence is 'number', so, 'has' should follow it. Hence, [A].
6. All options for the first and third blank are appropriate. For the last blank, 'these' is a better option as ontologies are being compared to specific things. 'Such' would imply forms 'of the kind' mentioned in the paragraph whereas 'these' would imply the very same forms mentioned in the paragraph. Unfortunately, it all comes down to 'subsumption relation', which, as it turns out, is a specific type of ontological relation. Hence, [E].
7. There can be no confusion about 'MBA' being a noun (it is preceded by 'the'), 'it' being a pronoun, 'helps' being a verb, etc. The deciding word is 'tackle', which is also clearly a verb. Hence, [E].
8. [D] and [E] have no basis in the passage. [A], [B] and [C] are quite strongly worded (due to the usage of 'most' and 'entire'). But since we have to choose one, [C] is the best option. It includes the information given in [B] and gives additional information (about 'media attention') which is definitely true. [A] seems to be inferable from the passage but the probability of [C] being correct is higher. Hence, [C].
9. 'Not only' should always be followed by 'but also'. This eliminates [B] and [C]. The superlative form of the adjective must be used when more than two things are being compared. Thus, 'oldest', not 'older', is correct. Hence, [A].
10. (1) should be classified as an assumption as the author is accepting as true that the disabled people he noticed always wanted to prove others (who had low expectations from them) wrong. This leaves [A] and [B]. (3) is a question, so [A] gets eliminated. (4) must be accepted as a reason as all other options state the same. (7) can be called a conclusion. Hence, [B].

11. In all three statements, the author makes generalizations from specific instances. For e.g., from the unfortunate case of the 22 children of Bihar, in (1), he concludes that there is “chronic neglect of school education in a large part of India.” Hence, [D].
12. This parajumble was more about Physics than about English! However, it is clear that 5 cannot precede 4 (as 5 contains the acronym SUSY and 4 contains the full form). So, [D] and [E] get eliminated. ‘They’ in 2 can only be referring to the “two chiral superfields of Higgs doublets” in 5. So, [C] gets eliminated. 1 and 3 have the ‘electroweak’ connection. Hence, [A].
13. 3 should follow 5 because of the ‘quartos’ link. So, we are left with options [B] and [E]. 2 gives a possible reason for the unreliability of the quartos (talked about in 3); so, 2 should follow 3. Hence, [E].
14. [B] and [C] are included in [D] and it is a less extreme statement than [C]. Hence, [D].
15. In the second paragraph, the author was trying to show why it doesn’t matter that the assumption of rationality (behind explaining consumer behaviour) can be disproved. It is here that the author introduces Rutherford. The point that he is making through Rutherford’s example is that just because the assumption could be disproved, this doesn’t make the theory false, as the exceptions are few and unsystematic. Here, beer is being equated to gases, not elastic balls. [B] is the only option that contains some reference to an underlying motive, though it is an option that is far from ideal. Hence, [B].
16. The passage doesn’t define psychophysical goods at all. It only talks about beer being an example of psychophysically *identical* goods. Only the ‘identical’ aspect is talked about in the passage (beers that are psychophysically identical sell for different prices due to the difference in their advertising budgets). Actually, ‘psychophysical’ means ‘dealing with the relationships between physical stimuli and resulting sensations and mental states’. Consuming beer can create certain sensations and give rise to a certain mental state. Concrete, cars and mobile phones are unlikely to do that. Hence, [E].
17. Only [A], [C] and [D] talk about probability and experience. [A] is too strongly worded. [C] is too simplistic and doesn’t include the ‘clarification’ aspect. [D] seems most appropriate. Hence, [D].
18. Read the portion “Yet this very stumbling...two tasks.” and the last sentence of the passage. Clearly, both the tasks would be important for the author to test his theory. Hence, [E].
19. ‘Only’ in [A], [B] and [E] and ‘highly’ in [D] render these options incorrect. As there isn’t a consistent definition of probability, [C] is possible. Hence, [C].
20. The author stresses that if one does anything to get only money, he/she hasn’t done anything to be proud of; the aim of a labourer should be to perform his work well; one should work for scientific or moral ends; one should love one’s work; etc. None of the options talk about the motivation behind the actions. But, as betting seems to be an entirely self indulgent activity that is not productive, we are going with [D]. Hence, [D].
21. [C] seems true, but is one of the many points the passage deals with. The entire passage talks about money and work. Hence, [A].
22. The author believes that one should do work for the love of it. The ‘end’ therefore is related to the ‘self’. Hence, [B].

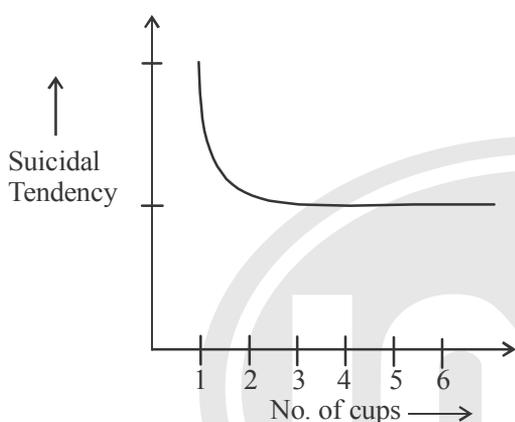
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23. Read the sentence “The objections which have been...a standing government”. It clearly shows that an army is fallible i.e. liable to err. Hence, [B].
24. The second paragraph stresses on conscience repeatedly. Hence, [D].
25. Read the portion “Must the citizen...and subjects afterward.” The first paragraph also states that the government is merely the mode which the people have chosen to execute their will. Hence, [A].

**Note: the passage and excerpts (for questions 26, 27 and 28) are taken from different sources. So, they don't gel completely. The logic and motivation behind the creation of questions 26, 27 and 28 elude us. The question (common for 26, 27 and 28) itself is worded very vaguely.**

26. [B] and [C] have no basis in the passage or excerpt. [D] is a very generalised statement that has no relation to the excerpt. It doesn't even clarify which desire is being talked about in it. [A] can be thought of as being the answer if we consider it to be the ‘explanation’ for the behaviour of men (according to the excerpt). The rationale would be that as desire has a social nature and consumers desire objects that would fulfil their hopes of attaining an altered state of being (all this can be inferred from the passage) and as men have failed to make a transition that has implications on their manliness (from the excerpt), manliness must no longer be socially desirable. However, a ‘consequence’ of this behaviour of men (considering the theme of the passage to be the same, but assuming that manliness must be desirable) could be that they buy more do-it-yourself kits to pass themselves off as being creators (as they don't want to make the transition but want to appear manly) and a bit more manly. Both answers are based on different assumptions. We are going with [E] as the answer so as to maintain consistency of logic across our remaining answers (for questions 27 and 28). Hence, [E].
27. The ‘pre-modern man’ is hardly of any importance to the passage or excerpt. So, [A] is eliminated. [B] is on the same lines as option [D] of question 26. It is too generalised. Also, ‘anti-social’ is quite a negative word, which doesn't seem to be warranted by the description given in the excerpt. [C] is too extreme and a bit absurd. [E] is also too generalised whereas [D] is quite pertinent to the excerpt. Hence, [D].
28. [A] and [E] are too simplified. [B] is too extreme. Both [C] and [D] seem correct. [C] includes the idea in [D] but it also mentions the motivation behind resisting fashion norms, which ties in with “personalised fashion narratives...that negotiate key existential tensions”. [[C] is specific to ‘feminists’, but, as the question doesn't clarify whether the answer can or cannot have new information, we are assuming that new information is allowed]. Hence, [C].

## SECTION - B

29. The information in the passage is not sufficient to answer this question. The source of this passage revealed that [A] is the answer, but a lot of information has been edited and therefore the options don't make sense. Hence, [A].
30. As parents and business leaders lament that there are no carrots/sticks to motivate teachers, they have assumed that teachers can be externally motivated. [A] contradicts the assumption and thus disproves their claim. Hence, [A].
31. When we plot the graph, it will look somewhat like as shown below.



Thus, L shaped curve is the correct answer.

Hence, [E].

32. Faneesh and Ashok will definitely finish the race before Ashok.. Thus, the best position Girish can finish at is third position. Hence, [C].
33. Probability for winning in an International competition is very less. Therefore, Ms. Banarjee will try to form a team for whom the probability of scoring a cent percent marks is maximum. Students 2, 8 and 14 score cent percent marks for maximum time. Hence, [B].
34. Probability for winning in a district level competition is very high. Therefore, Ms. Banarjee will try to form a team consisting of students for whom the average is maximum and also consistency is maximum. So, she will choose a team with students as average of 70 and who have scored a cent percent for least number of times. Therefore, the team would consist of students 4, 11 and 13. Hence, [D].
35. The students selected for International competition are student 2, 8 and 14. We have to follow the same logic as in question 33 for the remaining students because the probability of winning is the National competition is again very less. Between student 1 and student 10 it is better to select student 1 because his/her average is quite a lot better than student 10, while student 1 scored cent percent marks only one time less than student 10. Thus the students selected should be student 3, 6 and 1. Hence, [D].

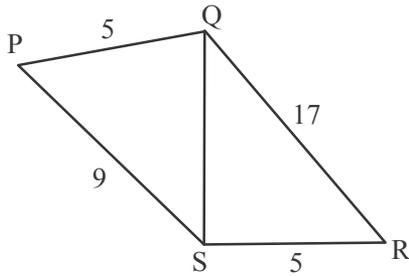
36. The cost of launching a product = Rs. 50 crores  
 If the product is successful, profit =  $100 - 50 = \text{Rs. } 50$  crores  
 If the product is unsuccessful, loss =  $50 - 20 = \text{Rs. } 30$  crores  
 The probability of product being successful is 0.5  
 $\therefore$  Expected profit =  $0.5 \times 50 - 0.5 \times 30 = \text{Rs. } 10$  crores  
 Hence, [B].
37. Total cost of launching a new product = Rs. 50 crores + Rs. 10 crores (marketing) = Rs. 60 crores.  
 Total probable sales of the product if the product is launched after favorable test marketing results = (Probability of the product being successful)  $\times$  (Expected sales of a successful product) + (Probability of the product being unsuccessful)  $\times$  (Expected sales of an unsuccessful product)  
 $= 0.8 \times 100 + 0.2 \times 20 = \text{Rs. } 84$  crores  
 $\therefore$  Expected profit =  $84 - 60 = \text{Rs. } 24$  crores.
38. Probability of product failure after test marketing = Probability of product failure when the product is favorably tested + Probability of product failure when the product is unfavorably tested =  $0.7 \times 0.2 + 0.3 \times 0.7 = 0.35$ . Hence, [B].
39. Total cost of launching a new product = Rs. 60 crores  
 Total probable sales of the product if the product is launched after an unfavorable test marketing = (probability of the product being successful)  $\times$  (Expected sales of a successful product) + (probability of the product being unsuccessful)  $\times$  (Expected sales of an unsuccessful product)  
 $= 0.3 \times 100 + 0.7 \times 20 = \text{Rs. } 44$  crores  
 $\therefore$  Expected profit =  $44 - 60 = \text{Rs. } -16$  crores  
 Hence, [D].
40. [A] and [B] are extremely opinionated and have no basis in the reports. The Korean market is not being talked about anywhere. So, [D] is not the answer. The first and last sentences of report 2 indicate that the customer is not neutral and objective. As the information in all three reports is different, [C] is correct. Hence, [C].
41. As the question talks about “divergent ranks of different companies and their products”, none of the answers are correct as they talk about one brand only. [D] is a generic statement that does not answer the question. Hence, [E].
42. As the first report is about sales and the third about satisfaction, [D] is a valid reason for different ranks of different companies in both the reports. Hence, [D].
43. [E] is clearly the answer as is evident from the last sentence of report 2. Hence, [E].
44. This is a very confusing question as there are hardly any clues given in the passage. As the question mentions “immediate to distant”, and as the last line of the case mentions that it was very difficult to hire new consultants, an option that places solution 5 towards the end should be the answer. In [A], solution 5 is at the second-last position (which is acceptable) but solution 4 comes after it, which shouldn't be the case as 4 can be effected immediately. That leaves only [B] as the answer. Solutions 4 and 3 can be effected immediately. Increasing support

- staff will take a bit more time. Solution 1 is something that ideally will be done gradually so as to not alarm existing clients. 5 would come at the end since it is the most difficult to implement. Hence, [B].
45. Doing nothing, firing people and pressurizing some while giving others preferential treatment are definitely not options worth considering. The new rules that have been formulated for the benefit of the organisation should be followed by all, not just only by those who don't mind following them. So, [C] is incorrect. There is nothing wrong with [E]. Hence, [E].
46. Any option containing 'do nothing' can straightaway be eliminated. That leaves [B] and [E], both of which begin with 2. The biggest challenge faced by Ajay's company is updating the knowledge of the consultants. So, [E] is most appropriate as it places 5 at the second position. 4 comes at the third position, which is acceptable as it can help Ajay's company be prepared for the future. Ajay's ambitions are not stated in the passage. The challenge in front of him is not to become #1. So 3 need not be high on the list of priorities. Hence, [E].
47. [B], [C], [D] and [E] are all based on ethical considerations. Only [A] is based solely on the profit motive. Hence, [A].
48. As Rocket Singh had realised that the consumers were miffed with two products, only [E] makes sense. Without understanding the reasons for consumers' dissatisfaction, no solution can be implemented. Hence, [E].
49. [B], [D] and [E] are completely illogical. The managers' 'rights' are not being violated here, so [A] is inappropriate. The problem is at a very nascent stage, and can be easily resolved, as the passage mentions that the managers are just discussing the problem among themselves. [C] is the best solution. Hence, [C].
50. As Rajinder's loyalty and love for Balwant is the reason for Rajinder's dilemma, Balwant is the best person to talk to. Balwant has also been Rajinder's mentor. Hence, [D].
51. Rajinder's concern was for Balwant who was retailer. [C] is the best course of action that can solve the problem. Hence, [C].
52. As the case explains, retailers are most threatened by Bigmart and consumers are most benefitted. Hence, [C].

### SECTION - C

53. Since the four terms are in Arithmetic Progression  
 $17 - x = 3x - y^2 - 2 - 17$   
 $\Rightarrow 4x - y^2 - 36 = 0 \quad \dots (i)$   
 Also  $17 - x = (3x + y^2 - 30) - (3x - y^2 - 2)$   
 $\Rightarrow 2y^2 + x - 45 = 0 \quad \dots (ii)$   
 Solving equations (i) and (ii), we get  
 $2(4x - 36) + x - 45 = 0$   
 $\Rightarrow x = 13$   
 Sum of the four terms =  $x + 17 + (3x - y^2 - 2) + (3x + y^2 - 30)$   
 $= 7x - 15 = 7 \times 13 - 15 = 76$   
 Thus, the sum of four terms is divisible by 2  
 Hence, [A].

54.



Consider  $\Delta PQS$ ,

Since, length of a side of triangle is lesser than the sum of the other two sides

$$l(QS) < 5 + 9 \Rightarrow l(QS) < 14$$

Consider  $\Delta RSQ$

$$l(QS) + 5 > 17 \Rightarrow l(QS) > 12$$

$$\therefore 12 < l(QS) < 14$$

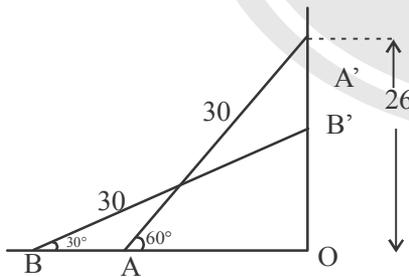
Hence, [B].

55. The only two values of  $x$  which satisfies the equation  $|X + 7| + |X - 8| = 16$  are  $X = -7.5$  and  $X = 8.5$

$$\therefore \text{The sum of two values} = -7.5 + 8.5 = 1$$

Hence, [B].

56. Let A and B be the points on wall where the ladder just reaches the higher and lower windows respectively.



$\therefore$  In  $\Delta OAA'$

$$\frac{OA'}{AA'} = \frac{26}{30} \approx \frac{\sqrt{3}}{2}$$

$\therefore \angle A'AO$  is  $60^\circ$

and  $\angle B'BO$  is  $30^\circ$

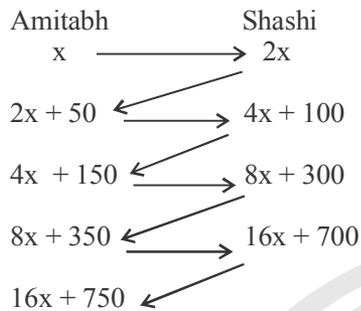
$$\therefore \frac{OA}{30} \cos 60^\circ = \frac{1}{2} \Rightarrow OA = 15$$

and  $\frac{OB}{30} = \cos 30^\circ \Rightarrow OB = 15\sqrt{3}$

$AB = OB - OA = 15\sqrt{3} - 15 = 15(\sqrt{3} - 1) > 10.5 \text{ m}$

Hence, [E].

57. Let  $x$  be the integer which Amitabh picks up. The number which each person has at every step is shown below.



Now, this number  $16x + 750$  should be greater than 1000 so that Shashi loses.

$\therefore 16x + 750 > 1000$   
 $16x > 250$

$x > 15\frac{5}{8}$

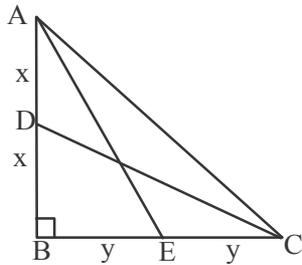
$\therefore$  Minimum value of  $x$  required = 16

Sum of the digits =  $1 + 6 = 7$

Hence, [C].

58. Consider statement I:  
 If all four numbers are prime numbers, the only possible values of  $x$  and  $y$  are  $x = 5$  and  $y = 2$   
 $\therefore$  The four numbers are 5, 2, 7, 3 and hence the sum is  $5 + 2 + 7 + 3 = 17$   
 Consider statement II:  
 Statement II alone does not give any information about the four numbers.  
 Hence, [A].

59. It is important to know which angle is right angled. Thus, statement III is required.



Let  $AB = 2x$

and  $BC = 2y$

$\therefore AD = DB = x$

and  $BE = EC = y$

Consider statement I:

$AE = 19$

$\therefore 4x^2 + y^2 = 19^2$

But this information is not sufficient to determine length of AC.

Consider statement II:

$CD = 22$

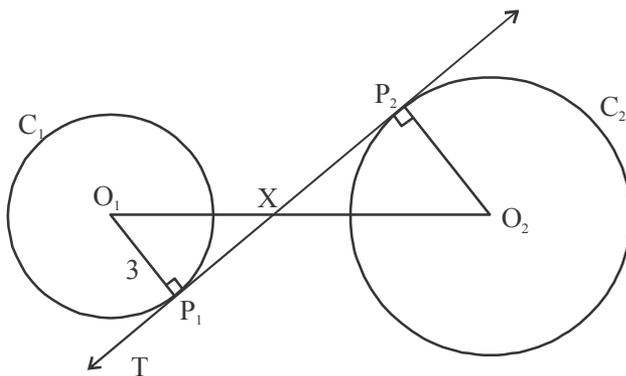
$\therefore x^2 + 4y^2 = 22^2$

Again this information without information from statement I is not sufficient to determine length of AC.

Therefore, all the three statements are required to find the length of AC.

Hence, [E].

60.



Let  $O_1$  and  $O_2$  be the center of the circle  $C_1$  and  $C_2$  respectively.

Given that  $O_1X = 5$

$\therefore P_1X = \sqrt{5^2 - 3^2} = 4$

$\Delta P_1O^1X$  is similar to  $\Delta P_2O_2X$

$$\therefore \frac{P_2O_2}{P_1O_1} = \frac{P_2X}{P_1X}$$

$$\Rightarrow \frac{8}{3} = \frac{P_2X}{4} \Rightarrow P_2X = \frac{32}{3}$$

$$\therefore P_1P_2 = P_1X + P_2X$$

$$= 4 + \frac{32}{3} = \frac{44}{3} = 11\frac{1}{3}. \text{ Hence, [A].}$$

61.  $S = \frac{\infty \times \omega}{\tau + \rho \times \omega}$

Divide both numerator and denominator by  $\omega$

$$S = \frac{\infty}{\frac{\tau}{\omega} + \rho}$$

As  $\omega$  is increased,  $\frac{\tau}{\omega}$  decreases and hence the denominator decreases. Thus, the overall fraction i.e.  $S$  will increase. Hence, [A].

62. Let  $n$  be the total number of quizzes and  $x$  be the total score of Ramesh in all the quizzes except the last one.  
From the given information in question,

$$\frac{x+97}{n} \geq 90$$

and  $\frac{x+70}{n} \geq 87$

For limiting case

$$x + 97 = 90n$$

$$\text{and } x + 70 = 87n$$

$$\Rightarrow 3n = 27$$

$$\text{i.e. } n = 9.$$

Hence, [D].

63. Since the polynomial intersects  $x$ -axis at 1 and  $-1$

$$a(1)^3 + b(1)^2 + c(1) + d = 0$$

$$\text{and } a(-1)^3 + b(-1)^2 + c(-1) + d = 0$$

$$\text{i.e. } a + b + c + d = 0$$

$$\text{and } -a + b - c + d = 0$$

$$\Rightarrow 2(b + d) = 0$$

$$\Rightarrow b = -d \quad \dots \text{ (i)}$$

The polynomial intersects y-axis at 2

$$\therefore a(0)^3 + b(0)^2 + c(0) + d = 2$$

$$\Rightarrow d = 2$$

$$\therefore b = -2$$

Hence, [A].

64. Total number of divisors of  $10^{29}$  (i.e.  $2^{29} \times 5^{29}$ )

$$= (29 + 1) \times (29 + 1) = 900$$

No. of divisors of  $10^{29}$  which are integral multiples of  $10^{23}$

$$= \text{No. of divisors of } \left( \frac{10^{29}}{10^{23}} \right) \text{ i.e. } 10^6 \text{ i.e. } 2^6 \times 5^6$$

$$= (6 + 1) \times (6 + 1) = 49$$

$\therefore$  Probability that a randomly chosen positive divisor of  $10^{29}$  is an integral multiple of

$$10^{23} = \frac{49}{900}$$

$$\therefore \frac{a^2}{b^2} = \frac{49}{900} \Rightarrow \frac{a}{b} = \frac{7}{30}$$

$$\therefore b - a = 30 - 7 = 23$$

Hence, [D].

65. Let the x co-ordinates of point P be  $x = t$

y-co-ordinates of points P and Q will be equal ( $\because$  PQ is parallel to x-axis)

$\therefore$  x co-ordinate of Q is 6 more than that of P

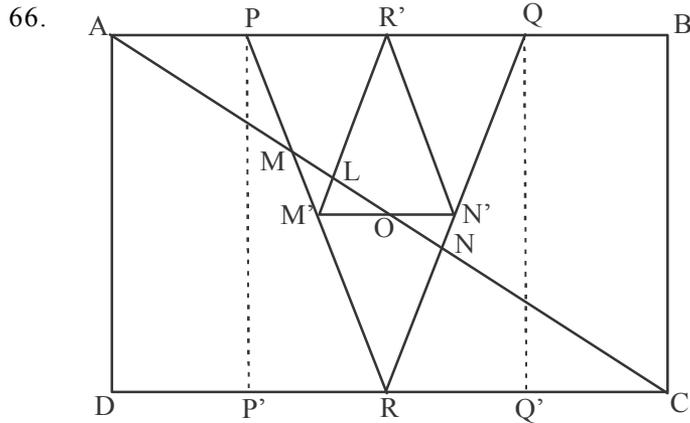
( $\because$  radius of circle = 3)

$\therefore$  x co-ordinate of Q is  $x = t + 6$

$$\therefore a^t = 2a^{t+6}$$

$$\Rightarrow \frac{1}{2} = a^6 \Rightarrow a = \frac{1}{\sqrt[6]{2}}$$

Hence, [A].



Draw lines parallel to AD and BC from points P and Q to meet CD at P' and Q' respectively.

The area of rectangle PQ Q'P' will be  $\frac{1}{3}$ <sup>rd</sup> of the whole rectangle i.e.  $\frac{1}{3} \times 90 = 30$  units

and area of  $\Delta PQR$  will be half of that of rectangle PQQ'P' i.e.  $\frac{1}{2} \times 30 = 15$  units

Draw a line M'N' parallel to PQ such that M' and N' are mid-points of PR and QR respectively. Also mark R' as mid-point of PQ and AC meets R'M' at L.

Now  $\Delta LM'O$  is similar to  $\Delta NN'O$

$\therefore$  To find the area of quadrilateral PMNQ, we can find the area of trapezium PM'N'Q and subtract area of  $\Delta LMM'$

$$\text{Area of trapezium PM'N'Q} = \frac{3}{4} \times \text{area of } \Delta PQR = \frac{3}{4} \times 15 = 11.25 \text{ units}$$

Area of  $\Delta LMM'$  is very small (of the order of 0.11 units)

$\therefore$  Approximate area of quadrilateral PMNQ =  $11.25 - 0.11 = 11.14$  units. Hence, [D].

67. In this question we need to put the values of B as given in each of the options. We will find that only for  $B = 19$ ,  $297_B$  is the factor of  $792_B$ . Hence, [E].

68. Let a, b and c be the number of students with scores 6, 8 and 20 respectively. From the given information.

$$6a + 8b + 20c = 504 \quad \dots (i)$$

$$\text{and } b = a + 2c \quad \dots (ii)$$

Putting value of b in equation (i), we get

$$7a + 18c = 252$$

$$a = 0 \text{ gives } c = 14$$

But,  $a \neq 0$

$\therefore$  We need to find next value of a such that  $7a$  is a multiple of 18.

It can be easily seen that value of  $a = 18$ .

$$\therefore c = 7$$

[Note: a cannot be 36 because in that case b cannot be mode]

$$\therefore b = 18 + 2 \times 7 = 32$$

$$\therefore \text{Total number of students in the class} = a + b + c = 18 + 32 + 7 = 57$$

Hence, [E].

69.  $x = \frac{13!}{1} + \frac{13!}{2} + \dots + \frac{13!}{13}$

Out of these 13 terms on R.H.S only  $\frac{13!}{11}$  is not divisible by 11

$$\frac{13!}{11} = 10! \times 12 \times 13$$

When  $10! \times 12 \times 13$  is divided by 11 remainder can be found out by applying remainder theorem.

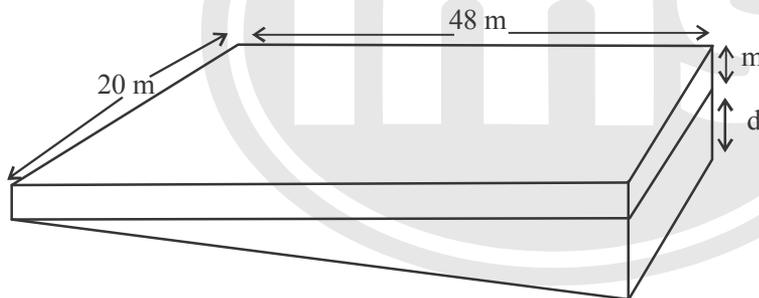
For remainder purpose

$$\frac{10 \times 12 \times 13}{11} = \frac{20}{11}$$

Thus, remainder is 9.

Hence, [D].

70.



For every 2.6m one gains an elevation of 1m

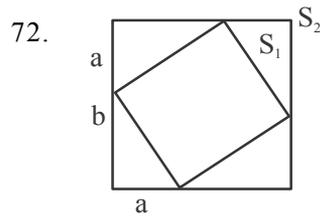
$$\therefore \frac{2.6}{1} = \frac{48}{d} \Rightarrow d = \frac{48}{2.6} = 18.461 \text{ m}$$

$$\therefore \text{Total volume of water in the pool} = \frac{1}{2} \times d \times 48 \times 20 + 48 \times 20$$

$$= \left[ \frac{1}{2} \times 18.46 \times 1 \right] \times 48 \times 20 = 9821.28 \text{ m}^2$$

The closest option is 10560. Hence, [D].

$$\begin{aligned}
 71. \quad \sum_{i=2}^{100} \frac{1}{\log_i 100!} &= \sum_{i=2}^{100} \frac{\log i}{\log 100!} \\
 &= \frac{\log 2 + \log 3 + \dots + \log 100}{\log 100!} = \frac{\log(2 \times 3 \times \dots \times 100)}{\log 100!} \\
 &= \frac{\log 100!}{\log 100!} = 1. \text{ Hence, [C].}
 \end{aligned}$$



Length of sides of  $S_1$  and  $S_2$  are  $\sqrt{8} = 2\sqrt{2}$  and  $\sqrt{9} = 3$  respectively.

$$\therefore a + b = 3 \text{ and } a^2 + b^2 = (2\sqrt{2})^2 = 8 \quad \dots(i)$$

$$\text{Thus, } (a + b)^2 = 3^2 \Rightarrow a^2 + b^2 + 2ab = 9$$

$$\Rightarrow 8 + 2ab = 9$$

$$\Rightarrow ab = \frac{1}{2} \quad \dots (ii)$$

Dividing equation (i) and (ii), we get

$$\frac{a}{b} + \frac{b}{a} = 16$$

$$\text{Let } \frac{b}{a} = x$$

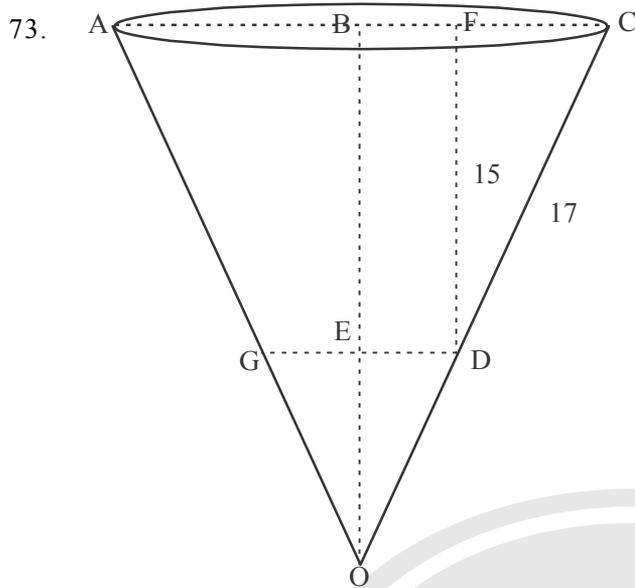
$$\therefore \frac{1}{x} + x = 16 \Rightarrow x^2 - 16x + 1 = 0$$

$$\Rightarrow x = \frac{16 \pm \sqrt{16^2 - 4}}{2} \Rightarrow x = 8 + \sqrt{63} \text{ or } 8 - \sqrt{63}$$

$$\Rightarrow x \simeq 16 \text{ or } x \simeq 0.$$

Thus, range in option D gives a possible value of  $\frac{b}{a}$ .

Hence, [D].



Let D be the point where the cylindrical pipe is attached to the surface of the cone.

Given that,

DF = 15 cm and DC = 17 cm

$$\therefore CF = \sqrt{17^2 - 15^2} = 8 \text{ cm}$$

$$\therefore BF = 13 - 8 = 5 \text{ cm}$$

Also,  $\triangle DCF \cong \triangle OCB$

$$\therefore \frac{OB}{BC} = \frac{DF}{CF}$$

$$OB = \frac{15 \times 13}{8} = 24.375 \text{ cm}$$

$$\therefore OE = 24.375 - 15 = 9.375 \text{ cm}$$

$\therefore$  Volume of water that will come out

= Volume of the cone - (Volume of the cone below point E)

$$= \frac{1}{3}\pi [13^2 \times 24.375 - 5^2 \times 9.375] = \frac{1}{3}\pi \times 3885$$

Rate at which water flow out =  $\pi \times 0.5 \times 0.5 \times 10 \times 100$

$$\therefore \text{Required time} = \frac{\frac{1}{3}\pi \times 3885}{\pi \times 0.5 \times 0.5 \times 10 \times 100} = 5.18 \text{ minutes}$$

Hence, [D].

74. There are only two possible cases:

Case I

One of the bags has 16 marbles out of which 10 marbles are red in colour. The other bag has 2 marbles, one of each colour.

In this case, probability of the two marbles drawn out being red =  $\frac{10}{16} \times \frac{1}{2} = \frac{5}{16}$  (as given)

So, the probability of the two marbles drawn out being blue

$$= \frac{(16-10)}{16} \times \frac{1}{2} = \frac{6}{16} \times \frac{1}{2} = \frac{3}{16}$$

Case II

One of the bags has 8 marbles out of which 5 marbles are red in colour

The other bag has 8 marbles out of which 4 are red in colour

In this case, probability of the two marbles drawn out being red =  $\frac{5}{8} \times \frac{4}{8} = \frac{5}{16}$

So, the probability of the two marbles drawn out being blue

$$= \frac{(8-5)}{8} \times \frac{(8-4)}{8} = \frac{3}{8} \times \frac{4}{8} = \frac{3}{16}$$

Thus, in any case, probability of both marbles being blue is  $\frac{3}{16}$ .

Hence, [C].

75. Percentage increase in the number of Indians going abroad

$$\text{in 2004} = \frac{6.21 - 5.35}{5.35} \times 100 = 16.075\%$$

$$\text{in 2005} = \frac{7.18 - 6.21}{6.21} \times 100 = 15.62\%$$

$$\text{in 2006} = \frac{8.34 - 7.18}{7.18} \times 100 = 16.166\%$$

$$\text{in 2007} = \frac{9.78 - 8.34}{8.34} \times 100 = 17.266\%$$

$$\text{in 2008} = \frac{10.87 - 9.78}{9.78} \times 100 = 11.145\%$$

Percentage increase in the number of domestic tourists

$$\text{in 2004} = \frac{366.27 - 309.04}{309.04} \times 100 = 18.519\%$$

$$\text{in 2005} = \frac{392.01 - 366.27}{366.27} \times 100 = 7.028\%$$

$$\text{in 2006} = \frac{462.32 - 392.01}{392.01} \times 100 = 17.936\%$$

$$\text{in 2007} = \frac{526.56 - 462.32}{462.32} \times 100 = 13.895\%$$

$$\text{in 2008} = \frac{563.03 - 526.56}{526.56} \times 100 = 6.926\%$$

Thus, we can see that percentage increase in no. of Indians going abroad is more than percentage increase in the no. of domestic tourists in years 2005, 2007 and 2008. Thus, from the given options, option [C] is correct. Hence, [C].

76. Cost of 1 rupee in terms of dollars in different years is as given below:

$$\text{In 2001: } \frac{3198}{15083} = 0.2120\$$$

$$\text{In 2002: } \frac{3103}{15064} = 0.2059\$$$

$$\text{In 2007: } \frac{10729}{44360} = 0.2418\$$$

$$\text{In 2010: } \frac{14193}{64889} = 0.2187\$$$

$$\text{In 2011: } \frac{16564}{77591} = 0.2134\$$$

Hence, [B].

77. The value of R for the given years in order is 1219, 1249, 1213, 1305, 1259, 1303, 1635, 1783, 1911, 1940, 2112, 2241, 2154, 2456 and 2633.

Sum of all value of R for all the given years = 26413

$$\therefore \text{Required angle} = \frac{2633}{26413} \times 360^\circ \simeq 36^\circ$$

Hence, [C].

78. It can be seen from the given exhibit that after United States, India has the highest spending on military as percentage of GDP. Note that the some data on military expenditure is missing for Vietnam, but when we look for data on other economic indicators for Vietnam we can conclude that even after considering the missing data spending on military as percentage of GDP for Vietnam would not be more than that for India. Hence, [C].

79. It can be seen from the given exhibit that maximum decline in “industry as percentage of GDP” was for Malaysia from 2008 to 2009. Hence, [D].

80. It can be seen that maximum increase in the “services value added as percentage of GDP” is for China where it becomes more than double from year 2000 to 2010. Hence, [E].

81. From the given graphs we can see that Scandinavia has the highest democratic index. So option [B] and [C] are eliminated.

Also, democratic index of poor countries of North America is lesser than that of Western Europe. So, option [E] is eliminated.

Also, democratic index of poor countries of North America is more than that of C and E Europe. Therefore, option [A] is eliminated. So, the only order among the five options which could be true is [D]. Hence, [D].

82. To find the disparity of democratic participation, we need to look at the slopes of the lines given in the each graph.

The slopes are:

$$\text{For North America} \equiv \left| \frac{20.1-17.9}{10.4-9.0} \right| = 1.57$$

$$\text{For C and E Europe} \equiv \left| \frac{21-4}{10-7} \right| = 5.67$$

$$\text{For Africa} \equiv \left| \frac{11.5-10.5}{10-6} \right| = 0.25$$

$$\text{For South America} \equiv \left| \frac{21-14}{10-7} \right| = 2.33$$

$$\text{For Western Europe} \equiv \left| \frac{19.7-19.9}{10.7-9.7} \right| = 0.2$$

Thus, highest disparity is for C and E Europe.  
Hence, [B].

83. Let a and b be the maximum GDP's for African and South American regions respectively.

Thus, from the graphs best estimate values are

$$\log_{10}a = 9.6 \text{ and } \log_{10}b = 9.4$$

$$\Rightarrow a = 10^{9.6} \text{ and } b = 10^{9.4}$$

$$\text{Thus, } \frac{a}{b} = \frac{10^{9.6}}{10^{9.4}} = 10^{0.2}$$

$$\Rightarrow a = 10^{0.2} \times b$$

$$\text{i.e. } a = 1.58 \times b$$

Thus, maximum GDP of African region is higher than the maximum GDP of South American region by a factor of 1.58. Hence, [E].

[Note: However, the value of difference will change by appreciable amount depending on the values of  $\log_{10}a$  and  $\log_{10}b$  we take from the graph. Thus, [E] should be the best possible answer]

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**PART - II**

84. The G-7 is a group consisting of the finance ministers of the US, the UK, France, Germany, Italy, Canada and Japan. Hence, [B].
85. The correct match is given in [C]. Hence, [C].
86. The correct match is given in [A]. Hence, [A].
87. The acronym YAHOO stands for Yet Another Hierarchical Officious Oracle. Hence, [C].
88. All the options contain the names of people who have held the post of the Governor of RBI. Hence, [E].
89. There is some confusion here as the options are not very specific. Industrial production directly impacts exports and imports, which impact exchange rates. Interest rates and investor sentiments also impact exchange rates. The goods and services tax, imposed on items for domestic consumption (i.e. imports) would have some impact on exchange rates. The consumer price index is just a calculated measure that can be used to identify periods of inflation or deflation. So, by itself it is not something that can impact exchange rates. But, changes in it may reflect inflation, and inflation does impact exchange rates. Hence, [D].
90. 'Chery Automobile Co., Ltd.' (not 'Cherry') is Chinese by origin, Tatra is from the Czech Republic and The First Cars doesn't seem to exist. So, there is no correct answer for this question.
91. As per the constitution of India, Right to Property is not a fundamental right. Hence, [D].
92. Jawaharlal Nehru declared Poorna Swaraj at Lahore in December 1929. Hence, [C].
93. Mother Teresa is also known as the 'Saint of the Gutters'. Hence, [B].
94. *Long Walk to Freedom* is the autobiography of Nelson Mandela. Hence, [D].
95. Brahmagupta (597-668 CE) authored the first book that treated zero as a number. Aryabhatta is known to have lived during 476-550 CE. Hence, [C].
96. The headquarters of IAEA are located in Vienna, Austria. Hence, [B].
97. Rann of Kutch is the only place in the world where the Asiatic Wild Ass is found. Hence, [D].
98. The Indian Constitution has granted the official language status to 22 languages. Hence, [A].
99. The ancient civilization of Sumer flourished in a region, which is known as Iraq in the modern world. Hence, [A].
100. Doris Lessing had won the Nobel Prize for Literature. Hence, [D].
101. According to the latest figures, the top five countries by GDP (PPP) are USA(#1), China, India, Japan and Germany. Hence, [B].
102. The distance covered in half marathon is approximately 21 km. Hence, [A].
103. The newest country in the world is South Sudan, which became an independent state in July, 2011. Hence, [E].