

# CAT 2002 Actual Paper

## ANSWERS and EXPLANATIONS

1	3	2	4	3	4	4	3	5	3	6	1	7	1	8	3	9	3	10	3
11	2	12	4	13	1	14	4	15	1	16	1	17	1	18	4	19	2	20	3
21	3	22	3	23	4	24	1	25	3	26	3	27	2	28	4	29	2	30	2
31	2	32	4	33	4	34	2	35	2	36	2	37	1	38	2	39	1	40	4
41	2	42	2	43	2	44	4	45	3	46	1	47	3	48	2	49	4	50	3
51	3	52	2	53	1	54	2	55	1	56	4	57	4	58	2	59	4	60	4
61	3	62	2	63	4	64	3	65	3	66	2	67	2	68	4	69	3	70	1
71	3	72	2	73	3	74	4	75	4	76	1	77	1	78	4	79	2	80	4
81	4	82	3	83	4	84	3	85	1	86	3	87	1	88	3	89	2	90	2
91	4	92	4	93	4	94	3	95	4	96	2	97	2	98	4	99	3	100	3
101	3	102	2	103	4	104	2	105	4	106	3	107	1	108	3	109	4	110	2
111	3	112	1	113	4	114	3	115	1	116	4	117	3	118	2	119	3	120	2
121	1	122	4	123	1	124	3	125	1	126	3	127	2	128	3	129	4	130	1
131	1	132	4	133	4	134	4	135	2	136	4	137	2	138	2	139	4	140	4
141	4	142	1	143	1	144	2	145	1	146	3	147	4	148	3	149	1	150	3

### Scoring table

Section	Question number	Total questions	Total attempted	Total correct	Total incorrect	Net score	Time taken
DI	1 to 50	50					
QA	51 to 100	50					
EU + RC	101 to 150	50					
Total		150					

1. 3 Statement I tells us that  
 (1) Ashish is not an engineer, (2) Ashish got more offers than the engineers.  
 Hence, Ashish did not have 0 offers.  
 After this the following table can be achieved.

Profession	Names	Offers			
		3	2	1	0
CA	Ashish	x	x	✓	x
MD	Dhanraj	✓	x	x	x
Economist	Sameer	x	✓	x	x
Engineer		x	x	x	✓

From statement IV, Dhanraj is not at 0 and 1.

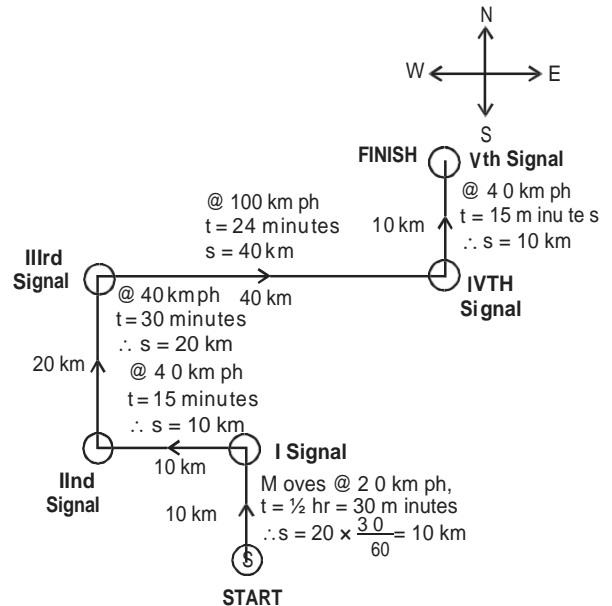
2. 4 Option (3) is ruled out by statement VII.  
 Option (1) is ruled out by statements VII and VIII.  
 From statement IV, Sandeep had Rs. 30 to start and Daljeet Rs. 20.  
 From statement II, option (2) is not possible as Sandeep was left with Re 1, he spent Rs. 29. But according to (2) he spent Rs. 1.50 more than Daljeet. But Daljeet had only Rs. 20. Hence option (4) is correct.
3. 4 Data insufficient, please check the question.
4. 3 Statements V and VI rule out options (1) and (2). Since contestants from Bangalore and Pune did not come first, school from Hyderabad can come first. Convent is not in Hyderabad which rules out option (4).

5. 3 The only two combinations possible are:  
 Younger Older  
 2 4  
 3 9

Cubes of natural numbers are 1, 8, 27, 64, ... Here 64 and above is not possible as the age will go above 10. Only (2) and (3) satisfy the case of mother and father.

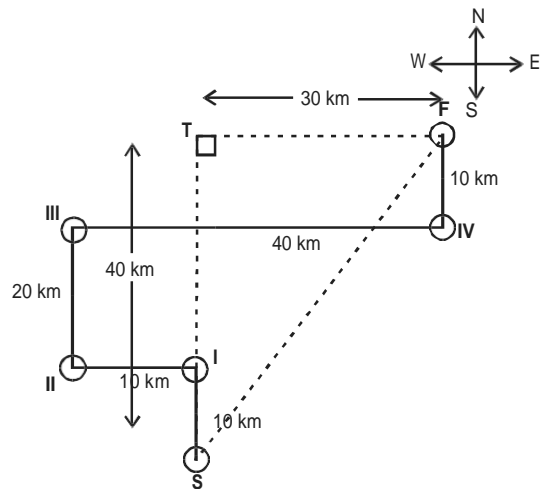
6. 1
- |                                |                      |
|--------------------------------|----------------------|
| Total seats in the hall        | 200                  |
| Seats vacant                   | 20                   |
| Total waiting                  | 180                  |
| Ladies                         | 72                   |
|                                | $2 \times 180 = 120$ |
| Seating capacity of flight     | 3                    |
| Number of people in flight A = | 100                  |
| For flight B =                 | $180 - 100 = 80$     |
|                                | $\frac{80}{20} = 4$  |
- Thus, airhostess for A = 20  
 Empty seats in flight B =  $120 - 80 = 40$   
 $40 : 4 = 10 : 1$

7. 1

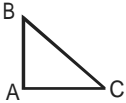


**Note:** s = Distance covered; v = Velocity (km/hr)  
 t = Time taken; s = v x t  
 The total distance travelled by the motorist from the starting point till last signal is  $10 + 10 + 20 + 40 + 10 = 90$  km

8. 3



**Note:** According to Pythagoras' theorem, for a right-angled triangle.

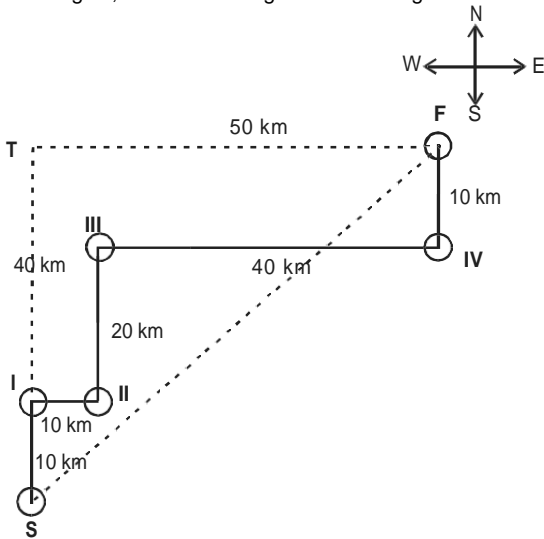


$$BC^2 = AB^2 + AC^2$$

$$BC = \sqrt{AB^2 + AC^2}$$

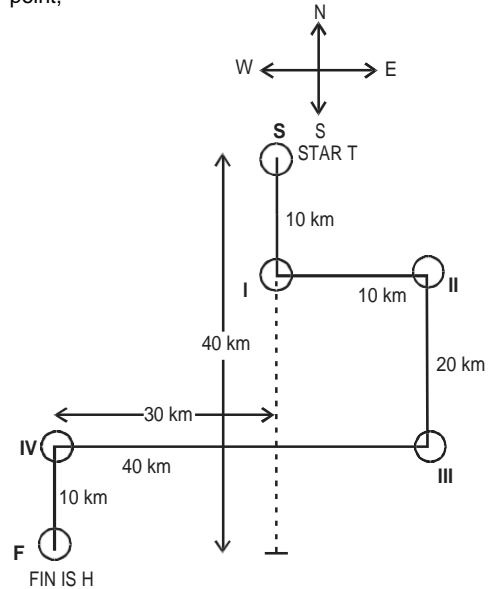
$$SF = \sqrt{ST^2 + TF^2} = \sqrt{40^2 + 30^2} = \sqrt{2500} = 50 \text{ km}$$

9. 3 For the case when 1st signal were 1 red and 2 green lights, the surface diagram will be as given below.



TF = 50 km; ST = 40 km  
Considering the above figure, option (3) is correct, 50 km to the east and 40 km to the north.

10. 3 If the car heads towards south from here starting point,



From the above we can conclude that option (3) is correct.

11. 2 Total five lie between 10 E and 40 E.  
Austria, Bulgaria, Libya, Poland, Zambia  
N N N N S
- $$\frac{1}{5} = 20\%$$
12. 4 Number of cities starting with consonant and in the northern hemisphere = 10.  
Number of countries starting with consonant and in the east of the meridian = 13.  
Hence option (4), the difference is 3.
13. 1 Three countries starting with vowels and in southern hemisphere — Argentina, Australia and Ecuador and two countries with capitals beginning with vowels — Canada and Ghana.
14. 4 Let us consider two cases:  
(a) If 5 min remaining the score was 0 – 2. Then final score could have been 3 – 3. [Assuming no other Indian scored]  
(b) But if the score before 5 min was 1 – 3, then final score could have been 4 – 3.
15. 1 From A, if by adding 12 students, the total number of students is divisible by 8, then by adding 4 students, it will be divisible by 8.

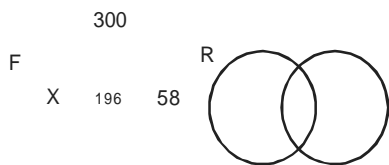
16. 1 From (A),  $(x + y) \left( \frac{1}{x} + \frac{1}{y} \right) = 4$  or  $(x + y) \left( \frac{y + x}{xy} \right) = 4$   
 $\Rightarrow (x + y)^2 = 4xy$   
 $\Rightarrow (x - y)^2 = 0$   
 $\Rightarrow x = y$  ... (i)  
 From (B),  $(x - 50)^2 = (y - 50)^2$   
 On solving  
 $x(x - 100) = y(y - 100)$  ... (ii)  
 This suggests that the values of x and y can either be 0 or 100.

17. 1 Statement:  
 A. Let the wholesale price is x.  
 Thus, listed prices = 1.2x  
 After a discount of 10%, new price =  $0.9 \times 1.2x = 1.08x$   
 $1.08 - x = 10\%$ . Thus, we know x can be found.  
 B. We do not know at what percentage profit, or at what amount of profit was the dress actually sold.

18. 4 A gives 500 as median and B gives 600 as range. A and B together do not give average. Therefore, it cannot be answered from the given statements.

19. 2 From statement A, we know that for all  $-1 < x < 1$ , we can determine  $|x - 2| < 1$  is not true. From B,  $-1 < x < 3$ , we cannot determine whether  $|x - 2| < 1$  or not. Therefore, statement B alone is sufficient.

20. 3 From statement A, we cannot find anything. From B alone we cannot find. From A and B,



$x + 196 + 58 = 300$ . Thus, x can be found.

21. 3 Jagdish (J), Punit (P), Girish (G)  
 (A)  $J = \frac{2}{9} [P + G]$   
 $P + G + J = 38500$   
 Thus, only J can be found.  
 (B) Similarly, from this only P can be found. Combining we know J, P and G can be found.

22. 3 Emp. numbers 51, 58, 64, 72, 73 satisfy them. Total = 5

23. 4 80% attendance = 80% of 25 = 20 days  
 Emp. numbers 47, 51, 72, 73, 74, 79, 80.  
 Thus, total = 7

24. 1

Emp. No.	Earnings E (medium)	No. of days D (medium)	E/D
2001151	159.64	13.33	11.97
2001158	109.72	9.61	11.41
2001164	735.22	12.07	60.91
2001171	6.10	4.25	-
2001172	117.46	8.50	13.81
2001179	776.19	19.00	40.85
2001180	1262.79	19.00	66.46

From the above we can see that Emp. number 2001180 earns the maximum per day salary.

25. 3 If you have practised Vedic mathematics you can easily compare the fraction in your time. Thus, Emp. numbers 51, 58, 64, 71, 72 satisfy the condition. [For emp. 64, you see 12 is not the double of 5. And 735 is not even double of 402.

Hence,  $\frac{402}{5} > \frac{735}{12}$  (3)

26. 3 Total revenue of 1999 = 3374

$5\% \text{ of } 3374 = 3374 \times \frac{5}{100} = 168.7$

For 1999, revenue for Spain is 55, Rest of Latin America is 115, North Sea is 140, Rest of the world is 91.

So total four operations of the company accounted for less than 5% of the total revenue earned in the year 1999.

27. 2 For man the 200% growth. The value should be more than three times.

28. 4 Four operations, as given below:  
 (1) North Africa and Middle-East  
 (2) Argentina  
 (3) Rest of Latin America  
 (4) Far East  
 have registered yearly increase in income before taxes and charges from 1998 to 2000.

29. 2 Percentage increase in net income before tax and charges for total world (1998-99)  
 $= \frac{1375 - 248}{248} \times 100 = 454.4\%$   
 Spain is making loss.

Percentage increase for North Africa and Middle-East  
 $\frac{341 - 111}{111} \times 100 = 207.2\%$

Percentage increase for Argentina =  $\frac{838 - 94}{94} \times 100$   
 = 791.5%

From the table one can directly say that there is no operation other than Argentina, whose percentage increase in net income before taxes and charges is higher than the average (world).

30. 2 Statement 1 is obviously wrong.

(b)  $\frac{54}{65} > \frac{20}{52}$ . Hence, (2) is correct.

(c)  $\frac{500}{1168} > \frac{61}{187}$ . Hence (3) is wrong.

31. 2 Profitability of North Africa and Middle-East in 2000  
 $= \frac{356}{530} = 0.67$

Profitability of Spain in 2000 =  $\frac{225}{43} = 5.23$

Profitability of Rest of Latin America in 2000 =  $\frac{169}{252}$ ,  
 i.e. < 1.

Profitability of Far East in 2000 =  $\frac{189}{311} < 1$

32. 4 Except Rest of Latin America and Rest of the World all the operations are greater than 2.

33. 4 I would rate this question as time-taking because to verify option (4) it takes time. But if you have ruled out options (1), (2) and (3), then you can straight away mark (4).

34. 2 It can be easily observed from the two charts that

Switzerland's ratio of chart 1 to chart 2 is  $\frac{20}{11}$  has the highest price per unit kilogram for its supply. Finding the ratio of the value and quantity is enough to reach the solution.

35. 2 Total value of distribution to Turkey is 16% of 5760 million Euro.  
 Total quantity of distribution to Turkey is 15% of 1.055 million tonnes.  
 So the average price in Euro per kilogram for Turkey is

$$\left( \frac{5760 \times \frac{16}{100}}{1055 \times \frac{15}{100}} \right) = 5.6$$

36. 2 BC → AC → AAC = 0

37. 1 BD → AE → AAB = 95.2  
 The least cost to reach to AAB is for AE. And that is BD to AE is zero.

38. 2 BB → AB → AAG = 311.1  
 Same as above.

39. 1 First you check the minimum cost for receiving at AAA. This is 0 for AE. But BB to AE is very high. Next is AC [314.5] BB to AC is 451.1. After AC the others are high. Hence, 314.5 + 451.1 = 765.6

40. 4 Number of refineries = 6  
 Number of depots = 7  
 Number of districts = 9  
 Therefore, number of possible ways to send petrol from any refinery to any district is  $6 \times 7 \times 9 = 378$ .

41. 2 If you look for large figures you would find them in both tables in AE. Add them and we get  
 BE → AE → AAH

42. 2

Position of States (Rank)	Year				
	96-97	97-98	98-99	99-00	00-01
1)	mA	mA	mA	mA	mA
2)	TN	TN	TN	TN	TN
3)	GU	AP	AP	AP	AP
4)	AP	GU	GU	GU	UP
5)	kA	UP	UP	UP	GU
6)	UP	kA	kA	kA	kA
7)	WB	WB	WB	WB	WB

From above, we can conclude that option (2) is correct.

43. 2 On referring to the above table, we can see that UP is the state which changed its relative ranking most number of times.

44. 4 We can say directly on observing the graph that the sales tax revenue collections for AP has more than doubled from 1997 to 2001.

45. 3 Growth rate of tax revenue can be calculated as:  
(Sales tax revenue of correct year – Sales tax revenue of previous year)

$$\text{For year 1997-98 } \frac{7826 - 7290}{7826} = 0.068$$

$$\text{For year 1998-99 } \frac{8067 - 7826}{7826} = 0.030$$

$$\text{For year 1999-2000 } \frac{10284 - 8067}{8067} = 0.274$$

$$\text{For year 2000-01 } \frac{12034 - 10284}{10284} = 0.170$$

46. 1 For this we have to check every option.

For Karnataka,  $\frac{\text{Sales tax revenue of the states}}{\text{total sales tax}}$

$$1996-97 \Rightarrow \frac{3510}{29870} = 0.11$$

$$1997-98 \Rightarrow \frac{33168}{4265} = 0.11$$

$$1998-99 \Rightarrow \frac{36068}{4839} = 0.11$$

$$1999-2000 \Rightarrow \frac{4839}{42348} = 0.11$$

$$2000-01 \Rightarrow \frac{5413}{49638} = 0.11$$

So Karnataka is the correct option and no further check is required.

47. 3 On referring to the table prepared in the solution for question (11), we can see that Tamil Nadu has been maintaining a constant rank over the years in terms of its contribution to total tax collections.

48. 2 Only R9

49. 4 Statement (1) is not satisfied by R9.  
Statement (2) is not satisfied R2 & R3  
Statement (3) is incorrect as there are five such region R1, R2, R3, R4 & R11.  
Statement (4) is correct.

50. 3 All three R9, R10, R11.

51. 3 Total possible arrangements =  $10 \times 9 \times 8$   
Now 3 numbers can be arranged among themselves in  $3!$  ways = 6 ways  
Given condition is satisfied by only 1 out of 6 ways.  
Hence, the required number of arrangements

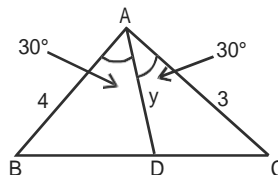
$$= \frac{10 \times 9 \times 8}{6} = 120$$

**Alternate solution:**

$${}^{10}C_3 = 120$$

Any three numbers selected out of 10 numbers will have only one possible arrangement.

52. 2



Let  $BC = x$  and  $AD = y$ .

As per bisector theorem,  $\frac{BD}{DC} = \frac{AB}{AC} = \frac{4}{3}$

Hence,  $BD = \frac{4x}{7}$ ;  $DC = \frac{3x}{7}$

In  $\triangle ABD$ ,  $\cos 30^\circ = \frac{(4)^2 + y^2 - 16x^2}{2 \times 4 \times y}$

$$\Rightarrow 2 \times 4 \times y \times \frac{\sqrt{3}}{2} = 16 + y^2 - \frac{16x^2}{49}$$

$$\Rightarrow 4\sqrt{3}y = 16 + y^2 - \frac{16x^2}{49} \quad \dots (i)$$

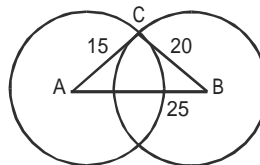
Similarly, from  $\triangle ADC$ ,  $\cos 30^\circ = \frac{9 + y^2 - \frac{9x^2}{49}}{2 \times 3 \times y}$

$$\Rightarrow 3\sqrt{3}y = 9 + y^2 - \frac{9x^2}{49} \quad \dots (ii)$$

Now (i)  $\times 9 - 16 \times$  (ii), we get

$$36\sqrt{3}y - 48\sqrt{3}y = 9y^2 - 16y^2 \Rightarrow y = \frac{12\sqrt{3}}{7}$$

53. 1



Let the chord =  $x$  cm

$$\therefore \frac{1}{2} (15 \times 20) = \frac{1}{2} \times 25 \times \frac{x}{2} \Rightarrow x = 24 \text{ cm}$$

54. 2  $f(x) + f(y) = \log \left( \frac{1+x}{1-x} \right) + \log \left( \frac{1+y}{1-y} \right)$

$$= \log \left( \frac{(1+x)(1+y)}{(1-x)(1-y)} \right)$$

$$= \log \left( \frac{1+x+y+xy}{1+xy-x-y} \right)$$

$$= \log \left( \frac{1+xy+x+y}{1+xy-(x+y)} \right)$$

$$= \log \left( \frac{1+\left(\frac{x+y}{1+xy}\right)}{1-\left(\frac{x+y}{1+xy}\right)} \right)$$

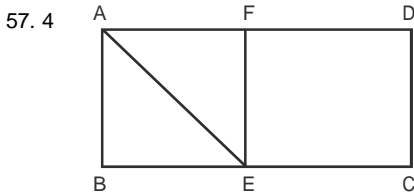
$$= f\left(\frac{x+y}{1+xy}\right)$$

55. 1 Total area =  $14 \times 14 = 196 \text{ m}^2$   
 Grazed area =  $\left| \frac{\pi \times r^2}{4} \right| \times 4 = \pi r^2 = 22 \times 7 (r = 7)$   
 $= 154 \text{ m}^2$   
 Ungrazed area is less than  $(196 - 154) = 42 \text{ m}^2$ , for which there is only one option.

56. 4 Every trip will need more than 180 m and there are  $\frac{1}{2}$  trips. Hence, the distance covered will be greater than 750 m, for which there is only one option = 860.

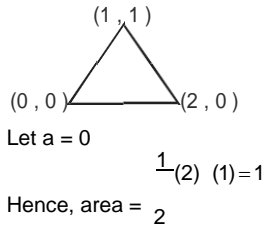
**Alternative method:**

For the first stone, he will cover 100 m.  
 For second,  $200 - 4 = 196$   
 For third,  $200 - 8 = 192$   
 For fourth,  $200 - 12 = 188$   
 For fifth,  $200 - 16 = 184$   
 Hence, total distance = 860 m



Area of  $\triangle ABE = 7 \text{ cm}^2$   
 Area of  $\triangle ABEF = 14 \text{ cm}^2$   
 Area of  $\triangle ABCD = 14 \times 4 = 56 \text{ cm}^2$

58. 2



**Note:** Answer should be independent of a and area of the triangle does not have square root.

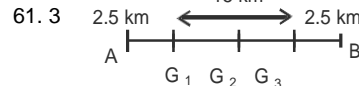
59. 4 Check choices, e.g.  $\frac{1}{2} \Rightarrow$  Diagonal =  $\sqrt{5}$   
 Distance saved =  $3 - \sqrt{5} \approx 0.75 \neq$  Half the larger side.  
 Hence, incorrect.  
 $\frac{3}{4} \Rightarrow$  Diagonal = 5  
 Distance saved =  $(4 + 3) - 5 = 2 =$  Half the larger side.

60. 4 If speed of N = 4, speed of S = 1,  
 $\Rightarrow$  Average speed =  $\frac{2 \times 4 \times 1}{4 + 1} = 1.6$   
 Because time available is  $\frac{2}{3}$ , speed =  $\frac{3}{2}$

Now average speed = 2.4  
 Now speed of N = 8  
 Now speed of S = y

$$\frac{2 \times 8 \times y}{8 + y} = 2.4 \Rightarrow y = 1.3$$

Required ratio =  $1.3 : 8 \approx 1 : 6$



$AG_1 = 5 \text{ min}$  at  $30 \text{ km/hr} = 2.5 \text{ km}$   
 $G_1G_3 = 15 \text{ km}$   
 Time for  $AG_1 = 5 \text{ min}$   
 Time for

$$G_1G_3 + G_3A = 32.5 \text{ min} = \text{total of } 37.5 \text{ min}$$

1 min is taken for transferring the patient into and out of the ambulance.  
 Hence,  $(40 - 37.5 - 1) = 1.5 \text{ min}$  is remaining.

62. 2 Check choices  
 Choice (2)  $54 \Rightarrow S = (5 + 4)^2 = 81$   
 $\Rightarrow D - S = 81 - 54 = 27$ . Hence, the number = 54

63. 4  $x_0 = x$   
 $x_1 = -x$   
 $x_2 = -x$   
 $x_3 = x$   
 $x_4 = x$   
 $x_5 = -x$   
 $x_6 = -x$   
 .....  
 $\Rightarrow$  Choices (1), (2), (3) are incorrect.

64. 3  $xy + yz + zx = 3$   
 $\Rightarrow xy + (y + x)z = 3$   
 $\Rightarrow xy + (y + x)(5 - x - y) = 3$   
 $\Rightarrow x^2 + y^2 + xy - 5x - 5y + 3 = 0$

$$\Rightarrow y^2 + (x - 5)y + x^2 - 5x + 3 = 0$$

As it is given that y is a real number, the discriminant for above equation must be greater than or equal to zero.

$$\text{Hence, } (x - 5)^2 - 4(x^2 - 5x + 3) \geq 0$$

$$\Rightarrow 3x^2 - 10x - 13 \leq 0$$

$$\Rightarrow 3x^2 - 13x + 3x - 13 \leq 0$$

$$\Rightarrow x \in \left[ -1, \frac{13}{3} \right]$$

Largest value that x can have is  $\frac{13}{3}$ .

65. 3 Area =  $40 \times 20 = 800$

If 3 rounds are done, area =  $34 \times 14 = 476$

$\Rightarrow$  Area > 3 rounds

If 4 rounds  $\Rightarrow$  Area left =  $32 \times 12 = 384$

Hence, area should be slightly less than 4 rounds.

66. 2 Since thief escaped with 1 diamond,

Before 3<sup>rd</sup> watchman he had  $(1 + 2) \times 2 = 6$

Before 2<sup>nd</sup> watchman he had  $(6 + 2) \times 2 = 16$

Before 1<sup>st</sup> watchman he had  $(16 + 2) \times 2 = 36$

**Alternative method:**

Check with choices.

67. 2 Mayank paid  $\frac{1}{2}$  of what others paid.

$\Rightarrow$  Mayank paid  $\frac{1}{3}$  rd of the total amount = \$20.

Similarly,

Mirza paid \$15 and little paid \$12.

Remaining amount of \$60 - \$20 - \$15 - \$12 = \$13 is paid by Jaspal.

68. 4 Let the number of gold coins =  $x + y$

$$48(x - y) = X^2 - Y^2$$

$$48(x - y) = (x - y)(x + y) \Rightarrow x + y = 48$$

Hence the correct choice would be none of these.

69. 3 Let's assume that

p days : they played tennis

y days : they went for yoga

T days : total duration for which Ram and Shyam stayed together.

$$\Rightarrow p + y = 22$$

$$(T - y) = 24$$

$$\& (T - p) = 14$$

Adding all of them,

$$2T = 22 + 24 + 14 \Rightarrow T = 30 \text{ days.}$$

70. 1 Coefficient of  $x^n = \frac{1}{2}(n + 1)(n + 4)$

$$S = 2 + 5x + 9x^2 + 14x^3 + \dots$$

$$xS = 2x + 5x^2 + \dots$$

$$S(1 - x) = 2 + 3x + 4x^2 + 5x^3 + \dots$$

$$\text{Let } S_1 = S(1 - x) \Rightarrow S_1 = 2 + 3x + 4x^2 + \dots$$

$$xS_1 = 2x + 3x^2 + \dots$$

$$S_1(1 - x) = 2 + x + x^2 + \dots$$

$$S_1(1 - x) = 2 + \frac{x}{1 - x}$$

$$S(1 - x^2) = 2 + \frac{x}{1 - x} \Rightarrow S = \frac{2 - x}{(1 - x)^3}$$

71. 3  $x^2 + 5y^2 + z^2 = 4yx + 2yz$

$$(x^2 + 4y^2 - 4yx) + z^2 + y^2 - 2yz = 0$$

$$(x - 2y)^2 + (z - y)^2 = 0$$

It can be true only if  $x = 2y$  and  $z = y$

72. 2 Arithmetic mean is more by 1.8 means sum is more by

18. So  $ba - ab = 18$

$b > a$  because sum has gone up, e.g.  $31 - 13 = 18$

Hence,  $b - a = 2$

73. 3 By trial and error:

$$30 \times 12 = 360 > 300$$

$$30 \times 7.5 = 225 < 300$$

$50 \times 6 = 300$ . Hence, he rented the car for 6 hr.

74. 4  $575 = \frac{n^2 + n}{2} \times x$

$$1150 = n^2 + n - 2x$$

$$n(n + 1) \geq 1150$$

$$n^2 + n \geq 1150$$

The smallest value for it is  $n = 34$ .

For  $n = 34$

$$40 = 2x \Rightarrow x = 20$$

75. 4  $x - 1 \leq [x] \leq x$

$$2x + 2y - 3 \leq L(x, y) \leq 2x + 2y \Rightarrow a - 3 \leq L \leq a$$

$$2x + 2y - 2 \leq R(x, y) \leq 2x + 2y \Rightarrow a - 2 \leq R \leq a$$

Therefore,  $L \leq R$

**Note:** Choice (2) is wrong, otherwise choice (1) and choice (3) are also not correct. Choose the numbers to check.



76. 1 Number of regions =  $\frac{n(n+1)}{2} + 1$ , where n = Number of lines, i.e. for 0 line we have region = 1. For 1 line we have region = 2. It can be shown as:

Number of lines	0	1	2	3	4	5	...	10
Number of regions	1	2	4	7	11	16	...	56

Therefore, for n = 10, it is  $\frac{10 \times 11}{2} + 1 = 56$

77. 1  $(2^4)^{64} = (17-1)^{64} = 17n + (-1)^{64} = 17n + 1$   
Hence, remainder = 1

78. 4  $\frac{A^2}{x} + \frac{B^2}{x-1} = 1 \Rightarrow A^2(x-1) + B^2x = x^2 - x$   
This is a quadratic equation.  
Hence, number of roots = 2 or 1 (1 in the case when both roots are equal).

79. 2 Because each word is lit for a second,  $\frac{21}{2} + \frac{49}{4} + \frac{49}{8} = \text{LCM}(2, 4, 8) \left( \frac{21}{2} + \frac{49}{4} + \frac{49}{8} \right)$

$$\frac{\text{LCM}(7, 21, 49)}{\text{HCF}(2, 4, 8)} = \frac{49 \times 3}{2} = 73.5 \text{ s}$$

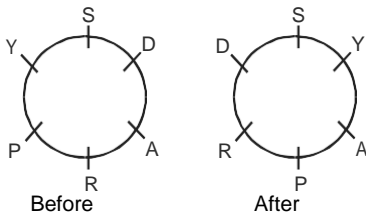
80. 4  $\text{HCF} \left( \frac{9}{2}, \frac{27}{4}, \frac{36}{5} \right) = \frac{\text{HCF}(9, 27, 36)}{\text{LCM}(2, 4, 5)} = \frac{9}{20} \text{ lb}$

= Weight of each piece  
Total weight = 18.45 lb

$$\text{Maximum number of guests} = \frac{18.45 \times 20}{9} = 41$$

81. 4  $3(4(7x + 4) + 1) + 2 = 84x + 53$   
Therefore, remainder is 53.

82. 3



Suresh is sitting to the left of Dhiraj.

83. 4 Number of oranges at the end of the sequence = Number of 2s - Number of 4s = 6 - 4 = 2

84. 3 Number of  $(1s + 2s + 3s) - 2(\text{Number of } 4s) = 19 - 8 = 11$

85. 1  $11 \times 10 \times 9 \times 8 = 7920$

86. 3 Total number of passwords using all letters - Total number of passwords using no symmetric letters =  $(26 \times 25 \times 24) - (15 \times 14 \times 13) = 12870$

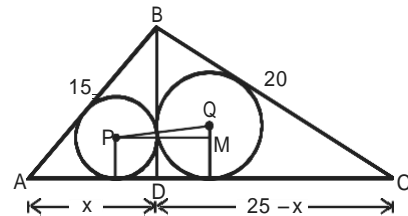
87. 1 Let tunnel = 8 km and speed of cat = 1 km/hr  
Time taken to reach entrance of tunnel by cat = 3 hr  
Time taken to reach exit of tunnel by cat = 5 hr  
Train will cover the sum (length of tunnel) = 2 hr  
Therefore, ratio of speeds of train and cat = 4 : 1  
 $\Rightarrow$  Speed of the train is greater by 3 : 1 than that of the cat.

88. 3 Let the largest piece = 3x  
Middle = x  
Shortest = 3x - 23  
or  $3x + x + (3x - 23) = 70$   
or  $x = 9$   
or the shortest piece =  $3(9) - 23 = 4$   
Check choices:  
The shortest piece has to be < 20 cm.  
27 is wrong choice.  
The largest piece is a multiple of 3.  
Or  $(23 + \text{Shortest})$  should be a multiple of 3.  
Answer = 4 cm (Among other choices)

89. 2 Each traveller had  $\frac{8}{3}$  loaves.  
 $\Rightarrow$  First traveller has given  $5 - \frac{8}{3}$  loaves to the third.  
Second traveller sacrificed only  $3 - \frac{8}{3} = \frac{1}{3}$ rd of a loaf.  
3 3

So, first should get 7 coins.

90. 2



$$(15)^2 - x^2 = (20)^2 - (25 - x)^2$$

$$\Rightarrow x = 9$$

$$\Rightarrow BD = 12$$

$$\text{Area of } \triangle ABD = \frac{1}{2} \times 12 \times 9 = 54$$

$$s = \frac{1}{2} (15 + 12 + 9) = 18$$

$$r_1 = \frac{\text{Area}}{s} \Rightarrow r_1 = 3$$

$$\text{Area of } \triangle BCD = \frac{1}{2} \times 16 \times 12 = 96$$

$$s = \frac{1}{2}(16 + 20 + 12) = 24$$

$$r_2 = \frac{\text{Area}}{s} \Rightarrow r_2 = 4$$

$$\text{In } \triangle PQM, \quad PM = r_1 + r_2 = 7 \text{ cm}$$

$$QM = r_2 - r_1 = 1 \text{ cm}$$

$$\text{Hence, } PQ = \sqrt{50} \text{ cm}$$

91. 4  $u^m + v^m = w^m$

$$u^2 + v^2 = w^2$$

Taking Pythagorean triplet 3, 4 and 5, we see  $m < \min(u, v, w)$

Also  $1^m + 2^m = 3^m$  and hence  $m \leq \min(u, v, w)$

92. 4 A black square can be chosen in 32 ways. Once a black square is there, you cannot choose the 8 white squares in its row or column. So the number of white squares available = 24  
Number of ways =  $32 \times 24 = 768$

93. 4  $7^{6n} - 6^{6n}$   
Put  $n = 1$

$$7^6 - 6^6 = (7^3 - 6^3)(7^3 + 6^3)$$

This is a multiple of  $7^3 - 6^3 = 127$  and  $7^3 + 6^3 = 559$  and  $7 + 6 = 13$

94. 3 If  $p = q = r = 1$ , then expression = 1  
Check the choice only, one choice gives the value of expression = 1.

95. 4 Total amount of work = 60 man-hours  
From 11 am to 5 pm, 6 technicians = 36 man-hours  
From 5 pm to 6 pm, 7 technicians = 7 man-hours  
From 6 pm to 7 pm, 8 technicians = 8 man-hours  
From 7 am to 8 pm, 9 technicians = 9 man-hours  
Total = 60 man-hours

96. 2 Number of samosas =  $200 + 20n$ ,  
 $n$  is a natural number.  
Price per samosa = Rs.  $(2 - 0.1n)$   
Revenue =  $(200 + 20n)(2 - 0.1n) = 400 + 20n - 2n^2$   
For maxima  $20 - 4n = 0$ ; by differentiation  $n = 5$   
 $\Rightarrow$  Maximum revenue will be at  $(200 + 20 \times 5)$   
= 300 samosas

97. 2 Three small pumps = Two large pumps  
Three small + One large pumps  
= Three large pump  $\Rightarrow \frac{1}{3}$

98. 4 If  $KL = 1$ , then  $IG = 1$  and  $FI = 2$

$$\text{Hence, } \tan \theta = \frac{2}{1} = 2$$

Thus,  $\theta$  none of 30, 45 and 60°.

99. 3 Area of quadrilateral ABCD =  $\frac{1}{2}(2x + 4x) \times 4x = 12x$

$$\text{Area of quadrilateral DEFG} = \frac{1}{2}(5x + 2x) \times 2x = 7x$$

Hence, ratio = 12 : 7

100. 3 Number of ways for single digit = 2  
2 digits =  $2 \times 3 = 6$   
3 digits =  $2 \times 3 \times 3 = 18$   
4 digits =  $2 \times 3 \times 3 \times 3 = 54$   
5 digits =  $2 \times 3 \times 3 \times 3 \times 3 = 162$   
6 digits =  $2 \times 3 \times 3 \times 3 \times 3 \times 3 = 486$   
Total = 728

101. 3 The size of the pitch is the usage of measure.  
The vessel is used to take out a litre of oil.  
Action against trespassers was instituted in the campus.  
Sheila ascertained the measurement of each item.

102. 2 Dinesh could not stand the discussion and he was forced to walk out.  
Vidya's story is the limit, very hard to believe.  
Jyoti wanted to go to the Bar.  
The forces were such that he was certain to go over the edge.

103. 4 Hussain tried to capture the spirit of India in this painting (on the canvas).  
Sorry, I could not understand what you just said.  
Is there some deception (vanishing act) in this proposal?  
All her friends agreed that Prakash was a person worth entrapping in the snares of romance.

104. 2 I decided not to do business in handmade cards.  
My brother is a trader of cards.  
Dinesh insisted on giving out the cards to the players.  
This contract is concerned with handmade cards.

105. 4 Ashish asked Laxman to turn his face in a new direction.  
Leena never sent a beggar away without offering anything.  
The old school building has taken the form of a museum.  
Now he had the opportunity to voice his protest.

106. 3 The reason why the demand for branded diapers may be price-sensitive is given in A. This is supported by DB. C contrasts, supported by the example in E. F can be linked with private-labels.

107. 1 (3) is a haphazard choice with no definite beginning, middle or end. Discipline goes better with strong focus as in AC. E further elaborates. DBF talks about making strategy foolproof through the value chain.
108. 3 B starts the paragraph. C is too abrupt to follow. E links job to ambassador in A. Ambivalence in D is illustrated in C.
109. 4 Only E can start the paragraph. C continues with the temporal reference and mentions division between 2 parties.
110. 2 Given B, E cannot start the paragraph. Rather, E follows with the question. D offers an answer to E. C supports with facts. A ends with the discoverers of the fact.
111. 3 Obviously is the right answer as it matches the tone of great simplifications.
112. 1 Numerical value in the earlier paragraph points to quantitatively as the answer.
113. 4 Assess alternatives that follows the blank gives the answer alternatives.
114. 3 The passage deals with firing employees.
115. 1 Resolve means to find a solution to something.
116. 4 The failed product would not be present had it not passed through the process.
117. 3 This is a simple question of parallelism, not that it is ... but that it is.
118. 2 You generate money through deals, and not by deals or on deals. The two factors — escalated costs and black money — are lucidly given in (2).
119. 3 We always have to use the conjunction between to compare prices at two levels.
120. 2 Reduce and encourage will make a parallel construction. Action is taken by someone, not of someone.
121. 1 Opprobrium is the state of being abused or scornfully criticized.
122. 4 Portend means to predict or foreshadow.
123. 1 Prevaricate means to speak evasively with intent to deceive.
124. 3 Restive means to be restless or nervous.
125. 1 Ostensible means what is apparent or seeming to be the situation.
126. 3 Refer 2nd para, especially to the part: 'Then Indian historians trained in ... mainly political.'
127. 2 (1), (3) and (4) seem to be superficial answers. (2) matches the syntax of the statement given in the question.
128. 3 Refer to the part glamour departed from politics.
129. 4 (4) is mentioned as a desirable characteristic towards the end of the passage.
130. 1 In (1), the writers and their respective approaches are correctly matched as per the information given in the passage.
131. 1 Refer to the part abortion access when their countries were perceived to have an overpopulation problem.
132. 4 (1), (2) and (3) are stated towards the end of the second paragraph and the beginning of the third paragraph.
133. 4 (1), (2) and (3) are too far-fetched and find no place in the passage.
134. 4 (1) need not be necessarily true as an inference. (2) and (3) are explicitly stated towards the end of the penultimate paragraph.
135. 2 Refer towards the end of the fourth paragraph. (2) comes closest to what the writer wants to say.
136. 4 (1), (2) and (3) find no place in the passage to support the pro-choice lobby.
137. 2 Simple. Just read the last line of the passage.
138. 2 (1), (3) and (4) are factually incorrect as per information given in the 3rd paragraph. (2) comes closest to the central idea in the third paragraph.
139. 4 The writer does not harbour a very favorable view of theologians, refer to all too definite.
140. 4 (1), (2) and (3) take the form of questions raised by the writer in the course of the passage.
141. 4 Refer towards the end of the second paragraph.
142. 1 Refer to inside of a cell bustles with more traffic and polymers, along which bundles of molecules travel like trams.
143. 1 Refer to 'The dynein motor ... is still poorly understood and without motor proteins. Our muscles wouldn't contract'.
144. 2 Refer to the part without motor proteins ... We couldn't grow and these particles create an effect that seems to be so much more than the sum of its parts.

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| <p>145. 1 Refer to the part three families of proteins, called myosin, kinesin and dynein and the growth process requires cells to duplicate their machinery and pulls the copies apart.</p> <p>146. 3 Refer to the part They think for us and is giving the language a lot of responsibility.</p> <p>147. 4 (4) does not qualify as rhetoric on the basis of information given in the fourth paragraph. Commands are, at best, staid.</p> | <p>148. 3 (1), (2) and (4) cannot qualify as an answer as they sound extreme or implausible. (3) comes closest to what the writer would like to suggest.</p> <p>149. 1 Arcane in the context of usage in the passage means esoteric.</p> <p>150. 3 Refer to the part bringing scholars to accept the better argument and reject the worse.</p> |
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