

Mock CAT – 3

Answers and Explanations

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

Scoring table

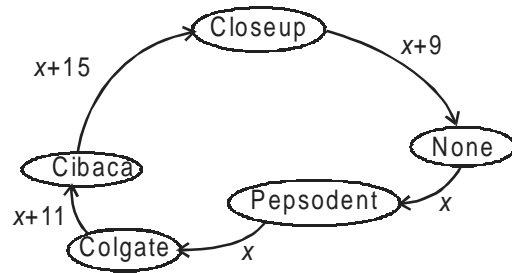
Section	Question number	Total questions	Total attempted	Total correct	Total wrong	Net score	Time taken
DI + DS + AR	1 to 50	50					
QA	51 to 100	50					
EU + RC	101 to 150	50					
Total		150					

1. d Data insufficient as age group distribution of the people who play golf is not given.
2. a People who smoke and play cards = $26 + 7 = 33$
Out of these, people who belong to group
 $14 - 16 \text{ Yrs} = \frac{30}{360} \times 33 = 2.75 = 3$
3. b No. of people who play cards and chew tobacco = $14 + 9 = 23$
For the age group 10 – 14 years we have
 $\frac{90}{360} \times 23 = 5.75 = 6$ (since it is the region common with Category V)
4. c Total no. of people = $11 + 12 + \dots + 15 = 200$
For the age group 20 and above
 $\frac{120}{360} \times 200 = 66.66 = 67$
5. d Total sales = \$600 bn.
Total demand = 100,000 Crore kgs.
Total sales by weight = $0.8 \times 100,000 = 80,000$ Crore kgs.
Price of oil = $(600 \times 3300 \text{ Crore Rupees}) / (80,000 \text{ Crore kgs.}) = \text{Rs. } 24.75/\text{kgs}$
6. d No generalized statement can be given as only the data for 1995 is given.
7. b Sales of HPCL in West = $\$600 \text{ bn} \times 0.33 \times 0.229 = \45.34 billion.
Sales of BPCL in North = $\$600 \text{ bn} \times 0.28 \times 0.191 = \32.09 billion.
Difference = $\$13.25 = \text{Rs. } 13.25 \times 3300 \text{ crores} = \text{Rs. } 43725 \text{ crore}$
8. a Total demand by Agriculture sector = $100000 \times 0.09 = 9000$ crore kgs
Market share of others in South = $80000 \times 0.23 \times 0.024 = 441.6$ crore kgs
Twenty times of this is 8832 crore kgs.
Hence difference = $(9000 - 8832) = 168$ crore kgs
9. c Directly calculate from all the four graphs and add IOC sales will be = $\$600 \times (15.5 + 10.7 + 16.3 + 12.5)\% = \330 billion.
10. b Increase in Close-Up users in the sample surveyed as a percentage of the total current sample population
 $= \frac{6}{252} \times 100\% = 2.58\%$
11. a No. of people using toothpaste = 227 (current),
= 174 (initial)
 $\% \text{ increase} = \frac{227 - 174}{174} \times 100 = 30.45$

For questions from 12 to 14:

If we consider x as the number of people who shifted from Pepsodent to Colgate, with the help of the data given in table,

we get the following number of people shifting for each brand.



12. c All the new people added to the sample data, must have preferred Pepsodent as the above chart shows not net addition to Pepsodent as a brand but the table shows 62 additions which is equal to increase in sample size.
13. b Given, $x = 10$ for the above diagram;
People who shifted to Close Up from Cibaca = $10 + 15 = 25$
14. d As per above diagram the required ratio is $(x/x) = 1.0$
15. a Ostentia's JAT/GD cut-off figure is $(125/60)$. The last row total of 1075 represents the number who score 75 % of 200 i. e 150 and above in the JAT. Of these, 109 score 60 and above in GD and therefore qualify for interview if their academics conform to ostentia. How many among these will actually qualify cannot be established, but $(1075 - 109)$ will fail as they do not clear the GD cut-off. Hence minimum percentage disqualified for interview among those who qualify in the JAT = $(1075 - 109) \times \frac{100}{1075} = 90\%$
16. d Since Utopia's cut-off for JAT/GD is $(180/80)$, we cannot determine the required percentage from the highest marks category data.
17. d We do not know if these students met the cut-off for academics grade. Hence, this cannot be determined.
18. c First find how many of the 6875 conform to Ostentia requirements of $\frac{125}{60}$. By this standard $(104 + 109) = 213$ qualify.
10 % of these can appear for interview. 10 % of 213 = 21.3 \Rightarrow 21 or 22.
Equivalent percentage values
 $= \frac{(30 - 22)}{30} \times 100 = 26\%$ to $\frac{(30 - 21)}{30} \times 100 = 30\%$
Hence, 26 to 30 % .

For questions 19 to 22 : From condition 1, the only numbers in first and fourth row can be 1,5,9,11,13,15. Also since the total of the first row is 30 and 3 is existing, the numbers that can be selected are 1,15 and 11. Now, 15 can be placed in second column (as per condition 2) and as per options of question 69, the number sequence will be 1,15,11.

1	15	3	11
14			
	6		12
			7

Since no square or cube of an integer can be placed in the third column, the only numbers possible in third column are 10 & 2 (in second and third row). Also from condition 3, the sum of integers in one diagonal is 18. Hence, we will put 10 & 2 as shown below with 8 plugged in to complete the diagonal with total 18.

1	15	3	11
14	8	10	
	6	2	12
			7

Also, next we use the condition 5, which indicates that the smaller of the numbers will be in column 1 and larger numbers in column 3. Hence the final solution works out to be as follows.

1	15	3	11
14	8	10	16
4	6	2	12
9	5	13	7

19. b

20. d

21. b

22. c

23. a No. of groups of customer = No. of bills – No. of customers coming single between 8 am and 12 noon
The required value = $(230 - 210) + (130 - 120) = 30$

24. c Total no. of customers who come in groups
= $(80 + 50 + 28 + 30 + 100 + 72) = 360$
Total no. of bills issued for groups of customers
= $(230 - 210) + (130 - 120) + (57 - 50) + (70 - 60) + (200 - 180) + (154 - 130) = 91$

$$\Rightarrow \text{Avg. no. customer in a group} = \frac{360}{91} = 4 \text{ (approx)}$$

25. a Total bill amount spent by customer in a group

$$\frac{\text{Total bill amount spent by customers in a group}}{\text{Total no. customers who come in a group}}$$

$$= \text{Rs. } \frac{[(80 \times 5.20) + (50 \times 4.30) + (28 \times 4) + (30 \times 3.9) + (100 \times 5.5) + (72 \times 6)]}{[80 + 50 + 28 + 30 + 100 + 72]} = \text{Rs. } 5.12$$

Total bill amount spent by single customers

$$\begin{aligned} & \text{Rs } [6 \times 210] + (4.8 \times 120) + (4 \times 50) \\ & + (4.2 \times 60) + (5.8 \times 180) + (6.1 \times 130) \\ & = \frac{210 + 120 + 50 + 60 + 180 + 130}{210 + 120 + 50 + 60 + 180 + 130} = \text{Rs. } 5.50 \end{aligned}$$

$$\text{Ratio} = \frac{5.12}{5.50} = 0.9 \text{ (approx)}$$

26. a Total collection in 8 am - 10am interval
= Rs $[(210 \times 6) + (80 \times 5.2)] = \text{Rs } 1676$
Similarly calculate for all intervals and check.
It is highest for 8 am - 10 am interval .

27. d Total collection for a day
Rs. $[(1676 + 791 + 312 + 369 + 1594 + 1225)]$
= Rs. 5967

$$\text{Profit for a day} = \text{Rs. } (5967 \times \frac{5}{100}) = \text{Rs. } 298.35$$

$$\text{Profit for a month} = \text{Rs. } [298.35 \times 25]$$

$$= \text{Rs } 7458.75$$

$$= \text{Rs. } 7500 \text{ (approx)}$$

28. c Both statements are required.

Any parallelogram inscribed in a circle has to be rectangle. Using Statement I, we can deduce that ABCD has to be a square. Thus we can find all dimensions of the square – the length of side, the diagonal. However we do not know if E is the midpoint of side BC and hence cannot find the length of AE. Using statement II alone, we understand that if AB is $2x$, BE will be x and hence we can find the length AE in terms of x . But again since we do not know that E is the midpoint of BC, we cannot find the ratio. Using both statements, we know that $AB = BC$ and hence we can ascertain that E is the midpoint of BC and can find the ratio.

29. c Both statements are required

The first statement does not tell us much except an equation involving a , b and c and that y can take a value equal to -5 when x is 4. Using the second statement we can understand that a is positive. Now using both statement, we gather that the graph of y will be a U shaped graph and since $(4, -5)$ lies on the graph the minimum value of y has to be negative i.e. the graph cuts the X axis in two points. For a quadratic expression with a being positive, the graph is U shaped and for a quadratic expression with a being negative the graph is \cap shaped. A U shaped graph of a quadratic expression which has the minimum value greater than 0 will not intersect the X axis (it will also have the roots as imaginary). A U shaped graph of a quadratic expression which has the minimum value as zero will be a tangent to the X axis i.e. will intersect the X axis in one point (also the roots will be equal) and a U shaped graph of a quadratic expression with minimum value as negative has to intersect the X axis at two distinct points (the roots will be real and unequal).

30. d Cannot be answered even by using both statements
Using statement I, though we can gather that the numerator is zero, since we do not know if the denominator is zero, we cannot be certain that the

ratio will be equal to 0. Using statement two we know

that $\frac{a}{b} = \frac{c}{d}$ but we do not know what this ratio is equal to in numeric terms. Thus we cannot answer using this statement. We cannot use both statements together as there is data violation.

31. d Cannot be answered even with both statements. The individual statements just give you the usual time taken and the time taken at the increased or decreased speed. Since distance is not known, we cannot find the speed.

Alternately, in the two equations, the speed will cancel out from both sides of the equation and we will be left with equation involving only time.

32. b Can be answered by either statement alone. Please understand that in this question one should not calculate anything. Since this is a biased game i.e. if played intelligently, there would always be a certain person who wins, which means that if one knows any number spoken, one can predict the winner. Thus the question can be answered by either statement. If you want to check this out, in this game whoever speaks 1, 10, 19, 28.....91 will surely win. Thus the winning strategy is to speak a number which is a multiple of 9 + 1.

33. c Using the two statements, the order we get is

Rack	Book
3	2
1	4
2	3
4	1

34. b Since there are 4 sides and a bottom each a congruent square, the amount of card board needed will be $5e^2$, where e is length of an edge of the box. So we need to find e. Statement I alone is sufficient. Since the volume of box is e^3 , statement II means $e^3 = 8$ and $e = 2$ feet.

35. a From Statement I, $a^2 * b^2 = -(b^2 * a^2)$ is possible when operation '*' represents subtraction:
i.e. $a^2 - b^2 = -(b^2 - a^2) = a^2 - b^2$
So, value of $a^3 - (b^3 - c^3)$ is greater than $(a^3 - b^3) - c^3$, i.e. $a^3 - (b^3 - c^3) \neq (a^3 - b^3) - c^3$
So, statement I is sufficient.
From statement II, $a * b = b * a$, i.e. * can be 'x' multiplication or '+' addition. But we put 'x' in the expression, then $a^3 * (b^3 - c^3) \neq (a^3 * b^3) - c^3$ and if we put '+' in the expression then $a^3 + (b^3 - c^3) = (a^3 + b^3) - c^3$ So, statement II is not sufficient.

36. a Statement (I) alone is not sufficient. Note that $x + y + z > 0$ implies $x + y > -z$ so that, using (I), $z > x + y + 1 > -z + 1$, and $z > -z + 1$ implies $z > 0.5$. For example, let $z = 0.7$ and $x + y = -0.6$; then $x + y + z > 0$ and $z > x + y + 1$, but $z < 1$. Statement II alone indicates that $x + y < -1$ if $(x + y) + z > 0$, then $z > 1$. Therefore, statement II alone is sufficient.

37. d Since $X = 3$, $Y = 1$, and $X = 1$, $Y = \left(\frac{1}{3}\right)$ both make

statement I true, statement I alone is not sufficient. Statement II alone is obviously not sufficient since it gives no information about X.

Now if Y were positive, we could use statement II to deduce that $Y > 1$ and then statement I would imply that $X > 2$. However, negative values of Y can also satisfy statement II (for example, $Y = -1$) and then statement I would have solutions with $X < 2$. So statement I and II together are not sufficient.

For questions 38 to 41:

BOIXNG = SONATH
BOCCER = SOFFERS
TOPPED = KOSSTE
INDIAN = DHGLNO

In each of the above inequalities, we start by checking the relative position of first alphabet and then check it in all the equalities given to us.

In the first equality, first letter B is replaced by S in RHS, S its relative positioning is 17 places ahead. Same is valid for the 2nd (B, S) and 3rd (T, K) equalities. However, it does not hold true the 4th equality (I, D).

Again, in the first equality, the second letter O is replaced by O in RHS. Same is true for the next two equalities. However, it is again not valid for the 4th equality. Now, let us examine the last alphabet of the first equality. H is the word next to G. In the next three equalities as well, in the last alphabet, the original letter is replaced by the next letter in the coded word.

38. d Since, the code is case sensitive, it has to be either option (b) or (d). The letter next to 'W' in sequence is 'X'. Hence, option (d) is correct.

39. c Since all options have the same letters, the case determines the correct option. In the original word, the 1st, 3rd, 4th, 8th and 11th letters are in the upper case. Hence option (c) is correct.

40. c The coded word for 'chintu' as per the solution rule is dijouv. Only option (c) has a different letter 'r' instead of 'v'.

41. b This involves working backwards. Since the coded word is 'DIBNJZB', the letter in sequence (which are immediately preceding the given letters) is 'CHAMIYA'. Hence option (b) is correct.

For questions 42 to 45:

SUPERMIX						
Bread	Sugar	Water	Flour			Total
	1	4	5	Captain cook (40%)	Trupti (60%)	10
	3	12	15	6	9	30
Biscuits	Sugar	Water	Flour			
				Captain cook (45%) 4.5	Trupti (55%) 5.5	
	4	5	5	Captain cook (45%)	Trupti (55%)	14
Pastries	Sugar	Water	Flour			
	7	4	6	Captain cook (45%)	Trupti (55%)	17
	21	12	18	8.1	9.9	51
Dinner rolls	Sugar	Water	Flour			
	7	7	10	Captain cook (75%)	Trupti (25%)	24
	21	21	30	22.5	7.5	72
Buns	Sugar	Water	Flour			
	1	8	10	Captain cook (0%)	Trupti (100%)	19
	2	16	20	0	20	38

42. b Total consumption/day of Captain cook flour was
 $(6 + 4.5 + 8.1 + 22.5 + 0) = 41.1 \text{ m}^3$

43. a Percentage of total supermix that was used for pastries is

$$\left[100 \times \frac{51}{(30 + 28 + 51 + 72 + 38)} \right] = \left[\frac{51}{219} \times 100 \right] = 23\%$$

44. c Total daily consumption of Captain cook
 $= (6 + 4.5 + 8.1 + 22.5 + 0) = 41.1 \text{ m}^3$
 While total daily consumption of Trupti flour was $= 9 + 5.5 + 9.9 + 7.5 + 20 = 51.9 \text{ m}^3$
 The ratio of volume of Captain cook flour to that of

$$\text{Trupti flour consumed daily is } \frac{41.1}{51.9} = 0.8$$

Thus the answer is c.

45. a He increased the sugar content in pastries from 21 to 42 and so the total sugar requirement increased from 55 to $55 + 21 = 76 \text{ m}^3$. Further flour content in pastries

reduced by $\frac{2}{3} \times 18 = 12 \text{ m}^3$. Thus flour content became

$93 - 12 = 81$. Therefore now the total volume of daily consumption of sugar and flour respectively, in m^3 became 76 and 81 respectively.

46. d For the current to flow through the circuit, you need S_1 and S_4 to be always ON. In addition, you need at least one of the two switches S_2 and S_3 to be in ON position.

For questions 47 to 50:

From (1), Mr. Gupta bought either a dress or a Sweater.

From (2), either Mr. Haathi or Mr. Handa would have bought the bicycle.

From (3), Mr. Chowbey spent Rs. 1200 for the item priced at Rs. 1500.

From (6), Mr. Pandey spent Rs. 800 for the item he purchased.

From (8), Mr. Sharma spent less than Rs. 800 (Rs. 600 or Rs. 75) and Mr. Gupta spent less than Mr. Sharma (Rs. 75 or Rs. 50)

From (7), Mr. Haathi, bought a dress for Rs. 75. Hence Mr. Gupta must have spent Rs. 50 for sweater. Also Mr. Sharma must have spent Rs. 600.

Now since, every one's paid price is known, Mr. Handa must have bought the bicycle for Rs. 1000 and from (2), the original price must have been Rs. 2000. From (4), the only original price and paid price pair which is different by Rs. 100, in Rs. 900 and Rs. 800 respectively. Hence, Mr. Pandey bought tires for Rs. 800.

From (10), since the paid price of telephone was more than the dresser, therefore, the paid price of telephone was Rs. 1200 and that of dresser was Rs. 600.

From (9) now, the original price of the lowest paid price item, sweater, would not be the lowest. Hence its original price must be Rs. 300.

Also from (7), the original price of the dress was Rs. 200 (twice the value of Rs. 100 note).

The summary of all the above is captured in the table below:

	Persons	Items						Prices Paid					
		Dress	Sweater	Dessert	Telephone	Tires	Bicycle	Rs. 800	Rs. 600	Rs. 1200	Rs. 1000	Rs. 75	Rs. 50
	Mr. Gupta		✓										✓
	Mr. Pandey					✓		✓					
	Mr. Sharma			✓					✓				
	Mr. Chowbey				✓					✓			
	Mr. Haathi	✓										✓	
	Mr. Handa						✓				✓		
Original price	Rs. 200	✓											
	Rs. 1500				✓								
	Rs. 300		✓										
	Rs. 2000						✓						
	Rs. 900					✓							
	Rs. 1200			✓									

47. c 48. d 49. d 50. b

51. d Let there be m lines in S_1 and n lines in S_2 . The lines will intersect in mn points.
Therefore $mn = 12$.

Case (1), $m = 6$, $n = 2$ (or) $m = 3$, $n = 4$,

The number of parallelograms that can be formed is ${}^6C_2 \times {}^2C_2 = 15 \times 1 = 15$.

Case (2), $m = 4$, $n = 3$,

The number of parallelograms that can be formed is ${}^4C_2 \times {}^3C_2 = 6 \times 3 = 18$

52. a $3^p = 4^q = 12^r = k$ (say)

$$\therefore 3 = k^{1/p}, 4 = k^{1/q} \text{ and } 12 = k^{1/r}$$

$$\text{Now } 3 \times 4 = 12$$

$$\text{or } k^{1/p} \times k^{1/q} = k^{1/r}$$

$$\text{or } k^{1/p+1/q} = k^{1/r}$$

$$\text{or } \frac{1}{p} + \frac{1}{q} = \frac{1}{r}$$

$$\text{or } \frac{p+q}{pq} = \frac{1}{r}$$

$$\text{or } (p+q)r = pq$$

53. d Each code is of the form NNAA where first two are digits and last two are alphabets

\Rightarrow Total number of codes possible

$$= (10)^2 \times (26)^2 = 67600$$

54. b When the air-conditioner is off, $0.65X$ pages are typed per hour. 575 pages will be typed in $575/0.65X = 884.6 X^{-1}$

$$\begin{aligned} 55. c \quad & \frac{1}{\log_2 x} + \frac{1}{\log_3 x} + \dots + \frac{1}{\log_{43} x} \\ &= \log_x 2 + \log_x 3 + \dots + \log_x 43 \\ &= \log_x (2 \times 3 \times \dots \times 43) = \log_x (43!) = \frac{1}{\log_{(43!)} x} \end{aligned}$$

$$\begin{aligned} 56. c \quad & \text{Let equal sides} = x \text{ cm} \Rightarrow \text{3rd side} = x - B \text{ cm} \\ & \Rightarrow \text{Perimeter } A = x + x + (x - B) = 3x - B \text{ cm} \\ & \Rightarrow x = \frac{(A+B)}{3} \text{ cm.} \end{aligned}$$

$$\begin{aligned} 57. c \quad & \text{Let the production on July 1st and on July 2nd be } X \text{ and } Y \text{ units respectively.} \\ & \Rightarrow \text{Rejection on July 1st} = 0.1 X \\ & \quad \text{Rejection on July 2nd} = 0.06 Y \\ & \Rightarrow \text{Total rejection} = 0.1 X + 0.06 Y = 0.09 (X + Y) \\ & \Rightarrow X : Y = 3 : 1 \end{aligned}$$

58. c There are 5 positive numbers and 4 negative numbers. If we select 3 positive numbers (or) 1 positive number and 2 negative numbers, their product will be positive.
This can be done is ${}^5C_3 + {}^5C_1 \times {}^4C_2 = 10 + 30 = 40$ ways.

59. b Area of the hexagon

$$\begin{aligned} &= \frac{1}{2} [PG \times AB + PH \times BC + PI \times CD + PJ \times DE + PK \times EF \\ & \quad + PL \times FA] = \left(\frac{6\sqrt{3}}{4} \right) a^2 \\ &= \frac{1}{2} a [PG + PH + PI + PJ + PK + PL] \end{aligned}$$

Hence $PG + PH + PI + PJ + PK + PL$

$$= \left(6 \frac{\sqrt{3}}{4}\right) \cdot (a^2) \left(\frac{2}{a}\right) = 3\sqrt{3}a$$

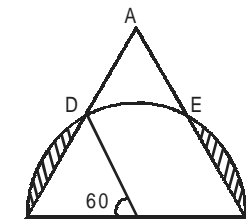
Alternate method:

If P is the centre of the regular hexagon, then

Height of $\triangle APB$ is $\frac{\sqrt{3}}{2}a$. Since, all perpendicular line from P to the sides of regular hexagon are equal.

$$\text{So, } PG + PH + PI + PJ + PK + PL = 6 \times \frac{\sqrt{3}}{2}a = 3\sqrt{3}a$$

60. b



O is the centre of the circle and the mid-point of BC.
DO is parallel to AC.
So, $\angle DOB = 60^\circ$

$$\text{Area of } \triangle BDO = \frac{\sqrt{3}}{4} \times 49.$$

$$\text{Area of sector OBD} = \frac{49\pi}{6}.$$

Hence area of the shaded region

$$= 2 \left(\frac{49\pi}{6} - \frac{\sqrt{3}}{4} \times 49 \right) \Rightarrow 49 \left(\frac{\pi}{3} - \frac{\sqrt{3}}{2} \right)$$

61. c We have $(b + c + a)(b + c - a) = kbc \Rightarrow (b + c)^2 - a^2 = kbc \Rightarrow (b^2 + c^2 - a^2) + 2bc = kbc$
 $2bc(1 + \cos A) = kbc$ (Applying cosine rule)
 Since $\cos A$ lies between -1 and 1 , so the value of k lies between 0 and 4 .

62. c If coordinates of 3 vertices of a \triangle are (x_1, y_1) , (x_2, y_2) , (x_3, y_3) then the coordinates of centroid are

$$X = \frac{(x_1 + x_2 + x_3)}{3} \text{ and } Y = \frac{(y_1 + y_2 + y_3)}{3}$$

Hence the most appropriate option is choice (c).

63. d Let $xy = 1$. Hence $x = \frac{1}{y}$.

$$\text{So, } x + y = \frac{1}{y} + y \geq 2 \text{ or } \frac{1}{y} + y \leq -2$$

64. b Statement I is true only if both x, y are positive or x, y are negative.
 Statement II is always true since the value of z is positive.

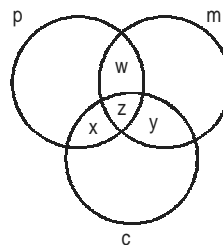
65. a

	Form of the exponent			
m	$4x + 1$	$4x + 3$	$4x + 2$	$4x$
n	$4y + 3$	$4y + 1$	$4y$	$4y + 2$
last digit of $7^m + 7^n$	0	0	0	0
Number of selections	25×25	25×25	25×25	25×25

If a number ends in a 0 then the number must be divisible by 5.

$$\text{Hence required probability is } \frac{625 \times 4}{100^2} = \frac{1}{4}.$$

66. b



$$p \cup m \cup c = 0.75$$

$$w + x + y = 0.4$$

$$z = 0.1$$

$$p \cup m \cup c = p + m + c - (w + x + y + 3z) + z$$

$$p + m + c = 1.35 = \frac{27}{20}.$$

67. d First distribute 3 oranges to each of the 4 children.
 Now 4 oranges are left to be distributed among four children.
 This can be done in 7C_3 ways, i.e. 35 ways.

68. c $[(32)^{32}]^{32} = (32)^{1024} = 2^{5120} = (2^3)^{1706} \times 2^2$
 $= [(7 + 1)^{1706}] \times 4 \Rightarrow (7m + 1) \times 4 \Rightarrow 7N + 4$
 Hence remainder is 4.

$$69. b \quad f(x) = \left(\frac{ax + d}{cx + b} \right)$$

$$f[f(x)] = f\left(\frac{ax + d}{cx + b}\right) \Rightarrow \frac{a \times \frac{ax + d}{cx + b} + d}{c \times \frac{ax + d}{cx + b} + b} = x$$

$$\frac{a^2x + ad}{cx + b} + d = x \left(\frac{ax + cd}{cx + b} + b \right)$$

$$\frac{a^2x + ad + cdx + bd}{cx + b} = \frac{acx^2 + cdx + bcx^2 + b^2x}{cx + b}$$

$$x^2(ca + bc) + x(b^2 - a^2) - ad - bd = 0$$

$$cx^2(a + b) + (a + b)x(b - a) - d(a + b) = 0$$

$$(a + b)(cx^2 + x(b - a) - d) = 0$$

For all real values of x , $a + b$ has to be zero.

70. a $\log_e x = 1 - x$
 $\Rightarrow x = e^{1-x}$

Case 1: If $0 < x < 1$, then

LHS value is less than the RHS value.

Case 2: If $x > 1$, then

LHS value is more than the RHS value.

Case 3: If $x = 1$, then equality holds.

71. a The two series have 4 and 5 as common difference. The series of common terms will have a common difference of 20 (lcm of 4, 5) starting with 21.

$$S_{100} = \frac{100}{2} (2 \times 21 + 99 \times 20) = 100 (21 + 990) = 101100$$

72. d Take any three numbers in G.P., e.g. 4, 2, 1 and get the value that will be zero.

73. c



$$\text{Number of point of intersection} = {}^{14}C_2 - ({}^4C_2 \times 7) = 49$$

74. a Treating them as three groups, they can be arranged in $3!$ ways. Thereafter each group can be arranged internally.
 Total number of ways = $3! \cdot 4! \cdot 5! \cdot 6!$.

75. b Numbers divisible by 4 are 104, 108, ..., 196
 $\Rightarrow 24$ in all.
 Numbers divisible by 7 are 105, 112, ..., 196
 $\Rightarrow 14$ in all.
 Numbers divisible by both 7 and 4 are divisible by 28, which are 112, 140, 168, 196
 $\Rightarrow 4$ in all.
 Therefore probability of a number being divisible by at

$$\text{least one of them is } \frac{24 + 14 - 4}{99} = \frac{34}{99}$$

$$\text{Hence, the required probability is } 1 - \frac{34}{99} = \frac{65}{99}$$

76. c $\frac{a^2 + b^2}{2} \geq ab$ [AM \geq GM]

$$a^2 + b^2 \geq 2ab$$

$$a^2 + b^2 + 2ab \leq 2(a^2 + b^2)$$

$$c^2 < a^2 + b^2 + 2ab \leq 2(a^2 + b^2)$$

$$\Rightarrow \frac{a^2 + b^2}{c^2} > \frac{1}{2}$$

$$\text{Therefore } k = \frac{1}{2}$$

77. c If we want to get the value maximum value of $(p + q)(r + s)$. Then p, q, r, s will be 12, 13, 14 and 15 not necessarily in that order.

$$(p + q) + (r + s) = 12 + 13 + 14 + 15 = 54$$

The maximum of $(p + q)(r + s)$ will be when $(p + q) = (r + s) = 27$

$$\text{Therefore, maximum of } (p + q)(r + s) = 27 \times 27 = 729.$$

78. c $\sum_{x=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \dots = \frac{1}{1-x} = a$

$$\Rightarrow x = \frac{a-1}{a}$$

$$f(-x) = 1 - x + x^2 - x^3 + \dots = \frac{1}{1+x}$$

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

79. c $a + \frac{1}{b} = b + \frac{1}{c} = c + \frac{1}{a} = p$ (say)

$$ab + 1 = bp, bc + 1 = cp, ac + 1 = ap$$

$$cp^2 = bcp + p$$

$$bcp = abc + c$$

$$\therefore cp^2 = abc + c + p$$

$$\Rightarrow c(p^2 - 1) = abc + p \quad \dots (i)$$

Similarly we can show that

$$b(p^2 - 1) = abc + p \quad \dots (ii) \text{ and}$$

$$a(p^2 - 1) = abc + p \quad \dots (iii)$$

\Rightarrow Since, no two of a, b, c are equal these relations will be valid only if $p = +1$ or -1

From (ii) and (iii), we get

$$abc = -p, \text{ if } p = -1, \text{ then } abc = 1 \text{ and}$$

$$\text{If } p = 1, \text{ then } abc = -1$$

$$\text{So, } abc = \pm 1$$

80. a $\sqrt{4a+1} \leq \frac{1+(4a+1)}{2} = 2a+1$ [AM $>$ GM]

$$\sqrt{4a+1} + \sqrt{4b+1} + \sqrt{4c+1} + \sqrt{4d+1} \leq 2(a+b+c+d) + 4$$

$$k = 6$$

81. a Let M, W, G, L stand for man, wife, gentleman and lady.

The following is the composition of the party of six guests with the following no. of ways.

M	W	No. of ways
3G	3L	${}^3C_3, {}^3C_3 = 1$
2G 1L	1G 2L	${}^3C_2 \cdot {}^4C_1, {}^4C_1 \cdot {}^3C_2 = 144$
1G 2L	2G 1L	${}^3C_1 \cdot {}^4C_2, {}^4C_2 \cdot {}^3C_1 = 324$
3L	3G	${}^4C_3 \cdot {}^4C_3 = 16$

Hence the total no. of ways = $1 + 144 + 324 + 16 = 485$

82. a If x is an integer then so
 $f(x) = 2[x] + 3 = 2x + 3$
 $g(x) = 2[x - 2] + 5 = 2(x - 2) + 5$
 Thus $f(x) + g(x) = 4(x + 1)$

83. a Total number of ways for first four trials = ${}^{10}C_4$
 Number of ways when the door is not opened from first four trials. = 9C_4
 Probability when the door is opened from fifth trial

$$= \frac{{}^9C_4}{{}^{10}C_4} \times \frac{1}{6} = \frac{1}{10}$$

Alternate method:

Probability when the door is not opened from the first

$$\text{key} = \frac{9}{10}, \text{ similarly for second} = \frac{8}{9}, \text{ third} = \frac{7}{8}, \text{ fourth}$$

$$= \frac{6}{7}$$

Probability when the door is opened from fifth key

$$= \frac{9}{10} \times \frac{8}{9} \times \frac{7}{8} \times \frac{6}{7} \times \frac{1}{6} = \frac{1}{10}$$

84. a Assume m and n be two non-negative integers which are the power of x^3 and x^6 respectively in Binomial expansion, then $3m + 6n = 28$ has no solutions for non negative integer values of m and n , the coefficient of x^{28} is zero.

85. a If $a = 1$, then b can have 6 values (1, 2, 3 ... 6)
 If $a = 2$, then b can have 3 values (1, 3, 5)
 If $a = 3$, then b can have 4 values (1, 2, 4, 5)
 If $a = 4$, then b can have 3 values (1, 3, 5)
 If $a = 5$, then b can have 5 values (1, 2, 3, 4, 6)
 If $a = 6$, then b can have 2 value (1, 5)
 So, total number of ways = $6 + 3 + 4 + 3 + 5 + 2 = 23$

86. d $a + c + e + b + d + f = 1$

$$\text{So maximum value of } \overline{a+c+e} \cdot \overline{b+d+f} \text{ is } \frac{1}{2} \cdot \frac{1}{2}$$

$$\text{i.e. } (ab + bc + cd + de + ef) + (ad + af + cf + be) \leq \frac{1}{4}$$

$$\text{or } (ab + bc + cd + de + ef) \leq \frac{1}{4} \text{ and}$$

$$(ad + af + cf + be) \leq \frac{1}{4}$$

$$\text{But if we take } a = b = \frac{1}{2} \text{ and } c = d = e = f = 0, \text{ the}$$

equation holds, so the maximum value is $\frac{1}{4}$.

87. d Max [min [3, 2, 5], max [-3, -5, -1], 3]
 = max [2, -1, 3] = 3

88. c Let the escalator moves x steps when A walks down 60 steps. Total number of steps on a stationary escalator = $x + 60$.
 When A takes 60 steps, B should have taken 30 steps and the escalator x steps.

So when B takes 40 steps, the escalator should have

$$\text{taken } \frac{4}{3}x \text{ steps}$$

$$\text{So } \frac{4}{3}x + 40 = x + 60 = \text{Total number of steps in the escalator when it is stationary.}$$

$$\text{So } x = 60$$

$$\text{Hence, total number of steps} = 120$$

89. c

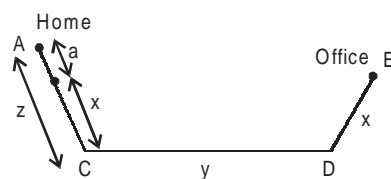
Number of digits	Number of binary numbers	Total number of digits after the 1 st position	Number of 1s	Total number of 1s (after first position)
3	2^2	$2^2 \times 2$	2^2	$4 + 12 + 32 + 80 = 128$
4	2^3	$2^3 \times 3$	$2^2 \times 3$	
5	2^4	$2^4 \times 4$	$2^3 \times 4$	
6	2^5	$2^5 \times 5$	$2^4 \times 5$	

Total number of 1's on first position = 61.

Since total number of 1's = $128 + 61 = 189$

Note: After the 1st digit, the number of 0s and number of 1s will appear equal number of times. The +1 is because we also have 1000000.

For questions 90 and 91:



Assume z , y and x be down hill, flat ground and uphill distances respectively. Then

$$\frac{z}{60} + \frac{y}{48} + \frac{x}{40} = 3 \quad \dots (i)$$

$$\text{and } \frac{z}{40} + \frac{y}{48} + \frac{x}{60} = \frac{19}{6} \quad \dots (ii)$$

Adding (i) and (ii) we get

$$\frac{x+y+z}{24} = 3 + \frac{19}{6} \Rightarrow x + y + z = 148 \text{ km}$$

90. b

91. a Assume AC be a km more than DE.

$$\text{Then } \frac{a}{40} - \frac{a}{60} = \frac{1}{6}$$

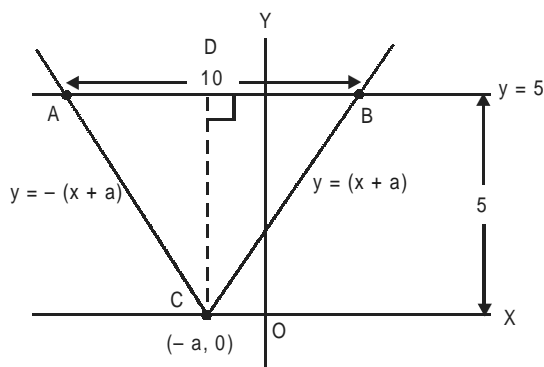
$$\Rightarrow a = 20 \text{ km}$$

92. b All numbers divisible by 15, 45 and 75 are also divisible by 5. Hence find the sum of all numbers divisible by 5.

$$\text{Sum} = \left(\frac{5+200}{2} \right) \times 40 = 4100$$

93. b Since ED = DF, AD must be the angular bisector of angle A. Hence BD : DC is same as AB : AC, i.e. 2 : 3. If they meet at D, ratio of the speeds is also equal to 2 : 3.

94. a



The distance between the points C and D = 5 units.

Since $\angle BCO = 45^\circ$, then also $\angle CBA = 45^\circ$

So, DB = 5 units.

Similarly AD = 5 units.

$$\begin{aligned} \text{Hence area of triangle } \Delta ABC &= \frac{1}{2} \times 10 \times 5 \\ &= 25 \text{ sq. units.} \end{aligned}$$

95. d The points of intersection of the two graphs are when $x^3 + x^2 + 4x + 5 = x^3 + 9x - 1$
i.e. $x^2 - 5x + 6 = 0 \Rightarrow (x-3)(x-2)$
 $x = 3$ and $x = 2$ are the points of intersection. But these values of x are not the roots of the two functions. Hence no common root exists.

96. a This is the fundamental rule that leads to Basic Proportionality Theorem.
So, AB : BC is equal to DE : EF.

For questions 97 and 98:

In base 7, $2(abcd) = bcda$

$$\Rightarrow 2(343a + 49b + 7c + d) = 343b + 49c + 7d + 9$$

$$\Rightarrow 685a = 245b + 35c + 5d$$

$$\Rightarrow 137a = 49b + 7c + d$$

$$\Rightarrow (254)_7 a = (bcd)_7$$

Here, a can take two values, i.e. 1 and 2. If $a = 1$, then $bcd = 254$ and if $a = 2$, then $bcd = 541$. So, $abcd$ has two values i.e. 1254 and 2541.

97. d

98. d

$$99. d \quad \frac{1}{x+a} + \frac{1}{x+b} = \frac{1}{c}$$

$$\text{or, } \frac{2x+a+b}{(x+a)(x+b)} = \frac{1}{c}$$

$$\text{or, } 2cx + ac + bc = x^2 + (a+b)x + ab$$

$$\text{or, } x^2 + (a+b-2c)x + ab - ac - bc = 0$$

Since the roots are equal in magnitude but opposite in sign so let them be α and $-\alpha$.

$$\text{We have } \alpha + (-\alpha) = -(a+b-2c)$$

$$\text{Or, } a+b = 2c \text{ or } c = \frac{a+b}{2}$$

$$\text{Product of the roots} = ab - c(a+b)$$

$$= ab - \frac{(a+b)}{2}(a+b)$$

$$= ab - \left(\frac{a^2}{2} + \frac{b^2}{2} + ab \right)$$

$$= -\frac{1}{2}(a^2 + b^2)$$

100. a Let $a^p = b^q = c^r = d^s = k$

$$\text{or, } a = k^{1/p}, b = k^{1/q}, c = k^{1/r} \text{ and } d = k^{1/s}$$

$$\log_a(bcd) = \log_{k^{1/p}}(k^{1/q} \cdot k^{1/r} \cdot k^{1/s})$$

$$= \log_{k^{1/p}} k^{1/q+1/r+1/s}$$

$$= \frac{1}{1/p} \left(\frac{1}{q} + \frac{1}{r} + \frac{1}{s} \right) \log_k k$$

$$= p \left(\frac{1}{q} + \frac{1}{r} + \frac{1}{s} \right)$$

101. c Exegetic means critically or explanatory. Exemplary means ideal, admirable or exceptionally good. Something that is sketchy is rough, unrefined or depthless.

102. a Desultory means aimless, haphazard, unfocused or broken. Desolate means abandoned, barren or depressed. A detrimental effect is a bad, damaging or adverse effect.

103. c Didactic means educational, academic, instructive, moralizing or bookish. An infirmary is a medical centre, dispensary or sickbay. A dynamic person is active, productive and charismatic. To excoriate is to wear off skin or to scratch scathingly.

104. c Captious means critical, complaining, difficult to please. Censorious is a synonym for captious. Capricious means changeable, aimless or erratic.
105. a An impecunious person is penniless, bankrupt, poverty-stricken or impoverished. Indigent is a synonym for impecunious. An impolite person is one who is bad-mannered and does not speak or act politely. To indent is to cut, push or curl. Opulent means rich, wealthy or luxurious.
106. b AC is a mandatory pair. (A) asks a question and (C) provides the answer. Also, "they" in (A), refers to "the stripes" in (C). EF is the other pair. (E) mentions "dawn and dusk" and (F) states "these times when the light is dim".
107. c BE is a mandatory pair. "He" in (E) refers to "Mr. Ramanathan" in (B). CF is the other mandatory pair; "everything" in (C) is further elaborated upon in (F).
108. b DA is a mandatory pair. The "give and take" in (D) is explained in (A). BE is the other mandatory pair. (B) raises a question and (E) answers it.
109. d BEC is a mandatory sequence. They are connected with "platform" and "journey" in (B) and (E) respectively. "Other expectant faces" in (E) connects with "I too" and "anticipation" in (C).
110. a (E) is an opening statement; it is general in nature. EAC is a mandatory sequence; (A) and (C) elaborate upon (E). BD is also a mandatory pair. "It" in (D) refers to "malnutrition" in (B).
111. b Option (c) is wrong because we don't know if the couple will "quarrel everyday". Option (d) changes the meaning of the sentence and concludes that living together will produce peaceful co-existence. Option (b) is more concise and grammatically correct than option (a).
112. a Option (b) does not mention "delay". "Succour" means help or assistance. In option (c), the usage "... delay in the succour..." is incorrect. Option (a) is more concise and grammatically correct as compared to option (d).
113. b Options (c) and (d) are wordy and misplace the subject — "stress management". In option (a), the subject is misplaced in the second part of the sentence. Option (b) correctly starts the sentence with the concerned subject and follows it up with "it" in the second part of the sentence.
114. b Option (d) is grammatically wrong. The phrase, "High stress levels..." is plural and not singular. So the singular "has" is incorrect. Option (c) uses the wrong subject and is wordy. Option (b) is the most concise and also uses the correct subject.
115. a Option (d) wrongly uses the singular "Election...". Option (c) is wrong because the present tense "has" cannot be used with the future tense "till". Option (b) incorrectly begins with "Till..." instead of "Unless and until...". Option (a) correctly uses the simple future tense ("will" and "till") throughout the sentence.
116. a The later part of the sentence says that the agreement 'stupefied Europe'. If it stupefied Europe then it cannot be a trustful, descriptive or candid agreement. Candid means openly straightforward and direct without reserve or secretiveness. Cynical means believing the worst of human nature and motives; having a sneering disbelief in for example, the selflessness of others.
117. c Divulgence means to reveal something. A secret can either be kept or divulged. Since this was a 'secret protocol', 'divulgence' is the best word to use.
118. b Slam refers to an aggressive remark directed at a person like a missile. To chastise someone is to harshly rebuke or criticise. To supersede is to surpass or to move ahead to take the place of another. A new treaty will not match, slam or chastise the old one. Rather, a new treaty will supersede the old treaty.
119. d Dogged means stubbornly unyielding. Unmitigated means not diminished or moderated in intensity or severity. Diseases 'take' or 'exact' a toll.
120. d Reserves of food and clothing are utilised to help people in times of crisis and disaster. A tarn is a mountain lake (especially one formed by glaciers). Dearth is a severe shortage (especially a shortage of food).
121. a The hint to this question is the phrase "smooth the dying pillow". Which means that the people are dying and may become extinct. Assimilation means absorption or gradually harmonizing with another culture.
122. c One can move a motion, which means to formally propose during a debate but one does not move through a film.
123. c To have control over a language is to be extremely proficient in it. But one's father cannot control one's voice. He can curb one's freedom of speech and expression but he cannot control another's voice.
124. b A person who is lost in his thoughts does not play with his mind. Rather, something is on his mind or playing on his mind.
125. a People can look similar or alike but not matching.
126. c Choice (c) is supported by the author in the initial part of passage. Refer to the last 3 lines of the first paragraph.
127. b Refer to paragraph 2, lines 8 to 11 and to paragraph 3, lines 1 to 4. The author explains as to how education results in the destruction of energy.
128. b Option (a) is ruled out as in paragraph 5 the author says that it is a social convenience, he does not say that it is a force. He does not say that it is a necessary evil. He says discipline helps in curbing wrong actions, so (d) is wrong. Thus (b) is the best possible option.

129. d If we read paragraph 5, lines 1 and 2, the author explicitly mentions (a), (b) and (c). Thus the answer is (d).
130. c Choice (a) is supported by the views in the initial part of the passage. Option (b) is supported in paragraph 3. Choice (c) is not mentioned and goes against author's view that "if a person wants to do something, he has the energy to do it". Though he says that most of the time, people are the outcome of their society, he does not agree with the view that society necessarily moulds a man. Therefore, the best option is (c).
131. c Medals are symbols of glorification of war. By using a simile, Atwood is expressing that medals are nothing more than holes in a cloth. In other words, she is saying that there is nothing good about war.
132. d All options are quotes from the text. The author discusses Atwood's work on two levels — the structure of the novel and its context or vision. The text reveals that (a), (b) and (c) are structural devices used by the novelist to fashion the form of her work, but not (d), which refers to one of the qualities of the curmudgeonly Renee.
133. b Refer to paragraph 5. A conservative newspaper reduces passion and tragedy to a report in clipped prose — the same experience is appropriated and formulated in different ways. There is a tussle on to paint life in one's own colours. Even treachery can be viewed by the traitors' sympathizers as bravery. Thus (b) is the right choice.
134. a The story is about people who are poor despite having a lot of money. This is voiced in option (a). Option (b) is ruled out as the novel does not examine people's economic status. Choice (c) assigns an authorial motive that is not cited. Thus (a) is the right choice.
135. b In paragraph 2, the author states explicitly that "In her latest book Atwood explores again a theme central to her fictional universe: what happens to relationships, to human potential, to the possibility of happiness when women are kept subordinate, stultified by their inferior status and locked in silence." This implies that option (b) is the right answer.
136. d All are correct except option (d) because according to the passage, psitronic fronts can be recognized by sensitive people.
137. a In the last paragraph, lines 1 and 2, the author explicitly states that "Its course across the pond represents one of many paths it might take..." This contradicts option (a). Choices (b), (c) and (d) are mentioned in the passage.
138. b Option (b) contradicts the passage. In paragraph 5, the author clearly mentions that according to Leibniz's theory animate objects may correspond with inanimate ones.
139. b Paragraph 2, line 5 clearly provides the answer.
140. c In the entire passage, the author talks about the links between the future and the present. Option (b) can not be true because the author is talking positively about these links. In the last 5 lines of the passage, the author discusses the complex nature of the casual links and the complexities accompanying the various theories on premonition.
141. d Paragraph 7, lines 3 to 6 clearly give the reasons for the war.
142. b The author refers to the Bible only once, so it cannot be concluded that he is a biblical scholar. Nowhere in the passage is it stated or implied that he wrote war poetry, ruling out option (a). The statement "...march us old devils..." makes (b) the correct option.
143. c Options (a) and (b) are some of the views provided by the author. In paragraph 7, the author states that the situation since the Skaldic times had not changed much and that war news still made good copy. This implies that the author thinks that people still like to read about war.
144. a Expressions like "manually executing each other's young men" and "send us old devils off to die honourably" seek to bring out the inhumanness of war. As the author is not very direct in whatever he is saying it can be said that the tone is satirical.
145. d The passage mentions (a), (b), and (c) respectively. Choice (d) is not mentioned in the passage as the passage does not tell us about the century in which Skaldic war poetry was written.
146. c Given verbatim in paragraph 1 that advertising began in 1600s.
147. d Increasing costs in the rate of the advertisements led to the reduction in the story line and consequently the run time.
148. d Mentioned clearly in paragraph 2, lines 3 to 4.
149. a Options (b) and (c) are mentioned in the passage. But nowhere does the passage say that Goodrun is the father of advertising.
150. d Paragraphs 2, 4 and 5 clearly mention all the options.