

Unproctored Mock CAT- 1 2014

Section I: QA&DI

1. One of the roots of the quadratic equation $x^2 - 2kx + 48 = 3px$ is thrice the other. If k and p are positive integers, then the number of ordered pairs (k, p) that satisfy the equation is
(a) 3 (b) 4 (c) 2 (d) 1

1. c The given quadratic equation can be rewritten as:

$$x^2 - (2k + 3p)x + 48 = 0$$

Let α and 3α be the roots of the equation.

$$\alpha \times 3\alpha = 48 \Rightarrow \alpha = \pm 4 \quad \dots \text{(i)}$$

$$\alpha + 3\alpha = 2k + 3p \Rightarrow 2k + 3p = \pm 16 \quad [\text{Using (i)}]$$

'p' and 'k' are positive integers.

$$\therefore 2k + 3p = 16$$

The ordered pairs (k, p) that satisfy the above equation are (2, 4) and (5, 2).

2. 'N1' is the largest three-digit number which is square of a natural number as well as a multiple of 2 and 3. 'N2' is the smallest four-digit natural number which when divided by 7 leaves a remainder of 4. Find the number of factors of the product of 'N1' and 'N2'.
(a) 64 (b) 112 (c) 108 (d) 96

2. d According to the given conditions,

$$N1 = 900 \text{ and } N2 = 1005$$

$$\therefore N1 \times N2 = 900 \times 1005 = 2^2 \times 3^2 \times 5^2 \times 3 \times 5 \times 67 = 2^2 \times 3^3 \times 5^3 \times 67$$

$$\text{Hence, the number of factors of the product of } N1 \text{ and } N2 = (2+1)(3+1)(3+1)(1+1) = 96.$$

3. In an assembly election, there were four parties in the fray – AAO, BJO, BSO and JDO. The number of seats won by BJO was 33.33% more than that by JDO; the total number of seats won by BJO and JDO put together was 75% more than that by AAO and BSO put together; the number of seats won by AAO was four-fifths the number of seats won by JDO; the number of seats won by BSO was 40 less than that won by AAO. If all the seats in the assembly went for the election, then find the total number of seats in it.
(a) 275 (b) 550 (c) 500 (d) 650

3. b Let the number of seats won by JDO be $3x$.

$$\text{The number of seats won by BJO} = 4x.$$

$$\text{The number of seats won by AAO} = \frac{12}{5}x$$

$$\text{The number of seats won by BSO} = \frac{12}{5}x - 40$$

According to the question,

$$3x + 4x = \frac{175}{100} \left(\frac{12}{5}x + \frac{12}{5}x - 40 \right) \Rightarrow x = 50$$

$$\text{Hence, the total number of the seats in the assembly} = 7x + \frac{24}{5}x - 40 = 7 \times 50 + \frac{24}{5} \times 50 - 40 = 550.$$

4. Three years ago, the ratio of the ages of Sarita and her younger sister Mamita was 5 : 4. The present average age of Sarita, Mamita and their mother is 49 years. Nine years ago, if the sum of the ages of Sarita and her mother was 96 years, then the present age of Mamita's mother is
(a) 63 years (b) 60 years (c) 73.5 years (d) 69.5 years

4. c Let the present ages of Sarita, Mamita and their mother be $(5x + 3)$, $(4x + 3)$ and y years respectively.
According to the question,

$$\frac{4x + 3 + 5x + 3 + y}{3} = 49 \Rightarrow 9x + y = 141 \quad \dots \text{(i)}$$

Nine years ago, the age of Sarita was $(5x - 6)$ years and that of her mother was $(y - 9)$ years.

$$\therefore 5x - 6 + y - 9 = 96 \Rightarrow 5x + y = 111 \quad \dots \text{(ii)}$$

Solving (i) and (ii), we get $x = 7.5$ and $y = 73.5$.

Hence, the present age of the mother is 73.5 years.

5. Shikshit Mosai, a poulterer, has 5 turkeys, 4 hens and 2 ducks. Motilal visits Mr. Shikshit to buy some of the poultry available with him. He wants to buy at least one unit of each of the three types of poultry, but not more than 3 turkeys. If no two poultry of any of the three types of poultry are identical, then in how many ways can Motilal buy poultry?

- (a) 1125 (b) 270 (c) 315 (d) 870

5. a The required number of ways = ${}^5C_1 + {}^5C_2 + {}^5C_3)(2^4 - 1)(2^2 - 1) = 1125$.

6. Each of the two friends Madan and Mohan has a certain number of coins of each of the denominations Re. 1, Rs. 2 and Rs. 5. The total number of coins with each of them is 8. The number of Rs. 5 coins with Mohan is twice that with Madan. The absolute difference between the number of Re. 1 and Rs. 5 coins with Mohan is 3 and that between the amounts with Madan and Mohan is Rs. 7. What is the value (in Rs.) of the amount with Mohan?

- (a) 16 (b) 28 (c) 27 (d) 21

6. c Let the number of Rs. 5 coins with Madan be x .

The number of Rs. 5 coins with Mohan = $2x$.

Since the total number of coins with each of them is 8 and the absolute difference between the number of Rs. 5 and Re. 1 coins with Mohan is 3, the number of Rs. 5 and Re. 1 coins with Mohan could be either '2 and 5' or '4 and 1' respectively. Following are the two possible cases.

Case (i): When the number of Rs. 5 and Re. 1 coins with Mohan is 2 and 5 respectively.

Name	No. of coins			Amount (in Rs.)
	Rs.5	Rs.2	Re.1	
Mohan	2	1	5	17
Madan	1	-	-	Between 13 and 18

Case (ii): When the number of Rs. 5 and Re. 1 coins with Mohan is 4 and 1 respectively.

Name	No. of coins			Amount (in Rs.)
	Rs.5	Rs.2	Re.1	
Mohan	4	3	1	27
Madan	2	-	-	Between 17 and 21

Since the absolute difference between the amounts with Mohan and Madan is Rs. 7 and which is not possible in the case (i), only case (ii) is possible.

Hence, the amount with Mohan is Rs. 27.

Directions for questions 7 to 9: Answer the questions on the basis of the information given below.

The table given below shows the data of the number of boys across various age groups in a school named Gyancharitra. In the school, the number of girls in each of the age group mentioned in the table is greater than or equal to 20% but not more than 40% of the total number of students in that age group. The blank cell in the table represents the missing data, and no student in the school is aged more than 9 years.

Age group	Number of boys
4 years or less	117
5 years or less	139
6 years or less	150
7 years or less	
8 years or less	172
9 years or less	200

7. In the school, the number of girls who are aged more than 4 but not more than 5 years cannot be more than

(a) 14 (b) **62** (c) 92 (d) Cannot be determined

7. b Let the number of girls in the age group of 4 years or less be G4 and that in the age group of 5 years or less be G5.

$$\therefore 20 \leq \frac{G_4}{117 + G_4} \times 100 \leq 40$$

$$\Rightarrow 29.25 \leq G_4 \leq 78$$

$\Rightarrow 30 \leq G_4 \leq 78$ (As G4 cannot be a fraction)

Similarly,

$$20 \leq \frac{G_5}{139 + G_5} \times 100 \leq 40 \Rightarrow 34.75 \leq G_5 \leq 92.67 \Rightarrow 35 \leq G_5 \leq 92$$

In order to maximise the required value, the value of G4 has to be the minimum and that of G5 the maximum.

Hence, the required number of girls = 92 – 30 = 62.

8. In the school, if the number of girls who are aged 7 years or less is 38, then the number of different values that the number of boys who are aged 7 years or less can assume is

(a) 1 (b) 2 (c) **3** (d) more than 3

8. c Let the number of girls in the age group of 7 years or less be G7.

$$\therefore 20 \leq \frac{G_7}{B_7 + G_7} \times 100 \leq 40 \Rightarrow \frac{3G_7}{2} \leq B_7 \leq 4G_7$$

On putting G7 = 38, we get

$$57 \leq B_7 \leq 152$$

Since B7 is greater than or equal to 150 and less than or equal to 172, the values that B7 can assume are 150, 151 and 152. Hence, the number of values that B7 can assume is 3.

9. In the school, the number of boys who are aged more than 6 but not more than 9 years is

(a) 150 (b) 200 (c) **50** (d) Cannot be determined

9. c The number of boys who are aged more than 6 years but not more than 9 years = 200 – 150 = 50.

10. If $\log_b a^x = x$, then which of the following is definitely true?
 (a) $a^x = x^b$ (b) $x^a = x^b$ (c) $a = b$ (d) Both (b) and (c)

10. b $\log_b a^x = x \Rightarrow a^x = b^x$

There are two possible cases.

Case (i): When $x \neq 0$.

$$a^x = b^x \Rightarrow a = b$$

$$\therefore x^a = x^b$$

Case (ii): When $x = 0$.

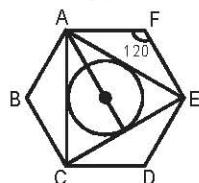
'a' may or may not be equal to 'b'.

$$\text{But } x^a = x^b$$

Hence, in either of the cases $x^a = x^b$.

11. What is the area (in cm^2) of the circle that is inscribed in a triangle of the maximum possible area that can be inscribed in a regular hexagon of side 10 cm?
 (a) 15π (b) 25π (c) 30π (d) 50π

11. b The triangle inscribed in the hexagon and the circle inscribed in the triangle thus formed can be shown as:



$$\text{The side of the triangle} = \sqrt{10^2 + 10^2 - 2 \times 10 \times 10 \times \cos 120^\circ} = 10\sqrt{3} \text{ cm}$$

$$\therefore \text{The altitude of the triangle} = 10\sqrt{3} \times \frac{\sqrt{3}}{2} = 15 \text{ cm}$$

The centre of the circle is the centroid of the triangle.

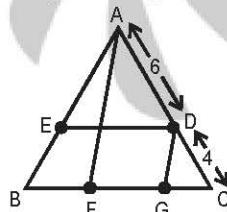
$$\therefore \text{Radius of the circle} = \frac{1}{3} \times 15 = 5 \text{ cm}$$

$$\text{Hence, the area of the circle} = \pi \times 5^2 = 25\pi \text{ cm}^2.$$

12. In isosceles triangle ABC, D and E are points on AC and AB respectively such that $DE \parallel BC$; F and G are points on BC such that $AF \parallel DG$. If $AC = AB$, $AD = 6 \text{ cm}$ and $FG : GC = 3 : 2$, then what is the length (in cm) of BE?

- (a) 6 (b) 4 (c) 5 (d) 3

12. b The given triangle can be drawn as:



In $\triangle CAF$, $DG \parallel AF$.

$$\therefore \frac{CD}{DA} = \frac{CG}{GF} = \frac{2}{3} \Rightarrow CD = \frac{2}{3} \times 6 = 4$$

In $\triangle ABC$, $DE \parallel BC$.

$$\therefore BE = CD = 4 \text{ cm.}$$

13. $N = 57^{99} + 55^{99}$. What is the remainder when N is divided by 224?
 (a) 28 (b) 0 (c) 56 (d) 112

$$\begin{aligned}
 13. d \quad & \text{Rem}\left[\frac{57^{99} + 55^{99}}{224}\right] \\
 &= \text{Rem}\left[\frac{(57 + 55)(57^{98} - 57^{97} \times 55^1 + 57^{96} \times 55^2 - \dots + 55^{98})}{224}\right] \\
 &= \text{Rem}\left[\frac{112 \times (57^{98} - 57^{97} \times 55^1 + 57^{96} \times 55^2 - \dots + 55^{98})}{224}\right] \\
 &= \frac{112}{112} \times \text{Rem}\left[\frac{(57^{98} - 57^{97} \times 55^1 + 57^{96} \times 55^2 - \dots + 55^{98})}{2}\right] \\
 &= \frac{112}{112} \times \text{Rem}\left[\frac{\text{odd}}{2}\right] \\
 &= \frac{112}{112} \times \text{Rem}\left[\frac{1}{2}\right] \\
 &= \text{Rem}\left[\frac{112}{112 \times 2}\right] = 112.
 \end{aligned}$$

Note: $a^n + b^n = (a + b)(a^{n-1}b^0 - a^{n-2}b + a^{n-3}b^2 - \dots + a^0b^{n-1})$
 Where 'n' is an odd natural number.

14. If $E = 0.3 + 0.33 + 0.333 + \dots + \text{up to 20 terms}$, then what is the value of $9E$?

$$\text{(a)} \frac{1}{27} \left[\frac{179 \times 10^{20} + 1}{10^{20}} \right] \quad \text{(b)} \frac{1}{3} \left[\frac{179 \times 10^{20} + 1}{10^{20}} \right] \quad \text{(c)} \frac{1}{27} \left[\frac{179 \times 10^{20} - 1}{10^{20}} \right] \quad \text{(d)} \frac{1}{3} \left[\frac{179 \times 10^{20} - 1}{10^{20}} \right]$$

14. b $E = 0.3 + 0.33 + 0.333 + \dots + \text{up to 20 terms}$

$$\begin{aligned}
 &= \frac{1}{3}[0.9 + 0.99 + 0.999 + \dots + \text{up to 20 terms}] \\
 &= \frac{1}{3} \left[\left(1 - \frac{1}{10}\right) + \left(1 - \frac{1}{10^2}\right) + \left(1 - \frac{1}{10^3}\right) + \dots + \text{up to 20 terms} \right] \\
 &= \frac{1}{3} \left[20 - \left(\frac{1}{10} + \frac{1}{10^2} + \frac{1}{10^3} + \dots + \text{up to 20 terms} \right) \right] \\
 &= \frac{1}{3} \left[20 - \frac{1}{10} \left(\frac{1 - \frac{1}{10^{20}}}{1 - \frac{1}{10}} \right) \right] \\
 &= \frac{1}{3} \left[20 - \frac{10^{20} - 1}{9 \times 10^{20}} \right] \\
 &= \frac{1}{27} \left[\frac{179 \times 10^{20} + 1}{10^{20}} \right] \\
 \therefore 9E &= \frac{1}{3} \left[\frac{179 \times 10^{20} + 1}{10^{20}} \right].
 \end{aligned}$$

15. If the maximum value of $p(x - k)(x - 4)$ is $-16p$, then what is the value of 'k'?
(a) -4 (b) 8 (c) 12 (d) Either (a) or (c)

15. d The given expression can be rewritten as:

$$px^2 - p(k + 4)x + 4pk$$

A quadratic expression of the form $ax^2 - bx + c$ realises its maximum value at $x = \frac{-b}{2a}$.

∴ The value of x at which $px^2 - p(k + 4)x + 4pk$ realises its maximum value = $\frac{(-p(k + 4))}{2p} = \frac{k + 4}{2}$

$$\therefore p\left(\frac{k+4}{2}\right)^2 - p(k+4)\times\frac{(k+4)}{2} + 4pk = -16p$$

$$\Rightarrow \frac{(k+4)^2 - 16k}{4} = 16 \quad [\because p \neq 0]$$

$$\Rightarrow (k-4) = \pm 8 \Rightarrow k = 12, -4.$$

16. How many three-digit numbers are there that are divisible by 4 and 7 but not by 9?
(a) 28 (b) 29 (c) 30 (d) 31

16. b The number three-digit numbers divisible by 4 and 7 (i.e, 28) = 32
The number of three-digit numbers divisible by 4, 7 and 9 (i.e, 252) = 3
Hence, the number of required numbers = 32 - 3 = 29.

Directions for questions 17 to 19: Answer the questions on the basis of the information given below.

In a parliamentary election of a country named Prajatantra, which has 150 constituencies, each of the three political parties Common Man Party (CMP), Jan Bhakti Party (JBP) and Democratic Development Party (DDP) put up its candidates for some of the constituencies. It is also known that:

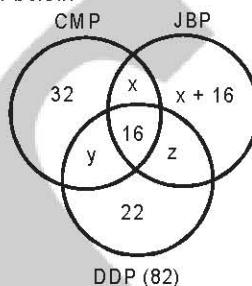
- (i) At least one of the candidates in the fray in each of the constituencies is from one of the three parties.
- (ii) The number of constituencies where only JBP put up its candidates was equal to the number of constituencies where both JBP and CMP put up their candidates.
- (iii) The number of constituencies where only CMP put up its candidates was twice the number of constituencies where all the three parties put up their candidates.
- (iv) JBP put up the maximum number of candidates among the three parties.
- (v) DDP put up its candidates in 82 constituencies.
- (vi) The number of constituencies where only DDP put up its candidates was 10 less than the number of constituencies where only CMP put up its candidates.
- (vii) In 60 constituencies where DDP put up its candidates, at least one of the other two parties also put up its candidates.
- (viii) None of the candidates from any of the three parties stood from more than one constituency.
- (ix) All the constituencies in the country went for the election.

17. In how many constituencies exactly two of the three parties put up their candidates?
(a) 56 (b) 54 (c) 44 (d) Cannot be determined
18. The number of constituencies where JBP and DDP but not CMP put up their candidates could not be less than
(a) 26 (b) 30 (c) 31 (d) 44

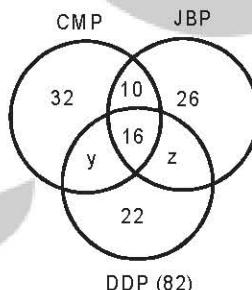
19. Which of the following additional information will enable us to find the exact number of candidates put up by CMP?
- The number of constituencies where exactly one of the candidates in the fray was from the one of the three parties was 80.
 - The number of constituencies where JBP put up its candidates was 30 more than the number of constituencies where CMP put up its candidates.**
 - The number of constituencies where DDP put up its candidates was more than the number of constituencies where CMP put up its candidates.
 - None of these

For questions 17 to 19: Let the number of constituencies where CMP and JBP but not DDP put up their candidates be x , the number of constituencies where CMP and DDP but not JBP put up their candidates be y and the number of constituencies where DDP and JBP but not CMP put up their candidates be z .

The given information can be depicted as shown below.



The final Venn diagram can be shown as below.



17. b The number of constituencies where exactly two of the three parties put up their candidates = $10 + y + z = 10 + 44 = 54$.
18. c JBP put up the maximum number of candidates.
 $\therefore 10 + 26 > y + 22$ and $z + 26 > y + 32$
 $\Rightarrow y < 14$ and $z > y + 6$... (i)
Also, $y + z = 44$... (ii)
From equations (i) and (ii), we get,
 $z > 30$
Hence, the minimum value of $z = 31$.
19. b Using the information given in option (b), we can calculate the exact number of candidates put up by CMP.

20. If the product of two real numbers 'm' and 'b' is greater than zero, then which of the following points cannot lie on the line whose equation is $y = mx + b$?
 (a) (0, 1997) (b) (0, -1997) (c) (19, 97) (d) (1997, 0)

20. d As $m \times b > 0$, there are two possible cases.

Case (i): When both m and b are positive real numbers.

For $x \geq 0$, y must be positive.

Points (0, 1997) and (19, 97) can lie on the line.

Therefore, options (a) and (c) are eliminated.

Case (ii): When both m and b are negative real numbers.

For $x \geq 0$, y must be negative.

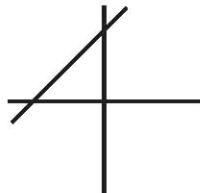
Point (0, -1997) can lie on the line. Therefore, option (b) is eliminated.

Hence, point (1997, 0) cannot lie on the line.

Alternative method:

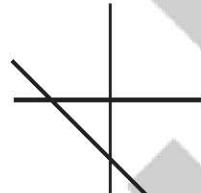
Case (i): When both m and b are positive.

The line can be drawn as:



Case (ii): When both m and b are negative.

The line can be drawn as:



From the above two graphs, it is clear that point (1997, 0) can never lie on the given line.

21. Three friends Moti, Choti and Khoti, who live in three different blocks of the same sector, take the same time to complete one round of the parks in their respective blocks. The parks in the blocks of Moti, Choti and Khoti are in the shapes of equilateral triangle, circle and square respectively. If side of the park in the shape of square, the radius of the circular park and the side of the triangular park are the same, then what is the ratio of the speeds of Moti, Choti and Khoti?

(a) 21 : 44 : 28 (b) 28 : 44 : 21 (c) 14 : 11 : 42 (d) 44 : 28 : 21

21. a Let the radius of the circular park be 'p' and the speeds of Moti, Choti and Khoti be 'm', 'c' and 'k' respectively.
 According to the question,

$$\frac{3p}{m} = \frac{2\pi p}{c} = \frac{4p}{k}$$

$$\Rightarrow m : c : k = 21 : 44 : 28.$$

22. Find the equation of the bisector of $\angle BAC$ of triangle ABC whose vertices are A(-2, 4), B(5, 5) and C(4, -2).

(a) $x + 3y - 10 = 0$ (b) $x - 3y + 10 = 0$ (c) $x - 3y - 10 = 0$ (d) None of these

22. a $AB = \sqrt{(5+2)^2 + (5-4)^2} = \sqrt{50} = 5\sqrt{2}$

$AC = \sqrt{(4+2)^2 + (-2-4)^2} = \sqrt{72} = 6\sqrt{2}$

Let AD be the bisector of $\angle BAC$.

$$\therefore \frac{AB}{AC} = \frac{BD}{DC} = \frac{5}{6}$$

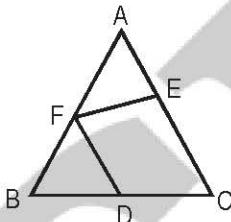
$$\therefore \text{Co-ordinates of D} = \left(\frac{20+30}{11}, \frac{-10+30}{11} \right) = \left(\frac{50}{11}, \frac{20}{11} \right)$$

∴ Equation of AD is given by

$$\frac{y-4}{x+2} = \frac{4-\frac{20}{11}}{-2-\frac{50}{11}}$$

$$\Rightarrow x + 3y - 10 = 0.$$

23. In triangle ABC shown below, AF : FB = 2 : 3, AE : EC = 1 : 2 and BD = DC. What is the ratio of the area of quadrilateral FECD to that of $\triangle BFD$?



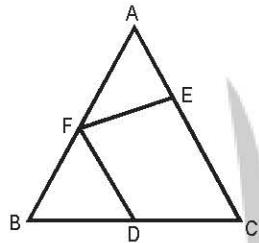
(a) 17 : 9

(b) 17 : 10

(c) 17 : 30

(d) None of these

23. a



$$\frac{\text{Area of } \triangle AEF}{\text{Area of } \triangle ABC} = \frac{\frac{1}{2} \times AE \times AF \times \sin A}{\frac{1}{2} \times AC \times AB \times \sin A} = \left(\frac{AE}{AC} \right) \times \left(\frac{AF}{AB} \right) = \frac{1}{3} \times \frac{2}{5} = \frac{2}{15}$$

Similarly,

$$\frac{\text{Area of } \triangle BFD}{\text{Area of } \triangle ABC} = \frac{\frac{1}{2} \times 3}{\frac{1}{2} \times 5} = \frac{3}{10}$$

$$\frac{\text{Area of } \square FECD}{\text{Area of } \triangle ABC} = 1 - \left(\frac{3}{10} + \frac{2}{15} \right) = \frac{17}{30}$$

$$\text{Hence, the ratio} = \frac{17}{30} : \frac{3}{10} = 17 : 9.$$

24. There are two identical dice, with exactly four numbered faces each. The numbers inscribed on the four numbered faces of each of the two dice are 1, 2, 3 and 4, with a unique number on a face. If the two dice are rolled simultaneously and both of them show numbered faces, then what is the probability that the sum of the numbers on the top faces of the two dice is 5?

(a) 1/3

(b) 1/7

(c) 1/4

(d) 1/8

24. c Both the dice show numbered faces.

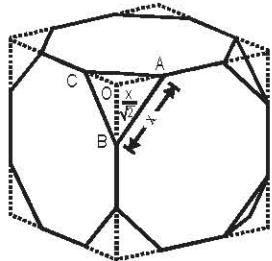
The total number of possible outcomes = $4 \times 4 = 16$

The possible cases when the sum of the numbers on the two dice is 5 are (1, 4), (2, 3), (3, 2) and (4, 1)

$$\text{Hence, the required probability} = \frac{4}{16} = \frac{1}{4}.$$

25. Eight identical triangular pyramids are cut out from the eight different corners of a solid cube so as each of the six original faces of the cube becomes a regular octagon. What is the percentage change in the total surface area of the solid thus formed compared to the original cube?
 (a) 8.25% increase (b) **7.25% decrease** (c) 10.25% increase (d) 15.50% decrease

25. b Let each side of each of the formed octagons be 'x' units.



$$\begin{aligned} \text{In } \triangle ABO, \\ AO^2 + BO^2 = x^2 \\ \Rightarrow 2AO^2 = x^2 \quad [\because BO = AO] \\ \Rightarrow AO = \frac{x}{\sqrt{2}} \end{aligned}$$

$$\therefore \text{The side of the cube} = x + 2 \times \frac{x}{\sqrt{2}} = (1 + \sqrt{2})x$$

$$\text{The surface area of the original cube} = 6 \times (x(1 + \sqrt{2}))^2$$

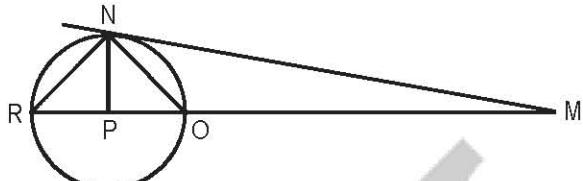
The decrease in the area due to the cut at each corner = $3 \times \text{Area of } \triangle ABO - \text{Area of } \triangle ABC$

$$= 3 \left[\frac{1}{2} \times \frac{x}{\sqrt{2}} \times \frac{x}{\sqrt{2}} \right] - \frac{\sqrt{3}}{4} x^2 = \frac{3}{4} x^2 - \frac{\sqrt{3}}{4} x^2$$

$$\text{The total change in the area} = 8 \left[\frac{3}{4} x^2 - \frac{\sqrt{3}}{4} x^2 \right] = (6 - 2\sqrt{3})x^2$$

$$\text{Hence, the percentage change (decrease)} = \frac{x^2(6 - 2\sqrt{3})}{6 \times x^2 \times (1 + \sqrt{2})^2} \times 100 \approx 7.25.$$

26. In the given figure, MN is a tangent to the circle and MOR is a secant of the circle. If NP bisects $\angle ONR$, $\angle ONP = 25^\circ$ and $\angle MON : \angle MNO = 5 : 3$, then find $\angle MNO$.



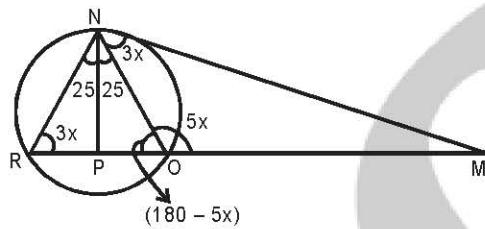
(a) 60°

(b) 45°

(c) 75°

(d) 36°

26. c Let $\angle MON = 5x$.
 $\therefore \angle MNO = 3x$



$$\angle NRP = \angle ONM = 3x$$

(Using Alternate Segment Theorem)

In $\triangle NRO$,

$$50 + 3x + (180 - 5x) = 180$$

$$\Rightarrow x = 25^\circ$$

$$\text{Hence, } \angle MNO = 3x = 3 \times 25 = 75^\circ.$$

27. Let $a_{n+1} = 2a_n - 3$, where n is a whole number. If $a_{16} = 32771$, then what is the value of a_9 ?
 (a) 259 (b) 515 (c) 131 (d) 512

27. a Let $a_0 = x$.

$$a_1 = 2x - 3$$

$$a_2 = 2(2x - 3) - 3 = 2^2x - (3 + 6)$$

$$a_3 = 2[2^2x - (3 + 6)] - 3 = 2^3x - (3 + 6 + 12)$$

$\therefore a_n = 2^n x - (3 + 6 + 12 + \dots + \text{up to } n \text{ terms})$

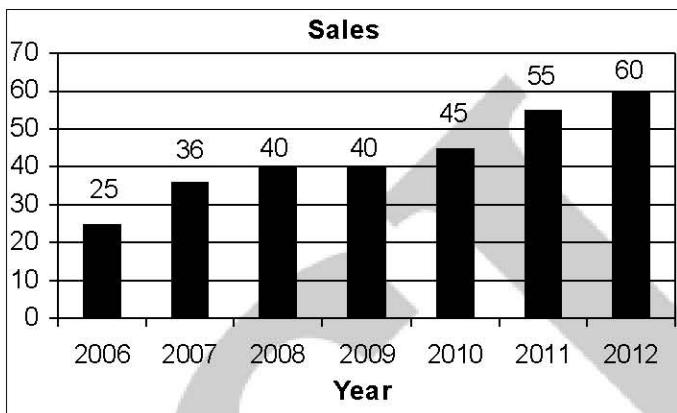
$$= 2^n x - \frac{3(2^n - 1)}{2 - 1} = 2^n x - 3(2^n - 1) = 2^n(x - 3) + 3$$

$$\therefore a_{16} = 2^{16}(x - 3) + 3 = 32771 \Rightarrow x = 3.5$$

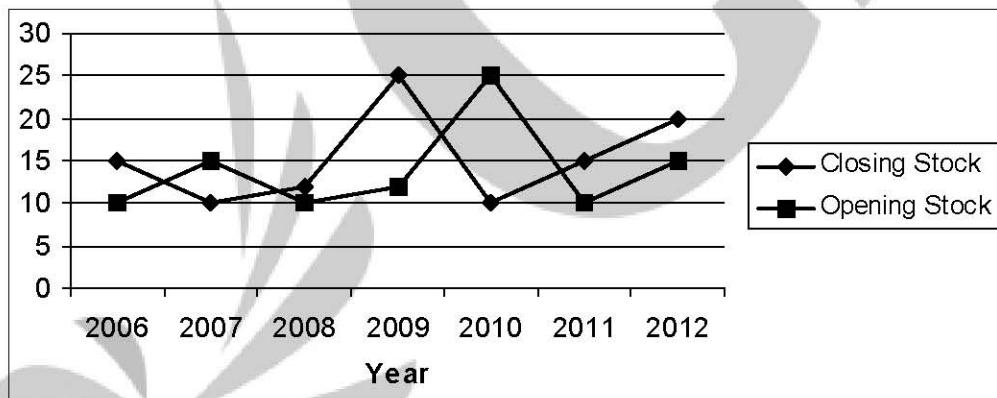
$$\therefore a_9 = 2^9 \times (3.5 - 3) + 3 = 259.$$

Directions for questions 28 to 30: Answer the questions on the basis of the information given below.

The bar graph given below shows the sales volume (in '000) of Washing Machine manufactured by a company named PQR Pvt. Ltd. during the period 2006-2012.



The line graph given below shows the opening and closing stocks (in '000) of Washing Machine with the company during the given period.



$$\text{Production} = \text{Sales} + \text{Closing Stock} - \text{Opening Stock}$$

28. In which years, during the given period, did the production of Washing Machine witness the maximum percentage change over the previous year?
(a) 2009 **(b) 2011** (c) 2010 (d) 2012

29. What was the absolute difference (approximately) between the average sales volume and average production of Washing Machine during the given period?
(a) 10000 (b) 3572 **(c) 1429** (d) 6070

30. In 2013, the company witnessed increments, over the previous year, of 7.69% and 20% in its production and sales volume of Washing Machine respectively. What was the opening stock at the beginning of 2014?

(a) 18000

(b) 15750

(c) 16900

(d) 21000

For questions 28 to 30: The given data can be tabulated as below.

Year	Sales	Closing stock	Opening stock	Production
2006	25	15	10	30
2007	36	10	15	31
2008	40	12	10	42
2009	40	25	12	53
2010	45	10	25	30
2011	55	15	10	60
2012	60	20	15	65

28. b The production of Washing Machine witnessed the maximum percentage change over the previous year in 2011 and it was equal to 100%.
29. c The total sales (in '000) during the given period = 301
 The total production (in '000) during the given period = 311
 The absolute difference between the sales and the production (in '000) = $(301 - 311) = 10$
 Hence, the answer = $\frac{10}{7} \times 1000 \approx 1429$.
30. a The production in 2013 = $65000 + 7.69\% \text{ of } 65000 = 70000$
 The sales in 2013 = $1.2 \times 60000 = 72000$
 The opening stock of 2014 = The closing stock of 2013 = $70000 + 20000 - 72000 = 18000$.

Section II: VA&LR

31. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately.

To provide even the sparest _____ outline of this history as it unfolded across the _____ regions of the continent is way beyond our scope here.

- (a) etymological, destroyed
(c) typological, differentiated

- (b) chronological, diverse**
(d) geographical, diverse

31. b The given sentence talks about how it is nearly impossible to provide a certain outline of the history of something/someone because it spans across regions of the continent. Only the word 'diverse', meaning 'distinct' or 'different' can fit in the second blank logically. The difficulty in creating the outline was because of the way the history had spread across the continent – through distinct or 'diverse' regions. Hence, options (a) and (c) both can be negated. Coming to the first blank, the word 'chronological' is a better choice as it grammatically fits in the sentence and is in sync with the context of the line too. It refers to events in history arranged in order of time of their occurrence (chronological order). Moreover, the phrase 'geographical outline of this history' is not correct. 'Geographical outline of this history as it unfolded across the diverse regions of the continent' is redundant.

32. Four sentences are given below, labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence.

- (a) Yet, much more is known about script death than about script birth.
(b) Naturally, not every script can be included: a recent academic reference book, *The World's Writing Systems*, runs to almost a thousand substantial pages.
(c) The birth and growth of writing have been the focus of more study than the death of scripts.
(d) This knowledge shows that no single theory can encompass why scripts flourish or vanish.

32. b Sentences 'c' and 'a' form a mandatory pair. Sentence 'c' states how studies have focused more on the 'birth and growth of writing' than on the 'death of scripts'. Sentence 'a' provides the perfect contrast to 'c' by saying that, despite the focus being on the birth and growth of scripts, much more is known about the death of scripts. Sentence 'd' continues on the same thought by concluding that 'this knowledge' (the one stated in sentences 'c' and 'a') shows how there cannot be a single theory explaining why scripts flourish or die. Hence, sentences 'cad' form a sequence and therefore, option (b) is the correct answer.

33. The word given below has been used in the given sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is *incorrect or inappropriate*.

PLAY

- (a) What do you think you are playing at?
(b) Don't play around with my tools!
(c) I decided to play along with her idea.
(d) The home team claimed a penalty but the referee told them to play up.

33. d The sentence given in option (a) is correct. 'What is somebody playing at' is usually asked (generally in anger or irritation/exasperation) when someone behaves in a stupid or unreasonable manner. The usage of 'play' in sentence (b) is also correct. 'Play about/around' (with somebody/something) is to behave or treat something in a careless/casual/cavalier fashion. 'Play along' (with somebody/something) is to pretend to agree with somebody/something. Hence, the sentence in option (c) is also correct. Option (d) is incorrect as 'play up' is to make someone or something seem to be more important; e.g. *The director tried to play Ann up, but she was not really a star* or *Try to play up the good qualities of our product*. The correct usage here should be 'play on' which is to continue to play or to start playing again.

34. Given below are four sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option.
- A. Reform is not easy; were it easy to right the problems with American system,
B. someone would have done so long ago.
C. Consequences of reform efforts are notoriously difficult in predicting;
D. the passage of reform proposals is always difficult because of those with vested interests in the status quo.
- (a) A and D **(b) A and C** (c) A and B (d) C and D
34. b In A, the sentence is referring to a particular system, the American one and hence, the definite article 'the' should have been used before it. Hence, A is incorrect. The correct sentence should have read '...with the American system'. In C, the use of 'in predicting' after the word 'difficult' is incorrect. The correct phrase is "...notoriously difficult to do something". B and D are correct and therefore, option (b) is the correct answer.
35. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate sequence.
- A. These feelings shape our thought, often without us realizing it.
B. It is not just that we are often in the grip of irrational or non-rational forces and desires; it is that our thinking is itself infused with emotion.
C. If we are to make the case for any point of view, the best way to do so is always to appeal to reasons and arguments that can command the widest possible support.
D. This book puts forward the rational case for atheism.
E. Unfortunately, we often approach rational discussions with prejudices, fears, and commitments.
- (a) BAEDC **(b) BADCE** (c) EDCBA (d) DCBEA
35. b Sentences C and E form a mandatory pair as they present a contrast between what we should do and what we actually do. Moreover, the 'rational discussions' mentioned in E refers to the 'reasons and arguments' talked about in C. Sentences B and A form another mandatory pair. B talks about how our thinking is infused with emotion and A takes this argument forward by saying that it is these emotions or feelings that shape the way we think. Only the sequence given in option (b) has both the mandatory pairs and hence, is the correct answer.
36. Four sentences are given below labeled (a), (b), (c) and (d). Of these, three sentences need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the one that does not fit the sequence.
- (a) By contrast more mature spines were relatively insensitive to the radiation.**
(b) But the exact mechanisms underlying the impairment have not been clear.
(c) However the treatment may progressively result in damage to one's neurological functions later in life, even causing debilitating cognitive dysfunction.
(d) Radiation therapy targeted at a person's head, also known as prophylactic cranial irradiation, is routinely used to treat brain tumours.
36. a Option (d) starts the sequence as it introduces the topic. Option (c) comes next as it provides a flipside to the use of radiation in cancer treatment. Option (b) follows as the 'impairment' mentioned in option (b) refers to the 'damage to one's neurological functions' and 'debilitating cognitive dysfunction' mentioned in option (c). Option (a) doesn't fit into the sequence and is the correct answer.

37. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

News, which was once difficult and expensive to obtain, today surrounds us like the air we breathe. Much of it is literally ambient: displayed on computers, public billboards, trains, aircraft, and mobile phones. Where once news had to be sought out from expensive and scarce newsprint, today it is ubiquitous, and very largely free, at the point of consumption. Satisfying news hunger no longer involves a twice daily diet of a morning newspaper and evening TV news bulletin: news comes in snack-form, to be grazed, and at every level of quality, even programmed to order, to arrive, presorted, via your personal digital assistant.

- (a) What is now required is defending information from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction.
- (b) As the Internet has matured, enterprises have leveraged technology to enhance their operations and improve the services to which consumers have access.
- (c) Threats to this availability exist everywhere, from floods and fire to producing an electromagnetic pulse to malevolent users and random/accidental system faults.
- (d) Where once journalism's reach was confined by the time it took to haul bundles of newsprint from one end of a country to the other, now it is global, instantaneous, and interactive.**

37. d The paragraph is about news and how the availability of news has changed positively over the years. Option (a) is about information, not news, and talks about defending it, rather than making it available. Option (b) talks about how organizations are leveraging the Internet, not about news. Options (a) and (b) are, therefore, incorrect as they are not talking about news but about other issues. Option (c) goes off in the opposite direction. It talks about threats rather than about availability. Option (d) concludes the thought presented in the paragraph and is, hence, the correct answer.

Directions for questions 38 to 40: Answer the questions on the basis of the information given below.

Toral, Kalyani, Manisha, Ruchir, Nirvik and Salil holding six different designations – CFO, Executive Director, Managing Director, CEO, Associate Director and Senior Director – in a company, not necessarily in the same order – are sitting around a rectangular table, with two persons along each of the longer sides and one along each of the shorter sides. Each of them is from a different city among Delhi, Hyderabad, Pune, Kolkata, Mumbai and Ahmedabad. It is also known that:

- (i) The CEO, who is from Mumbai, is sitting opposite to Salil, who is not the Managing Director.
- (ii) The person from Hyderabad and Kolkata are sitting along the same side of the table.
- (iii) Ruchir is the Executive Director and Kalyani is the Associate Director.
- (iv) Toral, who is the Senior Director, is sitting opposite to Ruchir, who is from Ahmedabad.
- (v) The person who is from Kolkata is sitting immediately left of the person who is from Pune.
- (vi) Manisha, who is from Kolkata, is sitting opposite to Kalyani.

38. Who is sitting to the immediate right of Kalyani?

- (a) Executive Director (b) CEO (c) Salil **(d) Either (a) or (b)**

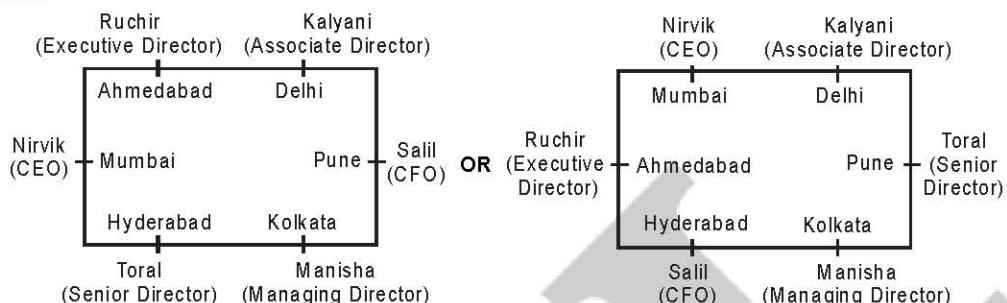
39. If Salil is from Pune, then who is sitting opposite Toral?

- (a) Nirvik **(b) Ruchir** (c) Manisha (d) Kalyani

40. If CFO is sitting to the left of the Managing Director, then Ruchir is sitting

- (a) opposite to Nirvik (b) opposite to CFO
(c) to the immediate right of Kalyani **(d) None of these**

For questions 38 to 40: Using statements (ii), (v), (vi), (iii), (i) and (iv), in that order, we can arrive at the following arrangements:



38. d The person sitting to the immediate right of Kalyani could be either the Executive Director or the CEO.

39. b If Salil is from Pune, then the person sitting opposite to Toral is Ruchir.

40. d

Directions for questions 41 to 44: The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

On the surface or manifest level, the story of Oedipus describes that figure's vain effort to elude the fate that has been imposed on him. Latently, however, Oedipus most wants to do what manifestly he least wants to do. He wants to act out his 'Oedipus Complex'. The manifest or literal level of the myth hides the latent, symbolic meaning. On the manifest level, Oedipus is the innocent victim of Fate. On the latent level, he is the culprit. Rightly understood, the myth depicts not Oedipus' failure to circumvent his ineluctable destiny but his success in fulfilling his fondest desires. Yet, the latent meaning scarcely stops here. For the myth is not ultimately about Oedipus at all. Just as the manifest level, on which Oedipus is the victim, masks a latent one, on which Oedipus is the victimizer, so that level in turn masks an even more latent one, on which the real victimizer is the myth-maker and any reader of the myth grabbed by it. Here the myth is about the fulfillment of the Oedipus complex in the male myth-maker or reader, who identifies himself with Oedipus and through him fulfills his own Oedipus Complex. At heart, the myth is not biography but autobiography. In whom does the Oedipus complex lie? To a degree, it lies in all adult males, none of whom has fully outgrown the desires that first arose in childhood. But the complex lies above all in neurotic adult males who are stuck, or fixated, at their Oedipal stage. For many reasons, they cannot fulfill their desires directly. Their parents may no longer be alive, or, if alive, may no longer be so intimidating or so alluring. Furthermore, surely, not even the most indulgent parents would readily consent. Any son who did succeed would likely get caught and punished. And the guilt felt for having killed the father whom one loved as much as hated, and for having forced oneself upon a resisting mother, would be overwhelming. But the biggest obstacle to the enactment of the complex is more fundamental. One does not know that the complex exists. It has been repressed.

Under these circumstances, myth provides the ideal kind of fulfillment. True, the outer layers of the myth hide its true meaning and thereby block fulfillment, but they simultaneously reveal that true meaning and thereby provide fulfillment. After all, on even the literal level Oedipus does kill his father and does have sex with his mother. He simply does so unintentionally. If, on the next level, it is Oedipus rather than the myth-maker or reader who acts intentionally, the action is still intentional. The level above therefore partly reveals, even as it partly hides, the meaning below. The true meaning always lies at the level below but is always conveyed by the level above. By identifying themselves with Oedipus, neurotic adult males secure

a partial fulfillment of their own lingering Oedipal desires, but without becoming conscious of those desires. Myth thus constitutes a compromise between the side of oneself that wants the desires satisfied outright and the side that does not even want to know they exist. For Freud, myth functions *through* its meaning: myth vents Oedipal desires by presenting a story in which, symbolically, they are enacted.

41. Which of the following is true of Oedipus?
- (a) Oedipus laments about being a victim of fate whereas in reality he controlled what happened to him.
 - (b) The myth of Oedipus casts him as an innocent victim of fate, but this was not true of the real Oedipus.
 - (c) Oedipus did not realize that the acts he was destined to do were the very things that he really wanted.**
 - (d) The myth of Oedipus tells us that what he endeavored to do and what he was destined to do were the same things.
41. c The passage does not suggest that Oedipus controls what happens to him. This is the very reason Oedipus appears to be a victim of fate. Hence, option (a) is incorrect. The passage is vague in its description of the real Oedipus. Hence, option (b) cannot be inferred. The passage suggests that the case of Oedipus is that of a person who does not have a conscious realization of his fondest desires and hence, when these very things happen to him, he sees himself as one controlled by destiny; this makes option (c) correct. Option (d) is incorrect as the passage nowhere suggests that Oedipus made a serious effort to do exactly the same things that he was ultimately destined to do.
42. Which of the following can be said about the myth of Oedipus?
- (a) In the myth of Oedipus, the complex that enslaves him is too strong to fight against.
 - (b) The myth of Oedipus is a celebration of the triumph of its protagonist over his destiny.
 - (c) The myth of Oedipus is focused more on what he wanted to do than on what he was destined to do.
 - (d) The myth of Oedipus has a fatalistic ring to it which leads the reader to mistakenly view Oedipus as a victim.**
42. d As per the passage, the readers of the myth of Oedipus get the impression that Oedipus was a victim of his circumstances and could not really escape what was happening to him. This casts Oedipus in a misleading light, as it is difficult for the reader to realize that Oedipus himself wanted the very things that were happening to him. This makes option (d) correct.
43. Which of the following can be inferred from the passage?
- (a) Readers of the Oedipus myth do not realize that they themselves are victims of the Oedipus complex.
 - (b) The function of myths is to provide vicarious fulfillment of suppressed desires.
 - (c) The real victimizer in the myth of Oedipus is any reader who fulfills his desires vicariously through Oedipus.**
 - (d) The second hand pleasure found in reading the myth of Oedipus is the real value of this myth.
43. c Option (c) is correct. Refer to the lines – “Just as the manifest level, on which Oedipus is the victim, masks a latent one, on which Oedipus is the victimizer, so that level in turn masks an even more latent one, on which the real victimizer is the myth-maker and any reader of the myth grabbed by it...” Hence, the author concludes that the real victimizer is the reader who is attracted to the myth. Option (a) is incorrect as the passage clearly says that the Oedipus complex lies in all adult males. Readers of the myth may include women as well, though they may not be victims of the Oedipus complex. Option (b) is incorrect as not all myths may provide vicarious fulfillment. The passage talks about the Oedipus myth only. Option (d) is similarly incorrect as the passage does not comment on the value of the myth but discusses its relation to the reader.

44. The primary purpose of the author of this passage is to
(a) expose the reality of Oedipus and his actual desires.
(b) explain the myth of Oedipus and its value to the reader.
(c) illustrate the value of the myth of Oedipus in an analysis of its reader.
(d) identify the relation between the myth of Oedipus and its reader.
44. d The author of the passage attempts to identify the victimizer in the myth of Oedipus. The passage then further explains why the reader who is grabbed by the myth is the victimizer. According to the author, such a reader is the victimizer as the myth helps him to vicariously fulfill his own unrealized, undiscovered desires. This makes option (d) correct.
45. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.
- The story is told of how Harun Al Raschid, the caliph of Baghdad, would disguise himself as a beggar in order to discover what his subjects were thinking. Surrounded by the flatterers who cluster round absolute power, he could discover the truth of things only in devious ways. Harun was the caliph reputed to have condemned Scheherazade to death, who so charmed him with her stories from evening to evening for a thousand nights that he delayed her execution and eventually married her. This story is a famous image of despotism, a system of order created by conquest, resting on fear, and issuing in caprice. In a despotic system of government, the ultimate principle of order issues from the inclinations of the despot himself. Yet, despotism is not a system in which justice is entirely meaningless: it has generally prevailed in highly traditional societies where custom is king and the prevailing terms of justice are accepted as part of the natural order of things.
- (a) They typically instituted administrative reform, religious toleration, and economic development but did not propose reforms that would undermine their sovereignty or disrupt the social order.
(b) Aristotle asserted that oriental despotism is based not on force, but on consent.
(c) Each person fits into a divinely recognized scheme.
(d) Fear cannot be said to be its motive force as all the governments feed upon the servile nature of those enslaved.
45. c The given paragraph is about a despotic system of government. It starts with the story of Harun, the caliph of Baghdad, who was one of the most well known despots ever. And the paragraph ends by stating that the citizens of such a form of government uncomplainingly accept the despot and his caprices because they believe themselves to be part of "the natural order of things". Option (c) continues in the same strain by saying how everyone in such a government fit into their proper places, into the "divinely recognized scheme". Option (a) is incorrect because it abruptly starts with the pronoun 'they', when the pronoun has no antecedent. Option (b) is beyond the scope of the passage as it talks about "oriental despotism" and not about despotism in general. Option (d) is incorrect because it is a very general statement that talks about "all governments" feeding upon the servile nature of their subjects and the passage has made no allusion to this.
46. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate one.
- A. Modern theories hail from long-standing disciplines such as philosophy, religious studies, and literature, but modern theories come most effusively from the social sciences – anthropology, sociology, and psychology.
B. Theories of myth go back to ancient times.
C. Plato and the Stoics are the best-known ancient theorists, and they offer contrary approaches to myth.

D. There are perhaps as many versions of a story as tellings of that story.

E. There is no one version of any myth.

(a) EDBCA

(b) BEDAC

(c) ACEBD

(d) EDBAC

46. a ED is a mandatory pair. 'One version' in E and 'many versions' in D make them a pair. 'Ancient times' in B and 'ancient theorists' in C make BC a pair. A then follows up with information about modern theories. This makes option (a) correct.

Directions for questions 47 to 49: Answer the questions on the basis of the information given below.

Five students – Aditya, Shobhit, Gautam, Harsh and Prakash – wrote a test, which had 15 questions. In the test, each correct answer fetched 3 marks, whereas each wrong answer attracted a penalty of 1 mark. It is also known that:

- (i) The number of questions attempted by Aditya and Harsh was 9 and 11 respectively.
- (ii) The highest and lowest marks scored in test were 23 and 17.
- (iii) The number of questions attempted by Gautam was 10 less than that attempted by Shobhit and Harsh put together.
- (iv) The marks scored by the students who scored neither the maximum marks nor the minimum marks were consecutive integers.
- (v) The number of questions attempted by Shobhit was 2 more than that by Prakash, who attempted 10 questions.

47. Who scored the second highest marks?

(a) Aditya

(b) Gautam

(c) Prakash

(d) Shobhit

48. The number of questions answered incorrectly by Gautam was

(a) 3

(b) 5

(c) 4

(d) Cannot be determined

49. If the student who attempted the maximum number of questions was not the topper, then who scored the third highest marks?

(a) Aditya

(b) Gautam

(c) Harsh

(d) Prakash

For questions 47 to 49: Using statements (i), (iii) and (v), it can be deduced that the number of questions attempted by Aditya, Shobhit, Harsh, Gautam and Prakash was 9, 12, 11, 13 and 10 respectively. Using statements (ii) and (iv), the final table can be drawn as:

Student	No. of questions attempted	Marks
Aditya	9	23/19
Shobhit	12	20
Harsh	11	17
Gautam	13	19/23
Prakash	10	18

47. d Shobhit scored the second highest marks.

48. d The number of questions answered incorrectly by Gautam could be either 4 or 5.

49. b Since Gautam, who attempted the maximum number of questions, was not the topper, he must have been the third highest scorer.

Directions for questions 50 to 52: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

In many of the somewhat violent attacks that have recently been made on that splendor of mounting which now characterizes our Shakespearian revivals in England, it seems to have been tacitly assumed by the critics that Shakespeare himself was more or less indifferent to the costumes of his actors, and that, could he see Mrs. Langtry's production of Antony and Cleopatra, he would probably say that the play, and the play only, is the thing, and that everything else is leather and prunella. While, as regards any historical accuracy in dress, Lord Lytton, in an article in the Nineteenth Century, has laid it down as a dogma of art that archaeology is entirely out of place in the presentation of any of Shakespeare's plays, and the attempt to introduce it, one of the stupidest pedantries of an age of prigs.

Lord Lytton's position I shall examine later on; but, as regards the theory that Shakespeare did not busy himself much about the costume-wardrobe of his theatre, anybody who cares to study Shakespeare's method will see that there is absolutely no dramatist of the French, English, or Athenian stage who relies so much for his illusionist effects on the dress of his actors as Shakespeare himself.

Knowing how the artistic temperament is always fascinated by beauty of costume, he constantly introduces into his plays masques and dances, purely for the sake of the pleasure which they give the eye; and we have still his stage-directions for the three great processions in Henry the Eighth, directions which are characterized by the most extraordinary elaborateness of detail down to the collars of S.S. and the pearls in Anne Boleyn's hair. Indeed, it would be quite easy for a modern manager to reproduce these pageants absolutely as Shakespeare had them designed; and so accurate were they that one of the court officials of the time, writing an account of the last performance of the play at the Globe Theatre to a friend, actually complains of their realistic character, notably of the production on the stage of the Knights of the Garter in the robes and insignia of the order, as being calculated to bring ridicule on the real ceremonies, much in the same spirit in which the French Government, some time ago, prohibited that delightful actor, M. Christian, from appearing in uniform, on the plea that it was prejudicial to the glory of the army that a colonel should be caricatured. And elsewhere, the gorgeousness of apparel, which distinguished the English stage under Shakespeare's influence, was attacked by contemporary critics, not, as a rule, however, on the grounds of the democratic tendencies of realism, but usually on those moral grounds which are always the last refuge of people who have no sense of beauty.

50. The author of the passage is likely to agree with which of the following statements?
- Lord Lytton's position on historical accuracy of dress in plays is not correct.
 - Shakespeare saw how important costume was as a means of producing dramatic effects.**
 - Archaeology in shows, so far from being a bit of priggish pedantry, is in every way legitimate and beautiful.
 - Anachronisms in the Shakespearean plays show his indifference to historical accuracy.
50. b The passage mentions Lord Lytton's position on archaeology in plays but does not comment on that position. Hence, options (a) and (c) are incorrect. Refer to these lines from the second paragraph – “anybody who cares to study Shakespeare's method will see that there is absolutely no dramatist of the French, English, or Athenian stage who relies so much for his illusionist effects on the dress of his actors as Shakespeare himself...” This clearly makes option (b) correct. Refer to the lines – “so accurate were they that one of the court officials of the time, writing an account of the last performance of the play at the Globe Theatre to a friend, actually complains of their realistic character”. This shows that Shakespeare was not indifferent to either the beauty of costumes or their accuracy. Hence, option (d) is incorrect.

51. Which of the following is likely to be true of Shakespeare?
- (a) Some of Shakespeare's dramatis personae are people who had actually existed.
 - (b) Shakespeare often draws from authentic history.
 - (c) Shakespeare may have approved a movement in art that relied on truth for its appeal.
 - (d) All of the above
51. d The passage gives examples of how the accuracy in Shakespearean plays offended some viewers. This makes options (a) and (b) correct. The passage also suggests that Shakespeare believed in art that relied on truth for its appeal. Refer to these lines from the last paragraph of the passage, "...so accurate were they that one of the court officials ... actually complains of their realistic nature..." From this, it can be inferred that during the time of Shakespeare, had there been a movement in art that relied on truth for its appeal, it is highly likely that Shakespeare, since he himself did the same in his plays, would have approved of the movement. This makes option (c) correct too. Therefore, option (d) is the correct answer.
52. The author is most likely to categorize which of the following as 'people who have no sense of beauty'?
- A. The court official who wrote an account of the last performance of the play at the Globe Theatre
 - B. Critics writing about the recent Shakespearian revivals in England
 - C. The French Government
- (a) A and C (b) A and B (c) Only B (d) All of the above
52. c The author begins and ends the passage by criticizing those critics who comment on the emphasis paid to dress in Shakespearean plays being enacted today. Refer to the last line of the last paragraph, "...the gorgeousness of apparel...was attacked by contemporary critics...usually on those moral grounds which are always the last refuge of people who have no sense of beauty." This makes statement B correct. In the very line quoted above, the author states that this criticism is not on the grounds of the democratic tendencies of realism, which is the case with the French government and the court official (both being offended by the accuracy of dress and customs and its ability to bring ridicule on real ceremonies, etc.). Hence, statements A and C are incorrect. Therefore, option (c) is the correct answer.
53. The word given below has been used in the given sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is *incorrect or inappropriate*.

AWAY

- (a) There were ten children away yesterday. (b) They danced away the night.
(c) Away with all these rules and regulations! (d) The station is a few minutes away from here.
53. b The usage of the word 'away' in option (a) is correct. It means not present. The sentence in option (b) is incorrect. 'Away' has been placed incorrectly. The correct sentence should be 'They danced the night away', wherein 'away' means until disappearing completely, that is, all night. The usage of 'away' in both the sentences given in option (c) and (d) is correct. 'Away with' is used to say that you would like to be rid of somebody or something. In (d), 'away' has been used in the sense of being at a distance from somebody/something. Therefore, option (b) is the correct answer.
54. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately.

To show that Jung's theory, when applied, _____ the myth of Adonis would not itself establish the _____ of a collective unconscious, which, on the contrary, would be presupposed.

- (a) elucidates, existence (b) explains, dominance
(c) refutes, possibility (d) lifts, existence

54. a The correct sentence should have elucidates and existence in the given blanks respectively. Therefore, option (a) is the correct answer. Other options do not fit in the given context. '...Explains the myth would not itself establish the dominance...' is incorrect; '...Explains the myth would not itself establish the dominance of Jung's Theory' could have been correct. Thus, option (b) is incorrect. A myth cannot be refuted. A myth is only a story. The possibility of a story being factually accurate may be refuted but the story itself cannot be refuted; an argument may be refuted. Thus, option (c) is also incorrect. 'Lifts the myth' does not make any sense at all; 'lifts the myth to the level of ...' would have been meaningful. Hence, option (d) is incorrect.

Directions for questions 55 to 57: Answer the questions on the basis of the information given below.

The district court of Jurmnagar pronounced sentence in five cases, on five different days of a week from Monday to Friday, involving five different convicts – Munna, Chotu, Panga, Todu and Katku. Each of the convicts is of a different age among 42, 36, 52, 35 and 28 years. After conviction, all of them were sent to the same penitentiary, where the jailer of the penitentiary, on the background check of the five convicts, found that they were arrested in a week, which was not the week in which they were sentenced, on five different days from Monday to Friday. It is also known that:

- (i) Todu and Katku were arrested on two consecutive days.
 - (ii) Katku, who is oldest among the five, was sentenced after Chotu.
 - (iii) Chotu's age is half the sum of the ages of Munna and Panga.
 - (iv) Munna, who was arrested on Tuesday, was sentenced on Thursday.
 - (v) Panga was arrested before Munna, but sentenced after him.
55. Which of the following must not have been the days on which the second youngest person was arrested?
(a) Monday, Tuesday and Thursday
 (b) Monday, Tuesday and Wednesday
 (c) Monday, Tuesday and Friday
 (d) None of these
56. The absolute difference(in years) between the ages of Munna and Panga is
 (a) 7 **(b) 14** (c) 6 (d) 16
57. Katku was sentenced on
 (a) Wednesday (b) Tuesday (c) Monday **(d) Either (a) or (b)**

For questions 55 to 57: Using statements (ii) and (iii), the ages of the convicts can be tabulated as:

Name of Convict	Age
Munna	42/28
Chotu	35
Panga	28/42
Todu	36
Katku	52

Using statements (i), (iv) and (v), we can draw the final table as:

Name of convict	Age	Arrested on	Sentenced on
Munna	42/28	Tuesday	Thursday
Chotu	35		
Panga	28/42	Monday	Friday
Todu	36		
Katku	52		

55. a The second youngest person is Chotu. Using statement (i), we can say that Chotu could never be arrested on Thursday. Since Munna and Panga were arrested on Monday and Tuesday, Chotu could not be arrested on these two days as well. Hence, option (a) is the correct answer.
56. b The required difference = $42 - 28 = 14$ years.
57. d Since Katku was sentenced after Chotu, he must have been sentenced on either Tuesday or Wednesday.

Directions for questions 58 to 60: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

There exists a vague belief that some combination of evolutionary theory, biology, and neuroscience will support a Grand Unifying Pessimism. Indeed, most of the popular books on ethics in bookstores fall into one of two camps. There are those that provide chicken soup for the soul: soggy confections of consolation and uplift. Or, there are those that are written by one or another life scientist, a neuroscientist or biologist or animal behaviorist or evolutionary theorist, anxious to tell us that 'science' has shown that we are all one thing or another. Once more we stand unmasked - human beings are 'programmed'. We are egoists, altruism doesn't exist, ethics is only a fig leaf for selfish strategies, we are all conditioned, women are nurturing, men are rapists, we care above all for our genes. There is good news and bad news about the popularity of this genre. The good news is that we do have a relentless appetite for self-interpretation. There is a huge desire to find patterns of behavior, enabling us to understand and perhaps control the human flux. The bad news is that we will accord authority to anyone in a white coat, even when the science is over (for, as we are about to see, talking of the significance of science is not talking science). We should only venture into this literature if we are armed against three confusions. The first is this: it is one thing to explain how we come to be as we are; it is a different thing to say that we are different from what we think we are. Yet, these are fatally easy to confuse with each other. Suppose, for instance, evolutionary theory tells us that mother's love is an adaptation. This means that it has been 'selected for', because animals in which it exists reproduce and spread their genetic material more successfully than ones in which it does not. We could, if we like, imagine a 'gene for mother's love'. Then the claim would be that animals with this gene are and have been more successful than animals having only a variant (an allele) that does not code for mother's love (this is likely to be grossly oversimplified, but it's a model that will make the point). The confusion would be to infer that *therefore* there is not really any such thing as mother's love: thus, we unmask it! The confusion is to infer that underneath the mask we are only concerned about spreading genetic material more successfully.

Not only does this not follow but also it actually contradicts the starting point. The starting point is 'Mother's love exists, and this is why'; the conclusion is that mother's love doesn't exist. In other words, an evolutionary story, plausible or not, about the genetic function of a trait such as mother's love must not be confused with a psychological story unmasking a mother's 'real concern'. We should not rear a generation of children taught to turn round and say, 'You didn't really care about me, you only cared about your genes.' Perhaps nobody would make this mistake so baldly in this instance. But consider the idea of 'reciprocal altruism'. Game theorists and biologists noticed that animals frequently help each other when it would seem to be to their advantage not to do so. They asked the perfectly good question of how such behavior could have evolved, when it looks set to lose out to a more selfish strategy. The answer is (or may be) that it is adaptive insofar as it triggers reciprocal helping behavior from the animal helped, or from others witnessing the original event. In other words, we have a version of 'You scratch my back and I'll scratch yours'.

58. Which of the following depicts the main idea of the passage?
- (a) **We can make the mistake of inferring that the psychology is not what it seems to be because of its functional explanations.**
- (b) The scientific explanations of psychological phenomenon are often inconsequential.
- (c) Scientific theories aiming to explain psychological phenomenon may contradict their premises.
- (d) It is not possible to gauge the sincerity of the response to the question 'what do you really care about?'
58. a Throughout the entire passage, the author explains how due to certain interpretations we end up with an incorrect understanding of psychology. Hence, option (a) is the correct answer. The passage does not comment on whether the scientific explanation of psychological phenomenon is inconsequential; hence, option (b) cannot be inferred. Option (c) is incorrect because scientific theories do not contradict their premises; instead, we make inferences that contradict the premises. Option (d) is irrelevant.
59. Which of the following is the author likely to agree with?
- (a) People confuse mother's love with mother's real concern.
- (b) Animals help each other only because they want to be helped in turn.
- (c) **We can make the mistake of believing that apparent concerns are not real concerns.**
- (d) We only care to maximize our chance of getting a return on our investments of helping behavior.
59. c Options (b) and (d) are incorrect because of the presence of the word 'only' in both the options. Option (a) is given only as an example in the passage and the result cannot be generalized. Option (c) clearly follows from the passage.
60. Which of the following can be taken as an example of reciprocal altruism?
- A. A driver gives a penniless hitchhiker a lift.
- B. A diner tips a waiter despite knowing that he may never see the waiter again.
- C. A contestant in a beauty pageant helps another contestant in getting ready.
- (a) B and C (b) Only C (c) A and B (d) All of the above
60. b Only statement C presents a case where the altruist can expect the same treatment in turn. Hence, option (b) is the correct answer.