

Proctored Mock CAT- 8 2014

Section I: QA & DI

1. Royal Super Riders, one of the ten KPL teams, has 6 batsmen, 4 bowlers and 1 wicketkeeper of Indian origin and 2 batsmen, 2 bowlers and 1 wicketkeeper of Non-Indian origin. In how many ways can a playing eleven, comprising 6 batsmen, 4 bowlers and 1 wicketkeeper, be selected such that it contains exactly 2 Non-Indian players?

(a) 89 (b) 129 (c) 137 (d) 152

1. c The following table gives all the possible compositions of the team and the number of ways corresponding to each one of them under the given conditions:

Sn.	Indian Origin	Non-Indian origin	Number of ways
1	4 Batsmen, 4 Bowlers, 1 Wicket-keeper	2 Batsmen	${}^6C_4 \times {}^4C_4 \times {}^1C_1 \times {}^2C_2 = 15$
2	6 Batsmen, 2 Bowlers, 1 Wicket-keeper	2 Bowlers	${}^6C_6 \times {}^4C_2 \times {}^1C_1 \times {}^2C_2 = 6$
3	5 Batsmen, 3 Bowler, 1 Wicket-keeper	1 Batsman, 1 Bowler	${}^6C_5 \times {}^4C_3 \times {}^1C_1 \times {}^2C_1 = 96$
4	5 Batsmen, 4 Bowler	1 Batsman, 1 Wicket-keeper	${}^6C_5 \times {}^4C_4 \times {}^2C_1 \times {}^1C_1 = 12$
5	6 Batsmen, 3 Bowler	1 Bowler, 1 Wicket-keeper	${}^6C_6 \times {}^4C_3 \times {}^2C_1 \times {}^1C_1 = 8$

Hence, there are 137 ways.

2. At how many distinct points do the graphs of the two functions $x - |2y| + 5 = 0$ and $y = 2 - |x|$ intersect each other?

(a) 4 (b) 2 (c) 3 (d) 0

2. b There are four possibilities:

I. When $2y > 0$ and $x > 0$.

$$x - 2y + 5 = 0$$

$$y = 2 - x$$

$$\Rightarrow x = -\frac{1}{3} \text{ and } y = \frac{7}{3}$$

It does not satisfy as $x < 0$.

II. When $x < 0$ and $2y < 0$.

$$x + 2y + 5 = 0$$

$$y = 2 + x$$

$$\Rightarrow x = -3 \text{ and } y = -1$$

This satisfies the given condition.

III. When $x < 0$ and $2y > 0$.

$$x - 2y + 5 = 0$$

$$y = 2 + x$$

$$\Rightarrow x = 1 \text{ and } y = 3$$

It does not satisfy as $x > 0$.

IV. When $x > 0$ and $2y < 0$.

$$x + 2y + 5 = 0$$

$$y = 2 - x$$

$$\Rightarrow x = 9 \text{ and } y = -7$$

This satisfies the given condition.

Hence, the graph intersect at two points.

3. A total of 780 handshakes took place among the students of a class. In the class, if every student shook hands with every other student exactly once and a total of 66 handshakes took place among girls. The number of handshakes that involved a boy and a girl was
 (a) 406 (b) 308 (c) 306 (d) 336

3. d Let the total number of students in the class be 'n'.

$$\therefore \text{Total number of handshakes in the class} = {}^nC_2 = \frac{n(n-1)}{2} = 780$$

$$\Rightarrow n = 40.$$

Let the number of girls in the class be 'k'.

$$\therefore {}^kC_2 = \frac{k(k-1)}{2} = 66 \Rightarrow k = 12$$

$$\therefore \text{Number of boys} = 40 - 12 = 28$$

Hence, the total number of handshakes that involves a boy and a girl = ${}^{28}C_1 \times {}^{12}C_1 = 336$.

4. The ratio of the area of triangle ABD and that of triangle BCD is 1 : 3. If the coordinates of A, B, C and D are (0, 0), (a, b), (a^2, ab) and (a^3, ab^2) , find the value of 'a'.
 (a) 1 (b) 4 (c) 3 (d) -1

4. b $\frac{\text{Area of } \triangle ABD}{\text{Area of } \triangle BCD} = \frac{1}{3}$

$$\Rightarrow \frac{\frac{1}{2}[0(b-ab^2) + a(ab^2-0) + a^3(0-b)]}{\frac{1}{2}[a(ab-ab^2) + a^2(ab^2-b) + a^3(b-ab)]} = \frac{1}{3}$$

$$\Rightarrow \frac{a^2b^2 - a^3b}{-a^2b^2 + a^3b^2 + a^3b - a^4b} = \frac{1}{3} \Rightarrow \frac{1}{a-1} = \frac{1}{3} \Rightarrow a = 4.$$

5. The interest accrued in the first two years and that in the first three years on a sum invested at a certain rate of interest, compounded annually, were Rs. 1050 and Rs. 1655 respectively. What was the rate of interest?
 (a) 10% (b) 12% (c) 15% (d) 20%

5. a Let the rate of interest be r%.

The interest received in the first year = $\frac{Pr}{100} = k$ (say)

Total interest received in the first two years

$$= k + k\left(1 + \frac{r}{100}\right) = k\left(2 + \frac{r}{100}\right) = 1050 \quad \dots \text{(i)}$$

Interest received in the third year

$$= k\left(1 + \frac{r}{100}\right)^2 = 1655 - 1050 = 605 \quad \dots \text{(ii)}$$

Dividing (i) by (ii), we get

$$\frac{k\left(2 + \frac{r}{100}\right)}{k\left(1 + \frac{r}{100}\right)^2} = \frac{1050}{605} \Rightarrow \frac{\left(2 + \frac{r}{100}\right)}{\left(1 + \frac{r}{100}\right)^2} = \frac{210}{121} \Rightarrow r = 10\%.$$

6. The total money with the three classmates – Abla, Bholu and Chalu – is Rs. 96000. Abla gives Bholu an amount what Bholu already has; Bholu then gives Chalu an amount what Chalu already has; Chalu then gives Abla an amount what Abla now has. Finally, all the three have an equal amount. What is the absolute difference (in Rs.) between the original amount with Abla and that with Chalu?
- (a) 4000 (b) 16000 (c) 20000 (d) 24000

6. c Let the initial amount with Abla, Bholu and Chalu be A, B and C respectively.

$$\therefore A + B + C = 96000$$

When Abla gives an amount to Bholu what he already has, the amount with the three will be:

$$\text{Abla} = A - B; \quad \text{Bholu} = B + B = 2B; \quad \text{Chalu} = C$$

When Bholu given an amount to Chalu what he already has, the amount with the three will be:

$$\text{Bholu} = 2B - C; \quad \text{Chalu} = C + C = 2C; \quad \text{Abla} = A - B$$

When Chalu gives an amount what Abla now has, then the amount with the three will be:

$$\text{Abla} = 2(A - B); \quad \text{Bholu} = 2B - C; \quad \text{Chalu} = 2C - (A - B)$$

Now, all the three has an equal amount

$$\therefore 2A - 2B = 2B - C = 2C - A + B$$

$$\Rightarrow 2C - A + B = 2(A - B) \Rightarrow C = \frac{3}{2}(A - B)$$

$$\text{Also, } 2B - C = 2(A - B)$$

$$\Rightarrow 2B - \frac{3}{2}(A - B) = 2(A - B) \Rightarrow A = \frac{11}{7}B \text{ and } C = \frac{6}{7}B$$

$$\Rightarrow A : B : C = 11 : 7 : 6 \Rightarrow A = 44000 \quad B = 28000 \quad C = 24000$$

Hence, the absolute difference between the amounts with Abla and Chalu is Rs. 20000.

7. A rhombus, with side 4 cm, is rotated around its longer diagonal to make a solid. If the length of the shorter diagonal of the rhombus is $2\sqrt{7}$ cm, what is the volume (in cm^3) of the solid thus formed?

- (a) 44 (b) 22 (c) 8π (d) 16π

7. a The solid formed will be of the shape where two identical cones are joined from their bases. The height of each cone will be half of the longer diagonal and the radius will be half of the shorter diagonal.

Let the length of the larger side be 'd'

$$\therefore 4^2 = \left(\frac{2\sqrt{7}}{2}\right)^2 + \left(\frac{d}{2}\right)^2 \Rightarrow d = 6$$

$$\therefore \text{Volume of the cone} = \frac{1}{3} \times \frac{22}{7} \times (\sqrt{7})^2 \times 3 = 22 \text{ cm}^3$$

$$\therefore \text{Volume of the solid} = 2 \times 22 = 44 \text{ cm}^3.$$

8. A contractor undertakes the task of painting the outer curved surface of a hemispherical dome of diameter 20 m at the rate of Rs. 140 per sq. meter. The cost of painting includes cost of paint and cost of labor. If contractor earns a profit of 10% and the cost of paint is Rs. 30,000, what is the cost of labor?

- (a) Rs. 80000 (b) **Rs. 50000** (c) Rs. 49200 (d) Rs. 58000

8. b Surface area of the dome = $2\pi r^2 = 2 \times \frac{22}{7} \times 10 \times 10 = \frac{4400}{7} \text{ m}^2$

Total cost of painting the dome at the rate Rs. $140/\text{m}^2 = \frac{4400}{7} \times 140 = \text{Rs. } 88,000$

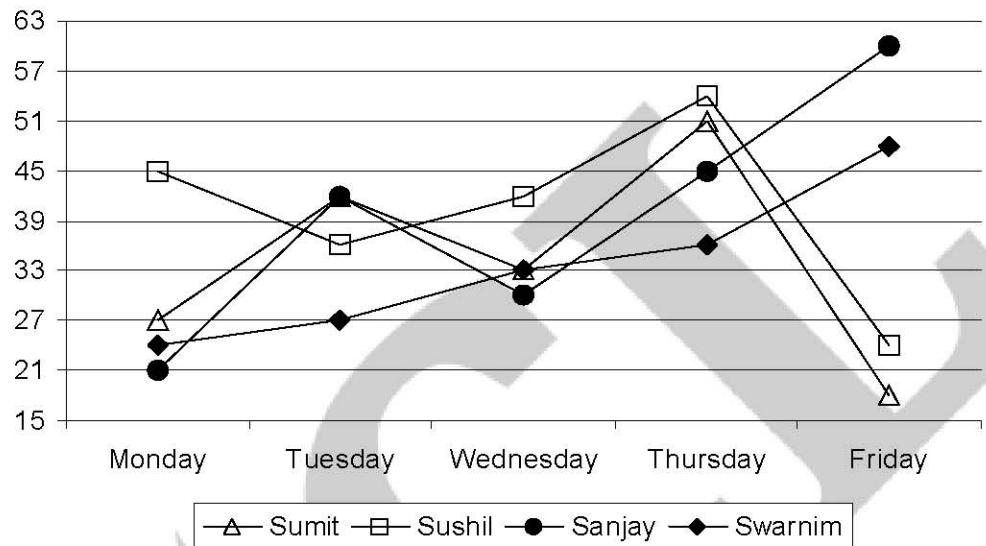
The contractor earns a profit of 10%

$$\therefore \text{The amount spent by the contractor} = 88000 \times \frac{10}{11} = \text{Rs. } 80,000.$$

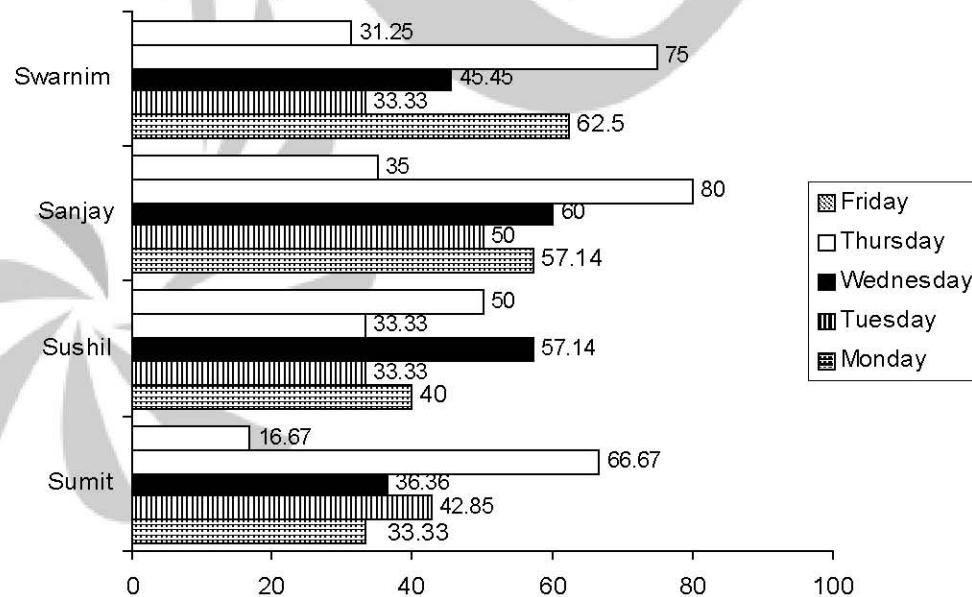
Hence, the required cost = $80000 - 30000 = \text{Rs. } 50,000$

Directions for questions 9 to 11: Answer the questions on the basis of the information given below.

Sumit, Sushil, Sanjay and Swarnim work in a BPO named Koshish. They are entrusted with the responsibility of handling calls pertaining to issues related to the existing customers and queries of prospective customers, different from existing customers. The line graph given below shows the number of calls, of the aforementioned types, received by the four persons from Monday to Friday of a week.



The bar graph given below shows the approximate percentage of calls received by the four persons from the existing customer as a percentage of total calls received by them.



9. What was the average of the number of queries received by Sushil from the existing customers from Tuesday to Thursday?
- (a) 54 (b) 12 (c) 24 (d) 18

10. Who received the maximum number of queries from prospective customers on Wednesday?
 (a) Sumit (b) Sushil (c) Sanjay (d) Swarnim
11. On which of the given days did all of the four persons put together received the maximum number of queries from prospective customers?
 (a) Monday (b) Wednesday (c) Thursday (d) Friday

For questions 9 to 11:

9. d The average = $\frac{33.33\% \text{ of } 36 + 57.14\% \text{ of } 42 + 33.33\% \text{ of } 54}{3} = 18.$

10. a On Wednesday the queries received from prospective customers by:

$$\text{Sumit} = (100 - 36.36)\% \text{ of } 33 = 63.64\% \text{ of } 33 = 21$$

$$\text{Sushil} = (100 - 57.14)\% \text{ of } 42 = 42.86\% \text{ of } 42 = 18$$

$$\text{Sanjay} = (100 - 60)\% \text{ of } 30 = 40\% \text{ of } 30 = 12$$

$$\text{Swarnim} = (100 - 45.45)\% \text{ of } 33 = 54.55\% \text{ of } 33 = 18$$

Hence, Sumit received the maximum number of queries from prospective customers.

11. d The queries received from prospective customers by the four persons put together on:

$$\text{Monday} = (66.67\% \text{ of } 27 + 60\% \text{ of } 45 + 42.86\% \text{ of } 21 + 37.5\% \text{ of } 24) = 18 + 27 + 9 + 9 = 63$$

$$\text{Tuesday} = (57.15\% \text{ of } 42 + 66.67\% \text{ of } 36 + 50\% \text{ of } 42 + 66.67\% \text{ of } 27) = 24 + 24 + 21 + 18 = 87$$

$$\text{Wednesday} = (63.64\% \text{ of } 33 + 42.86\% \text{ of } 42 + 40\% \text{ of } 30 + 54.55\% \text{ of } 33) = 21 + 18 + 12 + 18 = 69$$

$$\text{Thursday} = (33.33\% \text{ of } 51 + 66.67\% \text{ of } 54 + 20\% \text{ of } 45 + 25\% \text{ of } 36) = 17 + 36 + 9 + 9 = 71$$

$$\text{Friday} = (83.33\% \text{ of } 18 + 50\% \text{ of } 24 + 65\% \text{ of } 60 + 68.75\% \text{ of } 48) = 15 + 12 + 39 + 33 = 99$$

Hence, the maximum number of such calls was received on Friday.

12. If $x(x - a) = 6(1 + a^2)$, where 'a' is a natural number, then for how many values of 'a' is 'x' a natural number?
 (a) 2 (b) 0 (c) 1 (d) More than 3

12. c $x(x - a) = 6(1 + a^2) \Rightarrow x^2 - ax - 6(a^2 + 1) = 0$

$$x = \frac{a \pm \sqrt{a^2 + 24(a^2 + 1)}}{2} = \frac{a \pm \sqrt{25a^2 + 24}}{2}$$

As x is a natural number, $(25a^2 + 24)$ has to be the square of a natural number.

$$\text{Let } b^2 = 25a^2 + 24.$$

$$\therefore b^2 - 25a^2 = 24$$

$$\Rightarrow (b - 5a)(b + 5a) = 24$$

Since 'a' and 'b' are natural numbers, $(b - 5a) < (b + 5a)$ and 24 has to be the product of two natural numbers.

$$\therefore (b - 5a)(b + 5a) = 24 = 1 \times 24 = 2 \times 12 = 3 \times 8 = 4 \times 6$$

On comparing the values, we get 'a' as a natural number only for the case 2×12 , wherein $a = 1$ and $b = 7$ and $x = 4$.

Hence, there is only one value of a for which x is a natural number.

13. Find the value of the following expression:

$$\log_a x + 2 \times \log_{\frac{1}{a^2}} x^2 + 3 \times \log_{\frac{1}{a^3}} x^3 + \dots + n \times \log_{\frac{1}{a^n}} x^n.$$

(a) $\left[\frac{n(n+1)}{2} \right]^2 \times \log_a x$

(b) $\left[\frac{n(n+1)}{2} \right] \times \log_a x$

(c) $\left[\frac{n(n+1)(2n+1)}{6} \right] \times \log_a x$

(d) $\left[\frac{n(n+1)}{4} \right] \times \log_a x$

13. a $\log_a x + 2 \times \log_{\frac{1}{a^2}} x^2 + 3 \times \log_{\frac{1}{a^3}} x^3 + \dots + n \times \log_{\frac{1}{a^n}} x^n$

$$\Rightarrow \log_a x + \frac{2 \times 2}{2} \log_a x + \frac{3 \times 3}{3} \log_a x + \dots + \frac{n \times n}{n} \log_a x \Rightarrow \log_a x [1 + 2^2 + 3^2 + \dots + n^2] = \left(\frac{n(n+1)}{2} \right)^2 \log_a x.$$

14. What is the value of $\lceil \sqrt[3]{50} \rceil + \lceil \sqrt[3]{51} \rceil + \lceil \sqrt[3]{52} \rceil + \lceil \sqrt[3]{53} \rceil + \dots + \lceil \sqrt[3]{1000} \rceil$, where $[x]$ represents the greatest integer less than or equal to x ?
 (a) 6864 (b) **6871** (c) 6863 (d) 6976

14. b The value of each of the quantities from $\lceil \sqrt[3]{50} \rceil$ to $\lceil \sqrt[3]{63} \rceil$ will be 3, that of each of the quantities from $\lceil \sqrt[3]{64} \rceil$ to $\lceil \sqrt[3]{124} \rceil$ will be 4 and so on.

$$\therefore \text{The value of the given expression} = 3(63 - 50 + 1) + 4(124 - 64 + 1) + 5(215 - 125 + 1) + 6(342 - 216 + 1) + 7(511 - 343 + 1) + 8(728 - 512 + 1) + 9(999 - 729 + 1) + 10 \\ = (3 \times 14) + (4 \times 61) + (5 \times 91) + (6 \times 127) + (7 \times 169) + (8 \times 217) + (9 \times 271) + 10 \\ = 42 + 244 + 455 + 762 + 1183 + 1736 + 2439 + 10 = 6871$$

15. If the ratio of the sum of the cubes of the first $(n - 2)$ natural numbers to that of the squares of the first $(n + 1)$ natural numbers is $1000 : 77$, find the value of n .

- (a) 25 (b) **26** (c) 27 (d) 28

15. b Sum of the cubes of the first $(n - 2)$ natural numbers = $\left[\frac{(n-2)(n-1)}{2} \right]^2$

$$\text{Sum of the square of the first } (n+1) \text{ natural numbers} = \frac{(n+1)(n+2)(2n+3)}{6}$$

According to the question,

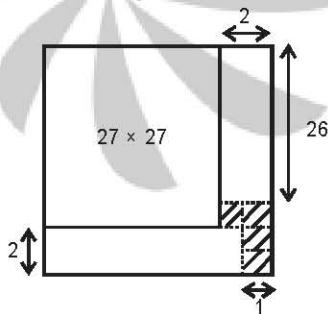
$$\frac{\left[\frac{(n-2)(n-1)}{2} \right]^2}{\frac{(n+1)(n+2)(2n+3)}{6}} = \frac{1000}{77} \Rightarrow \frac{\left[(n-2)(n-1) \right]^2}{(n+1)(n+2)(2n+3)} = \frac{2000}{231}$$

Now, using the options we see that '26' satisfies the equation.

Hence, option (b) is the correct answer.

16. A square shaped floor of dimensions 29×29 is fully covered with square shaped tiles of dimensions 1×1 , 2×2 and 3×3 . The number of tiles used of dimensions 1×1 to cover the floor cannot be less than
 (a) 8 (b) 2 (c) 1 (d) 4

16. d 3×3 tiles may be used to cover 27×27 units part of the floor.



The left out part, as shown in the above figure, may be covered by using the 2×2 tiles.

The shaded part shows the part that cannot be filled even by using 2×2 tiles and have to be filled by 1×1 tiles.
 Hence, the minimum number of tiles of dimension 1×1 is required is 4.

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

The parliamentary elections in the Republic of ASU, having three states, namely Ultra Pradesh, Karela and Hurryana, follow the constituency system in which each state is divided into a number of constituencies and a member of parliament is elected from each constituency. There are four recognized parties – DJP, Wrongless, CRAAP and PSB – that can contest parliamentary elections in the country. A party fields its candidates in some or all the constituencies of each of the three states. A party is said to have a clear majority in a state if it wins from more than 50% constituencies of that state.

The last parliamentary elections in the country were held in May 2014. The following table gives the data related to the constituency-wise number of votes cast in the three states. For example, there were 42 constituencies in Ultra Pradesh with the number of votes cast less than 150000.

State	Number of Constituencies with votes range			
	100000	Less than 150000	Less than 200000	Less than 250000
Ultra Pradesh	24	42	87	93
Karela	48	60	72	83
Hurryana	15	45	75	80

Assume all cast votes to be valid votes.

17. If all the four parties contested from all the constituencies in Ultra Pradesh and CRAAP secured a clear majority in the state, the approximate percentage of votes secured by CRAAP in Ultra Pradesh could not be less than
 (a) 14% (b) 8.5% (c) 6% (d) 18%
17. b In order to minimize the number of votes received by CRAAP, the following constraints must be followed:
 (i) CRAAP must have won from those constituencies that had lesser number of votes, with the minimum percentage of votes.
 (ii) It must have won from exactly 47 constituencies.
 (iii) It must not have received any votes from the rest of the constituencies i.e. 46.
 (iv) Consider the votes cast to be the minimum, in the given range, in each of the constituency from where CRAAP won and the maximum from where it lost.
 Required votes received by CRAAP
 $= 25\% \text{ of } [24 \times 10^5 + 18 \times 10^5 + 5 \times 1.5 \times 10^5]$
 $= 25\% \text{ of } [49.5 \times 10^5]$
 $= 12.375 \times 10^5$
 Total votes casted in order to minimize the required percentage $= 24 \times 10^5 + 18 \times 10^5 + (5 \times 1.5 \times 10^5 + 40 \times 2 \times 10^5) + 6 \times 2.5 \times 10^5 = 144.5 \times 10^5$
- \therefore The percentage $= \frac{12.375 \times 10^5}{144.5 \times 10^5} \times 100 \approx 8.56\%$.

Note: For the calculation purpose, we have considered 100001 as 100000. The same has been done with many other figures. It has been done in order to make calculation simpler. The changes would not make any significant difference to the required result.

18. In Karela, if a party lost from all the constituencies, the number of votes secured by the party in the state could not be more than
 (a) 5874920 (b) 5874999 (c) 5874917 (d) 5875000

18. c To maximize the required number, the party that lost from all the constituencies must have received one vote less than from 50% votes in all the constituencies in Karela, and consider the votes cast to be the maximum for the constituencies in the given vote range.

The required number of votes

$$= 50\% \text{ of } [48 \times 10^5 + 12 \times 1.5 \times 10^5 + 12 \times 2 \times 10^5 + 11 \times 2.5 \times 10^5] - 83 = 58.75 \times 10^5 - 83 = 5874917.$$

19. If only two parties contested from Hurryana and each of them contested from all the constituencies in Hurryana, the approximate percentage of votes secured by the party that could not secure a majority in the state could not be more than (Assume a party secured a clear majority in Hurryana and voters polled to be the same as that given in the table.)

(a) 64

(b) 83

(c) 72

(d) 75

19. b By using the concepts used in the previous questions, we evaluate the required number for this question.
The maximum number of votes that a party could secure without securing majority

$$= 5 \times 250000 + 30 \times 200000 + \left(4 \times 1.5 \times 100000 + \frac{26 \times 10^5}{2} \right) + 15 \times \frac{100000}{2} = 9.9 \times 10^6$$

$$\text{Total votes casted} = 5 \times 250000 + 30 \times 200000 + (4 \times 1.5 \times 10^5 + 26 \times 10^5) + 15 \times 10^5 = 11.95 \times 10^6$$

$$\text{The required percentage} = \frac{9.9 \times 10^6}{11.95 \times 10^6} \times 100 = 82.8\% \approx 83\%.$$

20. If the measures (in cm) of the three altitudes of a triangle are 6, 4.8 and 8, what is the area (in cm^2) of the triangle?

(a) 12

(b) 48

(c) 24

(d) 32

20. c Let the sides of the triangle be a , b and c cm; the length of the altitudes be 6, 4.8 and 8 cm respectively and the area of the triangle be A cm^2 .

$$\text{Now, Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\Rightarrow 2A = 6a = 4.8b = 8c$$

$$\Rightarrow a = \frac{A}{3}; b = \frac{5}{12} A \text{ and } C = \frac{A}{4}$$

$$S = \frac{\frac{A}{3} + \frac{5A}{12} + \frac{A}{4}}{2} = \frac{A}{2}$$

Using Heron's Formula,

$$A = \sqrt{\frac{A}{2} \left(\frac{A}{2} - \frac{A}{3} \right) \left(\frac{A}{2} - \frac{5A}{12} \right) \left(\frac{A}{2} - \frac{A}{4} \right)}$$

$$\Rightarrow A = 24 \text{ cm}^2.$$

21. If $X^{abc} + Y^{bcd} + Z^{cda} + W^{dab} = 16$ and $a^{XYZ} + b^{YZW} + c^{ZWX} + d^{WXY} = M$, where a, b, c, d, X, Y, Z and W are natural numbers, then the minimum possible value of M is

(a) 4

(b) 8

(c) 16

(d) None of these

21. a To minimize the value of M , the values of a, b, c and d should be the minimum.

Since they are natural numbers, the minimum values of a, b, c and d will be 1.

Now, irrespective of the values of W, X, Y and Z , the minimum value of M will be 4.

22. A, B and C ran a 500 m race. To record the time taken by A to complete the race, watch W1 was used, and to do the same for B and C, watch W2 was used. According to the corresponding watches, the time taken by A, B and C to finish the race was 50 seconds, 60 seconds and 30 seconds respectively. If W2 was a faulty clock, which was losing time uniformly, and A beats B by 100 m, what was the speed of C during the race?
- (a) 16 m/s (b) 15 m/s (c) 16.67 m/s (d) 13.5 m/s

22. a. Speed of A = $\frac{500}{50} = 10 \text{ m/sec.}$
Speed of B = $\frac{400}{50} = 8 \text{ m/sec.}$
 \therefore The actual time taken by B to complete the race = $\frac{500}{8} = 62.5 \text{ sec.}$
Now it can be concluded that when faulty clock elapsed 60 sec, the same in the correct clock was 62.5 sec.
The time taken by C = $30 \times \frac{62.5}{60} = 31.25 \text{ seconds}$
Hence, the speed of C = $\frac{500}{31.25} = 16 \text{ m/sec.}$

23. Mr. Betsy predicts the order in which the wickets of the players of his favorite team would fall in an ODI cricket match. The team loses at least one wicket and no batsman gets retired hurt during the innings. If Mr. Betsy knows the batting order of the team, what is the probability that he would get his prediction right? (Assume the probability of getting out of all the players in the team is the same.)

(a) $\frac{1}{2048}$

(b) $\frac{1}{2046}$

(c) $\frac{1}{1023}$

(d) $\frac{1}{10!}$

23. b. As we know that a cricket team has eleven players and a player cannot bat alone, the maximum number of wickets that can fall is 10. Also, at any stage of a match there are two players on the crease, therefore the number of possible ways in which a wicket can fall is 2.

The number of different orders in which exactly one wicket can fall = 2

The number of different orders in which exactly two wickets can fall = 2×2

The number of different orders in which exactly three wickets can fall = $2 \times 2 \times 2$

.

.

The number of different orders in which exactly ten wickets can fall = $2 \times 2 \times 2 \times \dots \times 2$ (10 times)

Since the batting order of the team is known, we do not need to consider the order in which a batsman comes out to bat. Therefore, the total number of orders in which one or more wickets can fall = $2 + 2^2 + 2^3 + \dots + 2^{10} = 2046$

Hence, the required probability = $\frac{1}{2046}$.

24. Let $*n(x) = \left[\frac{x}{n} \right]$, where x and n are natural numbers, where $[x]$ represents the greatest integer less than or equal to x. If $*9(*7(*5(*3(*1(a))))) = 0$, then find the sum of the digits of the largest possible value of 'a'.

(a) 7

(b) 17

(c) 3

(d) 6

$$24. b \quad *9\left(*7\left(*5\left(*3\left(*1(a)\right)\right)\right)\right)=0 \Rightarrow *9\left(*7\left(*5\left(*3\left(\left[\begin{array}{c} a \\ 1 \end{array}\right]\right)\right)\right)=0$$

$$\Rightarrow *9\left(*7\left(*5\left(*3(a)\right)\right)\right)=0 \quad [\text{As 'a' is a natural number}]$$

$$\Rightarrow *9\left(*7\left(*5\left(\left[\begin{array}{c} a \\ 3 \end{array}\right]\right)\right)\right)=0$$

$$\Rightarrow *9\left(*7\left(\left[\begin{array}{c} a \\ 3 \\ 5 \end{array}\right]\right)\right)=0 \Rightarrow *9\left(*7\left(\left[\begin{array}{c} a \\ 15 \end{array}\right]\right)\right)=0$$

Continuing in the same way, we get

$$\left[\frac{a}{945}\right]=0 \Rightarrow a < 945 \Rightarrow a_{\max}=944$$

Hence, the required sum = 9 + 4 + 4 = 17.

Directions for questions 25 to 27: Answer the questions on the basis of the information given below.

A survey was conducted among 500 people to gauge the popularity of the trailers of four movies – Paap, Kaungress, Syapa and Janta Darr – scheduled to be released on the same day. All these people watched the trailers of each of these movies and none of them liked the trailer of more than one of the four movies. After one week of the release of the movies, one more survey was conducted among the same set of 500 people to assess the response garnered by the four movies. Each of the 500 people watched exactly one movie in the last one week, and some of them watched movies other than the aforementioned ones.

- (i) The ratio of the number of people who liked the trailer of PAAP, Kaungress, Syapa and Janta Darr was 2 : 5 : 7 : 8, and that of those who watched the four movies, in the given order, was 1 : 2 : 4 : 3.
 - (ii) Out of the four movies, there was only one that was watched by a number of people that was less than the number of people who watched movies other than these four.
 - (iii) Out of the four movies, there was only one movie the trailer of which was liked by a number of people that was less than the number of people who did not like the trailer of any of the four movies.
 - (iv) The number of people who watched movies other than the four movies was half of the number of people who liked the trailer of a movie which was liked by the maximum number of people, out of the 500 people.
25. Out of the 500 people, the number of people who liked the trailer of Kaungress was
(a) 60 (b) **100** (c) 140 (d) 110
26. Out of the 500 people, if all the people who watched a movie other than the four movies had earlier liked the trailer of Kaungress, then the number of people who liked the trailer of Janata Darr and watched Kaungress could not be less than (Assume all the people who liked the trailers of PAAP and Syapa watched the same movies.)
(a) 64 (b) 16 (c) **4** (d) 0
27. If statement (iv) had been invalid, which of the following could not have been the number of people who watched Paap?
(a) 43 (b) 44 (c) 45 (d) **46**

For questions 25 to 27: Let the number of people who liked the trailer of the movies PAAP, Kaungress, Syapa and Janta Darr be $2x$, $5x$, $7x$ and $8x$ respectively, and the number of people who watched these four movies be y , $2y$, $4y$ and $3y$ respectively. Also, from statement (iii), the number of people (say ' m ') who did not like the trailer of any of the four movies lies between $2x$ and $5x$.

$$\therefore 2x + 5x + 7x + 8x + m = 500$$

$$\Rightarrow 22x + m = 500 \quad \dots(1)$$

Similarly, from statement (ii), the number of people (say ' n ') who did not watch any of the four movies lies between y and $2y$. From statement (iv), $n = 4x$.

$$\therefore y + 2y + 3y + n = 500 \text{ or } 10y + 4x = 500 \quad \dots(2)$$

From equation (2), it can be noted that ' x ' has to be multiple of 5.

Only $x = 20$ satisfies all the given conditions.

$$\therefore m = 60; n = 80; y = 42.$$

The final table is shown below:

Movie	People who liked the trailer	People who watched the movie
PAAP	$2x = 40$	$y = 42$
Kaungress	$5x = 100$	$2y = 84$
Syapa	$7x = 140$	$4y = 168$
Janta Darr	$8x = 160$	$3y = 126$
Other	60	80

25. b From the table, it can be said that the number of people who liked the trailer of Kaungress is 100.
26. c To minimize the number of people who liked the trailer of Janta Darr but watched Kaungress, the number of viewers of Kaungress from other movies has to be maximized.
Except the 80 people who liked the trailer of Kaungress but ended up watching a movie other than the four movies, the rest of the 20 people who liked the trailer of Kaungress, and watched it also.
Now, the people who liked the trailers of the movies PAAP and Syapa could not watch Kaungress as they viewed their respective movies.
Now, 60 people who did not like the trailers of any of the four movies must have watched Kaungress. Hence, the remaining 4 who liked Janta Darr watched Kaungress.
27. d Option (d) is not feasible, as it violates statement (ii).
28. The number of factors of the number of marbles in four packets – A, B, C and D – is 16, 28, 40 and 49 respectively. If Alibaba, a mathematician, wants to pick a packet, out of the four packets, which packet should he pick to be sure of picking up a packet in which the number of marbles is the cube a natural number?
 (a) A (b) B (c) C (d) D
28. d The number of factors of a number (N) = $p^a \times q^b \times r^c \dots$, where a, b, c, \dots a natural numbers and p, q, r, \dots are prime numbers, is $(a+1) \times (b+1) \times (c+1)$.
If N is a perfect cube, a, b, c, \dots have to be multiples of 3.
Thus, $(a+1) \times (b+1) \times (c+1)$ will leave a remainder of 1 when divided by 3.
We can see that all of 16, 28, 40 and 49 satisfy this condition.
So all the four numbers – A, B, C and D – can be written in the form of a perfect cube.
However, we have to find the number that can be written only in the form of a perfect cube.
It can be noted that A can be written as $p^{15} \times p^{3q^3}$, which are perfect cubes. But, it can also be written as pq^7 , which is not a perfect cube.
Similarly, B can be written as pq^{13} and C can be written as pq^{19} , which are not perfect cubes.
However, D can only be written as either p^{48} or p^6q^6 , both of which are perfect cubes.
29. The unit digit of $33^{45} \times 66^{884} \times 4a^{39b}$ is 6, where '4a' is a two-digit natural number. If 'b' is a single digit whole number, which of the following cannot be a value of the unit digit of a^b ?
 (a) 8 (b) 3 (c) 2 (d) both (a) and (b)

29. c The unit digit of 33^{45} is 3 and that of 66^{384} is 6.

Let the unit digit of $4a^{39b}$ be k.

\therefore Unit digit of $(3 \times 6 \times k)$ should be 6

The possible values of k for which the above condition holds true are 2 and 7.

\therefore Unit digit of $4a^{39b}$ should be either 2 or 7.

the following table gives the possible values of unit digit a^b along with the values are a, b and k.

a	b	k	Unit digit of a^b
2	3	2	8
2	7	2	8
7	3	7	3
7	7	7	3
8	5	2	8
8	9	2	8
3	5	7	3
3	9	7	3

Hence, only 8 and 3 are the only possible values of the unit digit of a^b . Thus, 2 is not a possible value of the unit digit of a^b .

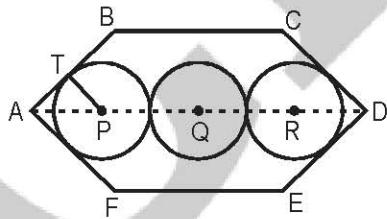
30. In a regular hexagon with side $3(\sqrt{3} + 1)$ cm, three identical circles of radius 'r' cm each are inscribed as shown below. The circle with center P touches AB at point T. Find the length (in cm) of BT.

(a) $3(\sqrt{3} - 1)$

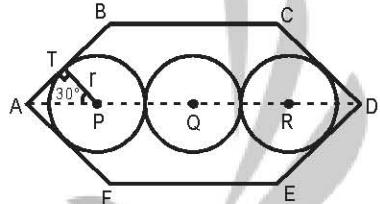
(b) $\frac{3\sqrt{3} + 3}{2}$

(c) $3\sqrt{3} + \frac{3}{2}$

(d) $3\sqrt{3}$



30. c



As AB is a tangent to the circle with center P, $PT \perp AB$.

$$\angle TAP = \frac{1}{2} \angle TAF = \frac{1}{2} \times 120^\circ = 60^\circ$$

$$\therefore \angle TPA = 30^\circ$$

Let $PT = r$ cm

$$PA = \frac{PT}{\cos 30^\circ} = \frac{2r}{\sqrt{3}} \text{ cm}$$

Since the hexagon is a regular one, the distance between the centre of the 3rd circle and the corresponding vertex(D) will be the same.

Length of the longest diagonal of a regular hexagon = $2 \times$ side (say a in the given case)

$$\therefore 2a = 4r + 2 \times \frac{2r}{\sqrt{3}}$$

$$\Rightarrow 2a = r \left[4 + \frac{4}{\sqrt{3}} \right] = \frac{4r}{\sqrt{3}} [\sqrt{3} + 1] \Rightarrow r = \frac{a\sqrt{3}}{2(\sqrt{3} + 1)}$$

Now, $BT = BA - TA = a - PA \sin 30^\circ$

$$= a - \frac{2r}{\sqrt{3}} \times \frac{1}{2} = a - \frac{r}{\sqrt{3}} = a - \frac{a}{2 \times (\sqrt{3} + 1)} = 3(\sqrt{3} + 1) - \frac{3(\sqrt{3} + 1)}{2(\sqrt{3} + 1)} = \left(3\sqrt{3} + \frac{3}{2} \right) \text{ cm}$$

($\because a = 3(\sqrt{3} + 1)$)

Section II: VA & LR

Directions for questions 31 to 33: Answer the questions on the basis of the information given below.

Four movies – ASM2, MDA, Rio2 and 3 States – were played in a multiplex named Chitran, having four screens, namely A1, A2, A3 and A4, on July 21, 2014. Each of the four movies was of a different length (in minutes) from among 130, 145, 155 and 160. On the given day, the multiplex had four shows on each screen, with no two screens showing the same movie at the same time for more than 10 minutes, and each movie was played four times during the day. The timing of the first show on all the screens was the same, and it was 10:00 AM. There was a break of 20 minutes between every two consecutive shows on each of the four screens. It is also known that:

- (i) ASM2 was played on all the four screens.
 - (ii) Rio2, which had two continuous shows on two screens, was played only on A1 and A3.
 - (iii) The first show on A1 and A4 was ASM2 and 3 States respectively.
 - (iv) The absolute difference between the lengths of Rio2 and 3 States was 10 minutes.
 - (v) The last show on A4 was ASM2, which ended exactly at 9:00 PM.
 - (vi) The length of ASM2 was not the longest.
 - (vii) Except Rio2, there was no movie that had continuous shows on any of the four screens.
31. Had the multiplex had a plan for the 5th show on A3, what would have been the show timing? (Assume all the other conditions remain intact.)
- (a) 8:40 PM (b) 9:20 PM **(c) 9:00 PM** (d) None of these
32. Which movie was played in the second show on A1?
- (a) 3 states** (b) Rio2 (c) MDA (d) Cannot be determined
33. On which two screens their respective 3rd shows started at the same time?
- (a) A1 and A2 **(b) A2 and A3** (c) A3 and A4 (d) A4 and A1

For questions 31 to 33: From statements (iv) and (vi) we can deduce that ASM2 and MDA were of lengths 130 and 160 minutes respectively.

From statements (iii) and (v), we can say that the show timings of ASM2 on A1 was 10 am to 12 : 10 pm, ASM2 on A4 was 6 : 50 pm to 9 : 00 pm and 3 States on A4 is 10 am to 12 : 35 pm.

From statements (iii), (v) and (vii), we can say that the 2nd and 3rd shows of A4 can neither be ASM2 nor Rio2. Also, the 2nd show on A4 cannot be 3 States as Rio2 is the only movie which has continuous shows. Therefore, the 2nd show must have been MDA and the 3rd must have been 3 States.

Since the start time of 1st show and the end time of last show is known, with breaks, we can determine the durations of 3 States as 155 minutes and Rio2 as 145 minutes.

From statement (ii), it can be observed that the only possibility for Rio2 shows was the 1st and 2nd shows on one screen and the 3rd and 4th shows on the other screen. Since, the first show was not possible on A1, 3rd and 4th shows must have been on A1 and the 1st and 2nd shows must have been on A3.

Now, from statement (i), ASM2 could not be the 4th show on A3. Hence, it must have been the 3rd show on A3 and the 2nd show on A2. Further analysis leads to the following tables:

A1	A2	A3	A4
10:00 – 12:10	10:00 – 12:40	10:00 – 12:25	10:00 – 12:35
ASM2	MDA	Rio2	3 states
12:30 – 15:05	13:00 – 15:10	12:45 – 15:10	12:55 – 15:35
3 states	ASM2	Rio2	MDA
15:25 – 17:50	15:30 – 18:10	15:30 – 17:40	15:55 – 18:30
Rio2	MDA	ASM2	3 states
18:10 – 20:35	18:30 – 21:05	18:00 – 20:40	18:50 – 21:00
Rio2	3 states	MDA	ASM2

31. c End time of the 4th show on A3 was 20 : 40. Hence, the start time for the 5th show on A3 was 20 : 40 + 20 minutes i.e. = 21 : 00.
32. a 3 States was in the 2nd show on A1.
33. b The end time of the second shows is the same on screens A2 and A3.
Hence, the required screens are A2 and A3.
34. 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.

China has endowed itself with an arsenal which underpins₁ a doctrine of minimum deterrence, whereby Chinese nuclear forces could be assured of absorbing an initial first strike while still being able to retaliate with ICBMs (Inter-Continental Ballistic₂ Missiles) into the homelands of US, Russia or India. The Chinese nuclear arsenal includes a large number of theatre weapons. These include around 40 x 2900 km DF 3A ballistic missiles, 12 x DF 4 5500 km missiles and 48 x DF 21A 1800 km missiles. In addition to these strategically placed land-based weapons, China has 12 submarine launched ballistic missiles, each capable of delivering a single 200 - 300 kiloton warhead up to 1000 km, deployed aboard its sole Xia nuclear-powered ballistic missile submarine. _____

- (a) Notwithstanding the above, the recent forays₃ of the Chinese navy into the Indian Ocean Region are not new.
- (b) The possibility of a Chinese nuclear submarine lurking in the Indian Ocean Region cannot be discounted.**
- (c) China has come up with what is popularly known as the 'String of Pearls' - a series of facilities, military or otherwise, that can be expected to support its operations in the Indian Ocean Region.
- (d) China is increasingly aggressive these days and its officials have been involved in an endless series of diplomatic struggles and not-so-diplomatic arm-twisting₄.

-
1. **Underpin (v)** : support, justify, or form the basis for
 2. **Ballistic (adj)** : relating to projectiles or their flight
 3. **Foray (n)** : a sudden attack or incursion into enemy territory, especially to obtain something; a raid
 4. **Arm-twisting (n)** : the action of pressurizing someone into doing something they are unwilling to do

34. b The word 'notwithstanding' in option (a) suggests some contradiction. However, this option does not provide any information that is contradictory to what is given in the paragraph. Thus, option (a) cannot follow the paragraph. Option (b) is the correct answer. It continues with the theme of the paragraph - China and its 'strategically placed' weapons - and also provides further information regarding Chinese submarines, which clearly connects to the last line of the given paragraph. Option (c) shifts the focus away from 'nuclear arsenal' to military facilities. Hence, option (c) cannot follow the paragraph. Option (d), similarly, digresses from the theme of the paragraph and talks of diplomatic struggles, etc. and, hence, is ruled out.

35. 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.

Someone once said that the trick of performing well on radio is to know that it is a conversation between just two people, you and the listener you cannot see. It's the same with blogging. It's more like radio than it is like a newspaper column. The journalist's style must adapt to the different medium that a blog is: more intimate, more informally conversational, more interactive. The writer can ask rhetorical questions - "Prince Charles is a plonker₅, isn't he?", knowing that a dozen Royalists may leap to the Prince's defense. Actually no, not in a blog. _____

(a) **A blogger must be very cautious and restrained in his statements; even bad spelling can shatter the illusion of authority.**

(b) Brevity₆ is best, it always is.

(c) Above all, a blogger must have a thick skin.

(d) Trolls₇, posting in the comments section can be sarcastic, abusive, mocking.

35. a Option (a) is the correct answer. The passage explains how blogging is different. It then suggests that a blogger can even ask rhetorical questions, but then explains further and clarifies that this cannot be done in a blog. Option (a) clearly explains why this cannot be done. Thus, option (a) will follow the paragraph. Option (b) is, ironically, too brief to connect to the given paragraph. Further, it marks a departure from the discussion about rhetorical questions. Option (c), similarly, does not connect to the paragraph - the paragraph suggests that blogging is more intimate, etc. But option (c) says that a blogger must have a thick skin. There is nothing in the paragraph to connect to such a statement. Option (d) also deviates from the theme of the paragraph - the given paragraph talks about what a blogger should do while (d) talks about what a troll would do.

36. 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. The first word fills the first blank and the second one fills the second blank.

I know her as a sensible person and the fact that she evaded my serious questions by a _____ answer, was a sure sign that she had something to _____.

(a) brusque, disgorge (b) narcissistic, brag (c) defiant, veil

(d) flippant, conceal

36. d The given sentence implies that 'she' evaded the speaker's questions in a particular way and that this was a sure sign that she was hiding something. 'Brusque' in option (a) may fit the first blank since it means terse or short – someone may give a brusque answer while hiding something. But the other word in the pair, 'disgorge', cannot fit the second blank since it means to let out or release something. Disgorge and brusque, hence, are antithetical. Quite similarly, option (c) has 'veil' which goes well in the latter blank, but 'defiant' doesn't fit in the first blank. 'Narcissistic' and 'brag' do not convey any sense of evasion and, thus, are eliminated. Option (d) is the correct answer since it explains how 'she' gave an answer that lacked proper respect or seriousness and this was a sign that she was hiding something.

5. **Plonker (n)** : a foolish or inept person

6. **Brevity (n)** : concise and exact use of words in writing or speech

7. **Troll (n)** : a person who makes a deliberately offensive or provocative online posting

Directions for questions 37 to 39: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Albedo, or “whiteness,” is a scientific term meaning reflectivity. It is the fraction of solar energy that the Earth reflects back into space. Lighter colored areas of the Earth—those covered in new snow and ice—reflect most solar energy back into space. Darker areas of the Earth—oceans, forests, and cities—absorb more solar heat.

This whiteness is why snow-covered areas can stay cold, while dark spots like pavements and black roofs heat up. So when the white color of snow and ice is darkened by dirt and soot, more of the sun’s heat is absorbed, and snow and ice melt faster.

Researchers have also attributed some Arctic ice cap melting to darkening from soot. Further, as Arctic Ocean ice thaws in spring and summer, more dark, heat-absorbing water is exposed. This dark water is warmed by the sun’s rays, and, in turn, melts even more ice nearby. In what scientists call a “feedback loop,” melting causes even more melting; more heat-absorbing dark water is exposed as more ice melts, and even more ice melts because more dark water is exposed, and so on.

Satellite images in 1979 first revealed the size of the Arctic ice cap and since then Arctic ice has retreated about 12 percent per decade in summer. This is a trend that has accelerated since 2007, driven primarily by rising global temperatures. In September 2012, nearly half the ice cap melted in summer, leaving a record low amount of ice, and in May 2014, Arctic sea ice extent was the third lowest on record.

It’s not just Greenland and Arctic ice caps that are being affected by soot and dust. Atmospheric dirt is changing Himalayan glaciers in Asia and snowpacks₈ in the mountains of western North America.

A 2009 study in the Proceedings of the National Academy of Sciences documented how soot is playing a role in the retreat of Himalayan glaciers. Soot from biomass stoves falls on and darkens snow and ice in this region, whose extensive glaciers give birth to Asia’s largest rivers—the Yangtze, Yellow, Mekong, and Ganges—and provide water for two billion people.

The snowpacks of the Colorado Rockies are melting earlier than usual causing streams to swell early in spring. Rising temperatures and lack of snow this winter in the Sierras and the Cascade Range signal an emerging “new normal” in the western United States. On May 1, when researchers traveled to high mountain sites in the Sierras to measure snowpack, there was little snow to measure.

We can expect these trends to continue. A 2011 U.S. Geological Survey study suggests that we will see more dust storms in the U.S. Southwest in the years ahead, as continued warming and drying makes the survival of shrubs and grasses—plants whose roots help keep the soil in place—more difficult. The National Climate Assessment released last month indicates that the Southwest will also be more vulnerable to fires.

So it’s likely that we could be looking forward to more dust, more melting, and a long ride on the global warming feedback loop.

37. Which of the following statements would the author most likely agree with?
- The melting of ice and snow because of heat-absorbing dark water is a never-ending loop.
 - Ice in the Arctic Sea was at its lowest-ever level in May 2014.
 - A black roof is prone to absorbing more of the sun’s heat than a snow-covered pavement.**
 - There is an inherent connection between melting of polar ice and fires in the Southwest of the US.

8. **Snowpack (n)** : a mass of lying snow that is compressed and hardened by its own weight

37. c The passage clearly states that dark spots like black roofs heat up more than snow-covered areas. Hence, option (c) is the correct answer. Option (a) is not correct since the passage does not at all mention that the 'feedback loop' is never-ending. The passage mentions that Arctic sea ice extent in May 2014 was the third lowest on record, which obviously means that there were records lower than that. Hence, option (b) is incorrect. Option (d) is incorrect since the passage only makes a connection between warming, drying and fires in the Southwest. Stretching the connection to include melting snow, that too in the polar regions, is not supported by the passage.
38. In light of the passage, which of the following options would be most advisable to counter ice melting due to darkening from soot?
- (a) Covering ice caps and glaciers with a huge white canvas, enabling lesser absorption of heat
 - (b) Creating and imposing laws regarding soot emission from households and commercial areas**
 - (c) Banning production of soot and soot-producing items like vehicles, stoves, etc.
 - (d) Creating a No-Soot zone in the vicinity of Arctic ice-caps
38. b Option (a) is incorrect as it is not practical and feasible. Option (b) will at least control the amount of soot present and, hence, may lead to reduced melting of ice. Option (b) is, thus, the right answer. Option (c) is not correct since banning vehicles and stoves, which are very useful to us, is not a practical course of action. Option (d) comes close but is negated since it only deals with Arctic ice caps and will not prevent/reduce the melting of ice in any other part of the world.
39. The author of the passage is likely to be
- A. An expert on measuring the melting of Arctic ice and polar ice caps.
 - B. A researcher specializing in Albedo and its effects on the environment.
 - C. A professional weather forecaster with a huge collection of data about recent shifts and trends from around the world.
 - D. A reporter for a local Health and Fitness magazine.
- (a) Only A (b) Only B **(c) Either B or C** (d) Either A or D
39. c The passage starts by explaining Albedo and goes on to describe the implications of soot. The author could thus be a specialist who knows a lot about reflectivity and its effects. The passage also presents some forecasts about weather changes. This and the numerous data presented in the passage hint that the author may be a weather guy with a ready collection of facts and figures at his disposal. Statement A limits the author's knowledge to Arctic ice caps and measuring the melting of ice. A detailed knowledge of the impact of soot and how it affects even non-Arctic regions would not be possible in such a case. A reporter in a local Health and Fitness magazine would write a relatively superficial article on the topic. The given passage, on the other hand, is very detailed and thorough. Hence, D also can be ruled out.
40. 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) There is a large majority of "everyday liars", and a small minority of "prolific liars".
 - (b) Obviously, some people lie more often than others.
 - (c) What's surprising is new research showing that the spread of lying propensity through the population is uneven.
 - (d) The research also uncovered some intriguing differences between prolific and everyday liars.**
40. d The sentences in the correct sequence will be (c), (a) and (b). The odd one out is option (d). Options (c) and (a) form a mandatory pair since the word 'population' connects with 'large majority and small minority.' Option (b) then follows up with the significance of what the data means; that some people tell lies more often than others. Option (d) also refers to some 'research' but it moves in a different direction and talks about how the research has also uncovered other differences between these categories of liars.

41. 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. A recent circular has drawn everyone's attention to the new policy
- B. that, with effect from next Monday, standard charges would be levied
- C. by the management not only on parking space provided to employees
- D. but also food served at the cafeteria, usage of the coffee machine and stationary.

(a) Only B (b) **B and D** (c) B, C and D (d) C and D

41. b The policy is going to be implemented from Monday. Hence, B will have the correction, 'charges will be levied.' Would is used to indicate tentativeness. In the given context, no tentativeness is implied. The correction in D has to do with parallelism. We have used 'not only on parking' and so the correction should be 'but also on.'

42. 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. "We have the complete package, so it's really hard for us to know what's particularly special and what isn't," says Taylor.
- B. In fact, Taylor speculates that our ability to learn about causality through observation alone could have been one of the driving forces behind our success as a species.
- C. We have both; crows (at least as per this study) only have the latter.
- D. The crows' failure means that the ability to "create causal interventions" - that is, the ability to do things that result in a desired effect - can be separated from the ability to understand causality in the first place.
- E. Studies like this provide a more nuanced view of what's going on or what once did.

(a) **DCAEB** (b) BACDE (c) DACEB (d) ADEBC

42. a DC is an obvious mandatory pair. D mentions two abilities – the 'ability to create causal interventions' and the 'ability to understand causality in the first place.' C explains that we (humans) have both abilities while crows only have the latter. 'Having everything' has been paraphrased in A, as 'having the whole package.' E suggests how such studies can help understand 'what is going on' (present) or 'what once did' (past) and sentence B connects to this thought by advancing Taylor's speculation about the past - about how the human species may have evolved successfully.

43. 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.

Hand

- (a) It has come to the attention of the Commissioner that some high-ranking police officials have been working hand in glove with the local mafia.
 - (b) Clarke, the stand-in skipper, will hand over the reins to Ponting, who returns next match.
 - (c) During lunch-break, she handed her fiancé's picture for all to see.**
 - (d) With an impressive sleight of hand, he produced a pigeon out of his coat pocket.
43. c The correct phrase in option (c) would be 'she handed around' which would mean that she gave the picture to many people for them to see it. 'To work hand in glove' means to work in collaboration with or be involved with. 'To hand over the reins' is to give authority or leadership to someone else. 'Sleight of hand' refers to a cleverly executed trick or deception.

44. 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. The first word fills the first blank and the second one fills the second blank.

The latest round of _____ power cuts in the city are being justified since it has become _____ to strike some balance between high electricity bills and the desire of people to be comfortable during the summer months.

(a) inchoate, prudent
(c) barbarous, clamant

(b) magnanimous, obligatory
(d) inordinate, exigent

44. d The given sentence uses the word 'justified' which indicates that the first blank needs a word which refers to the power cuts as 'high' or 'excessive.' Also, the sentence talks about the need to strike a balance and so the second blank requires a word like 'necessary' or 'urgent.' This leads us to option (d). Inordinate means excessive or immoderate while exigent means urgent, necessary or vital. Though 'prudent' fits the bill in option (a), the word 'inchoate' makes no sense since it means not completely formed or developed yet. Similarly, 'clamant', which means important or necessary, makes sense, but 'barbarous' does not fit in at all. 'Magnanimous', which means altruistic or benevolent, also does not fit the given sentence.

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 portrayal of women in Indian cinema is drenched in immoral assumptions and baseless stereotypes. Such portrayals are to be found everywhere, from cult movies and celluloid blockbusters like 'Sholay' to the more recent 'Fashion,' movies that embroil themselves profoundly in complex gender issues. Women are portrayed either as damsels in distress or as demented, over-the-top feminists or as simple belly-shaking glam dolls whose sole ambition is to attract the attention of the male gender. Seldom does a film fail to conform to the common trend of inserting 'item numbers' at those points in the film where the actual script is devoid of any substantial attention-grabbing action. Such 'item numbers', which bear no rational connection to the film in any which way, often operate on the mere premise that 'the script requires them.'

- (a) As Bindu Nair says, "Sometimes film-makers blatantly turn a blind eye to the plight of women in society in pursuit of commercial gains."
(b) Very rarely do we see a female being the protagonist of a film rather than just an object of sexual desire.
(c) Indian cinema often acts like an emotional register and is very resourceful while portraying a skewed characterization of women.
(d) In a well-defined patriarchal society like India, even the cinematic world fails to project women realistically.

45. b Option (b) is the correct answer. It continues with the issue being talked about in the paragraph. Option (a) talks about the plight of women in society which is not mentioned anywhere in the paragraph. Options (c) and (d), similarly, digress from the paragraph and raise other issues - 'emotional register ... resourceful' and 'well-defined patriarchal society'.

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 sequence.
- A. Two further studies cleared up some ambiguities.
 - B. Regardless of age, the children who couldn't yet read were indiscriminate in whether they chose to trust the purely oral advice, or whether to trust the puppet who read the text instruction.
 - C. In other words, the young readers weren't simply swayed by the fact the text puppet was drawing on a secondary source.
 - D. For instance, it was found that young readers prefer to trust a puppet who reads the instruction from text, than oral advice from a puppet that gets its information from a whisper in the ear.
 - E. By contrast, the children with some reading ability showed a clear preference to trust the puppet who read from the envelope, choosing the tube they were recommended over 75 per cent of the time.

(a) BAECD

(b) DEABC

(c) BEADC

(d) CDBEA

46. c BE is an obvious mandatory pair. B mentions that the children in that particular category chose in an indiscriminate fashion. E then begins with 'by contrast' and goes on to use the phrase 'clear preference' while talking of the other category of children. 'Two further studies clearing up ambiguities' in A is connected to 'for instance it was found,' in D. C then follows by explaining the implication of the information given by D.

47. 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. Even the gym instructor duly noted
- B. that I power-walked faster than Biddu
- C. and that my cardio-rate had gone up by a 20% increase,
- D. which gave me an immense and more importantly a smug sense of one-upmanship.⁹

(a) Only D

(b) Only C

(c) A and D

(d) B, C and D

47. b Option (b) is the correct answer. There is a case of redundancy in sentence C. The phrase 'gone up by' itself denotes an 'increase.' So both the phrases occurring together is incorrect. The correct sentence should either be 'had gone up by 20%', or 'my cardio-rate had increased by 20%.'

Directions for questions 48 to 50: Answer the questions on the basis of the information given below.

Eight mafias – A, B, C, D, E, F, G and H – are sitting around an octagonal table, with one mafia along each side, facing the centre of the table. Each of them belongs to a different country from among India, Pakistan, Bangladesh, Nepal, Sri Lanka, Bhutan, Maldives and Afghanistan. Three of them were spies in the past and one of them is carrying a mouser. It is also known that:

- (i) The mafia who is from India and the one who is carrying a mouser are sitting opposite to each other.
- (ii) C, who is from Sri Lanka and not a spy, is sitting second to the right of the mafia who is carrying a mouser.
- (iii) G is sitting second to the right of D.

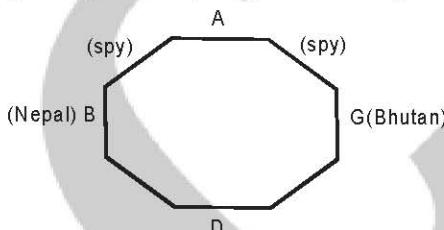
-
9. One-upmanship (n) : the technique or practice of gaining an advantage or feeling of superiority over another person
-

- (iv) A and D are sitting opposite to each other.
 (v) A is sitting between two mafias who were spies.
 (vi) B, who is from Nepal, is sitting opposite to the mafia who is from Bhutan, and neither of them were spies.
 (vii) E, who is from Afghanistan, is not carrying a mouser and is sitting second to the right of H.
 (viii) No three mafias with their names as three consecutive letters are together.

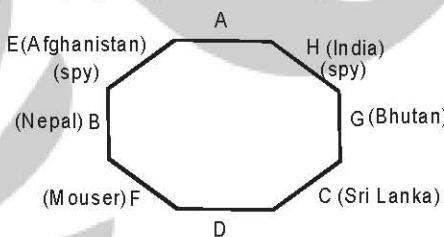
48. The mafia who is carrying a mouser is sitting between
 (a) A and G (b) C and B **(c) B and D** (d) G and D
49. Nationality of how many mafias cannot be determined uniquely?
 (a) 2 **(b) 3** (c) 4 (d) 5
50. The mafia from India is
 (a) A (b) D (c) E **(d) H**

For questions 48 to 50:

By using statements (iv), (v), (vi) and (viii) in the given order, we get the following sitting arrangement:



From statements (ii) and (viii) forbids C from sitting either between A and B or B and D or A and G. Hence, he is sitting between G and D. Further utilizing statement (vii) and (viii), we get the final arrangement as:



48. c F, who is carrying the mouser, is sitting between B and D.
 49. b Nationality of A, F and D is not known.
 Hence, the required number is 3.
 50. d The mafia from India is H.

Directions for questions 51 to 54: The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

The product most heavily promoted in Skyfall is Britain. It's like the royal family got together with Saatchi and Saatchi and New Labour to write a Bond script. It's a Churchillian Britain, not a Blair-ite or Cameronian Britain. It is also a Royal Britain. As if reminding us of Bond's meeting with the Queen at the Olympics, Bond wears royal-blue tracksuits with the royal coat-of-arms emblazoned¹⁰ prominently in silver while rehabilitating at MI6. James Bond, 'Licensed to Kill'. By appointment.

But there's far more at stake here. It seems to me that the misogyny in Skyfall is irrefutable. Slavoj Žižek, paraphrasing Lacan, points out somewhere that the solitary laconic¹¹ male action heroes of cinema are always those whose solitude is predicated on the ability to remain unencumbered¹² by women. Welcome to contemporary misogyny: the impossible and violent idealisation of women, and the borderline and psychotic identities of men.

So what we can expect from the quasi-Lacanian Bond is the pursuit and punishing of women, and periodic psychotic episodes. Actually, the psychotic breakdown doesn't take place, not until Skyfall. Instead, we get what Lacan called the 'sinthome' – the symptom that prevents the final psychosis. It is the massive act of ruthless logic that keeps the subject together. Just as the other James (Joyce) prevented his psychotic breakdown by hiding inside the armour of his literary name (and perhaps handing the psychological violence of his interior state to his children), so Bond has become 'Bond – James Bond', outsourcing his interior violence onto others. Like Joyce, he has become the symptom of his madness.

The plot of Skyfall is uncanny¹³ in speaking to its own dynamics. I'd be fairly sure that Sam Mendes and Barbara Broccoli didn't come up with a detailed storyboard that centred around the Name of the Father or a Žižekian commentary on Lacan. But in trying to make Bond speak beyond his own image of the sexually magnetic, suave, hi-tech, self-contained super spy, they have unwittingly revealed something. Something which has also been immensely profitable for them.

It is Dark Knight territory – an attempt to give the comic book hero credible back-story. It doesn't work for Batman, because there is never going to be a billionaire philanthropist who disguises himself as giant bat, wears superhero body-armour and chases mutated super-villains. It works for Bond because there are actually plenty of narcissistic murdering misogynist psychopaths around who think they are saving the western world from evil.

51. Which of the following best describes the tone of the passage?
(a) Boisterous (b) **Analytical** (c) Aphoristic (d) Carping
51. b In this passage, the author has tried to analyze the psychological aspects of the movie Skyfall and the character James Bond. Thus, the tone of the passage can best be described as analytical. Boisterous means energetic or overexcited. The passage is not boisterous at all. Neither is it aphoristic, which means a concise statement of a principle, nor carping, which means marked by or inclined to querulous and often perverse criticism.

-
10. **Emblazon** (v) : conspicuously inscribe or display a design on
11. **Laconic** (adj) : (of a person, speech, or style of writing) using very few words
12. **Unencumbered** (adj) : not having any burden or impediment
13. **Uncanny** (adj) : strange or mysterious, especially in an unsettling way
-

52. Which of the following most likely explains why Skyfall's makers decided to 'make Bond speak beyond his own image'?
- (a) They did not have a detailed storyboard, preferably one centered on 'the Name of the Father' or a '•i•ekian commentary on Lacan.'
 - (b) They did not do this on purpose, but it happened unwittingly, revealing a lot about Bond in the process.
 - (c) It was an attempt to give Bond a credible backstory and provide a peek into his character.**
 - (d) It was a conscious attempt to reveal hidden things about Bond which would be immensely profitable for them.
52. c The final paragraph of the passage mentions that the attempt to make Bond speak beyond his own image is 'Dark Knight territory' - an attempt to give the hero credible back-story. Thus, option (c) is the right answer. Option (a) is mentioned in the passage in connection to the uncanny plot of Skyfall and not in connection with Bond's portrayal. Option (b) is wrong since the passage says that in the attempt to portray Bond differently the movie's makers end up revealing something unwittingly - it does not say that the attempt to portray Bond differently was inadvertent. Option (d) is not supported by the passage. The passage does not at all mention whether the movie's makers were aware that revealing hidden things about Bond would be profitable for them.
53. Which of the following options best describes the connection between the first two paragraphs of the passage?
- (a) There is no connection whatsoever. The first paragraph stands alone with the simple purpose of introducing Royal Britain.
 - (b) Just as the absurdities of Bond's character are brought out in the second paragraph, the introductory paragraph describes the farcical nature of Skyfall's themes.
 - (c) The meeting with the Queen, and Bond wearing her royal coat-of-arms are the first examples of the misogyny¹⁴ being talked about in the passage.
 - (d) The first paragraph is a way to prepare the reader for the far more pressing issue involved in Skyfall - the misogyny in Bond's character which is described in subsequent paragraphs.**
53. d The first paragraph talks about Britain being the most advertised product in Skyfall. The author then begins paragraph 2 by saying that there's much more to the movie. He then proceeds to talk about the misogyny apparent in the movie. Thus, option (d) is the correct answer. Option (a) is clearly incorrect – the first paragraph talks about the portrayal of Britain in the movie; introducing Royal Britain is definitely not the purpose of this paragraph. Option (b) is too judgmental – the passage does not at all indicate that Skyfall's themes are farcical. Similarly, option (c) is also incorrect – these two incidents have not at all been mentioned as examples of misogyny.
54. Which of the following best describes the central idea of the passage?
- (a) The author wants to present Bond as a normal human instead of the suave¹⁵, magnetic and self-contained super spy that he's usually portrayed as.
 - (b) The passage clinically dissects Bond's character in movies, especially the way he deals with women and violence on a psychological level.
 - (c) The passage is an attempt to analyze the psychosis involved in Skyfall and reveal westerners as narcissistic¹⁶, murdering misogynist psychopaths.
 - (d) The passage explains the psychology of Bond, a character in the movie Skyfall, and illustrates the misogyny inherent in his nature.**

14. Misogyny (n) : dislike of, contempt for, or ingrained prejudice against women

15. Suave (adj) : (especially of a man) charming, confident, and elegant

16. Narcissistic (adj) : having or showing an excessive interest in or admiration of oneself and one's physical appearance

54. d Option (a) is incorrect. The passage does not at all attempt to present Bond as a normal human; instead, the passage discusses the misogyny and psychotic elements inherent in the movie and in the protagonist. This makes option (d) the right answer. Option (b) is wrong since it talks of all movies in general while the passage deals with Skyfall in particular. Option (c) is also incorrect. The author states that there are plenty of narcissistic murdering misogynist psychopaths but he does not at all try to prove that all westerners are narcissistic murdering misogynist psychopaths.

Directions for questions 55 to 57: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Monomania is a passion of ignorance. It is contended that this passion of ignorance is situated precisely between the ideal ego and the ego ideal. The ideal ego is the fantasy an individual has of himself or herself, a narcissistic illusion of completeness. It is a representation based on an image of the self, fixed at the infantile period. The ego ideal is the goal of a process, a movement towards an idealized self based on internalized significant early role models, people admired and preferred in favor of the self. In monomania, the ideal ego seeks to eradicate the other, the ego ideal. This is an act of envy, an attempt to kill and steal the other's good because it represents what one should be or could have been. Such an act is never conscious. It is a passion of ignorance. The saga of Captain Ahab and his obsessive desire to obliterate¹⁷ the Great White Whale in the classic 'Moby Dick' is illustrative of this dynamic.

The yearning for absolutes is a hallmark of monomania. Monomania is to be found in the boundary between love and hate. It is inherently evil because it excludes and destroys reality. In monomania, ignorance functions as a parochial¹⁸ and universalized concept of reality, marked by a certainty and rectitude which enables the harming of others with humanitarian conviction and moral purpose. The passion of ignorance is situated precisely between the subject and the fantasy of himself. The ideal ego wishes to eradicate the other, the ego ideal.

What is at the heart of all psychopathological behavior is an incapacity to communicate with aspects of the self that have, as part of the self-protective mechanism of the psyche, been obscured because they are too painful to be addressed. At the time of obfuscation¹⁹, the only perceived path for survival has been the isolation and dissociation of something intrinsic. Analytical psychology recognizes that there are dark recesses people carry deep within in which lurk forbidden secrets that are treated as unapproachable. These dark places and forbidden secrets are not passive; they pulsate with the presence of malignant²⁰, carnivorous forces that reek of fear and anarchy.

It is no accident that the developmental arm of analytical psychology is preoccupied with the determining effects of family history, for it is in the family setting that people experience the strongest and most primitive feelings, where relationships take on their most stark and forceful forms. Analytical psychology understands that the individual is deeply affected by the net of past experiences. They impact on the way in which present experiences are assimilated²¹ or repressed. They determine what may be allowed to come to consciousness and what must be assigned to the unconscious.

-
17. **Obliterate (v)** : destroy utterly; wipe out
18. **Parochial (adj)** : having a limited or narrow outlook or scope
19. **Obfuscation (noun)** : the hiding of intended meaning in communication, making communication confusing, willfully ambiguous, and harder to interpret
20. **Malignant (adj)** : evil in nature or effect; malevolent
21. **Assimilate (v)** : take in and understand fully (information or ideas)
-

55. Which of the following characters would be diagnosed with monomania in accordance with the passage?
- (a) Ahab has an obsessive compulsion to wash his hands every few minutes. He hates doing this but does it to the extent that his hands bleed.
 - (b) Moby is tremendously narcissistic. The more he talks about himself and admires himself, the happier and more satisfied he becomes.
 - (c) Dick's role model is his favorite cartoon character from childhood. He emulates₂₂ everything the character has ever done to the point that he's almost forgotten everything about the real world.
 - (d) Tywin's only goal in life is accumulating wealth for himself. To this end he justifies harming his family and friends and feels that it's the right thing to do.**
55. d Tywin is the only character described in the options who displays the features of a monomaniac as described in the passage. The passage talks of monomania as a passion of ignorance to the point that the yearning for absolutes becomes evil and the person's view of morality is twisted to a level where he/she starts justifying harming others with humanitarian conviction. In option (a), Ahab is not inherently evil nor is he harming others. Thus, he cannot be called a monomaniac. Option (b) does speak of narcissism, but, as the passage suggests, a lot more than just narcissism is involved in monomania. Similarly, Dick in option (c) only reflects obsessive behaviour - his behaviour need not at all imply monomania. There is nothing to indicate that his obsession is evil, etc. This option too, thus, cannot be taken as the answer.
56. According to the author, which of the following statements highlights the prime difference between the 'ego ideal' and the 'ideal ego'?
- (a) The ideal ego wishes to eradicate the other, the ego ideal.
 - (b) The ideal ego is based on infantile fantasy while the ego ideal is real.
 - (c) The ego ideal is the goal of a process while the ideal ego is a representation of an image.**
 - (d) The ideal ego is an unconscious act, a passion of ignorance.
56. c Options (a), (b) and (d) do not bring out the difference between the 'ego ideal' and the 'ideal ego'. Only option (c) clearly demarcates both by describing how the 'ego ideal' is the goal of a process towards achieving an idealized self, based on early role models, while 'ideal ego' is a narcissistic illusion of oneself, an image.
57. Which of the following can be best inferred from the passage?
- (a) A psychopath may be oblivious to the painful aspects of his personality since his mind obfuscates these pieces in order to protect the psyche.**
 - (b) Every human is a psychopath since analytical psychology reveals how all of us carry forbidden malignant dark secrets buried deep inside the recesses of our psyche.
 - (c) One of the first things an analytical psychologist does is to dig into his patient's family history in order to find signs of psychotic behavior.
 - (d) The sum of a person's past experiences controls which aspects of his personality are consciously visible to others and which are sheltered in the unconscious part of the mind.
57. a The third paragraph of the passage mentions that psychopathological behavior includes the incapacity to realize the painful aspects of one's mind or memories since the protective mechanism of the psyche obscures these. Thus, option (a) can be inferred from the passage. Option (b) has been mentioned in the passage partially; but merely carrying deep dark secrets is not a sufficient criterion to make us all psychopaths. The passage similarly states that analytical psychology is preoccupied with the determining effects of family history, but this piece of information is not enough to infer that the first thing an analytical psychologist does is to dig into his patient's family history in order to find signs of psychotic behavior. The sum of a person's past experiences controls which aspects are allowed to come to 'that person's' consciousness and what must be unconscious to him/her. The passage does not state that these aspects would not be visible to others. Thus, option (d) is also not supported by the passage.

22. Emulate (v) : imitate

Directions for questions 58 to 60: Answer the questions on the basis of the information given below.

The cellphones with eight friends – Rishi, Rishabh, Rachit, Ruchir, Chetan, Chandan, Champak and Chander – are of four different companies – Samsung, Apple, Blackberry and Nokia. The price of the cellphones with no two friends is the same. First word of the name of a cellphone represents company's name. It is also known that:

- (i) The prices (in Rs.) of the cellphones with Champak, Chetan and Rishabh are 11000, 15000 and 29900, not necessarily in the same order.
 - (ii) The names of the cellphones with Rishi and Chander are Samsung Galaxy S3 and Nokia XL and they are priced at Rs. 32000 and Rs. 16500, again not necessarily in the same order.
 - (iii) The names of the cellphones in descending order of their prices are Apple iPhone 5S, Apple iPhone 5C, Samsung Galaxy S3, Nokia Lumia 920, Blackberry Bold 9300, Nokia XL, Samsung Wave II and Samsung Galaxy Duos.
 - (iv) The cellphones with both Chandan and Rachit are of Apple, and they are priced at Rs. 53500 and Rs. 41900.
 - (v) The cellphone with neither Champak nor Rishabh is the cheapest. The cellphone with neither Rachit nor Ruchir is the costliest.
 - (vi) The cellphone with Ruchir is Nokia Lumia 920, which is priced Rs. 31900.
 - (vii) The price of the cellphone with Rishabh is less than Rs. 15950.
58. The name of the cellphone with Rishabh is
- (a) **Samsung Wave II**
 - (b) Nokia Lumia 920
 - (c) Blackberry Bold 9300
 - (d) Cannot be determined
59. The cellphone with the fourth lowest price is with
- (a) **Champak**
 - (b) Ruchir
 - (c) Rishi
 - (d) Chander
60. What is the price (in Rs.) of Blackberry Bold 9300?
- (a) **29900**
 - (b) 31900
 - (c) 32000
 - (d) 41900

For questions 58 to 60: From statements (iii), (iv) and (v), it can be deduced that Apple iPhone 5S is owned by Chandan and Apple iPhone 5C by Rachit and their prices are Rs. 53,500 and Rs. 41,900 respectively.

Now, from statements (ii) and (iii), we can conclude that the prices of Samsung Galaxy S3 and Nokia XL are Rs. 32000 and Rs. 16500 respectively. From statements (i), (iii), (v) and (vi), we can deduce that Samsung Wave II and Samsung Galaxy Duos must be priced Rs. 15,000 and Rs. 11,000 respectively and Chetan has Samsung Galaxy Duos.

From statement (vii), it can be seen that Rishabh has Samsung Wave II. Hence, Champak has Blackberry Bold 9300.

The final table is given below:

Name	Cellphone	Price
Chandan	Apple iPhone 5S	53,500
Rachit	Apple iPhone 5C	41,900
Chander/Rishi	Samsung Galaxy S3	32,000
Ruchir	Nokia Lumia 920	31,900
Champak	Blackberry Bold 9300	29,900
Rishi/ Chander	Nokia XL	16,500
Rishabh	Samsung Wave II	15,000
Chetan	Samsung Galaxy Duos	11,000

58. a Rishabh has Samsung Wave II.

59. a Blackberry Bold 9300 is the fourth cheapest smartphone and it is with Champak.

60. a The price of Blackberry Bold 9300 is Rs.29900.