

# New Unproctored Mock CAT- 1 2014

## **Section I: QA & DI**

4. d Let ABC be the three-digit number.  
 $A + B + C = 5k$ , where 'k' is a natural number.  
Also,  $C = 3A$   
The values of A can be 1, 2 or 3; consequently the values of C can be 3, 6 or 9 respectively. Therefore, the numbers will be of the forms 1B3, 2B6 or 3B9.  
Now,  $1 + B + 3 = 5k$  or  $4 + B = 5k$   
Possible values of B = 1 or 6  
Similarly for the second case B = 2 or 7  
and for the third case B = 3 or 8  
Hence, the numbers are 113, 163, 226, 276, 339 and 389.  
When 113, 163, 226, 276, 339, 389 are divided by 9, the remainders are 5, 1, 1, 6, 6 and 2 respectively.  
So, 7 cannot be a possible value of the required remainder.

5. If  $2r^2 - 3r + 2 = 0$ , then find the value of  $\left(r^5 + \frac{1}{r^5}\right)$ .
- (a)  $\frac{-57}{32}$       (b)  $\frac{57}{32}$       (c)  $\frac{-53}{32}$       (d)  $\frac{-57}{52}$

5. a  $2r^2 - 3r + 2 = 0$

$$\Rightarrow \left(r + \frac{1}{r}\right) = \frac{3}{2} \quad \dots(i)$$

$$\Rightarrow \left(r + \frac{1}{r}\right)^2 = \frac{9}{4} \quad \dots(ii)$$

$$\Rightarrow r^2 + \frac{1}{r^2} = \frac{1}{4} \quad \dots(ii)$$

Multiplying (i) and (ii), we get

$$r^3 + \frac{1}{r^3} + \left(r + \frac{1}{r}\right) = \frac{3}{8} \quad \dots(iii)$$

$$\Rightarrow r^3 + \frac{1}{r^3} = -\frac{9}{8} \quad \dots(iii)$$

Multiplying equation (ii) and (iii), we get

$$r^5 + \frac{1}{r^5} + \left(r + \frac{1}{r}\right) = \frac{1}{4} \times \frac{-9}{8}$$

$$\Rightarrow r^5 + \frac{1}{r^5} = \frac{-57}{32}$$

6. Ajay, Vijay and Dhananjay purchased 1, 10 and 25 notebooks for Rs.14, Rs.130 and Rs.300, respectively, from a stationery shop. In his transaction with Ajay and Dhananjay, the shopkeeper made a profit of p% and q% respectively, where  $p = 2q$ . If the shopkeeper bought all the notebooks that he sold to the three persons at the same price, how much profit (in term of percentage) did the shopkeeper make in his transaction with Vijay?

- (a) 22      (b) 25      (c) 28      (d) 30

6. d Let the price at which the shopkeeper bought each note book be equal to 'c'.

$$\left(\frac{14-c}{c}\right) \times 100 = p \text{ and } \left(\frac{300-25c}{25c}\right) \times 100 = q$$

As per the information given in the question

$$\frac{14-c}{12-c} = \frac{p}{q} = 2$$

$$\Rightarrow c = 10$$

$$\text{The required profit} = \left( \frac{130 - 100}{100} \right) \times 100 = 30\%.$$



7. d The price at which 50 gm of Pure Ghee is sold

$$= \frac{50}{1000} \times 120 = \text{Rs. } 6$$

The price at which 80 gm of SNF is sold

$$= \frac{80}{1000} \times 20 = \text{Rs. } 16$$

Total price at which the products that are obtained after processing 1 kg of milk are sold =  $6 + 16 = \text{Rs.} 22$ .

Since, the profit = 10%, the total cost price of the products = Rs.20 per kg.

If 'x' be the cost price of 1 kg of milk and 'y' kg of milk is processed everyday then

$$\left(\frac{300}{y}\right) + (6 + x) = 20 \quad \dots(i)$$

(Fixed cost + Variable cost = Total cost)

By checking the options, we get option (d) satisfies equation (i).

8. A car travels at 100 km/hr for the first half time of the journey, at 50 km/hr for the half of the remaining time of the journey, at 25 km/hr for the half of the remaining time of the journey and so on till the completion of the journey. The average speed of the car is approximately equal to  
(a) 200 km/hr      (b) 100 km/hr      (c) 66 km/hr      (d) 50 km/hr

8. c Let the total time taken = t

$$\text{Distance travelled} = 100 \times \frac{t}{2} + 50 \times \frac{t}{4} + 25 \times \frac{t}{8} + \dots \infty$$

$$= \frac{50t}{1 - \frac{1}{4}} = \frac{200}{3}t = 66.66t$$

Time taken = t

Hence, the average speed of the car is approximately 66 km/hr.

**Directions for questions 9 to 12:** Answer the questions on the basis of the information given below.

The table given below shows the information related to the postpaid plans offered by three different mobile service providers – Airtel, Vodafone and Idea. The rent and the CLIP charges are payable on a monthly basis, unless otherwise mentioned, whereas charges for all calls – STD or local – are payable in rupees per minute. The SMS rates are given in rupees per SMS. A person is considered to be on roaming when he is outside of his state. The roaming rental is applicable only when a person uses roaming services.

	All Charges in rupees		
	Airtel	Vodafone	Idea
RENTAL	150	175	100
CLIP	50	75	75
INCOMING CALLS	Free	Free	Free
STD CALLS	2.65	3	3
<b>LOCAL CALLS TO</b>			
GSM PHONE	1.5	1.5	1
LANDLINE PHONE	3	2	2
CDMA PHONE	2.5	2	2.5
<b>SMS</b>			
LOCAL	1	1	1
NATIONAL	2	2	1.5
INTERNATIONAL	5	5	3
<b>ROAMING</b>			
RENT	50 per month	100 per month	1.5 per day
INCOMING CALLS	2	3	2.5
OUTGOING CALLS	2	3	2.5
SMS (ANYWHERE)	2	2	2

12. Idea comes up with a new scheme in which it waives off CLIP charges if a customer is on roaming for 7 or more days in a month. If Ram, who uses Idea mobile services, receives the same number of calls every day of 1 min each and does not use outgoing calls facility or SMS facility while on roaming then what is the maximum number of calls that he can receive everyday such that his incoming call charges while on roaming does not exceed Rs. 75. (Assume he is on roaming for 10 days in a month)

(a) 3

(b) 4

(c) 2

(d) Not possible

**For questions 9 to 12:**

9. b The roaming rental is Rs.50 for Airtel and Rs.15 for Idea for 10 days. A total of 80 calls are received or made during these 10 days. Given a call difference of Re. 0.50 between Airtel and Idea, the additional call charges for Idea is  $(80 \times 0.5)$  i.e., Rs. 40. Hence Airtel is cheaper by Rs. 5 for the roaming period.

10. a Rent plus CLIP is lowest for Idea among the three service providers.

11. c Budget = Rs. 1,500.

Subtracting the rental and CLIP charges, the available balance for the three service providers is given in the table below:

Airtel	Hutch	Idea
1300	1250	1325

Since the total charges of one local CDMA call, one local GSM call and one landline call put together for Idea, Airtel and Vodafone is Rs. 5.5, Rs. 5.5 and Rs. 7 respectively and the amount left after rental and CLIP charges is the maximum for Idea, the plan offered by Idea would be the best choice for him.

12. a In order to maximize the number of calls received during 10 days while on roaming, he should receive as many calls as he can at an expense of Rs. 75.  
 $\therefore$  Number of calls which he can receive in 10 days

$$= \frac{75}{25} = 30.$$

⇒ Number of call which he can receive everyday

$$= \frac{30}{10} = 3.$$

Hence, Ram can receive a maximum of 3 calls everyday of 1 minute each while ensuring his roaming bill does not exceed Rs. 75.

13. There are X boxes – B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, ..., B<sub>x</sub> – with a certain number of balls each. The number of balls in the nth box is 'n' more than that in (n – 1)th box, for n > 1. If the number of balls in B<sub>1</sub> is 7, what is the total number of balls in X boxes put together?

(a)  $\frac{X}{6}(X^2 + 3X + 38)$  (b)  $\frac{X}{12}(X^2 + 3X + 38)$  (c)  $\frac{X}{6}(X^2 + 3X + 36)$  (d)  $\frac{X}{6}(X^2 + 5X + 36)$

13. a It can be observed that the number of balls in  $n^{\text{th}}$  box is  $6 + \sum n$  i.e.  $6 + \frac{n(n+1)}{2}$ .

Hence, the total number of balls in X boxes put together =  $\sum_{n=1}^X \left( 6 + \frac{n(n+1)}{2} \right) = 6X + \frac{1}{2} \sum_{n=1}^X n^2 + n$

$$= 6X + \frac{1}{2} \left( \frac{X(X+1)(2X+1)}{6} + \frac{X(X+1)}{2} \right)$$

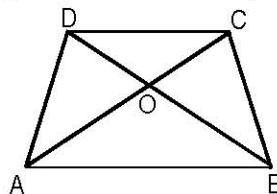
$$= 6X + \frac{1}{2} \left( \frac{2X^3 + 6X^2 + 4X}{6} \right)$$

$$= 6X + \frac{X^3 + 3X^2 + 2X}{6} = \frac{X}{6}(X^2 + 3X + 38).$$

#### **Alternate method:**

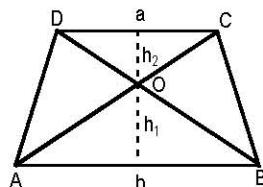
By putting  $X = 2$ , we see that only option (a) satisfies the given condition.

14. In trapezium ABCD, AB and CD are parallel to each other. The area of triangles COD and AOB is 10 sq. cm and 40 sq. cm respectively. The area of the trapezium is



- (a) 90 sq. cm      (b) 100 sq. cm      (c) 180 sq. cm      (d) 120 sq. cm

14. a



Let  $AB = b$ ,  $CD = a$  and the length of perpendiculars from O to AB and CD be  $h_1$ ,  $h_2$  respectively.

The triangles AOB and COD are similar.

Since the ratio of their areas is  $1 : 4$ , the ratio of the corresponding sides and heights (i.e.,  $h_2$  and  $h_1$ ) must be  $1 : 2$ .

$$\text{Area of the trapezium} = \frac{1}{2} (a + b) (h_1 + h_2)$$

$$= \frac{1}{2} (3a) (3h_2)$$

$$= 9 \times \text{area of the triangle COD} = 90 \text{ sq. cm.}$$

15. If  $100 \leq n \leq 1300$ , how many even values of n are neither divisible by 7 nor 9?

- (a) 459      (b) 359      (c) 142      (d) 152

15. a Even values of n in the range  $100 \leq n \leq 1300$  which are divisible by either 7 or 9 must be the multiples of 14 and 18. Number of multiples of 14 in the given range

$$= \left[ \frac{1300}{14} \right] - \left[ \frac{99}{14} \right] = 92 - 7 = 85$$

Number of multiples of 18 in the given range

$$= \left[ \frac{1300}{18} \right] - \left[ \frac{99}{18} \right] = 72 - 5 = 67$$

Where  $[x]$  represents the greatest integer less than or equal x.

Now, among these multiples of 14 and 18, there must be some numbers which are multiples of both 14 and 18, and these numbers will be multiples of LCM (14,18) i.e. 126.

Number of multiples of 126 in the given range

$$= \left[ \frac{1300}{126} \right] - \left[ \frac{99}{126} \right] = 10 - 0 = 10$$

So, a total of  $(85 + 67 - 10)$  i.e. 142 even natural numbers in the given range are there which are multiples of either 7 or 9.

Number of even numbers in the given range

$$= 650 - 49 = 601$$

Hence, the required number of numbers

$$= 601 - 142 = 459.$$

16. Let  $f(x) + f(2x) + f(1+x) + f(2-x) = x$  for all  $x$ . What is the value of  $f(0)$ ?

(a)  $-\frac{1}{2}$

(b)  $-\frac{1}{4}$

(c) 0

(d)  $\frac{1}{4}$

16. b We have,

$$f(x) + f(2x) + f(1+x) + f(2-x) = x \quad \dots \text{(i)}$$

Putting  $x = 0$  in (i), we get

$$f(0) + f(0) + f(1) + f(2) = 0$$

$$\Rightarrow 2f(0) + f(1) + f(2) = 0 \quad \dots \text{(ii)}$$

Putting  $x = 1$  in (i), we get

$$f(1) + f(2) + f(2) + f(1) = 1$$

$$f(2) + f(1) = \frac{1}{2} \quad \dots \text{(iii)}$$

From (i) and (iii),

$$2f(0) = -\frac{1}{2} \Rightarrow f(0) = -\frac{1}{4}$$

17. What is the angle between the lines represented by  $(x+y)^2 - 2k(x+y) - 15k^2 = 0$ ?

(a)  $45^\circ$

(b)  $30^\circ$

(c)  $90^\circ$

(d)  $0^\circ$

17. d  $(x+y)^2 - 2k(x+y) - 15k^2 = 0$

$$\Rightarrow (x+y-k)^2 - 16k^2 = 0$$

$$\Rightarrow (x+y-k-4k)(x+y-k+4k) = 0$$

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

Thus, the equations of the two lines are:

$$x+y-5k=0 \text{ and } x+y+3k=0.$$

As their slopes are equal, they are parallel lines.

Hence, the angle between them is  $0^\circ$ .

18. If the equation  $2x^3 + Ax^2 + B = 0$  has three non-zero integral roots, two of them are equal, then which of the following cannot be a possible value of  $(A + 3B)$ ?

(a) 18

(b) -18

(c) 72

(d) 180

18. c Let the three roots of the equation be  $\alpha, \alpha$  and  $\beta$  respectively.

$$\therefore 2\alpha + \beta = -\frac{A}{2}, \alpha^2 + 2\alpha\beta = 0 \text{ and } \alpha^2\beta = -\frac{B}{2}$$

$$\Rightarrow B = \alpha^3 \text{ and } \frac{A}{2} = -(2\alpha + \beta) = -\frac{3\alpha}{2}$$

$$A + 3B = 3\alpha^3 - 3\alpha$$

For  $\alpha = 2$ ,  $A + 3B = 3\alpha^3 - 3\alpha = 18$ , which occurs in option (a).

For  $\alpha = -2$ ,  $A + 3B = 3\alpha^3 - 3\alpha = -18$ , which occurs in option (b).

For  $\alpha = 3$ ,  $A + 3B = 3\alpha^3 - 3\alpha = 72$

But if  $\alpha = 3$ ,  $\beta$  will not be an integer.

So  $\alpha$  cannot be 3 and thus the value of  $A + 3B$  cannot be 72.

$\therefore$  Option (c) is the right choice.

19. If the lines  $y = x$ ,  $y = -x$ ,  $y = ax + c$  and  $y + ax + c = 0$  are concurrent, then which of the following is definitely correct?

(a)  $a = 1$

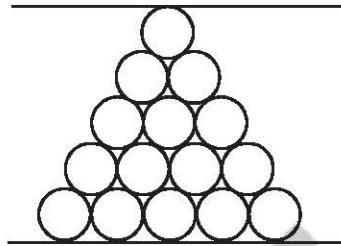
(b)  $a = 0$

(c)  $c = 0$

(d)  $a = c$

19. c If the lines  $y = x$  and  $y = -x$  are concurrent, then the point of intersection of these two mentioned lines is the origin. Therefore, both the lines  $y = ax + c$  and  $y = -ax - c$  should pass through the origin, which is only possible when  $c = 0$ . Hence, option (c) is always true.

20. Fifteen identical circles are arranged in a triangle-like shape as shown in the figure given below. If the height of the given figure is 10 cm, find the radius of each circle.



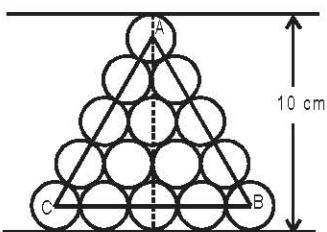
(a)  $\frac{5(3\sqrt{3}-1)}{22}$  cm

(b)  $\frac{5(3\sqrt{3}-2)}{22}$  cm

(c)  $\frac{5(4\sqrt{3}-3)}{11}$  cm

(d)  $\frac{5(2\sqrt{3}-1)}{11}$  cm

20. d



Let the radius of each circle be 'r' cm.  
AB = 8r cm

$$\text{Height of equilateral triangle } ABC = \frac{\sqrt{3}}{2} \times 8r = 4\sqrt{3}r$$

$$\therefore 10 = 4\sqrt{3}r + 2r$$

$$\Rightarrow r = \frac{5}{2\sqrt{3}+1} = \frac{5(2\sqrt{3}-1)}{11}.$$

21. If  $|x^2 - 7x + 12| > x^2 - 7x + 12$ , how many of the following statements are true?

- I. x cannot take any value greater than 4.
- II. x can take any real value.
- III. x can take any value between 3 and 4.
- IV. x can take any value between 1 and 3.

(a) 0

(b) 1

(c) 2

(d) 3

21. c  $|x^2 - 7x + 12| > x^2 - 7x + 12$

For any number a,  
 $|a| > a$  is true only when  $a < 0$

$$\Rightarrow x^2 - 7x + 12 < 0$$

$$\Rightarrow (x-3)(x-4) < 0$$

$$\Rightarrow 3 < x < 4$$

Hence, statements I and III are true.

22. If a, b, c, d, e and f are 6 consecutive even numbers, their average is

(a)  $\frac{abcdef}{6}$

(b)  $a + 6$

(c)  $6(a + 6)$

(d)  $a + 5$

22. d According to the given information,

$b = a + 2, c = a + 4, d = a + 6, e = a + 8$  and  $f = a + 10$

Hence, the required average  $= \frac{a+f}{2} = \frac{a+a+10}{2} = a+5$ .

23. If  $\alpha$  and  $\beta$  are the roots of the equation  $x^2 + 9x + 3 = 0$ , then the equation whose roots are  $\frac{1}{\alpha^2}$  and  $\frac{1}{\beta^2}$  is

(a)  $x^2 + 3x + \frac{1}{3} = 0$     (b)  $x^2 - \frac{25}{3}x + \frac{1}{9} = 0$     (c)  $x^2 - \frac{25}{3}x + \frac{1}{3} = 0$     (d)  $x^2 + \frac{25}{3}x - \frac{1}{9} = 0$

23. b The equation whose roots are  $\frac{1}{\alpha^2}$  and  $\frac{1}{\beta^2}$  is given by

$$x^2 - \left( \frac{1}{\alpha^2} + \frac{1}{\beta^2} \right)x + \frac{1}{\alpha^2} \cdot \frac{1}{\beta^2} = 0$$

or  $(\alpha\beta)^2 x^2 - [(\alpha+\beta)^2 - 2\alpha\beta]x + 1 = 0$  ... (i)

From equation  $x^2 + 9x + 3 = 0$ ,  $\alpha + \beta = -9$  and  $\alpha\beta = 3$

Putting the values of  $\alpha + \beta$  and  $\alpha\beta$  in (i),

we get the equation as  $x^2 - \frac{25}{3}x + \frac{1}{9} = 0$

**Directions for questions 24 to 27:** Answer the questions on the basis of the information given below.

The following table provides partial information about the composition of six different alloys namely A, B, C, D, E and F. Each of these six alloys contains the five different elements namely Zinc, Tin, Lead, Copper and Nickel. An alloy G, the composition of which is not given in the table, contains alloys A, B and C in the ratio 2 : 1 : 3. It is also known that in alloy G, tin, lead and copper are present in an equal quantity.

Alloy	Zinc	Tin	Lead	Copper	Nickel
A	10%	40%			10%
B	25%	15%	50%	5%	5%
C	15%		20%		35%
D	20%	25%	15%	30%	10%
E	5%	50%	25%	5%	15%
F	40%	10%	5%	30%	15%

24. Find the percentage of copper in alloy A.

(a)  $\frac{95}{9}$

(b)  $\frac{95}{3}$

(c)  $\frac{25}{9}$

(d)  $\frac{25}{3}$

**For questions 24 to 27:**

The given information can be tabulated as:

	Zinc	Tin	Lead	Copper	Nickel
A	10%	40%	(x) %	(40 - x)%	10%
B	25%	15%	50%	5%	5%
C	15%	(y) %	20%	(30 - y)%	35%
D	20%	25%	15%	30%	10%
E	5%	50%	25%	5%	15%
F	40%	10%	5%	30%	15%

24. b In alloy G, the percentage of:

$$Tin = \left( 2 \times \frac{40}{6} + 1 \times \frac{15}{6} + 3 \times \frac{y}{6} \right) = \frac{3y + 95}{6}$$

$$\text{Lead} = \frac{2x + 110}{6}$$

$$\text{Copper} = \frac{175 - 2x - 3y}{6}$$

$$\text{Now, } (3y + 95) = (2x + 110) = (175 - 2x - 3y)$$

$$\Rightarrow x = \frac{25}{3} \text{ and } y = \frac{95}{9}$$

Therefore, the percentage of copper in alloy A

$$= (40 - x) = \left( 40 - \frac{25}{3} \right) = \frac{95}{3}.$$

25. d There are two possible ways in which the alloy X can be formed. The possible combinations are (E and F) and (B and C).

26. c The percentage of lead in A, E and F is  $\frac{25}{3}\%$ , 25% and 5% respectively.

By checking options:

$$\text{Option (a): Percentage of lead in the mixture} = \frac{1}{6} \left( 4 \times \frac{25}{3} + 1 \times 25 + 1 \times 5 \right) = \frac{95}{9}\% < 12\%$$

Option (b): Percentage of lead in the mixture =  $\frac{1}{6} \left( 2 \times \frac{25}{3} + 1 \times 25 + 3 \times 5 \right) = \frac{85}{9}\% < 12\%$

Option (c): Percentage of lead in the mixture =  $\frac{1}{6} \left( 1 \times \frac{25}{3} + 2 \times 25 + 3 \times 5 \right) = \frac{110}{9}\% > 12\%$

Option (d): Percentage of lead in the mixture =  $\frac{1}{7} \left( 1 \times \frac{25}{3} + 2 \times 25 + 4 \times 5 \right) = \frac{235}{21}\% < 12\%$

Hence, option (c) is the correct answer.

27. d Since the percentage of nickel in alloy B and alloy Z is 5% and 8.25% respectively, in order to maximize the percentage of B in Z, we need to choose alloy in which the percentage of nickel is greater than 8.25% and also the maximum among the given alloys. So, we need to choose alloy C.

Let the percentage of alloy B in alloy Z be 'x%.

$$\therefore 5x + 35(1 - x) = 8.25 \Rightarrow x = 89.16\%$$

28. If  $\log_7 3 = 0.5646$ ,  $\log_7 5 = 0.8271$  and  $7^{-33.4008} = 10^{-29} \times 5.9299$ , then find the product of the first two most significant digits of  $15^{-24}$ .

(a) 81

(b) 10

(c) 14

(d) 45

28. d  $\log_7 3 = 0.5646$  or  $3 = 7^{0.5646}$

Similarly,  $5 = 7^{0.8271}$

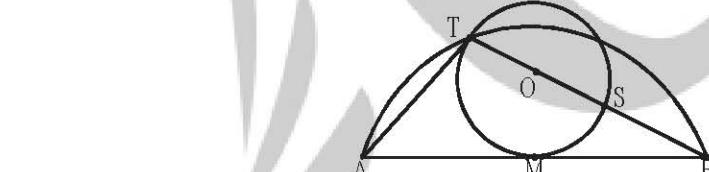
Hence,  $15 = 5 \times 3 = 7^{0.5646} \times 7^{0.8271} = 7^{1.3917}$

$$\therefore 15^{-24} = (7^{1.3917})^{-24} = 7^{-33.4008} = 10^{-29} \times 5.9299 \text{ (given)}$$

The first two significant digits of the above number are 5 and 9.

Hence, the required product = 45.

29. In the figure shown below, O is the center of the circle, the radius of which is 10 cm. AB passes through point M, which is the centre of the semicircle  $\widehat{ATB}$ , with AM as its radius. AT is a tangent to the circle at point T. Find the length of BS.



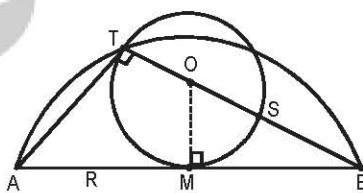
(a)  $5\sqrt{3}$  cm

(b)  $8\sqrt{3}$  cm

(c) 12 cm

(d) 10 cm

29. d



Let radius of the circle be r (i.e., 10 cm) and  $AM = BM = R$ .

AB is tangent to the circle, therefore  $AT = AM = BM = R$  cm.

In right angle triangle ATB,

$$BT = \sqrt{(AB^2 - AT^2)} = R\sqrt{3} \text{ cm}$$

Also, we have  $BM^2 = BS \times BT$

$$\Rightarrow R^2 = (R\sqrt{3} - 2r) \times R\sqrt{3} \Rightarrow R = 10\sqrt{3} \text{ cm}$$

Hence,  $BS = BT - ST = 30 - 20 = 10$  cm.

30. Gloria has 160 cellphones with her. Each of the cellphones with her is either GSM or CDMA, but not both. The ratio of the number of GSM cellphones to that of CDMA cellphones is 3 : 5. The ratio of the number of cellphones with blue-tooth to that of those without blue-tooth is 1 : 4. The ratio of the number of GSM cellphones with blue-tooth to that of CDMA cellphones with blue-tooth is 3 : 1. Find the ratio of the number of GSM cellphones without blue-tooth to that of CDMA cellphones without blue-tooth.

(a) 9 : 23

(b) 11 : 21

(c) 1 : 3

(d) 5 : 11

30. a The total number of phones is 160 and the ratio of GSM and CDMA phones is 3 : 5  
So, the number of GSM and CDMA phones are 60 and 100 respectively.

$$\text{Also, the number of phones with blue-tooth} = \frac{1}{5} \times 160 = 32$$

$$\therefore \text{Number of GSM cellular phones with blue-tooth is } \frac{3}{4} \times 32 = 24$$

$$\therefore \text{Number of CDMA cellular phones with blue-tooth is } \frac{1}{4} \times 32 = 8$$

$$\therefore \text{The required ratio} = \frac{60 - 24}{100 - 8} = \frac{36}{92} = 9 : 23.$$

31. From the set of the first 10 natural numbers, three distinct prime numbers a, b and c are selected to form a quadratic equation of the form  $ax^2 + bx + c = 0$ , having real roots. How many such equations can be formed?

(a) 4

(b) 7

(c) 5

(d) 6

31. d For distinct real roots of a quadratic equation, we must have  $b^2 > 4ac$ .

As a, b and c are distinct prime numbers from 1 to 10, the possible values of ordered triplets (a, b, c) are (2, 5, 3), (3, 5, 2), (2, 7, 3), (3, 7, 2), (2, 7, 5), (5, 7, 2).

Hence, there are six such quadratic equations.

32. The incircle of triangle ABC touches AB, BC and CA at points D, E and F respectively. If the length (in cm) of AB, BC and CA are three consecutive even numbers, then which of the following cannot be a value of the radius (in cm) of the incircle?

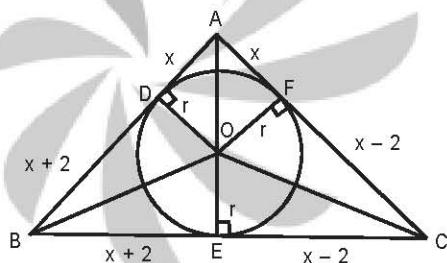
(a)  $\sqrt{3}$

(b)  $\sqrt{7}$

(c)  $\sqrt{15}$

(d)  $\sqrt{32}$

32. a



Let AC =  $(2x - 2)$  cm, CB =  $(2x)$  cm and BA =  $(2x + 2)$  cm, where x is a natural number greater than 1.

Area of  $\triangle ABC$  = Area ( $\triangle OBC + \triangle OAC + \triangle OAB$ )

$$= \frac{1}{2}r\{(2x - 2) + (2x) + 2x + 2\} = (3rx)$$

$$\text{Semiperimeter (s)} = \frac{(2x - 2) + (2x) + (2x + 2)}{2} = 3x$$

$$\therefore \text{Area of } \triangle ABC = \sqrt{3x(x+2)(x)(x-2)} = 3rx$$

$$\Rightarrow \sqrt{\frac{(x+2)(x)(x-2)}{3x}} = r$$

$$\Rightarrow (x^2 - 4) = 3r^2$$

$$\Rightarrow x^2 = 3r^2 + 4 \quad \dots (\text{i})$$

For  $x$  to be a natural number,  $(3r^2 + 4)$  has to be a perfect square.

Only option (a) does not make  $x$  a natural number

Hence, option (a) is the correct choice.

33. Fathers of seven different students namely A, B, C, D, E, F and G, with no two of them being sibling, arrived at a school randomly for a parent-teacher meeting. If no two fathers arrived at the same time, what is the probability that the father of A arrived after the father of D, who did not arrive after the father of C?

(a)  $\frac{1}{4}$

(b)  $\frac{1}{3}$

(c)  $\frac{1}{2}$

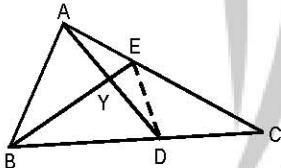
(d)  $\frac{1}{5}$

33. b Number of different orders in which fathers of A, C and D could arrive =  $3!$   
Number of cases in which father of D could arrive first = 2

$$\text{So, the required probability} = \frac{2}{3!} = \frac{1}{3}$$

34. In triangle ABC whose area is  $60 \text{ cm}^2$ , AD is the median from A to BC and BY is the median from B to AD. If BY is extended to meet AC at E, what is the area of triangle AYE?  
(a)  $10 \text{ cm}^2$       (b)  $9 \text{ cm}^2$       (c)  $6 \text{ cm}^2$       (d)  $5 \text{ cm}^2$

34. d



It is given that  $BD = DC$  and  $AY = YD$ .

Area of  $\triangle YBA$  = Area of  $\triangle YBD$

$$= \frac{1}{4} [\text{Area of } (\triangle ABC)] = \frac{60}{4} = 15 \text{ cm}^2$$

Area of  $\triangle AYE$  = Area of  $\triangle DYB$

$\therefore$  Area of  $\triangle ABE$  = Area of  $\triangle DBE$

Also, area of  $\triangle DBE$  = Area of  $\triangle CDE$

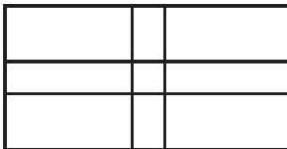
$\therefore$  Area of  $\triangle ABE$  = Area of  $\triangle DBE$  = Area of  $\triangle CDE$

$$= \frac{1}{3} \times 60 = 20 \text{ cm}^2$$

So, area of  $\triangle AYE$  = area of  $\triangle ABE$  – area of  $\triangle ABY$

$$= 20 - 15 = 5 \text{ cm}^2.$$

35. A rectangular plot measuring  $30\text{ m} \times 40\text{ m}$  has a  $2\text{ m}$  wide pathway in the middle as shown in the adjoining diagram. Tiles of size  $30\text{ cm} \times 50\text{ cm}$  are laid on the pathway in such a way so that no portion of these tiles cross the boundary of the pathway. How much area will still remain exposed after the maximum possible numbers of tiles are laid on the pathway without breaking any tiles?



- (a) 4000 sq. cm      (b) 1000 sq. cm      (c) 0 sq. cm      (d) 2000 sq. cm

35. b First let the  $30\text{ m}$  long stretch be covered with the tiles. Keeping the  $50\text{ cm}$  edge along  $2\text{ m}$  width of the pathway, we can exactly fit 4 such tiles side by side in a row. Let us cover 48 such rows from the top (covering  $48 \times 0.3 = 14.4\text{ m}$  from the top) and 47 such rows from the bottom (covering  $47 \times 0.3 = 14.1\text{ m}$  from the bottom). That will leave  $150\text{ cm} \times 200\text{ cm}$  wide area uncovered.

Considering the horizontal stretch, each  $19\text{ m}$  long still remains uncovered on both sides of the  $2\text{ m}$  wide middle-stretch.

Again, starting from the extreme ends, keeping the  $50\text{ cm}$  edge along  $2\text{ m}$  width of the pathway, we can exactly fit 4 such tiles side by side in a column. By adding 63 such columns on each side, we can cover up to  $18.9\text{ m}$  on either side of the middle stretch.

Now consider a middle patch of  $220\text{ cm} \times 150\text{ cm}$ .  $220$  can be broken onto  $100 + 120$ . So we have two different patches of  $120\text{ cm} \times 150\text{ cm}$  AND  $100\text{ cm} \times 150\text{ cm}$ . Both these patches can be completely covered by the given small tiles.

Still two small patches of  $10\text{ cm} \times 40\text{ cm}$  and two small patches of  $10\text{ cm} \times 10\text{ cm}$  will remain uncovered on each side. We cannot cover these two patches without breaking the tiles.

$$\text{Total exposed area} = (2 \times 10 \times 10) + (2 \times 10 \times 40)$$

$$= 1000 \text{ sq. cm}$$

36.  $A_1, A_2, A_3, \dots, A_{40}$  are forty sets with five elements each.  $B_1, B_2, B_3, \dots, B_n$  are  $n$  sets with four elements each.  $A_1 \cup A_2$  is a set that contains all the elements that belong to sets  $A_1$  or  $A_2$ .

Let  $A_1 \cup A_2 \cup A_3 \cup \dots \cup A_{40} = B_1 \cup B_2 \cup B_3 \cup \dots \cup B_n = S$ . If each element of  $S$  belongs to exactly 10 of  $A_i$ 's, where  $1 \leq i \leq 40$  and exactly 8 of  $B_j$ 's, where  $1 \leq j \leq n$ . Find the value of  $n$ .

- (a) 25      (b) 40      (c) 32      (d) 50

36. b Each of  $A_1, A_2, A_3, \dots, A_{40}$  has five elements.

$$\therefore \text{Total number of elements in all } A\text{'s put together} \\ = 40 \times 5 = 200$$

Each element is repeated 10 times.

$$\therefore \text{Total number of unique elements in all } A\text{'s put together} = 20$$

Each of  $B_1, B_2, B_3, \dots, B_n$  has four elements.

$$\therefore \text{Total number of elements in all } B\text{'s put together} = 4n$$

Each element is repeated 8 times.

$$\therefore \text{Total number of unique elements in all } B\text{'s put together} = \frac{n}{2}$$

According to the question,

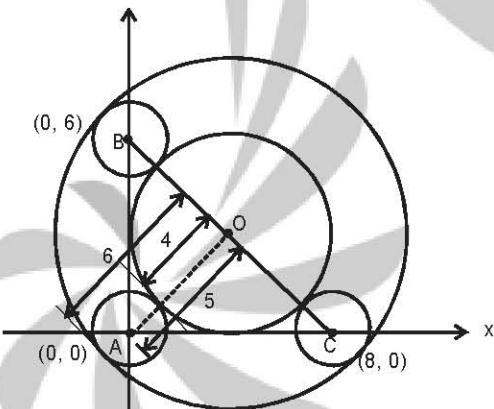
$$20 = \frac{n}{2} \Rightarrow n = 40.$$

37. In how many ways can six numbers be chosen from the matrix such that no two of them belong to either the same row or the same column?

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

- (a)  $(6^2 \times 5^2 \times 4^2 \times 3^2 \times 2^2 \times 1^2)$       (b) 360  
(c) 720      (d)  $(6 \times 6 \times 6 \times 6 \times 6 \times 6)$
37. c From the first row, we can choose any of the six numbers in 6 ways. From the second row, we can choose one number in only 5 ways as one of the chosen number from the first row will belong to one of the columns of this row. Similarly, the numbers from 3rd, 4th, 5th and 6th row can be chosen in 4 ways, 3 ways, 2 ways and 1 way respectively. Hence, the total number of ways  
 $= 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720.$
38. There are 3 circles, whose centers are at  $(0, 0)$ ,  $(6, 0)$  and  $(0, 8)$ , with unit radius each. Which of the following can be the radius (in units) of the circle that touches all these circles?  
(a) 5      (b) 5.5      (c) 4.5      (d) 6

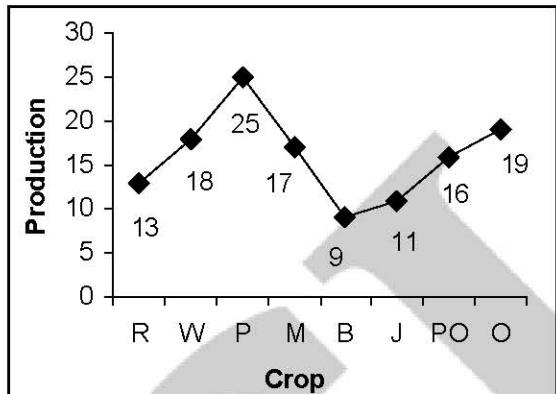
38. d The given information can be depicted as shown below:



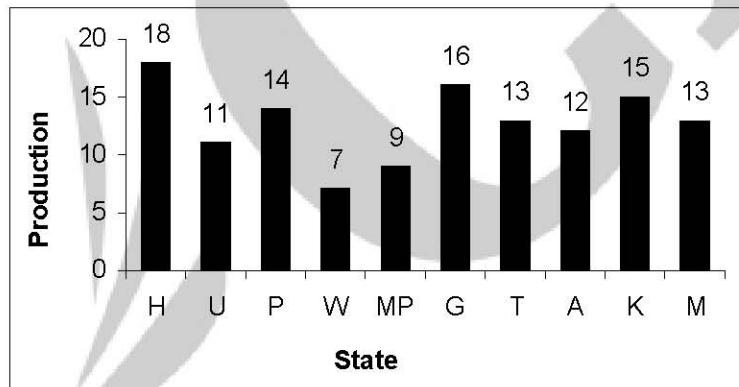
It can be noted that the triangle with vertices  $A(0, 0)$ ,  $B(6, 0)$  and  $C(0, 8)$  will be a right angled triangle. Therefore, the circle passing through ABC has its diameter as 10 cm. There will be two circles that will touch the given 3 circles, and their radii will be  $(5 - 1)$  i.e. 4 cm (circle touching the three circles externally) and  $(5 + 1)$  i.e. 6 cm (circle touching the three circles internally)  
Hence, a unique radius cannot be determined.

**Directions for questions 39 to 42:** Answer the questions on the basis of the information given below.

The line graph given below provides information about the production (in '000 tonnes) of eight different crops – Rice (R), Wheat (W), Pulses (P), Maize (M), Bajra (B), Jowar (J), Potatoes (PO) and Onions (O) – in India in 2013.



The bar graph given below provides information about the total production (in '000 tonnes) of crops across ten different states in India – Haryana(H), Uttar Pradesh(U), Punjab(P), West Bengal(W), Madhya Pradesh(MP), Gujarat(G), Tamil Nadu(T), Andhra Pradesh(A), Karnataka(K) and Maharashtra(M).



Assume that these eight mentioned crops were the only crops that were produced in India and the given ten states were the only states in India that produced the given eight crops in 2013.

40. b The possible combinations of states where the crop PO and O could be grown are (W, A, G), (W, T, K), (W, M, K), (MP, A, P), (T, M, MP) and (U, K, MP).  
So, H was definitely not the state where crop PO was grown.

**For questions 41 and 42:**

Minimum production (in'000 tonnes) of the crop amongst the ten states was in state W, i.e. 7.

Let the number of crops that were produced in an equal quantity and the maximum amount in the given states be 'x'.

The aggregate production (in'000 tonnes) of these 'x' crops in India could not have more than 70 as the minimum production (in'000 tonnes) of crops produced by a state among the given states was 7.

So, we need to pick those crops with lesser productions.

Aggregate production of crops R, M, B, J and PO put together =  $13 + 17 + 9 + 11 + 16 = 66$ .

If we take one more crop, then the total production will cross 70. Therefore, the maximum possible value of 'x' is 5.

41. b Therefore, there are three crops namely W, P and O that could not have been produced in equal quantities in the given ten states.

42. a The aggregate production (in '000 tonnes) of crops R, M, B, J and PO put together in state MP =  $\left(\frac{66}{10}\right) = 6.6$

**Directions for questions 43 to 47:** Each of the following questions given below is followed by two statements, I and II. Mark the correct answer as per the following instructions.

Mark (a) if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.

Mark (b) if the question can be answered by using either statement alone.

Mark (b) if the question can be answered by using either statement alone.  
Mark (c) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

**Mark (d) if the question cannot be answered even by using both the statements together.**

43. What is the volume of a solid right circular cylinder?

  - I. The total surface area of the cylinder is  $5\pi m^2$ .
  - II. The height of the cylinder is equal to the diameter of its base.

44. In 2000, the sales and the margin of a company named 'X' were Rs. 100 lakh and 20% respectively. What was the total cost of production for the company in the year 2001?

Total cost of production = Sales – Profit

$$\text{Margin} = \frac{\text{Profit}}{\text{Sales}} \times 100$$

- I. The sales of the company in 2002 was 80% of the sales in 2001 and 125% of the sales in 2003. Profit percentage was the same from 2000 to 2003.  
 II. The sales in 2003 was 140% of the sales in 2000.

45. If 'O' represents one of the operations out of '+', '-' and 'x', is  $k O (l + m)$  equal to  $(k O l) + (k O m)$  for all values of k, l, and m, where k, l and m are real numbers?

- I.  $k O l$  is not equal to  $l O k$  for some values of k.  
 II. 'O' represents subtraction.

46. A total of 774 doctorate degrees in mathematics were conferred in the US by its universities in the academic year 1972-73, and W of them went to women. The number of such doctorate degrees conferred in 1986-1987 was 362, and w of them went to women. If the number of doctorate degrees in mathematics conferred to female citizens of the US by its universities decreased in 1986-87 in comparison to that in 1972-73, was the decrease less than 10%?

- I.  $77.9 < w < 86.5$   
 II.  $W = w + 5$

47. If a, b and c are single-digit whole numbers, is  $(a + b + c)$  a multiple of 9?

- I. abc is a three-digit number and is a multiple of 9.  
 II.  $[(a \times b) + c]$  is a multiple of 9.

43. c Statement I gives:

$$\pi r^2 + 2\pi rh = 5\pi m^2$$

Statement II gives:

$$2r = h$$

Here we have two equations and two variables.

Hence, by combining the two statements together, the required quantity can be calculated.

44. c From statement A:

There is no data available in the statement A which can give any relation between the years 2000 and any of the years 2001, 2002 or 2003.

Hence statement A alone is not sufficient to answer the question.

From statement B:

Relation between the sales value of years 2003 and 2000 are given.

Hence, statement B alone is not sufficient to answer the question.

Combining the statements A and B:

	Sales value(lacs)	Margin	Profit	Cost of production
2000	100	20	25	
2001	$\frac{(1.25 \times 1.4 \times 100)}{0.8}$	20	25	$\frac{(1.25 \times 1.4 \times 100)}{(0.8 \times 1.25)}$
2002	$1.25 \times 1.4 \times 100$	20	25	
2003	$1.4 \times 100$	20	25	

Cost of production for the company in the year 2001

$$= \frac{(1.25 \times 1.4 \times 100)}{(0.8 \times 1.25)} = \text{Rs. } 175 \text{ lacs}$$

Hence, by combining the two statements required answer can be found.

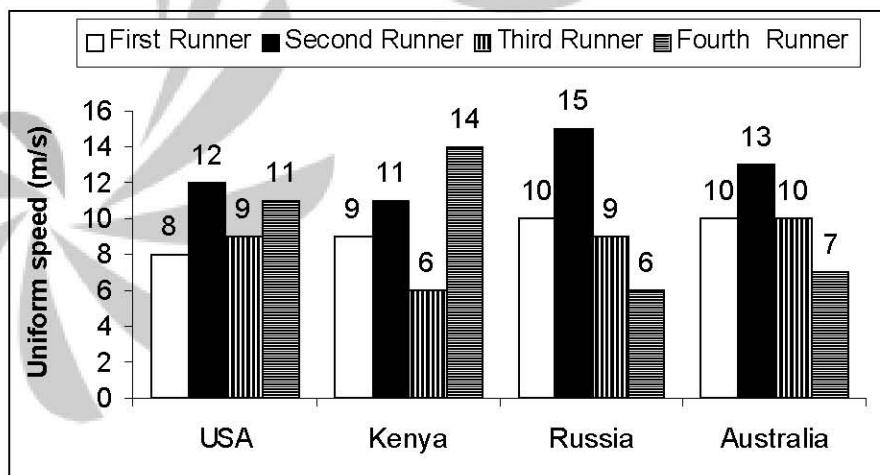
45. b Since  $k \circ l = l \circ k$  for both '+' and 'x' [i.e.  $k + l = l + k$  and  $k \times l = l \times k$  for all values  $k$ ]. According to statement I, ' $\circ$ ' must represent subtraction. Thus, it can be determined whether  $k - (l + m) = (k - l) + (k - m)$  holds for all values of  $k, l$ , and  $m$ . Thus statement I alone is sufficient.  
Statement II gives the direct information about ' $\circ$ ' i.e. subtraction. Hence, statement II alone is also sufficient.

46. d Here we have the details of the doctorate degree in mathematics for women conferred in the US in year 1972-73 and also the detail of the doctorate degree for the women in 1986-87.  
However, we do not have any information regarding the number of female citizens of US who were conferred doctorate degree by the US universities. Hence, on the basis of the given information, the question cannot be answered.

47. a **From statement I:**  
The three-digit number  $abc$  is divisible by 9, which means the sum of digits of  $abc$  is divisible by 9.  
Hence, statement I alone is sufficient.  
**From statement II:**  
Statement II is not sufficient as when  $a = 0 = b$  and  $c = 9$ ,  $(a + b + c)$  is a multiple of 9, but when  $a = 4 = b$  and  $c = 2$ ,  $(a + b + c)$  is not divisible by 9.

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

Four countries – USA, Kenya, Russia and Australia – participated in a  $4 \times 400$  metres relay which is an athletic track event in which each team comprises four runners, each of whom completes 1 lap of 400 metres. In the event, four runners, with one from each team, start running simultaneously from the same point on the track. As soon as the first runner from any team completes 1 lap of 400 metres, the second runner from that team starts running, from the same starting point, and this process continues till the fourth runner from the team has completed his lap. The same goes for the other teams. The winner of the event is the team whose players take the least composite times to complete the four laps. The following bar graph gives the information about the average speeds at which runners from the four teams ran to complete their laps.



**For questions 48 to 50:**

48. a The following lists down the time taken by each of the 4 mentioned countries to complete the  $4 \times 400$  metres relay.

$$\text{USA} = \left( \frac{1}{8} + \frac{1}{12} + \frac{1}{9} + \frac{1}{11} \right) \times 400 \approx 164 \text{ seconds}$$

$$\text{Kenya} = \left( \frac{1}{9} + \frac{1}{14} + \frac{1}{6} + \frac{1}{11} \right) \times 400 = 176 \text{ seconds}$$

$$\text{Russia} = \left( \frac{1}{10} + \frac{1}{15} + \frac{1}{9} + \frac{1}{6} \right) \times 400 = 178 \text{ seconds}$$

$$\text{Australia} = \left( \frac{1}{10} + \frac{1}{13} + \frac{1}{10} + \frac{1}{7} \right) \times 400 \approx 168 \text{ seconds}$$

Hence, the USA was the winner of the relay.

49. d First Runner from USA will complete one lap in 50 seconds. First Runner from Kenya will complete one lap in  $\frac{400}{9} = 44.44$  seconds.

By the time the Second Runner from USA starts running at the rate of 12 m/s, the Second Runner from Kenya had

already covered a distance of  $\frac{50}{9} \times 11$  metres i.e.  $\frac{550}{9}$  metres.

In other words, the Second Runner from Kenya had a head start of  $\frac{550}{9}$  metres.

To overtake the Second Runner from Kenya, the Second Runner from USA will take  $\frac{(550)}{9}$   $(12-11)$

$$= \frac{550}{9} \text{ seconds}$$

This implies that the Second Runner from USA will have to run

$$= \frac{550}{9} \times 12 = \frac{2200}{3} = 733.33 \text{ metres}$$

This is impossible because each runner can cover a maximum of 400 metres.

This implies that the Second Runners from USA and Kenya never met.

Hence, option (d) is the correct choice.

50. b Third Runner from Russia and Kenya did not meet as the speed of each of the corresponding runners from Russia was greater than the speed of the corresponding runner from Kenya.

## Section II: VA & LR

51. Given below are five sentences. Each sentence has a pair of words that are *italicized*. From the italicized words, select the most appropriate words (A or B) to form correct sentences. The sentences are followed by options that indicate the words, which may be selected to correctly complete the set of sentences. From the options given, choose the most appropriate one.

- I. The architects spoke of a three-story tower, with bedrooms and a bird-watching *aerie* (A) / *airy* (B) on the third floor.
- II. Gun battles in the capital do not *auger* (A) / *augur* (B) well for the next round of voting.
- III. The unprecedented commotion has certainly *piqued* (A) / *peaked* (B) my interest in the activity going on in the square
- IV. All of the landing party were left behind, the *basis* (A) / *bases* (B) remaining where they touched down.
- V. But immediately perceiving that he had discovered his vision, he *besot* (A) / *besought* (B) them not to disclose it to any one.

(a) AABBA

(b) ABBAB

(c) ABABB

(d) BABAA

51. c 'Aerie', which refers to a room or building built high up so that people can see things happening below them, is the correct answer in sentence I while 'airy' is an adjective which describes some place which has a lot of open space through which air can move freely. In sentence II, 'augur' is the correct word because it means to show or suggest something that might happen in the future while 'auger' refers to a sharp tool that is mainly used for making holes. 'Piqued' is to cause interest and is hence, the correct word in sentence III. 'Peaked' is the simple past and past participle of the verb 'peak' which refers to reaching the highest degree and is also an adjective which describes something that has a peak. In sentence IV, 'bases' is the correct word because it is the plural of base i.e. something that provides support for a place, business, etc. 'Basis' refers to a reason for doing something or a fixed system for doing something. 'Besought' is the simple past tense and past participle of beseech, i.e., to implore while 'besot' is to become dull with drunkenness. So, 'besought' is the correct word in sentence V.

52. Given below are five sentences. Each sentence has a pair of words that are *italicized*. From the italicized words, select the most appropriate words (A or B) to form correct sentences. The sentences are followed by options that indicate the words, which may be selected to correctly complete the set of sentences. From the options given, choose the most appropriate one.

- I. They have employed skilled craftsmen to *hew* (A) / *hue* (B) the stones to build the wall.
- II. Close friend of Prime Minister John Howard will get the job as Australia's chief *censer* (A) / *censor* (B) at the expense of a recommended candidate.
- III. The Bhonsla raja forfeited Orissa to the English, who had already occupied it with a flying column, and Berar to the nizam, who gained a fresh addition by every act of *complaisance* (A) / *complacence* (B) to the British government.
- IV. But at first the Roman citizen wore only an iron *cygnet* (A) / *signet* (B) ring, and this continued to be used at marriages.
- V. Finally there is a vertical stone slab *stile* (A) / *style* (B) in the southwest.

(a) AABBB

(b) ABAAA

(c) BABAB

(d) ABABA

52. d 'Hew', which means to shape something by cutting with a sharp tool, is the correct answer in sentence I while 'hue' is a shade of color. In sentence II, 'censor' is the correct word because it refers to a person whose job is to examine books, films, etc. and remove parts which are considered to be offensive, immoral or a political threat. 'Censer' is a container for holding and burning incense. 'Complaisance' which refers to the willingness to please is the correct word in sentence III while 'complacence' refers to self-satisfaction. In sentence IV, the correct word is 'signet' which refers to a small intaglio seal while 'cygnet' refers to a young swan. 'Stile' refers to a set of steps passing over a fence or wall while 'style' refers to a particular way. So, 'stile' is the correct word in sentence V.

53. The sentences given in the following question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

- A. Nevertheless, we do think that certain aesthetic, evaluative conceptions do relate to specific experiences in a non-trivial way, especially that of aesthetic excellence.
- B. This is so because, typically, we think that the experience of beauty is such that we cannot leave it to others to be had.
- C. It is rather intriguing that we will often try to persuade people of what we find beautiful, even though we do not believe that they may subsequently base their judgment of taste on our testimony.
- D. Moreover, we are often aware of the contingency of our own judgments' foundation in our own experience.
- E. Now the discussion within analytical aesthetics concerning the question of what kinds of truth-values adhere to aesthetic judgments of various kinds has evident bearing on the problem of aesthetic experience's relevance for evaluation.

(a) CEBAD

(b) CEDAB

(c) EADCB

(d) CBDAE

53. d C is an apt beginning of the paragraph because it contains the main idea that runs through the whole paragraph –A man's judgment of taste is not dependent on that of anyone else' testimony. C should be followed by B because B provides the reason behind it and D further adds to the reason as demonstrated by "moreover". Sentence A marks a shift from what has been said in D and adds to the overall picture. E elaborates the idea expressed in A further. Thus, option (d) the correct answer.

54. The sentences given in the following question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

- A. As Sylvia Huot declared, late medieval writers were perceptive of their changing status and strived to cast off their image as lyric entertainers for a more authorial identity.
- B. Much of the scholarship on this issue identifies late-medieval period as a critical moment in the development of modern concepts of authority.
- C. Jacqueline provides a detailed diagnosis of medieval literary references for students & medieval scholars alike.
- D. The colour of Melancholy cites an engaging survey of the development of authorship in the late Middle Ages, mainly designed for students.
- E. Authorship is a subject that has enraptured medievalists for the last two decades.

(a) DECBA

(b) EBADC

(c) CDEAB

(d) EADBC

54. b E is the opening statement because it introduces "authorship" as a subject. The rest of the statements give details about authorship. In B, the phrase "this issue" refers to "authorship" mentioned in E. This makes EB a mandatory pair. B also talks about the "development of modern concepts of authority" and "late medieval period as a crucial moment". This idea is elaborated in A where "changing status" of "late medieval" writers is mentioned. A also cites "more authorial identity". D introduces the name of a book "designed for students". C mentions Jacqueline and says that she provides "detailed analysis for students". This makes DC a mandatory pair. So the correct sequence is EBADC.

**Directions for question 55 to 58:** The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

On the first page of the novel I am writing, I describe a horse — a gray mare named Mathilde. The mare is not a principal character in my novel; on page 23, when she briefly reappears in the hold of a ship crossing the Atlantic Ocean on her way to South America, I may, in the confusion of a stormy passage, easily forget about her and call her a pony; worse still, on page 84 where Mathilde is galloping on the plains of the Gran Chaco in Paraguay, I could have her become a filly. My point is that there is a huge difference between a mare, a pony and a filly. My Mathilde is long-legged, elegant, reliable, whereas a pony is tricky, often mean and tends to nip, and a filly is skittish, untrained, ready to bolt and do who knows what.

Misspellings and inaccurate quotations and/or inaccurately rendered foreign phrases (and the writer herself is often the one to notice these most) stop the reader cold on the page. The same is true of typos. In a story I read recently, a dog called Marcia suddenly becomes Marci, and during the few seconds I was musing over the typo I lost sight of the actual dog. (It can also work the other way around and for the benefit of the writer: Richard Ford tells of meaning to write that someone was cold-eyed; only he typed old-eyed, which he liked better, so he kept it.) Either way, it doesn't take much.

Writing consistently goes beyond getting the facts right. "If it is one, say one," says a Chinese proverb (and not eighteen minus seventeen nor five-sixths plus one-sixth). This is not, I think, a question of keeping it simple but of making it as true as possible. Not an easy task: At every turn, the sentence invites me to show how much I know, to show how smart I think I am; every metaphor, every analogy has the potential for fraudulence. Most of my comparisons are odious. Adverbs are hills I must climb to get to my destination; adjectives are furniture blocking my way. English is a naming language; its power derives from nouns.

"Art," Ken Kesey said, "is a lie in the service of truth," a statement which may appear to be contradictory but is not. Interesting, too, how often a true story sounds both false and boring while a lie sounds quite plausible. (How often have I heard: "Listen, you won't believe this but it's a true story and if only I had the time to write, I'd . . . ?" I may believe it, but I don't want to listen to it.) The truth does not have the urgency given a lie, nor does it have the consistency or the accuracy. The truth is obvious, self-evident; the truth is right there in front of your nose. A lie is more trouble. As the liar/writer, I have to convince. I have to appear sincere and be twice as clever so as not to get caught. One way of doing this is to use a lot of details, to distract the reader: "Yeah, yeah, I tell you, the guy was riding a horse, a big gray mare, with a long white tail and a braided mane, and the other thing I noticed about the mare is how she kept tossing her head up and down and working the bit in her mouth and how she kept flicking her ears back and forth . . ." Or else one can do the opposite: Keep the lie simple and not describe or explain much; let the reader do some of the work: "I told you, he was riding a horse - you know what a horse looks like . . ."

Making things up — as in fiction — sounds easy and like fun and it may be at first. By page three, to say nothing of by chapter five or six, I guarantee, it becomes harder and harder to sustain that lie or whatever the story is that you have made up. Harder still is to continue to sustain the belief of your reader as well as to convince him of the worth of his endeavor; and hardest of all is for him to trust you with his credulity.

In my case, some of my writing is based on my experience — yes, I lived in Thailand, yes, I spent my childhood in South America — but most of it is based on accidentals, what I have heard or seen, and the rest on imagination. I borrow a bit here and a bit there; then I mix and rearrange to make it my own. And if I'm successful, in the end, I won't be able to remember — like a good liar, I suppose — what is true and what is made up. Or I like to write about stuff the average reader may not know a whole lot about: Sufis,

Thai culinary customs, Guarani lace-making. Or I do a lot of research and then try my damndest to hide it all — another form of deceit — because every fact, every date, every statistic (however accurate and consistent) in fiction is like a stone hurled into the hull of a boat and with each stone the boat sinks further in the water.

But fiction in the long run and final analysis has more to do with vision and desire than with making things up. The stronger both are, the more the language will be accurate, consistent and, possibly, lovely. The reverse is also true — the more accurate and consistent the language, the stronger the vision. Each word must be paid strict attention to, looked after, prized — “a rose by any other name” does not smell as sweet. And there’s no point fooling around; once a word is set down on paper, it is out there forever (like the cork from a champagne bottle). “Stay on the body,” Gordon Lish used to admonish us in class about our prose; an example he liked to point to was Amy Hempel’s word-perfect “It was as quiet as a church,” her description of — what else? — of being inside a church in a story called “In a Tub.” Often, too, the shorter the word the trickier, the more difficult to deal with. And consider, for instance, if Molly Bloom had not said “yes.” For sure, to write is to engage in a difficult relationship with language. I picture each word as a jealous husband, a demanding lover, an unreliable friend. Language is a problem, a presence, a kind of energy; language, in the words of Ahab, “taxes me.”

55. It can be inferred that the author talks about the mistakes with the horse, filly and mare in order to
    - (a) Present herself as an easygoing person who is not afraid to admit to her mistakes
    - (b) Showcase instances where she had also committed mistakes
    - (c) Highlight the details that need to be taken care of while writing a book
    - (d) In order not to appear too critical of others
  56. What does the author mean by saying “English is a naming language”?
    - (a) English is most conducive to indulge in name-calling
    - (b) English derives its power from nouns, from names
    - (c) The power of name-calling is immense in English
    - (d) English is most suited to talking about different people
  57. Which of the following is the author of the passage most likely to agree with?
    - (a) Lying is art if its purpose is to make the truth appear more plausible
    - (b) Art deals with truth in a different manner and sometimes this might appear as lying
    - (c) A lies can be more troublesome than truth
    - (d) Truth opposes lies and art is a lie
  58. It can be inferred that fiction
    - (a) tries to convince the reader of the veracity of the content
    - (b) tries to interest the reader who knows that fiction is a lie
    - (c) tries to match the level of lying between the author and the reader
    - (d) shows that readers are not fooled equally easily
55. c The author mentions the mistakes in the first paragraph of the passage and later moves on to mention other mistakes that are easy to make while writing. Her intention is as stated in option (c).
56. b The author mentions this at the end of the third paragraph. This makes option (b) correct. Name-calling is different and is not what the author means in this context.
57. c The author mentions this in the fourth paragraph. This makes option (c) correct.
58. a The author mentions in the fifth paragraph – “.....hardest of all for him to trust you with his credulity.” Thus, option (a) is the right answer.

**Directions for questions 59 to 62:** Answer the questions on the basis of the information given below.

Mr. Mathew teaches students of ten different classes – A through J. The number of students in the given classes is 1 through 10 respectively. No two classes have a common student. In a particular week, he did not teach the students of exactly two out of the ten classes. In the given week, he taught students of each of the remaining eight classes on exactly three different days. He did not teach the students of any class on Sunday, and on each of the remaining six days of the week, he taught the students of exactly four different classes. The number of students taught by him on Monday, Tuesday, Wednesday, Thursday, Friday and Saturday was 18, 12, 23, 19, 32 and 25 respectively. It is also known that, in the given week, no student was absent in his/her respective class.



**For questions 59 to 62:**

Had Mr. Mathew taught each of the given ten classes on exactly three different days of the week, he would have taught a total of  $(1 + 2 + 3 + \dots + 9 + 10) \times 3 = 165$  students.

Total number of students taught by Mr. Mathew on the six days of the week =  $18 + 12 + 23 + 19 + 32 + 25 = 129$

Therefore, the total number of students in the two classes that were not taught by him =  $\left(\frac{165 - 129}{3}\right) = 12$

So, the possible pairs of the two classes that were not taught by him could be (B and J), (C and I), (D and H) or (E and G).

On Tuesday the total number of students taught by him was 12.

This is possible in two cases:

**Case I:** He taught the classes A, B, C and F

**Case II:** He taught the classes A, B, D and E

From the two cases stated above, we can definitely conclude that he taught the classes A and B.

On Friday, the total number of students taught by him was 32.

This is possible in two cases:

**Case III:** He taught the classes E, H, I and J.

**Case IV:** He taught the classes F, G, I and J.

From the two cases stated above, we can definitely conclude that he taught the classes I and J and also, he taught either class E or G.

Therefore, the two classes that Mr. Mathew did not teach were D and H.

59. d

60. d The classes taught by him on Friday were F, G, I and J.  
Hence, option (d) is the correct choice.
61. a It is given that on Saturday of the week Mr. Mathew did not teach class J but taught class C.  
Since he did not teach class J on Saturday, he definitely taught class I on Saturday as on Saturday Mr. Mathew taught 25 students and only possible combination was (C, F, G, I).  
Hence, he definitely taught class E on each of the three days namely Monday, Wednesday and Thursday as he did not teach class E on Friday, Saturday and Tuesday.  
The possible combinations of the classes taught by him on Thursday is (E, I, C and B) or (E, A, C and J).  
Therefore, he definitely taught the class C on Thursday.  
The only possible combination of the classes taught by him on Monday was (A, B, E and J)  
The final table is given below:

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
A, B, E and J	A, B, C and F	(E, G, J and A) or (E, G, I and B)	(E, C, A and J) or (E, C, I and B)	F, G, I and J	C, I, F and G

Class C is not taught by him on two consecutive days of the week 'W'.

62. a By referring to the table given in the previous question, it can be calculated that the required days were Tuesday, Friday and Saturday.

**Directions for questions 63 to 66:** The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

It was Durkheim's thesis that the ever increasing division of labour in society was bringing into being a more differentiated and complex society which was characterized by what he called organic solidarity as opposed to the mechanical forms of solidarity which prevailed in earlier times.

What holds a society together or how is social integration possible? In his view social integration in modern industrial society was leading towards the formation of a society which was in its social and economic structures characterized by the division of labour, that is, a functionally differentiated society. Under such conditions, he believed, social integration required a particular kind of cultural cohesion that would be in harmony with social structures. The older forms of cultural cohesion - such as the idea of community - were losing their hold because they were based on a too direct (or 'mechanical', as he claimed) relationship between the individual and society. His question, then, related to the connection between social integration and cultural cohesion under the conditions of societal differentiation.

A differentiated society could only be based on cultural forms of solidarity that were differentiated, that is based on generalized values. In his view this could only be realized in the evolution of co-operative relations between groups, in particular occupational groups, and through education. Such a value system would not be based on the values of a particular group in society but shared civic values.

The second perspective Durkheim proposed was that the actual historical experience of his time was not illustrative of this new organic form of solidarity, for civic morality was everywhere in crisis. The phenomenon of suicide epitomized the anomie which Durkheim thought was creeping into European society in its transitional stage between traditional society and the truly modern stage, the latter of which he associated more closely with European society. Anomie results when there is a breakdown in solidarity, when a discord emerges between culture and society, and as a result individuals no longer feel integrated into the society.

Later Durkheim moved to a more advanced position seeing cultural cohesion in terms of the formation of cultural 'representations' which expressed the 'collective conscience'. These representations were the objectified self- images, or representations, of society. What happens, he wondered, when two collective consciences confront each other. 'For one people to be penetrated by another', he argued, 'it must cease to hold to an exclusive patriotism, and learn another which is more comprehensive'. Durkheim goes on to argue: ... this relation of facts can be directly observed in most striking fashion in the international division of labour history offers us. It can truly be said that it has never been produced except in Europe and in our time. But it was at the end of the eighteenth century and at the beginning of the nineteenth century that a common conscience of European societies began to be formed.

Though he opposed the negatively defined conservative view of the move from the cohesive world of community to the individualistic world of society - he was ambivalent on the merits of society. He did not think modern society, because of its differentiated structures, could recover the traditional idea of community as a fusion of culture and society; yet, 'the social' was something deeply ambiguous. It could provide the individual with more autonomy but it could also undermine it in the formation of anomie.

His sociology pointed to the view that social integration required a co-operative framework for social groups and one in which education would play an ever greater role in generating cultural cohesion around the formation of generalized values. The idea of how a society represents itself and creates a cognitive space which constitutes, what he called, the 'meeting ground' between two collective consciences is an issue of central importance in understanding European integration in terms of the problematic of the relationship between social integration and cultural cohesion. A century later we have still not moved beyond Durkheim's fear that the degenerating forces of anomie are creeping into the vacuum created by the divergence of the social and the cultural.

66. Which of the following best describes the tone of the passage?  
(a) Argumentative      (b) Analytical      (c) Derisive      (d) Meditative
63. c Option (c) is correct as inferred from the last sentence of the last paragraph. The fear of 'anomie' is in the mind of the author as well as Durkheim. Option (a) is incorrect because it is too general in nature and it suggests the impossibility of the accomplishment of the task. Option (b) talks about '..collective consciousness'; the passage does not deal with consciousness but conscience. Option (d) is unclear through the use of the phrase 'enhance the idea'.
64. d Option (d) is correct because it emphasizes on the idea of space for everyone without a fear of anomie. Option (a) talks about 'inner self which is not relevant; option (b) is a negation of the idea stated in the question. Option (c) takes the argument in an entirely different direction.
65. d Option (d) is correct because both A & C point towards the kind of society that will come into existence when there is greater social cohesion. 'B' is a problem that education seeks to address.
66. b The tone is clearly analytical. The author presents Durkheim's theory to the reader and delves into the various perspectives of Durkheim and the popular theories of his age. The author does not argue in support of any idea, eliminating option (a). Derisive means mocking, which does not make sense in connection to the passage. Option (d) would have been correct, had the author contemplated a lot through use of questions or thought-provoking statements.
67. Snapdragons always fly in summer if Beetles roll in winter. If Beetles roll in winter then Mantises always pray in autumn. The Mantises did not pray this autumn and thus Snapdragons will not fly.
- Which one of the following exhibits a flawed pattern of reasoning most similar to the flawed pattern of reasoning in the argument above?
- (a) The car will move only if the carburetor is not clogged. The carburetor is clogged if the engine is running. The engine is not running and so the car will move.  
(b) Dennis will ride his scooter when Margaret is not around. If Margaret is around, Gina will not feed her frog. Gina fed her frog, so Dennis is not riding his scooter.  
(c) If Golem is angry then Dobby is silent. If Golem is angry then Vader doesn't care. Vader cares so it's obvious that Dobby is not silent.  
(d) If the cheese is in the fridge, then it is still fresh. And the raisins are dry if the cheese is in the fridge. The raisins are not dry, so the cheese is still fresh.
67. c The given argument can be broken down as follows:  
A (Snapdragons fly in summer) -> if B (Beetles roll in winter)  
If B (Beetles roll in winter) -> then C (Mantises pray in autumn)  
If not C (Mantises pray in autumn) -> then not A (Snapdragons fly in summer)  
The flaw in this argument is that even though both A and C are connected as effects of cause B, we cannot relate A and C as cause and effect. The only option that reflects this same flaw in reasoning is option (c).  
A (Dobby is silent) -> if B (Golem is angry)  
If B (Golem is angry) -> then C (Vader doesn't care)  
If not C (Vader cares) -> then not A (Dobby is not silent)

68. Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the sentence that completes the paragraph in the most appropriate way.

Interestingly, Descartes would agree that *experiential* resources cannot solve the problem. By the Sixth Meditation, however, Descartes purports to have the *innate* resources he needs to solve it—namely, the innate ideas of mind and body. Among the metaphysical theses he develops is that mind and body have wholly distinct essences: the essence of thinking substance is pure thought; the essence of body is pure extension. In a remarkable maneuver, Descartes invokes this distinction to refute the skeptical worry that sensations are produced by a subconscious faculty of the mind: “nothing can be in me, that is to say, in my mind, of which I am not aware,” and this “follows from the fact that the soul is distinct from the body and that its essence is to think”. This result allows Descartes to supplement the involuntariness argument, thereby strengthening the inference from line one to line two.

- (a) What could then be the cause of sensation?
- (b) Descartes thus emerges as a radical thinker supporting the very essence of the philosophy.
- (c) For from the additional premise that *nothing can be in my mind of which I am unaware*, it follows that if sensation were being produced by activity in my mind, then I'd be aware of that activity on the occasion of its operation.
- (d) The body extends or contracts as per the circumstances and it is a function of matter.

68. c The last few statements say that Descartes uses his theory to supplement the theory of involuntariness, i.e. the production of sensations in one's body is not by one's mind. Option (c) continues the line of thought described in the paragraph. This option explains how Descartes supplements and strengthens the inference. Option (a) opens another question abruptly, a question that could come after option (c). Options (b) is a bit distanced from the given paragraph in terms of theme and option (d) is not connected to the idea presented in the paragraph.

69. Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the sentence that completes the paragraph in the most appropriate way.

Surowiecki offers a multitude of examples that demonstrate how crowds have made eerily accurate predictions. He points to the aftermath of the space shuttle Challenger disaster, for instance. The stock market immediately began to punish one of the four main shuttle contractors more harshly than the others. Six months later, it turned out that company was responsible for the disastrously defective O-rings.

- (a) The reason it's so hard to beat the point spread in a sports bet is because you're playing against the hordes and the hordes know all.
- (b) There are certain rules for optimum crowd success.
- (c) The smartest crowds are diverse.
- (d) A group is better at guessing the number of jelly beans in a jar than any one individual

69. d The passage gives examples of the accurate predictions made by crowds and option (d) concludes it by stating that groups are better at guessing than single individuals. Other (a) goes against the line of the argument. Option (b) deals with rules that govern crowd's success while the passage does not talk about it. Option (c) is inept because the passage does not talk about the types of smart crowds.

**Direction for question 70 to 72:** Answer the questions based on the following information.

Four students — Rahul, Rohit, Pooja and Neha — took an exam consisting of four questions, with four options each. In the exam, each of them attempted all the questions and answered at least one question correctly, and no two of them answered the same number of questions correctly. The table given below shows the responses of the four students for the questions in the exam.

Question Name	1	2	3	4
Rahul	a	d	b	a
Rohit	b	c	b	b
Pooja	a	c	d	d
Neha	a	c	d	a



For questions 70 to 72:

Assume Rahul attempted all the questions correctly. No two students answer the same number of questions correctly. On checking, we find that the condition given in the previous statement does not hold. Hence, Rahul did not answer all the question correctly.

On proceeding in the similar manner, we find that Neha answered all the questions correctly.

The number of questions answered correctly by:

Rahul = 2

Pooja = 3

Rohit = 1

The correct option for the 1st, 2nd, 3rd and 4th questions were 'a', 'c', 'd' and 'a' respectively.

70. a Rahul answered two questions correctly.

71. a The correct option for the 4th question was 'a'.

72. c According to the given marking scheme, the marks scored by

According  
Rahul = 5  
Rohit = 2  
Pooja = 6  
Neha = 10

**Directions for questions 73 to 76:** The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

The question of silence is inseparable from a certain atopia. It is no-where to be heard, as there is no such thing as a place without sound of any kind. Everyone knows that outer space, to be sure, is silent, but this silence is only technical, and is a kind of limit-possibility, is an absolute in the way that death is an absolute. It is always on the other side of the loud and noisy, bustling with activity so unlike death. Our science fiction films always give us the roar of the rockets, the booming explosions, and the affective omniscience of film music—the silence of space is made loud and noisy, bustling with activity so unlike death. The occasional films which omit sound when outside the spacecraft still have to contend with the candy wrappers and plastic lids and the coughing of the theatre space, so the silence of space can only be alluded to, barely auditioned. Perhaps the closest we get to the silence of space is the tinny voice of the headset, and the rhythm of breathing amplified in the astronaut's helmet, the claustrophobia of atmospheric recirculation, such that silence is brought so close that it frames our perceptions and the action. Silence then takes on the explosiveness of an immanent possibility. Like death.

It is no accident that we bring up cosmic space in our first consideration of the thematic of silence. For we can say, silence is the sound of space, quiet is always the sound of a place. For the closest approximation to silence is quiet, but to think of quiet is always to suggest a quiet: the quiet of the library, of a forest clearing, of anywhere at three in the morning. Silence, however, is a corollary of absolute space, of pure, uninterrupted extension, the space of Descartes and Newton, amongst others, or space uninflected, the happy medium for grids of all kinds. Noise localizes, for sounds have sources. They emanate from centers, or multiple centers, as in the accumulation of the traffic hum which is the acoustic signature of urban spaces. Silence is as well the transposition onto the acoustic plane of the blankness of paper, whether white or yellow. Western art music shares this white silence with writing and painting. Rauschenberg had presented, in the early fifties, a series of monochrome paintings entitled the White Paintings. Here, too, the apparent emptiness reveals an active vitality and presence of light, color, and movement. Rauschenberg's radical move towards white paintings certainly drove Cage to present his own "white" work, the silent piece. The imperative of silence for music, one can imagine, originates from the margins of the notation system, the white in-between of notes and staff lines, as well as the silence that is reading and writing, i.e. the silence of speechlessness, St. Augustine's instinctive horror at the silence of the figure at the lectern, the silence of unvocalized interiority, the silence necessary as the medium of thought.

The superabundant display of vitality, which takes the form of knocking, hammering, and tumbling things about, has proved a daily torment for some people. There are people, it is true—nay, a great many people—who smile at such things, because they are not sensitive to noise; but they are just the very people who are not sensitive to argument, or thought, or poetry, or art, in a word, to any kind of intellectual influence. On the other hand, noise is a torment to intellectual people. In the biographies of almost all the great writers, or wherever their personal utterances are recorded, complaints have been found regarding it.

Silence is an effect, specifically, a technological and architectural effect, a type of quiet that perhaps can trace its lineage to the invention of masonry walls, i.e. walls composed of solid planes and thus impermeable to the sounds that might creep in through a mesh of leaves or the gaps in bundled saplings. Silence as a fantasy or an act of imagination will thus be linked to a certain stage of civilization. For we can imagine the difference between death in the jungle and death in the polis. In the former situation, one imagines that the cessation of movement on the part of the deceased may lead to a heightened sensitivity to the surrounding activity of the place - the animal sounds, the wind in the foliage; in other words, all that may have been tuned out when giving attention to another would uncannily return to the foreground. By contrast, city death

implies the silence of the tomb, prepared somewhat by the echoey sonorousness of the temple. Thus silence can be linked to a certain stony sense of enclosure and interiority.

73. What does the author imply by stating that 'silence of space is a kind of limit possibility'?
- (a) The concept of silence of space is very restricted in nature.
  - (b) The occurrence of space silence is less in everyday life because of the constant sound of other different things such as the roaring of rockets.
  - (c) The silence of space is only technical and is an absolute, like death.
  - (d) The space is presented as a busy place always bustling with some type of activity or the other.
74. What does the author imply by comparing silence with the space of Descartes and Newton?
- (a) The author tries to state the relationship between cosmic space and the concept of silence.
  - (b) The author tries to focus on the localization of noise and the sources from where they emerge.
  - (c) The author tries to state the relevance of Descartes and Newton's theories with respect to space.
  - (d) The author makes an indirect reference to the unaltered original space that was referred to by Descartes and Newton.
75. The above passage does not imply that:
- (a) Vitality cannot be expressed through silence.
  - (b) The concept of silence is a condition of inherent possibility and represents a rigid form of closeness.
  - (c) Silence is many times approximated with quiet.
  - (d) Silence is a type of technological and architectural effect.
76. Which of the following statements can be inferred from the passage?
- (a) St Augustine was filled with remorse at the silence of the figure of the lectern.
  - (b) Silence can be as explosive as quiet.
  - (c) Silence can be seen as a corollary of absolute space, unlike quiet.
  - (d) Intellectual people are insensitive to noise.
73. c Option (a) is out of context as it is nowhere mentioned in the given passage. Again, option (b) speaks about the frequency of occurrence of space silence in daily life, which has no relevance to the given question. The question is asking us what the author attempts to convey by the phrase 'silence of space is a kind of limit possibility'. But, space being a busy place bustling with a lot of activity is an unrelated point. So, we can eliminate option (d). The correct answer is option (c) which follows from the first paragraph of the passage.
74. d Option (a) is irrelevant in terms of the given question because the author has not mentioned cosmic space with respect to the space of Descartes and Newton. Again Option (b) is out of context because 'localization of noise' is not our focus for the question. Option (c) is incorrect because the author has nowhere given the details of Descartes and Newton's theories in the passage. Option (d) is the correct answer as it has been mentioned in the 4th sentence of the 2nd paragraph of the passage where the author gives a hint regarding the real space of Descartes and Newton which was 'uninflected' or unaltered.
75. a In the example of Rauschenberg's paintings, it is stated that the apparent emptiness revealed an active vitality. Hence, it would be incorrect to infer that vitality cannot be expressed through silence. The other options can be inferred from the passage.
76. c Refer to the 2<sup>nd</sup> paragraph where silence has been differentiated from quiet. Options (a) and (d) are incorrect. Option (b) is also incorrect. The passage nowhere talks of the explosiveness of quiet. Also, explosiveness of silence is spoken about in the context of silence becoming a definite possibility.

77. 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*.

## Choke

- (a) She tried to choke the unpleasant words back, but could not and ended up turning the air blue.
  - (b) It was ridiculous on the part of the opposition to choke off the speaker before he could finish.
  - (c) You should have seen the horror on the manager's face when the restaurant patron began to choke on a fish bone.
  - (d) Remembering the disaster, I choked and knew that I couldn't go on speaking.

77. d The phrase 'choked' in option (d) should be changed to 'choked up' which means 'feel like crying.' To choke back words means to fight hard to keep something coming out from your mouth such as sobs, bad words, vomit, etc. To choke off something means to put an end to debate or discussion. To choke on something means to gag and cough due to something stuck in the throat.

78. 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*.

## Read

- (a) The young manager has learned to read between the lines of corporate annual reports to discern areas of fiscal weakness.
  - (b) Often, our parents read us a lecture because we have neglected our chores.
  - (c) You better read up George Washington for your assignment or you'll have make excuses tomorrow.
  - (d) Read my lips. You're not having any more ice cream.

78. c The correct phrase in option (c) needs to be 'read up on'. It means to find and read some information about someone or something. To tell someone to read your lips is to tell someone to listen to what you are saying. To read between the lines means to infer or understand the subtleties of a text or a situation. To read someone a lecture means to scold them.

**Direction for questions 79 to 82:** Answer the questions based on the following information.

**For questions 79 to 82:**

Let the respective initial letters namely J, S, H, B, P and E of the boys denote the marks scored by them.

From III, B, P and E are cubes of integers. From III and I, P and E are the squares of integers as well as cubes of integers.

Now none of the scores is zero and the cubes of integers in the range 1 to 100 are 1, 8, 27, 64. Out of these, 1 and 64 are squares of integers too. So P and E are 1 and 64, not necessarily in the same order.

From IV,  $J \times P$  is an odd number. Hence, both  $J$  and  $P$  have to be odd natural numbers. This implies that  $P$  cannot be 64. So  $P$  is 1 and  $E$  is 64. Therefore,  $B = 8$  or 27.

Now, from V,  $64 - S$  or  $S - 64$  is equal to either J, H, B or P. From I, the possible values of S are 4, 9, 16, 25, 36, 49, 81 and 100. The respective differences between these numbers and 64 are 60, 55, 48, 39, 28, 15, 17 and 36; out of these, except 36, none is either the cube or the square of an integer. This difference has to be 36 and hence  $S = 100$ . Since P cannot be 36 as it is 1, B cannot be 36 as it is either 8 or 27 and J cannot be 36 as it is an odd natural number. H is 36.

From II, J is either 9, 25, 49, 81. Out of these only 9 (i.e.,  $8 + 1$ ) is possible sum of the marks obtain by the two other boys. Hence,  $J = 9$  and  $B = 8$ .

Sq P = 1 E = 64 S = 100 B = 8 H = 36 J = 9

88, 1-1, E-31, G-100, B-3, H-38, S-3

79. C

80. b

81. d

82. d

**Directions for questions 83 to 86:** The passage given below is followed by a set of four questions. Choose the most appropriate answer to each question.

The intimate connection between the brain, as it is now developed in us, and the faculty of speech, is well shown by those curious cases of brain-disease in which speech is specially affected, as when the power to remember substantives is lost, whilst other words can be correctly used, or where substantives of a certain class, or all except the initial letters of substantives and proper names are forgotten. There is no more improbability in the continued use of the mental and vocal organs leading to inherited changes in their structure and functions, than in the case of hand-writing, which depends partly on the form of the hand and partly on the disposition of the mind; and handwriting is certainly inherited. Several writers, more especially Prof. Max Muller, have lately insisted that the use of language implies the power of forming general concepts; and that as no animals are supposed to possess this power, an impassable barrier is formed between them and man. The judgment of a distinguished philologist, such as Prof. Whitney, will have far more weight on this point than anything that I can say. He remarks, in speaking of Bleek's views: "Because on the grand scale language is the necessary auxiliary of thought, indispensable to the development of the power of thinking, to the distinctness and variety and complexity of cognitions to the full mastery of consciousness; therefore he would fain make thought absolutely impossible without speech, identifying the faculty with its instrument. He might just as reasonably assert that the human hand cannot act without a tool. With such a doctrine to start from, he cannot stop short of Max Muller's worst paradoxes, that an infant is not a human being, and that deaf-mutes do not become possessed of reason until they learn to twist their fingers into imitation of spoken words. Max Muller gives in italics this aphorism: "There is no thought without words, as little as there are words without thought." What a strange definition must here be given to the word thought! With respect to animals, I have already endeavoured to show that they have this

power, at least in a rude and incipient degree. As far as it concerns infants from ten to eleven months old, and deaf-mutes, it seems to me incredible, that they should be able to connect certain sounds with certain general ideas as quickly as they do, unless such ideas were already formed in their minds. The same remark may be extended to the more intelligent animals; as Mr. Leslie Stephen observes, "A dog frames a general concept of cats or sheep, and knows the corresponding words as well as a philosopher. And the capacity to understand is as good a proof of vocal intelligence, though in an inferior degree, as the capacity to speak."

Why the organs now used for speech should have been originally perfected for this purpose, rather than any other organs, it is not difficult to see. Ants have considerable powers of intercommunication by means of their antennae, as shown by Huber, who devotes a whole chapter to their language. We might have used our fingers as efficient instruments, for a person with practice can report to a deaf man every word of a speech rapidly delivered at a public meeting; but the loss of our hands, whilst thus employed, would have been a serious inconvenience. As all the higher mammals possess vocal organs, constructed on the same general plan as ours, and used as a means of communication, it was obviously probable that these same organs would be still further developed if the power of communication had to be improved; and this has been effected by the aid of adjoining and well adapted parts, namely the tongue and lips. The fact of the higher apes not using their vocal organs for speech, no doubt depends on their intelligence not having been sufficiently advanced. The possession by them of organs, which with long-continued practice might have been used for speech, although not thus used, is paralleled by the case of many birds, which possess organs fitted for singing, though they never sing. Thus, the nightingale and crow have vocal organs similarly constructed, these being used by the former for diversified song, and by the latter only for croaking. An excellent observer, Mr. Blackwall, remarks that the magpie learns to pronounce single words, and even short sentences, more readily than almost any other British bird; yet, as he adds, after long and closely investigating its habits, he has never known it, in a state of nature, display any unusual capacity for imitation. If it be asked why apes have not had their intellects developed to the same degree as that of man, general causes only can be assigned in answer, and it is unreasonable to expect any thing more definite, considering our ignorance with respect to the successive stages of development through which each creature has passed.

83. According to the passage, the curious cases of brain disease illustrate which of the following?
  - (a) That the power to remember substantives is lost as is the faculty of speech.
  - (b) That elemental correlation exists within the brain and speech organs.
  - (c) That improbability lies in the continued use of the mental and vocal organs.
  - (d) That inherited changes occur in structure and functions of the organs.
84. According to the passage, the 'judgement' on language implies all except which of the following?
  - (a) The use of language implies the power of forming general concepts.
  - (b) The use of language forms an impassable barrier between man and animal.
  - (c) The use of language is an auxiliary of thought and is essential to the development of cognition.
  - (d) The use of language is indispensable to the development of thought.
85. According to the passage, the statement "There is no thought without words, as little as there are words without thought", illustrates which one of the following?
  - (a) Professor Max Mueller's paradox.
  - (b) Professor Whitney's judgement.
  - (c) Bleek's views.
  - (d) Mr. Leslie Stephen's observation.

86. The next paragraph of the passage is likely to deal with which of the following?
- (a) That of all the differences between man and the lower animals, the vocal faculty is by far the most important.
  - (b) As per the general theory of evolution, it is extremely improbable that apes could not catch up with man.
  - (c) The mental faculties in man had become highly developed superseding all.
  - (d) That feeling of dissatisfaction, or even misery, which invariably results from any unsatisfied instinct, would arise in other animals.
83. b The first line of the passage establishes that there is an intimate connection between the brain and the faculty of speech, making option (b) correct.
84. c Refer to the following lines in the passage, "On the grand scale language is the necessary auxiliary of thought, indispensable to the development of the power of thinking, to the distinctness and variety and complexity of cognitions to the full mastery of consciousness". Hence, option (c) is correct.
85. a The passage very clearly ascribes this axiom to Max Mueller making option (a) correct.
86. a The passage deals mainly with the organs of communication. Option (a) takes this further, making it the correct answer choice.
87. The following question consists of four sentences on a topic. Some sentences are grammatically incorrect or inappropriate. Select the option that indicates the grammatically correct and appropriate sentence.
- (a) The scientist concluded his speech by saying, "To somewhat paraphrase Churchill's famous wartime statement: in the field of research and development, the much have owed more to the few than we care to acknowledge.
  - (b) The scientist concluded his speech by saying, "To somewhat paraphrase Churchill's famous wartime statement - in the field of research and development, more has been owed by the many to the few than we care to acknowledge".
  - (c) Concluding his speech, the scientist somewhat paraphrased Churchill's famous wartime statement and, in the process, owed more to the few in the field of research and development than many would care to acknowledge.
  - (d) The scientist concluded his speech by asking Churchill to somewhat paraphrase his wartime statement about the few who owed more to the many than those in the field of research and development would care to acknowledge.
87. b The given sentence means that the scientist concluded his speech by saying that in the field of research and development, many people owe more to the few than we care to acknowledge. Therefore, option (b) is the correct answer. Option (a) can be eliminated because 'much' should be followed by a singular verb 'has'. Option (c) suggests that 'owing to the few' is an effect of the scientist paraphrasing Churchill's statement, which is not the case. Option (d) can be ruled out because the scientist did not ask Churchill to say something. The scientist quoted Churchill.

88. Four alternative summaries are given below the passage. Choose the option that best captures the essence of the text.

The more prevalent view of language, at least since the scientific revolution and still assumed in some manner by most linguists today, considers any language to be a set of arbitrary but conventionally agreed upon words or signs, linked by a purely formal system of syntactic and grammatical rules. Language, in this view, is rather like a code; it is a way of representing actual things and events in the perceived world, but it has no internal, no arbitrary connections to that world, and hence is readily separable from it.

- (a) That language is a set of rules is an assumption.
- (b) By attending solely to the denotative and conventional aspect of verbal communication, we can hold ourselves apart from, and outside of the rest of animate nature.
- (c) Language is a set of rules and codes which represents the world.
- (d) Language represents the world but is separable from it.

88. d Options (a) and (c) are too narrow. Option (b) does not fit with the theme of the paragraph. The paragraph talks about "Language" and not "verbal communication". Option (d) states the crux of the paragraph and hence, is the correct answer.
89. Given below is a sentence, part of which is underlined. Beneath the sentence you will find four ways of phrasing the underlined part. Select the correct answer in terms of grammar and usage.

A penguin species that lived millions of years ago would dwarf today's big living penguins and stood taller than most humans, according to analysis of fossils by a team of researchers from the La Plata Museum in Argentina.

- (a) would be dwarfing today's biggest living penguins and stand tall like most humans,
- (b) would have dwarfed today's biggest living penguins and stood as tall as most humans,
- (c) will dwarf today's biggest living penguins and be standing as tall as most humans,
- (d) would have been dwarfing today's biggest living penguins and standing as tall as most humans,

89. b The given sentence suggests that there existed a species of penguins which were bigger than the biggest penguins alive on the planet. Therefore, option (b) is the correct answer. Options (a) and (c) can be negated as they talk of the possibility of these penguins that existed in the past dwarfing today's penguins in future. Out of options (b) and (d), option (d) can be eliminated because the act of dwarfing is not a continuous action.
90. World Health Organization official: Seven years have passed since the Government started the Anti-Rubella Vaccination programme in Jharkhand, against the highly infectious virus. But now state hospitals have decided to start cutting costs and discontinue the programme. The health minister has defended the government's move by arguing that it has been several years now that any case of Rubella sprung up. But, we at WHO are skeptical. Imports of meat products in the state from other countries with cases of diseases pose a risk, even though vaccines may be available. A couple of years ago, when the government reduced the use of the Haemophilus influenza vaccines, there was a minor outbreak among children, which convinced the government to resume the vaccine's usage.

The WHO official's statements, if true, best support which of the following as a conclusion?

- (a) There is a need to protect young children in Jharkhand against the risk of a possible Rubella outbreak.
  - (b) Studies have revealed improper refrigeration during shipping in the meat industry in Jharkhand.
  - (c) Rubella far surpasses Haemophilus Influenza in fatality rates and is hence much more deadly.
  - (d) State health agencies are not equipped to bear the undue cost of Anti-Rubella shots being provided to every citizen in Jharkhand.

90. a The correct answer is option (a). We know that the citizenry is immune because of the vaccine. If they stop immunizing further, the unvaccinated ones, i.e. the young children, would be vulnerable to this "highly infectious" disease. We know that at least their unvaccinated immune systems would be "at risk" for it. Option (b) suggests that meat imports could allow the Rubella disease into the state. We don't know whether diseases could be introduced through these imports, but even if they are, there's no reason to conclude meats are un-refrigerated. Furthermore, refrigeration doesn't destroy viruses. This option cannot be the correct one. Option (c) is unsubstantiated since we have no way to compare the infection rates. Also, the text makes no specific comment on the cost of vaccines being high or placing a burden on state health services. Hence, option (d) gets eliminated.

**Directions for questions 91 to 94:** Answer the questions based on the following information.

Five boys — A, B, C, D and E — went on a shopping trip. Before shopping, three of the five boys had different amounts from among Rs. 100, Rs. 300 and Rs. 400, and the remaining two of them had the same amount which was Rs. 200. While shopping, they did not lend or borrow from each other. After the shopping, it was found that each of them was left with a different amount from among Rs. 165, Rs. 95, Rs. 70, Rs. 40 and Rs. 10, not necessarily in the same order. It is also known that:

**For questions 91 to 94:**

Since C started with 66.67% of the money that B started with, the ratio of amounts of C and B must have been in the ratio 2 : 3 and thus C started with Rs. 200 and B with Rs. 300. Since E started with money more than just one person, E must have started with Rs. 200. Since A has more money than D, A must have started with Rs. 400 and D with Rs. 100.

B and C started with Rs. 300 and Rs. 200 respectively, and B spent Rs. 15 more than C. Hence, the difference between the amounts left with B and C should have been Rs. 85. Out of the remaining amounts, only Rs. 95 and Rs. 10 satisfy this condition. Hence, B ended with Rs. 95 and C with Rs. 10. Since E spent Rs. 35, he ended with Rs. 165. Between A and D, D ended with more than A, and hence, D ended with Rs. 70 and A with Rs. 40.

The final table is given below:

Name	Started with	Ended with	Spent
A	400	40	360
B	300	95	205
C	200	10	190
D	100	70	30
E	200	165	35

91. d

92. b

93. a

94. d

95. Four sentences are given below labeled a, b, c and d. Of these, three statements 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) More than 130,000 deaths would be avoided over a 20-year period if Britain's 50- to 64-year-olds took a daily aspirin for 10 years, because the beneficial effects continue even when the aspirin is stopped, the authors say.
- (b) He said that people considering embarking on a fitness regime should talk to their GP and it might be possible to get tested first.
- (c) An aspirin a day could dramatically cut people's chances of getting and dying from common cancers, according to the most detailed review yet of the cheap drug's ability to stem disease.
- (d) A research team led by Professor Jack Cuzick, head of the centre for cancer prevention at Queen Mary University of London, concluded that people between 50 and 65 should consider regularly taking the 75mg low-dosage tablets.

95. b Option (c) introduces the topic of the passage and option (a) elucidates more on the statement made in option (c). Option (d) supports the claims made in option (a) and (c) with the research results. Option (b) is the odd-one out.

96. Four sentences are given below labeled a, b, c and d. Of these, three statements 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) It is thought that the pressure is so great that calcium can't exist except in solution, so the bones of vertebrates would literally dissolve.
- (b) In recent years, deep-ocean dredges and unmanned subs have glimpsed exotic organisms such as shrimp-like amphipods, and strange, translucent animals called holothurians.
- (c) No bones, no fish.
- (d) In fact, some question whether Piccard's fish was actually a form of sea cucumber.

96. b The correct sequence should be (d)(a)(c). Option (d) speaks of the doubts about Piccard's fish being something else. Option (a) follows through with the reason of such doubts. Option (c) is the most logical conclusion after talking of bones in (a). Option (b) is the odd one out since it begins to talk of various other organisms having been viewed in recent years. This sentence has no strong connection to the rest of the three statements.

97. Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

Nonprofit organizations depend on two resources to fulfill their missions. One, of course, is money. The other resource – just as vital but perhaps even more scarce – is leadership. Indeed, qualified leadership candidates may be even rarer than six-figure donors. \_\_\_\_\_

- (a) Today, many nonprofit organizations struggle to attract and retain the talented senior executives they need to convert dollars into social impact.
- (b) During the next 10 years, the nonprofit leadership deficit will become impossible to ignore.
- (c) As one highly respected executive director recently observed, "If I have the choice between spending time with a \$100,000 donor or a potential candidate for a senior role, hands down it's the candidate."
- (d) Searches for chief executive, operating, and financial officers often turn up only one to three qualified candidates, compared with four to six for comparable private-sector positions.

97. c The correct option is option (c), which explains through an example the last sentence that leadership is more difficult to obtain than donors and thus it is the most logical continuation of the paragraph. Option (a) talks about attracting and retaining a talented official while the passage talks about the problem of finding such an official. Option (b) is not in line with the main argument as the passage makes no reference to lack of leadership being a major problem. Option (d) can be eliminated because the passage does not compare any two sectors.

**Directions for questions 98 to 100:** There are two blanks in each of the following sentences. From the pairs of words given, choose the one that fills the blanks most appropriately. The first word in the pair should fill the first blank.

98. The metaphor of a light in one's heart, therefore, represents a rejection of the \_\_\_\_\_ dichotomy between reason and emotion; all the more so since it is a candle of understanding in one's heart, for a candle \_\_\_\_\_ both light and heat.

- (a) growing, bars
- (b) pressing, brews
- (c) putative, emits
- (d) subsidizing, rebukes

99. Not that the Soviet \_\_\_\_\_ was the only culprit. In every country where it was shown, the censors had a field day, and nibbled away even at what the \_\_\_\_\_ Shumiatsky had left.

- (a) kingdom, benevolent
- (b) era, obnoxious
- (c) ideology, blasphemous
- (d) regime, esurient

100. Truly, with the \_\_\_\_\_ mirror of material \_\_\_\_\_ ever before our gaze, we see things spiritual and eternal 'through a glass darkly'.

- (a) tenebrous, reality
- (b) shattered, shadows
- (c) ethereal, reflection
- (d) fading, realms

98. c The sentence talks of rejection of an assumed dichotomy by giving an example. Option (c) is the answer because the given sentence means that the metaphor of 'a light in one's heart' rejects the well known/putative dichotomy between reason and emotion because a candle is known to emit both light and heat. Options (a), (b) and (d) can be eliminated because a candle cannot 'bar', 'brew' or 'rebuke' light and heat.
99. d The word culprit in the context shows us that whatever the Soviet did in blank two will need a word with a negative connotation. Option (a) thus can be eliminated. Also the phrase 'nibbled away even' shows us that the Soviet were greedier than the Shumiatsky were. This thought is perfectly expressed in the word 'esurient', which means greedy or hungry. This also gives us the correct word for blank one, which is regime. Options (b) and (c) lose out with the use of the words obnoxious and blasphemous which do not fit the context.
100. a The phrase 'glass darkly' suggests that whatever image the mirror reflects is dark or obscure. The word that fits in the first blank is 'tenebrous' which means dark and gloomy. The second blank can be figured out through the word 'material' which means denoting or consisting of physical objects.

