

Date: 17-November-2019

**Max. Marks: 100**

**SOLUTIONS**

**Time allowed: 120 mins**

1. What is sum of all positive factors of 256.  
 (1) 526                      (2) 511                      (3) 625                      (4) 562

Sol. Option (2)

Sum of all + ve factors of 256

$$256 \rightarrow 1, 2, 4, 8, 16, 32, 64, 128, 256$$

$$\text{Sum} \rightarrow 511$$

2. Value of  $\frac{X}{X+1} + \frac{X+1}{X} - \frac{1}{X(X+1)}$  will be  
 (1)  $X^2$                       (2) 1                      (3) X                      (4) 2

Sol. Option (4)

$$\frac{x}{x+1} + \frac{x+1}{x} - \frac{1}{x^2+x}$$

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

$$\frac{x^2+x^2+2x+1-1}{x^2+x}$$

$$\frac{2x^2+2x}{x^2+x} \Rightarrow \frac{2(x^2+x)}{x^2+x} \Rightarrow 2$$

3. Sum of sequence  $5 + 6 + 7 + 8 + \dots + 19$  will be?  
 (1) 180                      (2) 175                      (3) 185                      (4) 190

Sol. Option (1)

$$1 + 2 + 3 + \dots + 19$$

$$\frac{n(n+1)}{2} - (1+2+3+4)$$

$$\frac{19 \times 20}{2}$$

$$190 - 10 = 180$$

4. If three Numbers are in ratio  $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$ , difference between largest and smallest is 27 then numbers are

- (1) 54, 72, 81                      (2) 24, 45, 51                      (3) 64, 72, 91                      (4) 54, 65, 81

Sol. Option (1)

$$\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$$

$$\frac{1}{2} \times 12 : \frac{2}{3} \times 12 : \frac{3}{4} \times 12 \qquad 6 : 8 : 9$$

Let common factor is x then sssss

$$3x = 27$$

$$x = 9$$

$$6x \Rightarrow 54$$

$$8x \Rightarrow 72$$

$$9x \Rightarrow 81$$

5. Which of the following number will completely divide the value of  $(3^{25} + 3^{26} + 3^{27} + 3^{28})$

- (1) 35                      (2) 40                      (3) 50                      (4) 45

Sol. Option (2)

$$3^{25} + 3^{26} + 3^{27} + 3^{28}$$

$$3^{25} (1 + 3^1 + 3^2 + 3^3)$$

$$3^{25} (1 + 3 + 9 + 27)$$

$$3^{25} (40) = 80$$

Ans = 40

6. Rohan's score on the mid-term exam was 75, and his score on the final exam was 90. if the weight of the final exam is twice that of mid-term, what is Rohan's final score in the course?

- (1) 82.5                      (2) 80                      (3) 85.5                      (4) 85

Sol. Option (4)

$$75, 90$$

$$\frac{75 + 2 \times 90}{3} = \frac{255}{3} = 85$$

7. A grandmother, mother and daughter wish to arrange themselves in a row in order to be photographed. How many different ways can they arrange themselves?

- (1) 6                      (2) 3                      (3) 18                      (4) 9

Sol. Option (1)

$$3! = 3 \times 2 \times 1 = 6$$

8. At the time of marriage a man was 6 year older than his wife, but 12 year after the marriage his age was  $\frac{6}{5}$  times the age of his wife. Their ages (in years) at the time of the marriage were?

- (1) 26, 20                      (2) 24, 18                      (3) 27, 21                      (4) 30, 24

Sol. Option (2)

At the time of marriage

$$\text{Age of man} \rightarrow x + 6 = 24$$

$$\text{Wife} \rightarrow x = 18$$

$$\text{Now} \rightarrow x + 6 + 12 = x + 18$$

$$\text{Wife } x + 12 = x + 18$$

| M                   | W                               |
|---------------------|---------------------------------|
| $x + 18$            | $= (x + 12) \frac{6}{5}$        |
| $x + 18$            | $= \frac{6x}{5} + \frac{72}{5}$ |
| $18 - \frac{72}{5}$ | $= \frac{6x}{5} - x$            |
| $\frac{18}{5}$      | $= \frac{x}{5}$                 |

$$x = 18$$

$$\text{age of wife} = 18$$

$$\text{age of man} = 24$$

9. If we throw a die, what is the probability of obtaining a result that is less than 4. If we know that the result obtained was an even number?

- (1)  $\frac{1}{2}$                       (2)  $\frac{2}{3}$                       (3)  $\frac{1}{3}$                       (4)  $\frac{4}{5}$

Sol. Option (3)

$$1, 2, 3, 4, 5, 6$$

$$2, 4, 6$$

$$\text{Less 4} \rightarrow \frac{1}{3}$$

10. There are 10 balls in a box, 5 white and 5 black. Two balls are removed randomly from the box, one after another. The first ball that is removed is black and it is not returned to the box. What is the probability that the second ball that is removed is also black?

- (1)  $\frac{5}{9}$                       (2)  $\frac{4}{9}$                       (3)  $\frac{3}{9}$                       (4)  $\frac{1}{2}$

Sol. Option (2)  
SW, 5B

SW,, 4B                       $\frac{4}{9}$

11. Some equations are based on the basis of a certain system. Using the same pattern solve the unsolved equation. If  $10 - 3 = 12$ ,  $12 - 4 = 13$ ,  $14 - 5 = 14$ , what is  $16 - 6 = ?$

- (1) 10                      (2) 15                      (3) 16                      (4) 18

Sol. Option (2)

$$\begin{aligned} 10 - 3 &= 12 \\ 7 + 5 &= 12 \\ 12 - 4 &= 13 \\ 8 + 5 &= 13 \\ 14 - 5 &= 14 \\ 9 + 5 &= 14 \\ 16 - 6 &= 10 + 5 = 15 \end{aligned}$$

12. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?

- (1) 9                      (2) 10                      (3) 12                      (4) 20

Sol. Option (2)

Loss in speed =  $54 - 45 = 9$  kmph  
1 hr Bus course 9 kmph less due to stiffer  
Time in which the buy stops per h

$$T = \frac{D}{5Res} = \frac{9}{54} = \frac{1}{6} \text{ hr}$$

$$\frac{1}{6} \times 60 = 10 \text{ min}$$

13. If  $40\%$  of  $1620 + 30\%$  of  $960 = ?\%$  of  $5200$ .

- (1) 12                      (2) 24                      (3) 5                      (4) 18

Sol. Option (4)

$$40\% \text{ of } 1620 + 30\% \text{ of } 960 = x\% \text{ of } 5200$$

$$\frac{40}{100} \times 1620 + \frac{30}{100} \times 960 = \frac{x}{100} \times 5200$$

$$648 + 288 = 52x$$

$$936 = 52x$$

$$\frac{936}{52} = x \qquad x = 18$$

14. In a row, 25 trees are planted at equal distance from each other. The distance between 1<sup>st</sup> and 25<sup>th</sup> tree is 30m. what is the distance between 3<sup>rd</sup> and 15<sup>th</sup> tree?

- (1) 8m                      (2) 15m                      (3) 16m                      (4) 18m

Sol. Option (2)

$$24x = 30$$

$$x = \frac{30}{24}$$

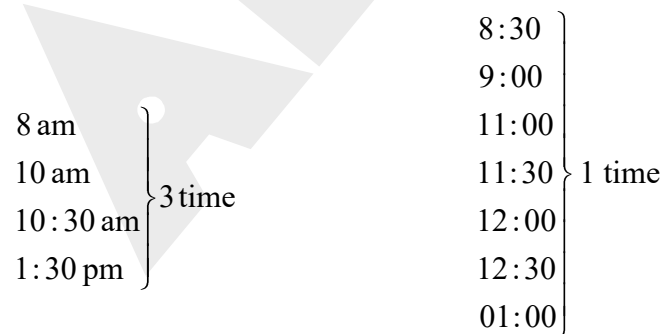
$$12 \Rightarrow x = \frac{30}{24} \times 12 \qquad x = 15$$

15. In a school, the bell is rung once after teach half an hour. The school starts at 8:00 AM and close at 1:30PM. The bell is rung 4 times continuously, at the time beginning, at the time of lunch break at 10:00 and 10:30 AM and at the end. How many times is the bell rung every day?

- (1) 21                      (2) 22                      (3) 19                      (4) 20

Sol. Option (4)

$$8 \Rightarrow 1:30$$



$$4 \times 3 = 12$$

$$12 + 8 = 20$$

16. If 80% of A = 50% of B and B = x% of A then value of x will be?  
 (1) 145                      (2) 170                      (3) 150                      (4) 160

Sol. Option (4)

$$\frac{48}{5100} = \frac{201}{100}$$

$$\frac{4A}{5} = \frac{B}{2}$$

$$B = \frac{x}{100}A \quad \frac{8A}{5} = 8$$

$$\frac{8100}{5100}, \frac{8}{5}A, \frac{8}{5} = 160B$$

$$\frac{80}{100} \times A = \frac{50}{100} \times B$$

$$\frac{8A}{5} = B$$

Now  $B = \frac{x}{100} \times A$

$$\frac{8}{5}A = \frac{x}{120} \times A \Rightarrow x = 160 \quad \text{So } 160\%$$

17. The mean of five consecutive numbers is 7. Which is the highest number?  
 (1) 10                      (2) 7                      (3) 9                      (4) 8

Sol. Option (3)

$$x, x+1, x+2, x+3, x+4$$

$$\frac{5x+10}{5} = 7$$

$$5x + 10 = 35$$

$$5x = 25$$

$$x = 5 \quad \text{highest} = 5 + 4 = 9$$

18. Find the value of  $x^2 + y^2 - x^3 - 3xyz$ . If  $x + y + z = 15$  and  $x^2 + y^2 + z^2 = 51$ .  
 (1) 540                      (2) -540                      (3) -225                      (4) 765

Sol. Option (2)

$$\begin{aligned} (x + y + z)^2 &= 15 \\ x^3 + y^3 + z^3 - 3xyz &= (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx) \\ &= (x + y + z)[x^2 + y^2 + z^2 - (xy + yz + zx)] \quad \dots (1) \end{aligned}$$

$$\Rightarrow (x + y + z)^2 = (15)^2$$

$$x^2 + y^2 + z^2 + 2zy + 2yz + 2zx = 225$$

$$51 + 2(xy + yz + zx) = 225$$

$$2(xy + yz + zx) = 225 - 51$$

$$2(xy + yz + zx) = 174$$

$$xy + yz + zx = 87$$

So  $15 [51 - 87] = -540$

19. If area of any triangle is  $384 \text{ cm}^2$  and its sides are in ratio  $3 : 4 : 5$  then perimeter of triangle will be?

(1) 60cm

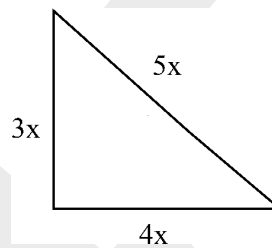
(2) 48cm

(3) 64cm

(4) 96cm

Sol. Option (4)

$$3x, 4x, 5x$$



$$\frac{1}{2} \times 4x \times 3x$$

$$6x^2 = 384$$

$$x^2 = \frac{384}{6} \quad x = 8$$

$$24 + 32 + 40 = 96$$

20.  $\frac{13}{48}$  is equal to

(1)  $\frac{1}{3 + \frac{1}{1 + \frac{1}{16}}}$

(2)  $\frac{1}{3 + \frac{1}{1 + \frac{1}{1 + \frac{1}{8}}}}$

(3)  $\frac{1}{3 + \frac{1}{1 + \frac{1}{2 + \frac{1}{4}}}}$

(4)  $\frac{1}{3 + \frac{1}{1 + \frac{1}{8}}}$

Sol. Option (3)

$$\frac{1}{3 + \frac{1}{1 + \frac{1}{2 + \frac{1}{4}}}} = \frac{1}{3 + \frac{1}{1 + \frac{4}{9}}} = \frac{1}{3 + \frac{9}{13}} = \frac{13}{48}$$

21. If for any two number a and b, the operation S is defined as follows:

$$a \$ b = a \times (a + b), \text{ then } (2 \$ 0) \$ 1 = ?$$

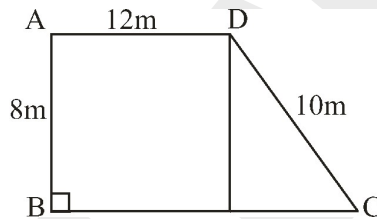
- (1) 12                      (2) 10                      (3) 20                      (4) 4

Sol. Option (3)

$$a \$ b = a(a + b)$$

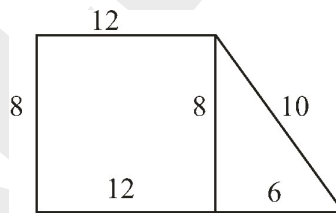
$$2 \$ 0 = 2(2 + 0) = 4 \$ 1 \Rightarrow 4(4 + 1) = 20$$

22. The accompanying figure shown a right + trapezoid (AD || BC) Based on this information and the information in the figure, the area of the trapezoid (in m<sup>2</sup>) is



- (1) 150                      (2) 120                      (3) 108                      (4) 96

Sol. Option (2)



$$12 \times 8 + \frac{1}{2} \times 6 \times 8$$

$$96 + 24 \Rightarrow 120$$

Direction (23 to 25) find the missing numbers in the number series.

23. 4, 8, 28, ?, 244

- (1) 69                      (2) 75                      (3) 80                      (4) 90



Sol. Option (3)

$$4 \quad 8 \quad 28 \quad \underline{\quad} \quad 244$$

$$3 + 1 = 4$$

$$3^2 - 1 = 8$$

$$3^3 + 1 = 28$$

$$3^4 - 1 = 80$$

$$3^5 + 1 = 244$$

24. 4, 7, 12, 19, 28, 39, ?

(1) 48

(2) 52

(3) 55

(4) 58

Sol. Option (2)

$$\begin{array}{cccccccc} 4, & 7, & 12, & 19, & 28, & 39, & 52 \\ \underbrace{\quad} & \underbrace{\quad} & \underbrace{\quad} & \underbrace{\quad} & \underbrace{\quad} & \underbrace{\quad} & \\ 3 & 5 & 7 & 9 & 11 & 13 & \end{array}$$

25. 10080, 1680, ?, 84, 28, 14

(1) 840

(2) 168

(3) 108

(4) 336

Sol. Option (4)

$$10080, 1680, ? 84, 28, 14$$

$$\frac{10080}{6} = 1680 \quad \Rightarrow \quad \frac{1680}{5} = 336$$

$$\Rightarrow \quad \frac{336}{4} = 84 \quad \Rightarrow \quad \frac{84}{3} = 28$$

$$\Rightarrow \quad \frac{28}{2} = 14$$

26. The compound interest on Rs. 30,000 at 7% per annum is Rs. 4,347. The period (in year) is

(1) 1

(2) 2

(3) 3

(4) 3.5

Sol. Option (2)

$$P = 30,0000$$

$$R = 7\%$$

$$CI = 4347$$

$$34347 = 30,000 \left(1 + \frac{7}{100}\right)^n$$

$$\frac{34,347}{30,000} = \left(\frac{107}{100}\right)^n$$

$$\left(\frac{107}{100}\right)^2 = \left(\frac{107}{100}\right)^n \Rightarrow n = 2$$

27. Among the numbers  $\sqrt{2}, \sqrt[3]{9}, \sqrt[4]{16}, \sqrt[5]{32}$  the greatest one is:

- (1)  $\sqrt{2}$                       (2)  $\sqrt[3]{9}$                       (3)  $\sqrt[4]{16}$                       (4)  $\sqrt[5]{32}$

Sol. Option (2)

$$\sqrt{2}, \sqrt[3]{9}, \sqrt[4]{16}, \sqrt[5]{32}$$

$$\frac{(2)^{\frac{1}{2}}}{\sqrt{2}}, (9)^{\frac{1}{3}}, \frac{(16)^{\frac{1}{4}}}{2}, \frac{(32)^{\frac{1}{5}}}{2}$$

$$(9^{\frac{1}{3}})^3 = (k)$$

$$\left(9^{\frac{1}{3}}\right)^3, (2)^3$$

$$9, 8$$

So  $9^{\frac{1}{3}} > 2$

28. If  $x + \frac{1}{x} = 2$  and x is real, then the value of  $x^{17} + \frac{1}{x^{18}}$  is

- (1) 1                      (2) 0                      (3) 2                      (4) -2

Sol. Option (3)

$$x + \frac{1}{x} = 2 \Rightarrow x^2 - 2x + 1 = 0$$

$$x^{17} + \frac{1}{x^{16}} \Rightarrow x = 1$$

$$1^{17} + \frac{1}{1^{16}} = 2 \Rightarrow 1 + 1 = 2$$

29. To win a 20 over match, the run rate is required 7.2. If in the end of 15<sup>th</sup> over, the run rate is 6. Then to win the match the required run rate is?

- (1) 1.2                      (2) 13.2                      (3) 10.8                      (4) 12

Sol. Option (3)

$$\begin{aligned} \text{Total sum} &= 20 \times 7.2 \\ &= 144.0 \end{aligned}$$

If the sum rank in 6 at the end of the 15<sup>th</sup> over

$$\text{Required run} = 144 - 90 = 54 \text{ run}$$

$$\text{Sum run rate} = 10.8$$

30. If P and Q are H.C.F. and L.C.F of two algebraic expression respectively and  $P + Q = x + y$  then what will be value of  $P^3 + Q^3$ ?
- (1)  $x^3 + y^3$                       (2)  $x^3 - y^3$                       (3)  $x + y$                       (4)  $x - y$

Sol. Option (1)

HCF  $\times$  LCM = mul. Of = Algebraic equation

$$P \times Q = xy$$

$$P + Q = x + y$$

$$(P + Q)^3 = (x + y)^3$$

$$P^3 + Q^3 + 3PQ(P + Q) = x^3 + y^3 + 3xy(x + y)$$

$$P^3 + Q^3 + 3xy(x + y) = x^3 + y^3 + 3xy(x + y)$$

$$P^3 + Q^3 = x^3 + y^3$$

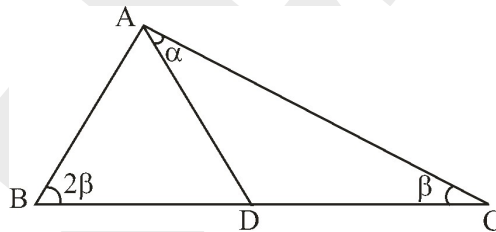
31. Pipe A and B can fill a tank in 12 minutes and 16 minutes respectively. Both pipe are kept open for x minutes and then b is closed and A fills the rest of tank in 5 minutes. The value of x will be
- (1) 4 minutes                      (2) 6 minutes                      (3) 5 minutes                      (4) 7 minutes

Sol. Option (1)

$$\begin{array}{l} A-12 \searrow \\ B-16 \swarrow \end{array} \begin{array}{l} \nearrow 4 \\ \searrow 3 \end{array} \begin{array}{l} 48 \\ \hline A+B=7 \end{array} \quad 7x + 20 = 48$$

$$7x = 48 - 20 \quad \Rightarrow \quad 7x = 28 \quad \Rightarrow \quad x = 4 \text{ min}$$

32. The accompanying figure shows right triangle ABC and isosceles triangle ABD ( $AB = AD$ ).



Based on this information and the information in the figure, the value of angle  $\alpha$  is.

- (1) 60                      (2) 45                      (3) 30                      (4) 25

Sol. Option (3)

Using Exterior Angle Property

$$\alpha + \beta = 2\beta \quad \Rightarrow \quad \alpha = \beta$$

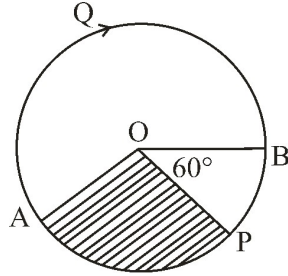
Now in  $\triangle ABD$ , Using Angle Sum property

$$\Rightarrow \quad 4\beta + 90 - \alpha = 108$$

$$\Rightarrow \quad 3\beta = 90$$

$$\Rightarrow \quad \beta = 30, \quad \text{Thus} \quad \alpha = 30$$

33. The accompanying figure shows a circle whose centre is O and radius is 10cm. The shaded sector equals  $\frac{1}{6}$  of the area of the circle. Based on this information and the information in figure the length (in cm) of the arc AQB is:



- (1)  $30\pi$                       (2)  $\frac{40}{3}\pi$                       (3)  $\frac{20}{3}\pi$                       (4)  $20\pi$

Sol. Option (2)

$$\text{Area of shaded Region} = \frac{1}{6} (\text{Area of Circle})$$

$$(\theta/360) \pi r^2 = \frac{1}{6} (\pi r^2)$$

$$\Rightarrow (\theta/360) \pi 100 = \frac{1}{6} (\pi 100)$$

$$\Rightarrow \theta = 60$$

$$\Rightarrow \text{arc (AQB)} = \frac{240}{360}(2\pi \cdot 10) = \frac{40\pi}{3}$$

34. If length of a Rectangle is increased by 25% and its width decreased by 20% then of the following which change in the Area of Rectangle occur.

- (1) 10% Increase                      (2) 16% Increase                      (3) 5% Decrease                      (4) No change

Sol. Option (4)

Let Area of rectangle be A square units.

$$\Rightarrow A = \ell b \quad \dots (1)$$

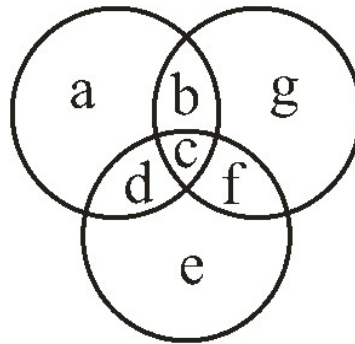
$$\text{New Area } A_1 = (125/100) \ell \times (80/100) b = \ell b$$

$$\Rightarrow \text{No Change}$$

35. An official meeting is attended by 130 department employees of them 66 drink tea, 56 drink coffee and 63 drink juice, 27 can drink either tea or coffee, 25 can drink coffee or juice and 23 can drink juice and tea. 5 employees can drink any of the three. How many drink only tea.

- (1) 21                      (2) 22                      (3) 18                      (4) 20

Sol. Option (1)



$$a + b + c + d = 60 \dots\dots\dots(1)$$

$$b + c + g + f = 56 \dots\dots\dots(2)$$

$$d + c + e + f = 63 \dots\dots\dots(3)$$

Now As  $c = 5, b + c = 27, c + f = 25, c + d = 23,$

On solving above,  $a = 21$

36. Of the three number, the sum of first two is 55, sum of second and third is 65, and sum of third with thrice of the first is 110. The third number is?

(1) 25

(2) 30

(3) 35

(4) 28

Sol. Option (3)

$$a + b = 55 \dots\dots\dots(1)$$

$$b + c = 65 \dots\dots\dots(2)$$

$$3a + c = 110 \dots\dots\dots(3)$$

On solving above equations,

$$c = 35$$

Direction: (37 to 40) Study the following table and answer questions given below:

| <b>EMPLOYEES SOURCE OF INCOME</b> |              |              |              |              |              |
|-----------------------------------|--------------|--------------|--------------|--------------|--------------|
|                                   | <b>K</b>     | <b>L</b>     | <b>M</b>     | <b>N</b>     | <b>O</b>     |
| Salary                            | 12000        | 6000         | 21000        | 9000         | 12000        |
| Bonus                             | 2400         | 1200         | 4500         | 2400         | 3000         |
| Overtime                          | 5400         | 2100         | 6000         | 5100         | 6000         |
| Arrears                           | 6000         | 5400         | 12000        | 4200         | 7500         |
| Miscellaneous                     | 1200         | 300          | 1500         | 300          | 1500         |
| <b>Total</b>                      | <b>27000</b> | <b>15000</b> | <b>45000</b> | <b>21000</b> | <b>30000</b> |

37. The employee who has minimum ratio of income from arrear to income form salary is  
(1) K (2) L (3) M (4) N

Sol. Option (4)

$$N = 4200/9000 = 7/15$$

$$K = 6000/12000 = 1/2$$

$$L = 5400/6000 = 9/10$$

$$M = 12000/21000 = 4/7$$

Thus N has minimum ratio.

38. The employee who earns maximum bonus in comparison to his total income?  
(1) M (2) N (3) L (4) K

Sol. Option (2)

$$N = 2400/21000 = 4/5$$

$$K = 2400/27000 = 4/45$$

$$L = 1200/15000 = 2/25$$

$$M = 4500/45000 = 1/10$$

Thus N earns maximum bonus

39. The employee who has maximum percentage of his salary out of the income?  
(1) K (2) L (3) M (4) O

Sol. Option (3)

$$O = 12000/30000 = 2/5$$

$$K = 12000/27000 = 4/9$$

$$L = 6000/15000 = 2/5$$

$$M = 21000/45000 = 7/15$$

Thus M has maximum percentage of his salary out of his income.

40. The income from overtime is what percentage of the income from the arrears in case of employee in category O?  
(1) 80 (2) 75 (3) 25 (4) 20

Sol. Option (1)

$$\text{Percentage of O} = (6000/7500) \times 100 = 80\%$$

41. The ratio of the present ages of Mohan and Suresh is 4:5. Five year ago, the ratio of their ages was 7:9. Their present ages was (in year) are:  
(1) 40, 50 (2) 18, 25 (3) 40, 60 (4) 20, 25

Sol. Option (1)

Let five years ago ages of Mohan was  $7x$  and Suresh was  $9x$ .

$$\text{Thus } (7x + 5)/(9x + 5) = 4/5$$

$$\Rightarrow x = 5$$

Thus present age of Mohan = 40 and Suresh = 50.

42. For a business lunch in a certain restaurant, you may choose one of 3 different first course and one of 4 different main course. In addition to first course and the main courses, you have a choice of a soup or dessert. How many different combinations of three course business lunch does this restaurant offer?

- (1) 12                      (2) 14                      (3) 18                      (4) 24

Sol. Option (4)

Choices for first course = 3

Choices for main course = 4

Choices of soup or desert = 2

Thus Total =  $3 \times 4 \times 2 = 24$ .

43. If the length of rectangular plot of land is increased by 12% and the breadth is decreased by 10%, its area is:

- (1) Decreased 1.25%      (2) Decreased by 2.5%      (3) Increased by 2.5%      (4) Increased by 1.25%

Sol. Option (4)

Let Area of rectangle be A square units.

$$\Rightarrow A = \ell b \quad \dots (1)$$

$$\text{New Area } A_1 = (225/200) \ell (90/100)b = (81/80) \ell b$$

$$\Rightarrow \% \text{ increase} = \left[ \frac{(81/80) \ell b - \ell b}{\ell b} \right] \times 100 = 1.25 \%$$

44. K is an even number and P is odd number. Which of the following statement is not correct?

- (1)  $P - K - 1$  is an odd number      (2)  $P + K + 1$  is an even number  
 (3)  $P + K + P$  is an odd number      (4)  $P^2 + K^2 + 1$  is an even number

Sol. Option (1)

$P - K - 1$  is even as

odd - even - odd = even

45. All of the liquid filling a cuboidal container that measures 2cm  $\times$  10cm  $\times$  20cm is poured into a cylindrical container with a base radius of 5 cm. What height (in cm) will the surface of the liquid reach in the cylindrical container?

- (1)  $\frac{16}{\pi}$                       (2)  $\frac{40}{\pi}$                       (3)  $8\pi$                       (4) 8

Sol. Option (1)

Volume of cuboidal container = Volume of cylindrical container

$$\Rightarrow 2 \times 10 \times 20 = \pi \times 25 \times h$$

$$\Rightarrow h = \frac{16}{\pi}$$

46. ( $0 < \theta < 90$ ). If  $\tan \theta + \cot \theta = 2$  then what will be value of  $\tan^{100} \theta + \cot^{100} \theta$ ?

- (1) 2                                      (2)  $2\sqrt{3}$                                       (3) 1                                      (4)  $\frac{1}{\sqrt{3}}$

Sol. Option (1)

$$\tan \theta + \cot \theta = 2$$

$$\Rightarrow \tan \theta + 1/\tan \theta = 2$$

$$\Rightarrow \tan^2(\theta) - 2\tan \theta + 1 = 0$$

$$\Rightarrow (\tan \theta - 1)^2 = 0$$

$$\Rightarrow \tan \theta = 1$$

$$\Rightarrow \theta = 45^\circ$$

$$\text{Thus } (\tan 45^\circ)^{100} + (\cot 45^\circ)^{100} = (1)^{100} + (1)^{100} = 1 + 1 = 2.$$

47. What is the coefficient of  $a^2 b^2$  in the expansion of  $(a + b)^4$ .

- (1) 1                                      (2) 6                                      (3) 2                                      (4) 3

Sol. Option (2)

$$(a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$$

Thus coefficient of  $a^2b^2$  is 6.

48. In a class composed of  $x$  girls,  $y$  boys. What part of the class is composed of girls?

- (1)  $y(x + y)$                                       (2)  $\frac{x}{xy}$                                       (3)  $\frac{x}{(x + y)}$                                       (4)  $\frac{y}{xy}$

Sol. Option (3)

girls =  $x$ , boys =  $y$

$$\text{Thus Girls Part} = \frac{x}{(x + y)}$$

49. The expression  $2^{6n} - 4^{2n}$ , where  $n$  is a natural number is always divisible by -

- (1) 15                                      (2) 18                                      (3) 36                                      (4) 48

Sol. Option (4)

$$2^{6n} - 4^{2n}$$

$$\Rightarrow 64^n - 16^n$$

$$\Rightarrow \text{This is always divisible by } 64 - 16 = 48.$$

50. If  $x = 2 - 2^{\frac{1}{2}} + 2^{\frac{1}{2}}$  then the value of  $x^3 - 6x^2 + 18x + 18$  is -

- (1) 22                                      (2) 33                                      (3) 40                                      (4) 45



Sol. Option (3)

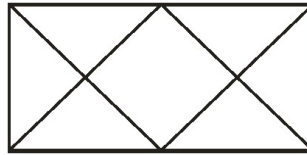
$$x = 2 - 2^{(1/3)} + 2^{(2/3)}$$

$$\Rightarrow (x - 2)^3 = 2^{(2/3)} - 2^{(1/3)}$$

$$\Rightarrow x^3 - 6x^2 + 12x - 8 = 2 - 6x + 12$$

$$\Rightarrow x^3 - 6x^2 + 18x + 18 = 40.$$

51. In this given figure how many triangle are there?



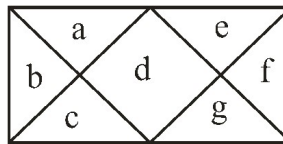
(1) 12

(2) 10

(3) 14

(4) 8

Sol. Option (1)



$$\Rightarrow 1 \text{ Component} = a + b + c + e + f + g = 6$$

$$\Rightarrow 2 \text{ Component} = (a + b) + (b + c) + (e + f) + (g + f) = 4$$

$$\Rightarrow 3 \text{ Component} = (d + c + g) + (a + d + e) = 2$$

$$\Rightarrow \text{Total} = 12$$

52. If Amit's father is Ketan's father's only son and Ketan has neither a brother nor a daughter. What is the relation between Ketan and Amit?

(1) Uncle-Nephew

(2) Father-Daughter

(3) Father-Son

(4) Cousin

Sol. Option (3)

Clearly Ketan is Father of Amit.

53. In a certain code language 'si po re' means 'books is thick', 'ti na re' means 'bag is heavy', 'ka si' means 'interesting book' and 'de ti' means 'that bag' what should stand for 'that bag is interesting' in that code language?

(1) ka re na ti

(2) de si re ka

(3) tip o ka na

(4) de ti re ka

Sol. Option (4)

Here Code are as Follow

re → is

si → book

ka → interesting

ti → bag

de → that

So Code for "that bag is interesting" is "de ti re ka".

54. In a certain language 'PRINCIPAL' is written as 'MBOQSOMVW' and 'TEACHER' is written as 'FDVSZDB'. Then how is 'CAPITAL' written in that code?  
 (1) SVMOFVW            (2) SVMODVW            (3) BVMODVM            (4) SVMIDVW

Sol. Option (1)

PRINCIPAL → MBOQSOMVW  
 TEACHER → FDVSZDB

Using observation code for P → M, R → B like all.

Thus for CAPITAL → SVMOFVW

55. In a certain language ROPE is written as %575, DOUBT is written as 35#8\* and LIVE is written as @24\$. How is TROUBLE is written in that code?  
 (1) \*%5#8@\$            (2) \*%#58@\$            (3) \*%5#8@4            (4) \*%#58\$@

Sol. Option (1)

Using observation code for R → %, O → 5, P → 7, E → \$ like all.

Thus for TROUBLE → \*%5#8@\$

56. If \$ means 'Plus (+)', # means 'minus (-)', @ means multiplied ( ), and \* means 'divided (/)' then what is the value of  $16\$4@5\#72*8$   
 (1) 29                      (2) 25                      (3) 27                      (4) 36

Sol. Option (3)

$$16\$4@5\#72*8 \\ \Rightarrow 16 + 4 \times 5 - 72 \div 8 = 27$$

57. In the number '5321648' how many digit will be as far away from the beginning of the number if digit arranged in ascending order as they are in the number?  
 (1) None                      (2) One                      (3) Two                      (4) Three

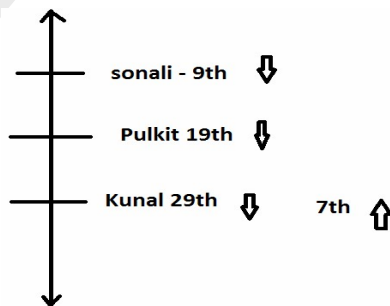
Sol. Option (1)

5321648 → 1234568,

Thus no digit follow the above pattern

58. In a class of 35 students Kunal is placed seventh from the bottom. Where as Sonali is placed ninth from top, Pulkit is placed exactly in between the two. What is Kunal's position from Pulkit?  
 (1) 9<sup>th</sup>                      (2) 10<sup>th</sup>                      (3) 11<sup>th</sup>                      (4) 12<sup>th</sup>

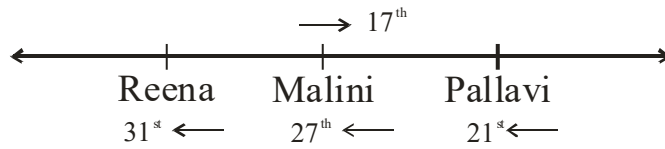
Sol. Option (2)



Thus Kunal is 10<sup>th</sup> from Pulkit

59. In a row of girls facing north, Reena is 10<sup>th</sup> to the left of Pallavi. Who is 21<sup>st</sup> from the right end. If malini, who is 17<sup>th</sup> from the left end is fourth to the right of Reena, how many girls are there in a row?  
 (1) 37 (2) 43 (3) 44 (4) Data inadequate

Sol. Option (2)

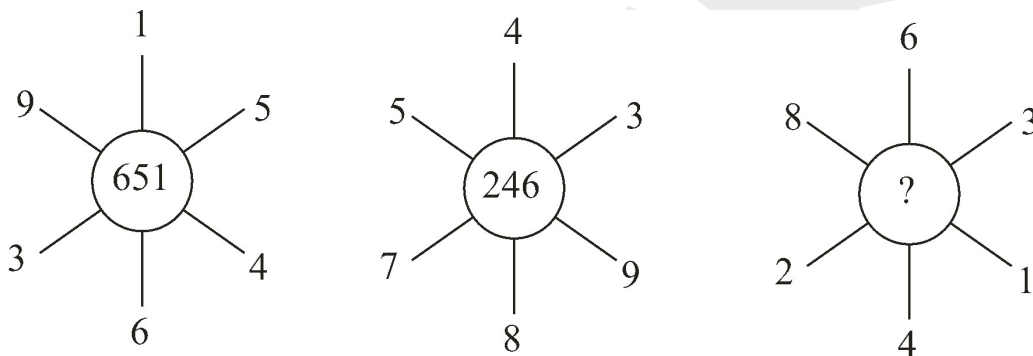


60. Anupriya was born on 29<sup>th</sup> November 1970, which was Sunday. When her next birthday will fall on Sunday?  
 (1) 1975 (2) 1976 (3) 1981 (4) 1982

Sol. Option (3)

Clearly  $1970 + 11 = 1981$

61. Which one will replace the question mark?



- (1) 262 (2) 622 (3) 631 (4) 834

Sol. Option (2)

$|9 - 3|, |1 - 6|, |5 - 4| = 651$  similarly  $|8 - 2|, |6 - 4|, |3 - 1| = 622$

62. If + means  $\times$ , - means  $\div$ ,  $\times$  means + and  $\div$  means - then,  $4 + 6 - 9 \div 6 - 2 \times 5$

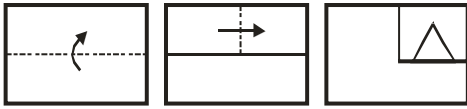
- (1)  $\frac{4}{6}$  (2)  $\frac{8}{3}$  (3) 2 (4)  $\frac{9}{2}$

Sol. Option (2)

$$4 \div 6 + 9 - 6 \times 2 + 5 = \frac{8}{3}$$

Direction: (63-66) In the Question given below piece of paper folded and cut as shown below in question paper, form the given answer figure.

63. Question figure

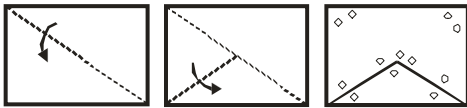


Answer figure



Sol. Option (1)  
By observation

64. Question figure



Answer figure



Sol. Option (4)  
By observation

65. Question figure

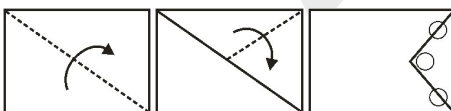


Answer figure



Sol. Option (1)  
By observation

66. Question figure



Answer figure



Sol. Option (3)  
3 by observation.

67. In the matrix below, the numbers in the cells follow some rule. Identify the number which when substituted for? Maintaing the same rule?

|     |     |   |
|-----|-----|---|
| 4   | 1   | 2 |
| 13  | 11  | 6 |
| 153 | 120 | ? |

(1) 32

(2) 45

(3) 16

(4) 48

Sol. Option (1)

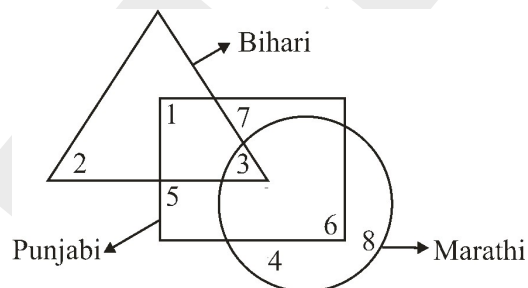
|     |     |   |
|-----|-----|---|
| 4   | 1   | 2 |
| 13  | 11  | 6 |
| 153 | 120 | ? |

$$13^2 - 4^2 = 153$$

$$11^2 - 1^2 = 120$$

$$6^2 - 2^2 = 32$$

Direction (68-72). The venn diagram given below is about a small circle is Marathi and triangle is Bihari square is Punjabi.



68. What is the total number of Biharis?

(1) 5

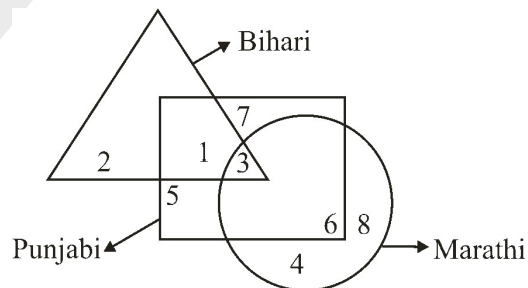
(2) 6

(3) 7

(4) 8

Sol. Option (2)

$$\text{Total no of Bihari's} = 2 + 1 + 3$$



69. What is the total number of Punjabis?  
 (1) 22                      (2) 28                      (3) 29                      (4) 35

Sol. Option (1)  
 Total number of Punjabi's  
 $= 1 + 7 + 3 + 5 + 6 = 22$

70. What is the total number of Marathis?  
 (1) 20                      (2) 15                      (3) 22                      (4) 21

Sol. Option (4)  
 Total number of Marathi's  
 $3 + 6 + 4 + 8 = 21$

71. How many Bihari which are not Punjabi?  
 (1) 1                      (2) 2                      (3) 3                      (4) 4

Sol. Option (2)  
 Bihari's not Marathi's  
 $(2 + 1 + 3) - (1 + 3) = 2$

72. How many Punjabi which are not Marathi  
 (1) 10                      (2) 11                      (3) 12                      (4) 13

Sol. Option (4)  
 Punjabi not Marathi  
 $22 - (3 + 6) = 13$

73. India became a republic on 26<sup>th</sup> January, 1950. Which day of the week was it?  
 (1) Monday                      (2) Tuesday                      (3) Thursday                      (4) Saturday

Sol. Option (3)  
 26<sup>th</sup> January 1950  
 1949 years completed from starting of calendar.

$$\Rightarrow 1949 = 1600 + 320 + 49$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ \text{Odd days} & = & 0 + 1 + 49 + 12 \end{array}$$

$$\Rightarrow \text{odd days} = 62 \Rightarrow 6$$

Now odd days in 1950<sup>th</sup> year

$$26 \text{ Jan} = 26$$

$$\text{Odd days} = \frac{26}{7} \Rightarrow 5$$

$$\text{Total odd days} = 6 + 5 = 11 = 4$$

So one 26 January 1950, it was Thursday

74. At what angle (larger) are two hands of a clock inclined at 48 minute past 12?  
 (1) 264 (2) 263 (3) 265 (4) 266

Sol. Option (1)

$$12 : 48$$

$$\text{Angle} = \left| 30H - \frac{11}{2}M \right|$$

$$\text{Angle} = \left| 30(0) - \frac{11}{2} \times 48 \right|$$

$$\text{Angle} = 264$$

75. A clock is set right at 4am. The clock loses 20 minutes in 24 hours. What will be the time, when the clock indicate 3am. On 4<sup>th</sup> day?

- (1) 5am (2) 4am (3) 3am (4) 4pm

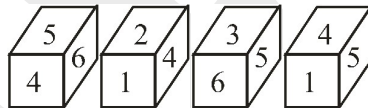
Sol. Option (2)

from 4 am to 3 am on next 4<sup>th</sup> day = 71 hours  
 time in right clock

$$= \frac{1440}{1420} \times 71 = 72 \text{ Horus}$$

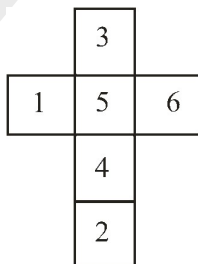
So correct time = 4 am

76. A die has four different positions. Find the number on the face opposite to 3.



- (1) 1 (2) 2 (3) 4 (4) 6

Sol. Option (3)



Direction: (77 to 79) are based on given information:- A solid cube is painted red on all faces. The side of the cube is 8 cm. it is cut into smaller cubes of side 2 cm. answer the following equation.

77. How many cubes have three faces coloured?  
 (1) 4 (2) 6 (3) 8 (4) 12

Sol. Option (3)

No of 3 side coloured cubes = 8

78. How many cubes have two faces coloured?

- (1) 8                      (2) 16                      (3) 36                      (4) 24

Sol. Option (4)

No of two face coloured cubes

$$= (n - 2) \times 12$$

$$(4 - 2) 12 = 24$$

79. How many cubes have only one face coloured?

- (1) 16                      (2) 24                      (3) 32                      (4) 36

Sol. Option (2)

No of only one face coloured cube =  $6 \times (n - 2)^2$

$$6 \times (4 - 2)^2 = 24$$

80. Choose the correct option to complete the matrix?

|     |     |     |
|-----|-----|-----|
| 4C  | 2B  | 3A  |
| 28A | 10C | 45B |
| 7C  | ?   | 15B |

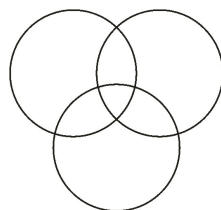
- (1) 15A                      (2) 12B                      (3) 5A                      (4) 8c

Sol. Option (3)

By observation.

|     |     |     |
|-----|-----|-----|
| 4C  | 2B  | 3A  |
| 28A | 10C | 45B |
| 7C  | 5A  | 15B |

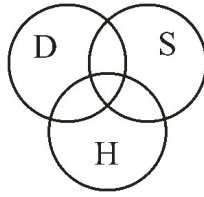
81. Which of following is the best represented in diagram?



- (1) Chair, Table, Furniture                      (2) Doctor, Social Person, Honest  
(3) Family, Parents, Children                      (4) Gold Jewellery, Silver Jewellery, Ornaments



Sol. Option (2)



Direction: (82 to 84) Study the letter series given and answer the questions that follows.  
HDYSMWNBQPOCRTBLZVEGUF

82. Which two neighbors in the given arrangement are farthest in the alphabetical order?  
 (1) B and Q                      (2) D and Y                      (3) U and F                      (4) V and E

Sol. Option (2)

|        |        | Difference    |
|--------|--------|---------------|
| B = 2  | Q = 17 | $17 - 2 = 15$ |
| D = 4  | Y = 25 | $25 - 4 = 24$ |
| U = 21 | F = 9  | $21 - 9 = 12$ |

So maximum difference is between D and Y

83. Which letter has the same neighbors as in the alphabetical order through they have change places?  
 (1) M                      (2) N                      (3) O                      (4) F

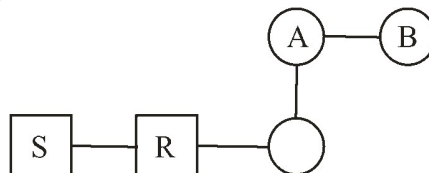
Sol. Option (3)

84. Which three letters have the same distance as they have in the alphabetical order through they have changed places?  
 (1) HMP                      (2) NQZ                      (3) QOE                      (4) YLF

Sol. Option (4)

85. A and B are sisters R and S are brothers, Daughter of A is she sister of R. Then which relation between B and S.  
 (1) Aunt                      (2) Grand Mother                      (3) Sister                      (4) Mother

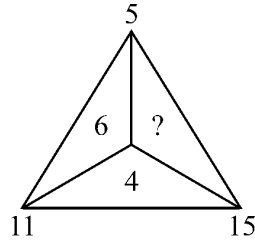
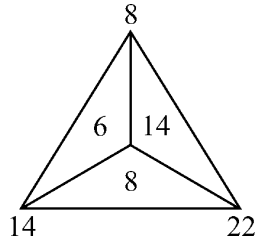
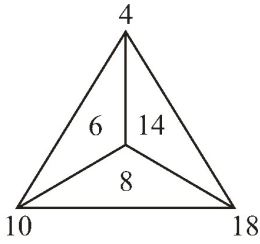
Sol. Option (1)



86. Abhay is the husband of Neena and Sunita is the Father of Abhay. Sohan is the uncle of NEerja. Who is the relation between Sohan and Neena?  
 (1) Jeth                      (2) Devar                      (3) Bhatija                      (4) Jeth/Devar

Sol. Option (Bonus)

87. Which one will replace the question mark



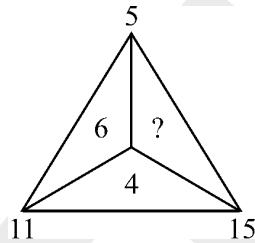
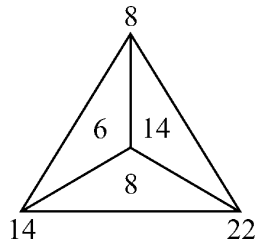
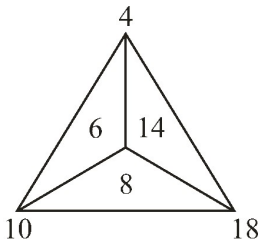
(1) 8

(2) 14

(3) 10

(4) 6

Sol. Option (3)



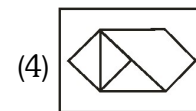
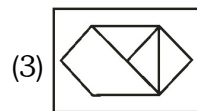
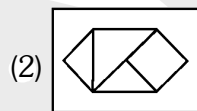
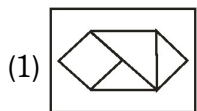
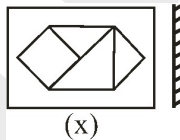
$$18 - 10 = 8$$

$$10 - 4 = 6$$

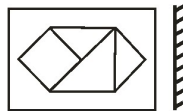
$$18 - 4 = 14$$

Similarly  $15 - 5 = 10$

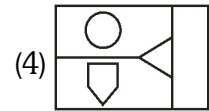
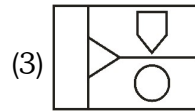
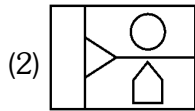
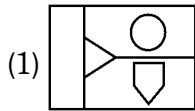
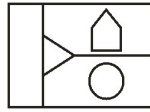
88. Choose the correct mirror image of figure (x) from given alternatives:



Sol. Option (2)



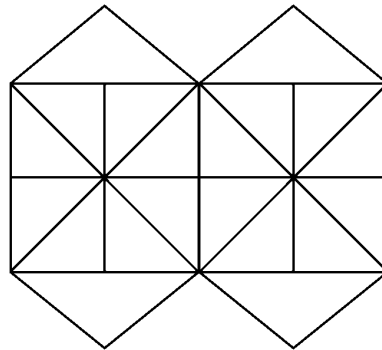
89. Choose the correct water image of figure (x) from given alternatives:



Sol. Option (1)

By observation

90. Which is the minimum number of straight lines needed to construct the following figure?



(1) 13

(2) 15

(3) 16

(4) 17

Sol. Option (3)

By observation

Direction: (91 to 95) A cube is coloured red on all of its faces. It is then cut into 64 smaller cubes of equal size. The smaller cubes so obtained are non separated.

91. How many smaller cubes have no surface coloured?

(1) 24

(2) 16

(3) 8

(4) 10

Sol. Option (3)

No face coloured =  $(n - 2)^3$

$$(2)^3 = 8$$

92. How many smaller cubes will have at least two surfaces painted with red colour?

(1) 4

(2) 18

(3) 32

(4) 24

Sol. Option (3)

At least two faces painted

2 face + 3 face

$$(n - 2) \times 12 + 8$$

$$\Rightarrow 24 + 8 = 32$$

93. How many smaller cubes have two surface painted with red coloured?  
 (1) 24                              (2) 8                              (3) 12                              (4) 20

Sol. Option (1)  
 $(n - 2) \times 12 = 24$

94. How many smaller cubes have only three surface painted with red coloured?  
 (1) 0                              (2) 12                              (3) 24                              (4) 6

Sol. Option (Bonus)

95. A 6 cm cube is cut into 2 cm smaller cube. How many smaller cubes can be obtained from their-  
 (1) 108                              (2) 156                              (3) 27                              (4) 64

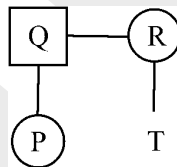
Sol. Option (3)  
 $\frac{6^3}{2^3} = 3^3 = 27$

Direction: (96 to 100) Read the following information's and answer the questions which follow:-

1. 'A × B' means 'A' is father of 'B'
2. 'A + B' means 'A' is daughter of 'B'
3. 'A ÷ B' means 'A' is mother of 'B'
4. 'A - B' means 'A' is brother of 'B'

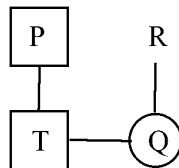
96. If  $P + Q - R \div T$ . How is T related to P.  
 (1) Aunt                              (2) Brother                              (3) Father                              (4) Cousin

Sol. Option (4)  
 $P + Q - R \div T$ , how T related to P



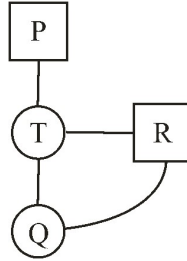
97. Which of the following means that R is the wife of P?  
 (1)  $P \times R - Q - T$               (2)  $P \div T + R - Q$               (3)  $P \div R - Q + T$               (4)  $P \times T - Q + R$

Sol. Option (4)  
 $P \times T - Q + R$



98. If 'P × T ÷ Q + R', how is R related to P?  
 (1) Daughter (2) Husband (3) Son in law (4) Daughter in law

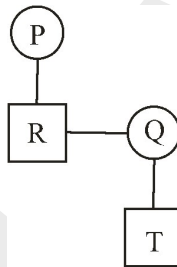
Sol. Option (3)



So in law

99. If P ÷ R - Q × T. How is P related to T?  
 (1) Grandmother (2) Mother in law (3) Sister (4) Grandfather

Sol. Option (1)



100. If P ÷ R - Q × T  
 If P ÷ Q + R × T. How Q is related to T.  
 (1) Aunt (2) Sister (3) Brother (4) None of these

Sol. Option (2)

$$P \div Q + R \times T$$

