



NUMBER SYSTEM-3_CSAT_EXPLANATION

Answer 1: (B)

$$\frac{\text{LCM of } (2, 4, 5)}{\text{HCF of } (3, 9, 6)} = \frac{20}{3}$$

Answer 2: (C)

First number \times second number = HCF \times LCM

$$\therefore \text{Second number} = \frac{\text{HCF} \times \text{LCM}}{\text{First number}}$$

$$= \frac{1820 \times 26}{130}$$

$$= 364$$

Answer 3: (D)

$$x - y = 60 \quad \dots\dots\dots (i)$$

$$xy = 12 \times 12 \times 204 \quad \dots\dots\dots (ii)$$

$$(x + y)^2 = (x - y)^2 + 4xy$$

$$\Rightarrow (x + y)^2 = 3600 + 4 \times 12 \times 12 \times 204$$

$$\Rightarrow (x + y)^2 = 3600 + 117504$$

$$\Rightarrow x + y = \sqrt{121104}$$

$$= 348$$

Answer 4: (A)

Let numbers be $13x$ and $13y$.

$$\text{Now, } 13 \times 13 \times xy = 6760$$

$$\Rightarrow xy = 40$$

\therefore Possible pairs are: (1, 40), (5, 8)

Answer 5: (B)

$$\text{LCM of } (15, 18, 24) = 360$$

Now, $(360k + 8)$ is divisible by 13 at $k = 2$.

$$\begin{array}{r} 27 \\ 13 \overline{) 360k + 8} \\ \underline{26} \\ 100 \\ \underline{91} \\ 9k + 8 \\ k = 2 \end{array}$$

$$\text{Number} = 360 \times 2 + 8 = 728$$

$$\therefore \text{Sum of the digits} = 7 + 2 + 8$$

$$= 17$$

Answer 6: (C)

$$\text{LCM of } 12, 15, 18, 27 = 540$$

Now,

$$\begin{array}{r} 18 \\ 540 \overline{) 9999} \\ \underline{-540} \\ 4599 \\ \underline{4320} \\ 279 \end{array}$$

$$\therefore \text{Required number} = 9999 - 279$$

$$= 9720$$

Answer 7: (A)

$$\text{LCM of } (15, 25, 35, 42, 70) = 1050$$

$$\text{Smallest 6-digit number} = 100000$$

$$\begin{array}{r} 95 \\ 1050 \overline{) 100000} \\ \underline{9450} \\ 5500 \\ \underline{5250} \\ 250 \end{array}$$

$$\text{Number} = 100000 + (1050 - 250)$$

$$= 100000 + 800$$

$$= 100800$$

$$\therefore \text{Required number} = 100800 - 4$$

$$= 100796$$

Answer 8: (D)

$$\text{Required number} = \text{HCF of } 1001 \text{ and } 910 = 91$$

Answer 9: (A)

$$\begin{array}{cc} +1 & -7 \\ \swarrow & \searrow \\ 121 & 93 \\ \hline 8 & 8 \end{array}$$

By using smaller remainders

$$\begin{array}{cc} +1 & -3 \\ \uparrow & \uparrow \\ 121 + 93 & = \frac{1-3}{8} = -2 \end{array}$$

$$= 8 - 2 = 6$$

**Answer 10: (A)**

$$\frac{(35)^{37}}{9}$$

The multiple of 9 near to 35 is 36

$$\begin{aligned} & \uparrow^{-1} \\ \Rightarrow \frac{(35)^{37}}{9} &= \frac{(-1)^{37}}{9} = -1 \\ \therefore \text{Remainder} &= 9 - 1 = 8 \end{aligned}$$

Answer 11: (D)

$$\frac{1! + 2! + 3! + 4! + \dots + 100!}{6}$$

$$\begin{aligned} & \uparrow^{+1} \\ 1! &= 1 = \frac{1}{6} = R=1 \\ & \uparrow^{+2} \\ 2! &= 1 \times 2 = \frac{2}{6} = R=2 \\ & \uparrow^0 \\ 3! &= 3 \times 2 \times 1 = \frac{6}{6} = R=0 \\ 4! &= 4 \times 3 \times 2 \times 1 = \frac{24}{4} = R=0 \\ & \uparrow^{+1} \quad \uparrow^{+2} \quad \uparrow^0 \quad \uparrow^0 \quad \uparrow^0 \quad \uparrow^0 \\ &= \frac{1! + 2! + 3! + 4! + 5! + \dots + 100!}{6} \\ &= \frac{1+2}{6} \\ &= \frac{3}{6} \\ R &= 3 \end{aligned}$$

Answer 12: (C)

$$\begin{aligned} \frac{7^{40}}{400} &= \frac{(7^4)^{10}}{400} \\ &= \frac{(2401)^{10}}{400} \\ &= \frac{(1)^{10}}{400} \\ &= 1 \\ R &= 1 \end{aligned}$$

Answer 13: (B)

$$\begin{aligned} 6 \text{ is divisible by } 6, \text{ so } \frac{x}{6} &= \frac{3}{6} \\ \therefore \text{Remainder} &= (x^4 + x^3 + x^2 + x + 1)/6 = (3^4 + 3^3 + 3^2 + 3 + 1)/6 \\ &= (81 + 27 + 9 + 3 + 1)/6 = 121/6 \\ \text{Hence, remainder} &= 1 \end{aligned}$$

Answer 14: (A)

7	N	
9	x	3
	1	6

$$\begin{aligned} x &= 9 \times 1 + 6 = 15 \\ N &= 7x + 3 = 7 \times 15 + 3 \\ &= 105 + 3 \\ &= 108 \\ \text{Now, divide } 108 \text{ by } 63 \\ \therefore \text{Required remainder} &= 45 \end{aligned}$$

Answer 15: (B)

$$\begin{aligned} 240 &= 2^4 \times 3^1 \times 5^1 \\ &= 5 \times [2^4 \times 3^1] \\ &= 5 \times [2^0 + 2^1 + 2^2 + 2^3 + 2^4] [3^0 + 3^1] \\ &= 5 \times 31 \times 4 \\ &= 620 \end{aligned}$$

Answer 16: (B)

$$\begin{aligned} 30^{16} \times 16^{18} \times 20^{21} \\ &= (2 \times 5 \times 3)^{16} \times (2^4)^{18} \times (4 \times 5)^{21} \\ &= 3^{16} \times 5^{16} \times 5^{21} \\ &= 3^{16} \times 5^{37} \\ &= 17 \times 38 = 646 \end{aligned}$$

Answer 17: (A)

2	100
2	50
5	25
5	5
	1

$$\begin{aligned} \text{Sum of even factors} &= (2^1 + 2^2) \times (5^0 + 5^1 + 5^2) \\ &= 6 \times 31 \\ &= 186 \end{aligned}$$

Answer 18: (D)

$$\begin{aligned} \text{Prime factorization of } 216 &= 2^3 \times 3^3 \\ \text{Total number of factors} &= (3 + 1)(3 + 1) = 4 \times 4 = 16 \\ \text{So, number of ways} &= \frac{1}{2} \times 16 = 8 \end{aligned}$$

Answer 19: (B)

$$\begin{aligned} 720 &= 2^4 \times 3^2 \times 5^1 \\ \therefore \text{Sum of odd factors} &= \frac{(3^3 - 1)}{3 - 1} \times \frac{(5^2 - 1)}{5 - 1} \\ & \quad \text{(Neglect even terms)} \\ &= \frac{(27 - 1)}{2} \times \frac{(25 - 1)}{4} \\ &= \frac{26}{2} \times \frac{24}{4} = 13 \times 6 = 78 \end{aligned}$$



Answer 20: (C)

2	210
3	105
5	35
7	7
	1

$$210 = 2^1 \times 3^1 \times 5^1 \times 7^1$$

$$= 1 + 1 + 1 + 1$$

$$= 4$$

Prime factor of 210 = 4

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