NUMBER SYSTEM-3_CSAT_EXPLANATION

Answer 1: (B)

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

Answer 2: (C)

First number × second number = HCF × 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 ..... (i)

xy = 12 × 12 × 204 ..... (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.

Now, 13 × 13 × xy = 6760

$\Rightarrow$ xy = 40

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

Answer 5: (B)

LCM of (15, 18, 24) = 360

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

$$13\overline{)360k+8}\ \ 27$$

$$\underline{26}$$

$$100$$

$$\underline{91}$$

$$9k+8$$

$$k = 2$$

Number = 360 × 2 + 8 = 728

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

= 17

Answer 6: (C)

LCM of 12, 15, 18, 27 = 540

Now,

$$540\overline{)9999}\ \ 18$$

$$\underline{-540}$$

$$4599$$

$$\underline{4320}$$

$$279$$

$\therefore$ Required number = 9999 – 279

= 9720

Answer 7: (A)

LCM of (15, 25, 35, 42, 70) = 1050

Smallest 6-digit number = 100000

$$1050\overline{)100000}\ \ 95$$

$$\underline{9450}$$

$$5500$$

$$\underline{5250}$$

$$250$$

Number = 100000 + (1050 - 250)

= 100000 + 800

= 100800

$\therefore$ Required number = 100800 - 4

= 100796

Answer 8: (D)

Required number = HCF of 1001 and 910 = 91

Answer 9: (A)

+1 -7 +5 -3

121 93

8 8

By using smaller remainders

+1 −3

↑ ↑

$$\frac{121+93}{8} = \frac{1-3}{8} = -2$$

= 8 - 2 = 6

Answer 10: (A)

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

The multiple of 9 near to 35 is 36

$\overset{-1}{\uparrow}$

$\Rightarrow \frac{(35)^{37}}{9} = \frac{(-1)^{37}}{9} = -1$

∴ Remainder = 9 - 1 = 8

Answer 11: (D)

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

$\overset{+1}{\uparrow}$

$1! = 1 = \frac{1}{6} = R = 1$

$\overset{+2}{\uparrow}$

$2! = 1 \times 2 = \frac{2}{6} = R = 2$

$\overset{0}{\uparrow}$

$3! = 3 \times 2 \times 1 = \frac{6}{6} = R = 0$

$4! = 4 \times 3 \times 2 \times 1 = \frac{24}{4} = R = 0$

$\overset{+1}{\uparrow}\ \overset{+2}{\uparrow}\ \overset{0}{\uparrow}\ \overset{0}{\uparrow}\ \overset{0}{\uparrow}\ \overset{0}{\uparrow}$

$= \frac{1!+2!+3!+4!+5!+.....+100!}{6}$

$= \frac{1+2}{6}$

$= \frac{3}{6}$

$R = 3$

Answer 12: (C)

$\frac{7^{40}}{400} = \frac{\left(7^4\right)^{10}}{400}$

$= \frac{(2401)^{10}}{400}$

$= \frac{(1)^{10}}{400}$

$= 1$

$R = 1$

Answer 13: (B)

6 is divisible by 6, so $\frac{x}{6} = \frac{3}{6}$

∴ 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

Hence, remainder = 1

Answer 14: (A)

7	N	
9	×	3
	1	6

x = 9 × 1 + 6 = 15

N = 7x + 3 = 7 × 15 + 3

= 105 + 3

= 108

Now, divide 108 by 63

∴ Required remainder = 45

Answer 15: (B)

$240 = 2^4 \times 3^1 \times 5^1$

$= 5 \times \left[2^4 \times 3^1\right]$

$= 5 \times \left[2^0 + 2^1 + 2^2 + 2^3 + 2^4\right]\left[3^0 + 3^1\right]$

$= 5 \times 31 \times 4$

$= 620$

Answer 16: (B)

$30^{16} \times 16^{18} \times 20^{21}$

$= (2 \times 5 \times 3)^{16} \times (2^4)^{18} \times (4 \times 5)^{21}$

$= 3^{16} \times 5^{16} \times 5^{21}$

$= 3^{16} \times 5^{37}$

= 17 × 38 = 646

Answer 17: (A)

2	100
2	50
5	25
5	5
	1

Sum of even factors = $(2^1+2^2) \times (5^0+5^1+5^2)$

= 6 × 31

= 186

Answer 18: (D)

Prime factorization of 216 = $2^3 \times 3^3$

Total number of factors = (3 + 1)(3 + 1) = 4 x 4 = 16

So, number of ways = $\frac{1}{2} \times 16 = 8$

Answer 19: (B)

$720 = 2^4 \times 3^2 \times 5^1$

∴ Sum of odd factors = $\frac{\left(3^3-1\right)}{3-1} \times \frac{\left(5^2-1\right)}{5-1}$

(Neglect even terms)

$= \frac{(27-1)}{2} \times \frac{(25-1)}{4}$

$= \frac{26}{2} \times \frac{24}{4} = 13 \times 6 = 78$

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