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Number System

- Any no. which when divided by p_1, q_1, r leaving same remainder s in each case will be of the form $k(\text{lcm of } p_1, q_1, r) + s$.
- Any number which when divided by p_1, q_1, r leaving respective remainders s_1, t_1 & u where $(p-s) = (q-t) = (r-u) = v$ will be of form $k(\text{lcm of } p_1, q_1, r) - v$
- Largest number with which numbers p_1, q_1 & r be divided giving remainders s_1, t_1 and u respectively will be Hcf of $(p-s), (q-t)$ & $(r-u)$.
- Largest number with which if we divide the numbers p_1, q_1 & r , remainders are same. Difference between any two pairs out of three given numbers $(p-q), (q-r)$ & $(p-r)$ Hcf of these numbers will be the required number.

- ① Lcm of $\frac{1}{3}, \frac{5}{16}, \frac{2}{19}, \frac{4}{127}$ is \Rightarrow (a) $\frac{1}{54}$ (b) $\frac{10}{97}$ (c) $\frac{20}{3}$ (d) None.
- ② Hcf of $\frac{2}{13}, \frac{8}{9}, \frac{64}{81}$ & $\frac{10}{27}$ is \Rightarrow (a) $\frac{2}{3}$ (b) $\frac{2}{81}$ (c) $\frac{160}{3}$ (d) $\frac{160}{81}$

- ③ Least number which when divided by $12, 15, 20$ & 54 leaves in each case a remainder of 8 $\textcircled{a} 504$ $\textcircled{b} 536$ $\textcircled{c} 544$ $\textcircled{d} 548$
- ④ Least number when divided by $48, 60, 72, 108$ & 140 leaves $38, 50, 62, 98$ & 130 as remainders respectively $\textcircled{a} 11115$ $\textcircled{b} 15110$ $\textcircled{c} 15120$ $\textcircled{d} 15210$
- ⑤ Least multiple of 23 , which when divided by $18, 21$ & 24 leaves remainders $7, 10$ & 13 respectively $\textcircled{a} 3002$ $\textcircled{b} 3013$ $\textcircled{c} 3024$ $\textcircled{d} 3036$.
- ⑥ Find the largest number which divides $34, 58$ & 94 leaving same remainder in each case. $\textcircled{a} 6$ $\textcircled{b} 9$ $\textcircled{c} 12$ $\textcircled{d} 8$
- ⑦ Smallest no. which when divided by $4, 6$ or 7 leaves a remainder of 2 is $\textcircled{a} 44$ $\textcircled{b} 62$ $\textcircled{c} 80$ $\textcircled{d} 86$
- ⑧ Largest no. with which when 425 & 373 are divided, respective remainders of 2 & 4 are left $\textcircled{a} 8$ $\textcircled{b} 9$ $\textcircled{c} 7$ $\textcircled{d} 11$.
- ⑨ Find greatest number that will divide $43, 91$ and 183 so as to leave same remainder in each case $\textcircled{a} 4$ $\textcircled{b} 7$ $\textcircled{c} 9$ $\textcircled{d} 13$
- ⑩ Greatest number which on dividing 1657 & 2037 leaves remainder 6 and 5 respectively $\textcircled{a} 123$ $\textcircled{b} 127$ $\textcircled{c} 235$ $\textcircled{d} 305$
- ⑪ Smallest number which when diminished by 7 is divisible by $12, 16, 18, 21$ and 28 is $\textcircled{a} 1008$ $\textcircled{b} 1015$ $\textcircled{c} 1022$ $\textcircled{d} 1032$
- ⑫ Greatest number which can divide $1356, 1868$ and 2764 leaving same remainder 12 in each case is $\textcircled{a} 64$ $\textcircled{b} 124$ $\textcircled{c} 156$ $\textcircled{d} 260$
- ⑬ Least number which when increased by 5 is divisible by each one of $24, 32, 36$ and 54 is $\textcircled{a} 427$ $\textcircled{b} 459$ $\textcircled{c} 867$ $\textcircled{d} 4320$
- ⑭ Six bells commence tolling together and toll at intervals of $2, 4, 6, 8, 10$ and 12 sec respectively. In 30 mins. how many times do they toll together $\textcircled{a} 4$ $\textcircled{b} 10$ $\textcircled{c} 15$ $\textcircled{d} 16$

Number System - II

- N is a composite Number $N = a^p \times b^q \times c^r \times \dots$
number of factors $= (p+1)(q+1)(r+1)\dots$
 - Product of factors of $N = N^{n/2}$ $n =$ total no. of factors of N
 - Sum of all factors of a Number N .
- $$= \left(\frac{a^{p+1}-1}{a-1} \right) \left(\frac{b^{q+1}-1}{b-1} \right) \left(\frac{c^{r+1}-1}{c-1} \right)$$
- Product of two numbers = LCM X HCF

- (14) Total number of factors of 540 a) 20 b) 24 c) 30 d) 48
- (15) Total divisors of 40500 except 18 itself is a) 48 b) 50 c) 46 d) 56
- (16) Sum of factors of 270 a) 270 b) 720 c) 710 d) 720
- (17) Product of factors of 360 a) $(360)^{120}$ b) $(36)^{120}$ c) $(360)^{24}$ d) 6×10^{10}
- (18) LCM of $\frac{2}{3}, \frac{4}{9}, \frac{2}{15}, \frac{36}{21}$ a) $1/12$ b) $1/2$ c) $2/21$ d) 24
- (19) HCF of $\frac{2}{3}, \frac{8}{9}, \frac{64}{81}, \frac{10}{27}$ is a) $2/3$ b) $2/81$ c) $\frac{16}{3}$ d) $160/81$
- (20) LCM of two numbers is 7700 & their HCF is 11. If one of the numbers is 275, other number is a) 279 b) 283 c) 308 d) 315

Concept of Unit Digit (Last Digit). →

* Cyclicity $0, 1, 5, 6 \rightarrow 1$, $2, 3, 7, 8 \rightarrow 4$ $4, 9 \rightarrow 2$

- Unit digit of $3^{102} \rightarrow$ cycle of 3 = 3, 9, 7, 1 $\Rightarrow 3^{4 \times 25} \times 3^2 = 3^{100}$ will end in 1
so unit digit will be second in cycle ⑨
- Unit digit of 8 = 8, 4, 2, 6 $8^{75} = 8^{4 \times 18} \times 8^3$ third in cycle = 2
- Unit digit of $357^{59} \times 59^{357}$
 $= 3 \times 7^{59} \times 9^{357} = (7^{4 \times 14} \times 7^3) (9^{4 \times 89} \times 9^1)$ ⑦

- (21) Unit Digit of 423 → (a) 5 (b) 7 (c) 3 (d) 9
- (22) Unit Digit of $53^{53} \times 33^{33}$ (a) 5 (b) 7 (c) 9 (d) 1
- (23) Last Digit of 2^{543} (a) 5 (b) 4 (c) 6 (d) 8 (e) 2
- (24) Last Digit of 87^{472} (a) 3 (b) 9 (c) 7 (d) 1
- (25) Last Digit of $(235)^{21}$ (a) 5 (b) 0 (c) 3 (d) 6.