

## 6<sup>TH</sup> CLASS WS-4 SOLUTIONS

### LCM & HCF

#### Teaching Task

1.  $P = a \times m \times r$ ,  $Q = b \times m \times 2 \times r$

$$HCF = mr$$

Key: A

2.  $a = p \times p \times q \times r \times s = p^2 \times q^1 \times r^1 \times s^1$

$$b = p \times q \times q \times s = p^1 \times q^2 \times s^1$$

To find GCD, least powers of p, q and s to be considered

$$\therefore GCD = p \times q \times s$$

Key – C

3.  $5 \overline{)300,900,600}$

$$5 \overline{)60,180,120}$$

$$3 \overline{)12,36,24}$$

$$2 \overline{)4,12,8}$$

$$2 \overline{)2,6,4}$$

$$1,3,2$$

$$LCM = 5 \times 5 \times 3 \times 2 \times 2 \times 3 \times 2 = 1800$$

4.  $2nd \text{ number} = \frac{LCM \times HCF}{1st \text{ number}}$   
$$= \frac{10^2 \times 7^3 \times 10}{7^3} = 10^2 \times 10 = 10^3$$

Key – B and C

5.  $HCF = 27$

$$LCM = 405$$

Given  $7 \mid a \mid 11$

$$\begin{array}{r} \hline 4 \\ \hline \end{array}$$

$$\therefore \text{One number } a = (7 \times 11) + 4 = 81$$

$$\begin{aligned} \therefore 2nd \text{ number} &= \frac{LCM \times HCF}{a} \\ &= \frac{405 \times 27}{81} = 135 \end{aligned}$$

6. Smallest prime number = 2

$$\text{Smallest composite number} = 4$$

$$HCF \text{ of } 2 \text{ and } 4 = 2$$

7.  $5 \overline{)25,40,60}$

$$2 \overline{)5,8,12}$$

$$2 \overline{)5,4,6}$$

$$5,2,3$$

$$LCM = 5 \times 2 \times 2 \times 5 \times 2 \times 3 = 600$$

$$\therefore \text{Answer is } 600 + 7 = 607$$

8. Let dimensions of cuboid are 6m, 12m, 14m

$$HCF \text{ of } 6, 12, 14 \text{ is } 2.$$

∴ Answer = 2m

9.  $\begin{array}{l} 5 \overline{)85,90,80} \end{array}$

$$\begin{array}{l} 2 \overline{)17,18,16} \end{array}$$

$$\begin{array}{l} 3 \overline{)17,9,8} \end{array}$$

$$\begin{array}{l} 2 \overline{)17,3,8} \end{array}$$

$$\begin{array}{l} 2 \overline{)17,3,4} \end{array}$$

$$17,3,2$$

$$LCM = 5 \times 2 \times 3 \times 2 \times 2 \times 17 \times 3 \times 2 = 12240 \text{ cm} = 122 \text{ m } 40 \text{ cm}$$

10. Conceptual

11.  $\begin{array}{l} 2 \overline{)48,64,72,96,108} \end{array}$

$$\begin{array}{l} 2 \overline{)24,32,36,48,54} \end{array}$$

$$\begin{array}{l} 3 \overline{)12,16,18,24,27} \end{array}$$

$$\begin{array}{l} 2 \overline{)4,16,6,8,9} \end{array}$$

$$\begin{array}{l} 3 \overline{)2,8,3,4,9} \end{array}$$

$$\begin{array}{l} 2 \overline{)2,8,1,4,3} \end{array}$$

$$\begin{array}{l} 2 \overline{)1,4,1,2,3} \end{array}$$

$$1,2,1,1,3$$

$$LCM = 1728$$

12. Statement – I – True

$$2^{\text{nd}} \text{ Number} = \frac{LCM \times HCF}{1^{\text{st}} \text{ number}} = \frac{160 \times 16}{32} = 80$$

Statement II – True

13. 144, 180, 198

$$144 \overline{)180} \text{ ( 1}$$

$$\begin{array}{r} 144 \\ \hline \end{array}$$

$$36 \overline{)144} \text{ ( 4}$$

$$\begin{array}{r} 144 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \end{array}$$

HCF of 144 and 180 is 36.

HCF of 36 and 198 is the answer

$$\therefore 36 \overline{)198} \text{ ( 5}$$

$$\begin{array}{r} 180 \\ \hline \end{array}$$

$$18 \overline{)36} \text{ ( 2}$$

$$\begin{array}{r} 36 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \end{array}$$

∴ Key – B HCF = 18

14.  $P = a \times \underline{b} \times \underline{c} \times \underline{d}$   $Q = \underline{b} \times \underline{c} \times \underline{d} \times 4$

$$HCF = bcd$$

15.  $x = 5 \times 7 \times 12$  and  $y = \underline{5} \times \underline{3} \times 19$

$$x = \underline{5} \times 7 \times \underline{3} \times 4$$

$$HCF \text{ of } x \text{ and } y \text{ is } 5 \times 3 = 15$$

16.  $24 \overline{)510} \text{ ( 21}$

$$\begin{array}{r} - 48 \\ \hline \end{array}$$

$$\begin{array}{r} 30 \\ \hline \end{array}$$

$$\begin{array}{r} - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \end{array}$$

$$24 \overline{)270} \text{ ( 11}$$

$$\begin{array}{r} - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 30 \\ \hline \end{array}$$

$$\begin{array}{r} - 24 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \end{array}$$

∴ 6 should be subtracted from 510 and 270.

17. a) Factors of 18 are 18, 9, 6, 3, 2, 1  
 Factors of 24 are 24, 12, 6, 8, 3, 4, 2, 1  
 Common factors = 6, 3, 2, 1 → p, q, t

b) 55 ) 121 ( 2

$$\begin{array}{r} 110 \\ \underline{11 \phantom{0} ) 55} \phantom{0} 5 \\ 55 \\ \underline{\phantom{0} 0} \\ 0 \end{array}$$

GCD = 11 →  $\textcircled{r}$

c) Factors of 38 are 38, 19, 2, 1

Common factor = 19, 1 →  $\textcircled{s}$ , t

d) 6 ) 3156 ( 526

$$\begin{array}{r} 30 \\ \underline{15} \\ 12 \\ \underline{12} \\ 36 \\ \underline{36} \\ 0 \end{array}$$

GCD of 3156 and 6 is 6.

### LEARNER'S TASK

1. Conceptual
2. Conceptual
3. 4 ) 12 ( 3

$$\begin{array}{r} 12 \\ \underline{\phantom{0} 0} \\ 0 \end{array}$$

GCD of 4 & 12 is 4.

4. Conceptual
5. Conceptual

$$6. \text{ LCM} = \frac{AB}{\text{HCF}} = \frac{64}{16} = 4$$

$$7. x = 2 \times 2 \times 3 \times 5 = 2^2 \times 3 \times 5$$

$$y = 2 \times 3 \times 3 \times 3 = 2 \times 3^3$$

$$\text{LCM} = 2^2 \times 3^3 \times 5 = 540$$

8. Conceptual

$$9. \frac{465}{527} = \frac{15}{17} \text{ (Cancellation with 31)}$$

$$10. \text{ HCF} = 6$$

$$\text{LCM} = 36$$

$$\text{One number} = 12$$

$$2^{\text{nd}} \text{ number} = \frac{\text{HCF} \times \text{LCM}}{1^{\text{st}} \text{ number}}$$

$$= \frac{6 \times 36}{12} = 18$$

### JEE MAIN LEVEL

1. LCM of 5 sec, 6 sec, 8 sec

$$2 \overline{) 5, 6, 8}$$

$$2 \overline{) 5, 3, 4}$$

$$5, 3, 2$$

$$\text{LCM} = 2 \times 2 \times 5 \times 3 \times 2 = 120 \text{ sec} = 2 \text{ min}$$

- $\therefore$  At 8 hrs 2 min all bells ring together.
- $HCF \times LCM = a \times b$   
 $= 5 \times 7^2 \times 11 \times 5^2 \times 7 \times 11^2$   
 $= (5 \times 7 \times 11)^3$
  - $398 - 7 = 391$   
 $436 - 11 = 425$   
 $542 - 15 = 527$   
 $HCF \text{ of } 391, 425, 527 = 17$
  - $HCF \text{ of } 1107, 1353 \text{ and } 1394 \text{ is the answer.}$   
First find HCF of 1107 & 1353, i.e., 123  
Then find HCF of 123 & 1394 which is 41.
  - $LCM \text{ of } 15, 20, 30$   

$$\begin{array}{r} 5 \overline{)15, 20, 30} \\ 2 \overline{)3, 4, 6} \\ 3 \overline{)3, 2, 3} \\ 1, 2, 1 \end{array}$$
  
 $LCM = 60 \text{ min} = 1 \text{ hr}$   
All clocks will clime together at  $9 + 1 = 10 \text{ AM}$
  - $\text{Product of two numbers} = ab$   
 $LCM \times HCF = xy \times 1 = xy$   
 $\therefore ab = LCM \times HCF = xy$
  - $HCF = 13$   
 $LCM = 1014$   
One number =  $a = 78$   
 $\therefore 2^{\text{nd}} \text{ number} = \frac{HCF \times LCM}{a} = \frac{13 \times 1014}{78} = 169$
  - $A = x^2y, B = xy^2, HCF = xy$   

$$LCM = \frac{AB}{HCF} = \frac{x^2y \times xy^2}{xy} = x^2y^2$$
  - $$HCF = \frac{AB}{LCM} = \frac{2x^2y^2 \times xy}{x^3y^3} = \frac{2x^3y^3}{x^3y^3} = 2$$

### ADVANCED LEVEL

- Conceptual
- Conceptual
- Statement - I, - True.  
 $HCF \text{ of } 60, 90, 150 \text{ is ?}$   
 $HCF \text{ of } 60 \text{ and } 90.$   

$$\begin{array}{r} 60 \overline{)90} ( 1 \\ \underline{60} \\ 30 \overline{)60} ( 2 \\ \underline{60} \\ 0 \end{array}$$
  
Then  $HCF \text{ of } 30 \text{ \& } 150$   

$$\begin{array}{r} 30 \overline{)150} ( 5 \\ \underline{150} \\ 0 \end{array}$$
  
 $\therefore HCF \text{ of } 60, 90, 150 \text{ is } 30.$   
Statement - II True
- $A = 248, B = 868, LCM = 1736$   

$$HCF = \frac{A \times B}{LCM} = \frac{248 \times 868}{1736} = 124$$

$$5. \text{ LCM} = \frac{A \times B}{\text{HCF}} = \frac{1850}{37} = 50$$

$$6. \text{ 2nd number} = \frac{\text{LCM} \times \text{HCF}}{\text{1st number}} = \frac{1488 \times 31}{186} = 248$$

$$7. \text{ HCF of } 2, 3, 5 = 1$$

$$\text{LCM of } 3, 7, 10 = 210$$

$$\text{HCF of fractions} = \frac{\text{HCF of numerators}}{\text{LCM of denominators}} = \frac{1}{210}$$

$$8. \text{ HCF of } \frac{a}{b}, \frac{c}{d}, \frac{e}{f} = \frac{10}{5} = 2$$

9. Column – I

$$a) \text{ GCD of } \frac{1}{2}, \frac{2}{3}, \frac{3}{4} = \frac{\text{GCD of } 1, 2, 3}{\text{LCM of } 2, 3, 4} = \frac{1}{12} \rightarrow \text{q}$$

$$b) \text{ HCF of } \frac{5}{6}, \frac{6}{5}, \frac{7}{2} = \frac{\text{HCF of } 5, 6, 7}{\text{LCM of } 6, 5, 2} = \frac{1}{30} \rightarrow \text{t}$$

$$c) \text{ LCM of } 0.3, 0.4, 0.5$$

Multiply 0.3, 0.4 & 0.5 with 10.

We get 3, 4, 5

LCM of 3, 4, 5 is 60

Divide 60 with 10.

$$\frac{60}{10} = 6 = \text{LCM of } 0.3, 0.4, 0.5 \rightarrow \text{s}$$

$$d) \text{ LCM of fractions} = \frac{\text{LCM of numerators}}{\text{HCF of denominators}}$$

$$\text{LCM of } \frac{3}{4}, \frac{4}{7}, \frac{8}{11} = \frac{\text{LCM of } 3, 4, 8}{\text{HCF of } 4, 7, 11} = \frac{24}{1} = 24 \rightarrow \text{p}$$