

LCM AND HCF

①

Class: 6th : Mathematics.

Board IIT Integrated

SOLUTIONS

TEACHING TASK

01. The H.C.F. of 1, 2, 3, 4, 6, 8, 12, 24 is 1 Ans: —

02. Let the other number be x

$$\text{H.C.F. of } \{x, 27\} = 9$$

x can be any multiple of 9.

$\therefore x = \text{either } 9 \text{ or } 18 \text{ or } 36 \text{ or } 45 \text{ or } 54 \dots$ Ans: —

03. H.C.F. of $\{1, 2, 3, 4, 6\} = 6$

Ans: D

04. HCF is 8

Ans: D

05. HCF = 9 product = 63

opt: C 3 and 21 $\rightarrow$ HCF = 9
product = 63

Ans: C

06. HCF $\{x, y\} = 11$

$$x = 11 \times 3 \times 2$$

$$y = 11 \times 7$$

The numbers are $11 \times 3 \times 2$ and 11×7

Ans: A

07. $24 = 2^3 \times 3$ H.C.F. = $2^2 \times 3$

$$36 = 2^2 \times 3^2 \quad = 12$$

Ans: B



08

$$60 = 2^2 \times 3 \times 5$$

$$75 = 3 \times 5^2$$

$$H.C.F = 3 \times 5$$

$$= 15$$

Ans: —

(2)

09

$$45 \overline{) 75} (1$$

$$\underline{45}$$

$$30 \overline{) 45} (1$$

$$\underline{30}$$

$$15 \overline{) 30} (2$$

$$\underline{30}$$

$$\textcircled{0}$$

$$H.C.F = 15$$

Ans: C

10

$$12 = 2^2 \times 3$$

$$18 = 2 \times 3^2$$

$$L.C.M = 2^2 \times 3^2$$

$$= 36$$

Ans: D

11

$$\text{opt: D} \quad 108 : 135 = 4 : 5$$

Ans: D

$$H.C.F \{108, 135\} = 27$$

12

$$\text{opt: B} \quad 119 + 187 = 306$$

$$H.C.F \{119, 187\} = 17$$

Ans: B

13

$$H.C.F \{56, 126, 182\} = 14, \text{ product} = 1, 284, 192$$

Ans: D

14

$$L.C.M = \{20, 24, 36, 40\} = 360.$$

The smallest 4 digit number divisible by

$$360 \text{ is } 1080.$$

Ans: B

$$12 \quad 63 = 3^2 \times 7$$

$$90 = 2 \times 3^2 \times 5$$

$$135 = 3^3 \times 5$$

$$L.C.M = 2 \times 3^3 \times 7 \times 5$$

$$= 1890$$

$$\text{Now, add } 11 = 1890 + 11 = 1901$$

Ans: A

13 option verification:

$$\text{opt: } C : 12$$

$$12 \mid 110(9)$$

$$\frac{108}{(2)}$$

$$\text{~~12~~ } 12 \mid 25(10)$$

$$\frac{120}{(5)}$$

Ans: C

$$4 \quad L.C.M \{ 24, 36, 48 \} = 360$$

Ans: C

$$15 \quad 252 = 2^2 \times 3^2 \times 7$$

Ans: A

$$16 \quad H.C.F \{ 48, 36, 72, 24 \} = 12$$

$$L.C.M \{ 48, 36, 72, 24 \} = 144.$$

$$\text{Now } \frac{144}{12} = 12$$

Ans: A

17. 459 is nearest to 457 and exactly divisible by 11

Ans: A

$$18 \quad L.C.M = 12$$

$$\text{product} = 24.$$

$$H.C.F = \frac{\text{product}}{L.C.M} = \frac{24}{12} = 2$$

Ans: B

$$19 \quad L.C.M = 1260; \quad H.C.F = 14, \text{ two numbers} = 84, 126$$

$$\text{Third No} = \frac{1260 \times 14}{84 \times 126} =$$

Ans: —

20. L.C.M. of $\{x, y\} = 2310$ ④

$xy = 330$

The numbers are 210 and 120 Ans:—

ADVANCED LEVEL QUESTIONS

01 $90 = 2 \times 3^2 \times 5$

$120 = 2^3 \times 3 \times 5$

$HCF\{90, 120\} = 2 \times 3 \times 5$
 $= 30$ Ans:—

02 $HCF\{420, 504\} = 84$ Ans: D

03 a is equal to b Ans: D

04 $a \times b = LCM \times HCF \rightarrow True$

c) product of numbers = $LCM \times HCF$ Ans: A, C

05 $40 = 2^3 \times 5$

$60 = 2^2 \times 3 \times 5$

$LCM = 2^3 \times 3 \times 5$ Ans: B

06 $\frac{720}{180} = 4$, with remainder 0 Ans: C

07 $L.C.M\left\{\frac{1}{4}, \frac{2}{5}, \frac{2}{3}\right\} = \frac{L.C.M\{1, 3, 2\}}{H.C.F\{4, 5, 3\}}$

$= \frac{b}{1}$ Ans:—

08

09. $P = a \times b \times c \times d$

$Q = b \times c \times d \times 4.$

$HCF\{P, Q\} = 4a \times b \times c \times d$

(5)

Ans: D

10 $HCF\{15, 25, 35\} = 5$

Ans: A

11. $HCF\{15, 25, 35, 20\} = 5$

It has no effect on H.C.F.

Ans: C

12. Assertion: (Conceptual true)

Reason: Conceptual true

Ans: A

13. Assertion: Conceptual true

Reason: Conceptually true

Ans: A

14. $HCF\{48, 72\} = 24$, true

Reason: Conceptually true

Ans: A

15. Assertion: Conceptually true

Reason: True

Ans: A

16. Statement I: $L.CM\{120, 20\} = 120$

Statement II: Conceptually true

Ans: A

17. Statement I: $L.CM\{3, 5\} = 15$ (True)

Statement II: True

Ans: A

18. $H.C.F\{3, 4\} = 12$.

Ans: 12

19. $H.C.F.\{8, 12, 16\} = 4$

Ans: 4

20 $18 = 2 \times 3^2$
 $12 = 2^2 \times 3$
 $16 = 2^4$

$$\begin{array}{r} 2^4 \\ \underline{2^1 \ 2} \\ 2^6 \end{array}$$

$$\begin{array}{r} 2(36) \\ \underline{2(18)} \\ 2(9) \end{array}$$

20 $18 = 2 \times 3^2$

$24 = 2^3 \times 3$

$36 = 2^2 \times 3^2$

HCF = $2 \times 3 = 6$

Ans: 6

⑥

21 G.C.D { 510, 270 } = 30

~~{ (510 - x) }~~

~~G.C.D { (510 - x), (270 - x) } = 24~~

~~New m =~~

21. G.C.D { 510, 270 } = 30

G.C.D { (510 - x), (270 - x) } = 24

The number to be subtracted is $30 - 24 = 6$

Ans: 6

22 a) H.C.F { 5, 7 } = 35

b) L.C.M. of prime no = product of their

c) L.C.M { 8, 9, 25 } = 1800

d) H.C.F { 8, 9, 25 } = 1

Ans: 9, 15, 8

23 a) product of two nos = HCF $\times$ LCM

b) Coprimes

c) twin primes

d) co-primes

Ans: 8, 9, 15, 9

LEARNER'S TASK

7

CUQ'S

01

Ans: A

$$02 \text{ HCF } \{45, 75\} = 15$$

Ans: B

$$03 \text{ HCF } \{24, 36\} = 2^2 \times 3$$

Ans: B

$$24 = 2^3 \times 3$$

$$36 = 2^2 \times 3^2$$

$$04 \text{ } 45 = 3^2 \times 5$$

$$60 = 2^2 \times 3 \times 5$$

$$\text{H.C.F} = \cancel{2}^2 \times 5 = 15$$

Ans: C

05

$$\{84, 63\} \rightarrow \text{HCF}$$

$$63 \overline{) 84} \text{ U}$$

$$\frac{63}{21} \overline{) 63} \begin{matrix} 3 \\ 0 \end{matrix}$$

$$\therefore \text{G.C.D} = 21$$

Ans: C

06

$$80 \overline{) 120} \begin{matrix} 1 \\ 20 \end{matrix}$$

$$\frac{40}{40} \overline{) 80} \begin{matrix} 2 \\ 20 \end{matrix}$$

$$\frac{20}{20} \overline{) 20} \begin{matrix} 1 \\ 0 \end{matrix}$$

$$\text{G.C.D} = 40$$

Ans: —

07

$$14 = 2 \times 7$$

$$28 = 2^2 \times 7$$

$$\text{L.C.M} = 2^2 \times 7 = 28$$

Ans: B

08

$$\text{G.C.D.}$$

Ans: C

09

$$\text{H.C.F. } \{8, 12\} = 4$$

Ans: D

10	Co-prime numbers = HCF = 1	Ans: B
11	$L.C.M \{2, 3\} = 6$	Ans: B
12	Infinite	Ans: C
13	$100 = 2^2 \times 5^2$	Ans: C
14	$L.C.M = \text{product}$	Ans: B
15	$HCF \times LCM = \text{product of A and B}$	Ans: A
16	$HCF \text{ of fractions} = \frac{HCF \text{ of Numerators}}{LCM \text{ of denominators}}$	Ans: B
17	$L.C.M. \text{ of fractions} = \frac{L.C.M. \text{ of Numerators}}{H.C.F. \text{ of denominators}}$	Ans: B
18	$L.C.M \{72, 90, 120\} = 360$	Ans: B
	<u>GEE MAINS LEVEL</u>	
01	$H.C.F \{1, 2, 3, 5, 6, 10, 15, 30\} = 1$	Ans: A
02	$H.C.F = \{10\}$	Ans: D
03	$A.C.F \{x, 3^2\} = 8$ $\Rightarrow x = 2, 16, \dots$	Ans: A
04	$56 = 2^3 \times 7$ $72 = 2^3 \times 3^2$ $H.C.F = 2^3$	Ans: C

05

$$84 = 2^3 \times 3 \times 7$$

$$126 = 2 \times 3^2 \times 7$$

$$H.C.F = \{2 \times 3 \times 7\}$$

Ans: —

(9)

06

$$36 \overline{) 54(1}$$

$$\begin{array}{r} 36 \\ 18 \overline{) 36(2} \\ \underline{36} \\ 0 \end{array}$$

$$\frac{36}{2}$$

$$H.C.F = 18$$

Ans: D

07.

$$H.C.F. \{23, 69\} = 23$$

$$\text{Difference} = 69 - 23 = 46.$$

Ans: D

08

$$H.C.F. \{155, 217\} = 31$$

$$\text{Sum} = 155 + 217 = 427$$

Ans: D

08

$$H.C.F \{341, 31\} = 31$$

$$\text{Sum} = 341 + 31 = 372$$

09

$$H.C.F \{48, 64, 96\} = 16$$

Ans: B

10

$$H.C.F \{87, 29\} = 29$$

$$87 - 29 = 58$$

Ans: C

11

$$L.C.M \{55, 7\} = 385$$

Ans: B

12

$$L.C.M. \{x, 540\} =$$

12

$$L.C.M \{x, 72\} = 540.$$

$$x = 125$$

13 L.C.M $\{16, 24, 40\} = 240$.

Greatest 4 digit no = $9999 \div 240$
 $= 41.6625$

Quotient = 41. —

$\therefore$ Greatest 4 digit no = 41×240

= 9840

Ans: B

14 H.C.F $\{45, 135, 105\} = 15$ cm

Ans: A

15 L.C.M $\{20, 24, 36, 40\} = 360$

Now $\frac{10000}{360} = 27.7778 \sim 28$

Answer $28 \times 360 = 10080$

Ans: C

16 H.C.F $\{325, 225\} = 25$ cm

= 0.25 m

Ans: A

17 999987

Ans: C

18 20 lit = 20,000 ml.

H.C.F $\{20,000, 30,000\} = 10,000 = 5 \text{ lit}$

Ans: —

19 $171 - 3 = 168, 251 - 6 = 245$

G.C.D $\{168, 245\} = 7$

Ans: C

20. L.C.M $\left\{ \frac{36}{225}, \frac{48}{150}, \frac{72}{65} \right\} = \frac{\text{L.C.M} \{36, 48, 72\}}{\text{H.C.F} \{225, 150, 65\}}$

= $\frac{144}{5}$

Ans: C

ADVANCED LEVEL QUESTIONS (11)

01. $H.C.F. \{ 324, 432 \} = 108$

Ans: D

02. $L.C.M. \{ 56, 72 \} =$

$$56 = 2^3 \times 7$$

$$72 = 2^3 \times 3^2$$

$$L.C.M. = 2^3 \times 7 \times 3^2$$

$$= 504$$

Ans: —

03. If 'a' is a factor of 'b', then LCM of 'a' and 'b' is equal to b
Ans: D

04. ~~$864 \div 108 = 8$~~

04. $864 \div 972 = 1$

$$\begin{array}{r} 108 \overline{) 864} \\ \underline{864} \\ 0 \end{array}$$

$\therefore 864 \div 108 = 8$, with remainder 0
Ans: C

05. $HCF \left\{ \frac{5}{8}, \frac{3}{4}, \frac{7}{10} \right\} = \frac{H.C.F. \{ 5, 3, 7 \}}{L.C.M. \{ 8, 4, 10 \}}$
 $= \frac{1}{40}$

Ans: —

06. Assertion: True
Reason: True
Ans: A

07. Assertion: True
Reason: True
Ans: A

08	<u>Assertion:</u> $H.C.F\{35, 49\} = 7$ <u>Reason:</u> (True) Ans: A	(12)
09.	<u>Assertion:</u> True <u>Reason:</u> True Ans: A	
10.	<u>Assertion:</u> True <u>Reason:</u> True Ans: A	
09	<u>Statement I:</u> True <u>Statement II:</u> product = $xy = 4107$ $H.C.F\{x, y\} = 37$ product = $L.C.M \times H.C.F$ $4107 = L.C.M \times 37$ $\therefore L.C.M = 111$ $\therefore x = 37a, y = 37b$ where a & b are co-prime ## $x = 4107 \div 111 = 37$ Now, $37 \times 37 = 1369$. Next number = 1369 (False) Ans C	
10.	$L.C.M\{15, 20, 30\} = 60$ Ans: D	
11	$L.C.M\{15, 20, 30, 25\} = 300$. It increased the L.C.M. Ans: A	
12	$H.C.F\{ \frac{9}{10}, \frac{12}{25}, \frac{18}{35}, \frac{21}{40} \} = \frac{H.C.F\{9, 12, 18, 21\}}{L.C.M\{10, 25, 35, 40\}}$	

(13)

$$12. \text{H.C.F.} \left\{ \frac{9}{10}, \frac{12}{25}, \frac{18}{35}, \frac{21}{40} \right\}$$

$$= \frac{\text{H.C.F.} \{ 9, 12, 18, 21 \}}{\text{L.C.M.} \{ 10, 25, 35, 40 \}} = \frac{3}{1400}$$

Ans: C

$$13. \text{H.C.F.} \{ 36, 84 \} = 12$$

$$14. 10 \overline{) 20, 30, 40}$$

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

$$1, 1, 2$$

$$\text{L.C.M.} = 10 \times 2 \times 1 \times 3 \times 2$$

$$= 120$$

Ans: 120

$$15. 90 = 2 \times 3^2 \times 5$$

$$120 = 2^3 \times 3 \times 5$$

$$\text{H.C.F.} = 2 \times 3 \times 5 = 30$$

Ans: 30

$$16. a) 18 = \{ 1, 2, 3, 6, 9, 18 \}$$

$$24 = \{ 1, 2, 3, 4, 6, 8, 12, 24 \}$$

common factors = $\{ 1, 2, 3, 6 \}$

$$b) \text{H.C.F.} \{ 55, 121 \} = 11$$

$$c) \text{L.C.M.} \{ 12, 24 \} = 24$$

$$d) 38 = \{ 1, 2, 19, 38 \}$$

$$57 = \{ 1, 3, 19, 57 \} \rightarrow 19$$

→ THE END ← Ans: a, s, t, x