CHAPTER

05

LCM AND HCF OF NUMBERS

LCM

LCM (Least Common Multiple) of two or more numbers is a number which is smallest common multiple of the numbers, *e.g.,* Multiple of 5 are 5, 10, 15, 20, 25, 30, 35, 40.

Multiple of 6 are 6, 12, 18, 24, 30, 36, 42.

e.g. Among the multiple of 5 and 6; 30 is the smallest multiple, which is common to both.

So, 30 is LCM of 5 and 6.

Similarly, 28 is the LCM of 4 and 7.

Methods for Finding LCM

There are two methods for finding LCM

1. Prime factorisation method
2. Division method

Prime Factorisation Method

Step I Write each of the given numbers as product of prime factors.

Step II Find the product of the highest powers of the prime factors, which will be the LCM.

Example **1.** Find the LCM of 54 and 21.

(1) 350 (2) 256
(3) 378 (4) 415

Sol. (3) Prime factors of,

$54 = 2 \times 3 \times 3 \times 3$

In both numbers, $21 = 3 \times 7$

Factor '2' appears maximum 'one' time.

Factor '3' appears maximum 'three' times.

Factor '7' appears maximum 'one' time.

$\therefore$ Product $= 2 \times 3 \times 3 \times 3 \times 7 = 378$,

which is the required LCM.

Division Method

Step I Write the given numbers in a row

Step II Write the factor on the left hand side, which can divide maximum of the numbers.

Step III Write down the quotients and the undivided numbers in the row below the first row.

Step IV Repeat steps II and III until we get a row, where all the numbers are prime to each other.

Step V The product of all the factors/divisors and the numbers left in the last row is the required LCM.

Example **2.** Find the LCM of 36, 56, 105 and 108.

(1) 6730 (2) 7577 (3) 6578 (4) 7560

Sol. (4)

2	36, 56, 105, 108
2	18, 28, 105, 54
3	9, 14, 105, 27
7	3, 14, 35, 9
	3, 2, 5, 9

36 is a factor/submultiple of 108 ($36 \times 3 = 108$). 56 and 108 are divisible by 2. So, we write 2 on the left side and perform Step III.

Next factors are 2, 3 and 7.

Thereafter, we find that 2, 5 and 9 left in the last row have no common divisor *i.e.,* 2, 5, 9 are co-prime to each other, though 9 itself is not a prime number.

So, we find the product of 2, 2, 3, 7, 2, 5 and 9 to get the required LCM. LCM $= 2 \times 2 \times 3 \times 7 \times 2 \times 5 \times 9 = 7560$

Questions Based on Bells

To solve the problems based on ringing bells at different intervals, the student has to take LCM of different intervals.

Example Six bells commence ringing together and ring at intervals of 2, 4, 6, 8, 10 and 12 seconds respectively. After what interval of time will they ring again together?

Sol. According to question, first we take the LCM of intervals

LCM of 2, 4, 6, 8, 10 and 12.

So, after each 120 seconds, they would ring together.

2	2, 4, 6, 8, 10, 12
2	1, 2, 3, 4, 5, 6
2	1, 1, 3, 2, 5, 3
3	1, 1, 3, 1, 5, 3
	1, 1, 1, 1, 5

$\Rightarrow \quad 2\times2\times2\times3\times5=120$

HCF

HCF (Highest Common Factor) is the greatest number that divides both the given numbers or more numbers. i.e., HCF is a greatest common factor of all the given numbers.

It is also known as Greatest Common Divisor (GCD).

e.g. 15 is the greatest number that divides both 30 and 75. So, 15 is the HCF of 30 and 75.

Methods for Finding HCF

There are two methods for finding HCF

1. Prime factorisation method
2. Division method

Prime Factorisation Method

Step I Write each number as product of its prime factors.

Step II Multiply the factors with lowest powers which are common to all numbers.

Example **3.** Find the HCF of 140, 168 and 224.

(1) 25 (2) 28
(3) 38 (4) 20

Sol. (2) Factorising the given numbers

2	140
2	70
5	35
	7

2	168
2	84
2	42
3	21
	7

2	224
2	112
2	56
2	28
2	14
	7

Thus, $140 = 2\times2\times5\times7$

$168 = 2\times2\times2\times3\times7$

$224 = 2\times2\times2\times2\times2\times7$

Common prime factors are $2\times2\times7$

$\therefore$ HCF $= 2\times2\times7 = 28$

Division Method

Step I Divide the greater number by the smaller number.

Step II Next, divide the preceding divisor by the remainder. Continue until you get zero as remainder. The last divisor is the required HCF.

Example **4.** Find the HCF of 45 and 108.

(1) 12 (2) 7 (3) 9 (4) 10

Sol. (3) $\because$ $45 < 108$

$\therefore$ 45) 108 (2
90
18) 45 (2
36
9) 18 (2
18
×

$\therefore$ Required HCF = 9

Example **5.** Find the HCF of 24 and 30.

(1) 6 (2) 7 (3) 8 (4) 5

Sol. (1) By prime factorization method,

$24 = 2\times2\times2\times3;\ 30 = 2\times3\times5$

HCF = Highest Common Factor of 24 and 30

$= 2\times3 = 6$

Alternate Method

By Division method,

24)30(1
24
6)24(4
24
×

$\therefore$ HCF = The last divisor = 6

Entrance Corner

1. The number of numbers which are multiples of both 3 and 5 in the first 100 natural numbers is **[JNV 2019]**
(1) 10 (2) 9 (3) 7 (4) 6

2. The HCF of two numbers 14 and 28 is 14. Find the LCM. **[JNV 2018]**
(1) 28 (2) 196 (3) 298 (4) 98

3. What is the four digit smallest number which is completely divided by 2,3,8,10? **[JNV 2019]**
(1) 1020 (2) 1060 (3) 1080 (4) 1120

4. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is **[JNV 2017, 2009]**
(1) 1197 (2) 2394 (3) 4932 (4) 2384

5. HCF of 128, 288 and 160 is **[JNV 2016]**
(1) 16 (2) 24 (3) 32 (4) 48

6. If the product of two co-prime numbers is 117, their LCM will be **[JNV 2016]**
(1) 9 (2) 13 (3) 39 (4) 117

7. The greatest number which will divide 1277 and 1368 leaving 3 as the remainder in each case is **[JNV 2015]**
(1) 68 (2) 77 (3) 91 (4) 97

8. LCM of 114 and 95 is **[JNV 2015]**
(1) 570 (2) 950 (3) 1140 (4) 5700

9. Three bells ring at intervals of 12, 15 and 18 min, respectively. They started ringing simultaneously at 9 : 00 am. What will be the next time when they all ring simultaneously? **[JNV 2014]**
(1) 10 : 00 am (2) 11 : 00 am
(3) 12 : 00 pm (4) 1 : 00 pm

10. Greatest number, which is to be divided by 280 and 1245 leaves the remainder 4 and 3 respectively, is **[JNV 2014]**
(1) 138 (2) 148 (3) 145 (4) 178

11. Find the HCF of 45, 75 and 165. **[JNV 2013]**
(1) 15 (2) 45 (3) 75 (4) 2475

12. Find the smallest number divided by 42, 98 and 70. **[JNV 2013]**
(1) 1470 (2) 1740 (3) 1070 (4) 980

13. Find the LCM of 12,18 and 24. **[JNV 2012]**
(1) 72 (2) 48 (3) 60 (4) 84

14. LCM of 42, 70, 98 and 126 is **[JNV 2011]**
(1) 126 (2) 2205 (3) 4410 (4) 8820

15. Find the common factor of 12 and 15. **[JNV 2010]**
(1) 1, 2, 4 (2) 1, 3, 5 (3) 1, 12 (4) 1, 3

16. What is the greatest number that divides both 16 and 20 exactly? **[JNV 2008]**
(1) 40 (2) 32 (3) 80 (4) 4

17. Find the least number which is divisible by 15 and 18. **[JNV 2008]**
(1) 60 (2) 54 (3) 90 (4) 100

18. Find the LCM of 30, 40 and 60. **[JNV 2008]**
(1) 300 (2) 120 (3) 180 (4) 500

19. What will be the HCF of 48, 144 and 576? **[JNV 2007]**
(1) 576 (2) 144 (3) 48 (4) 1

20. What is the LCM of 16, 80 and 48? **[JNV 2005]**
(1) 8 (2) 16 (3) 240 (4) 480

21. The difference between the LCM and HCF of the numbers 30, 36 and 90 is **[JNV 2004]**
(1) 366 (2) 354 (3) 186 (4) 174

22. Three bells start ringing together at 8 : 35 am, if they ring after 12 s, 15 s and 18 s respectively each time, the next time they will ring together at **[JNV 2004]**
(1) 8 : 38 am (2) 8 : 40 am
(3) 8 : 41 am (4) 8 : 45 am

23. The LCM of 8, 12, 20 and 36 is **[JNV 2003]**
(1) 120 (2) 180 (3) 360 (4) 720

24. The HCF of two co-prime numbers is **[JNV 2003]**
(1) 1
(2) 0
(3) sum of the numbers
(4) difference of the numbers

25. Three bells start ringing together at 8 : 30 am. If they ring after 4 min, 5 min and 6 min respectively each time, the next time they will ring together at **[JNV 2003]**
(1) 8 : 45 am (2) 9 : 30 am
(3) 9 : 45 am (4) 10 : 15 am

26. The LCM of 12, 24 and 30 is **[JNV 2002]**
(1) 2 (2) 30 (3) 60 (4) 120

27. LCM of 3, 5 and 9 is **[JNV 2000]**
(1) 25 (2) 45 (3) 65 (4) 85

28. HCF of 8, 18, 24 is **[JNV 2000]**
(1) 2 (2) 4
(3) 6 (4) 8

29. Six bells begin tolling together and toll at interval of 2 s, 4 s, 6 s, 8 s, 10 s, 12 s, respectively. The time after which they will toll together is **[JNV 1999]**
(1) 2 min (2) 103 s
(3) 150 s (4) 1 min

30. Find the greatest number which divides 18 and 30 completely. **[JNV 1999]**
(1) 6 (2) 8
(3) 10 (4) 12

31. The greatest number which will divide 2112 and 2792 leaving 4 as the remainder in each case is **[JNV 1999]**
(1) 68 (2) 58 (3) 78 (4) 188

32. Find the LCM of 18, 24 and 60. **[JNV 1999]**
(1) 120 (2) 360
(3) 480 (4) 520

33. Find the HCF of 84 and 105. **[JNV 1998]**
(1) 19 (2) 20 (3) 21 (4) 22

34. Find the LCM of 20, 40, 60 is **[JNV 1997]**
(1) 100 (2) 120 (3) 140 (4) 240

35. Find the measure of the greatest length which can measure 24 m, 32 m and 44 m completely. **[JNV 1997]**
(1) 2 m (2) 3 m (3) 4 m (4) 5 m

Answers

1. (4)	**2.** (1)	**3.** (3)	**4.** (2)	**5.** (3)	**6.** (4)	**7.** (3)	**8.** (1)	**9.** (3)	**10.** (1)
11. (1)	**12.** (1)	**13.** (1)	**14.** (3)	**15.** (4)	**16.** (4)	**17.** (3)	**18.** (2)	**19.** (3)	**20.** (3)
21. (4)	**22.** (1)	**23.** (3)	**24.** (1)	**25.** (2)	**26.** (4)	**27.** (2)	**28.** (1)	**29.** (1)	**30.** (1)
31. (1)	**32.** (2)	**33.** (3)	**34.** (2)	**35.** (3)					

Hints and Solutions

1. $\because$ LCM of 3 and 5 = 15
The numbers which are multiples of both 3 and 5
$= 15\times1,\ 15\times2,\ 15\times3,\ 15\times4,\ 15\times5,\ 15\times6$
$= 15, 30, 45, 60, 75, 90$
Total numbers = 6

2. We know that,
Product of two numbers = HCF × LCM
$$14\times28 = 14\times \text{LCM} \Rightarrow \text{LCM} = \frac{14\times28}{14} = 28$$

3. LCM of 2,3,8,10

2	2, 3, 8, 10
3	1, 3, 4, 5
4	1, 1, 4, 5
5	1, 1, 1, 5
	1, 1, 1, 1

$= 2\times3\times4\times5 = 120$
$\therefore$ The four digit smallest number is multiple of
$120 = 120\times9 = 1080$

4. Other number $= \dfrac{\text{HCF}\times\text{LCM}}{\text{First number}}$
$$= \frac{38\times98154}{1558}$$
$$= 2394$$

5. $128 = 2\times2\times2\times2\times2\times2\times2$
$288 = 2\times2\times2\times2\times2\times3\times3$
$160 = 2\times2\times2\times2\times2\times5$
So, the required HCF = Common factor between given numbers
$= 2\times2\times2\times2\times2 = 32$

6. $\because 117 = 3\times3\times13$
Here, 9 and 13 are co-prime, so the required LCM $= 9\times13 = 117$

7. Required greatest number
= HCF of (1277 − 3) and (1368 − 3)
= HCF of 1274 and 1365

1274)1365(1 and 91)1365(15
1274 1365
91)1274(14 ×
1274
×

∴ Greatest number = 91

8.

2	114, 95
3	57, 95
19	19, 95
5	1, 5
	1, 1

∴ Required LCM = 2 × 3 × 19 × 5 = 570

9. The LCM of 12, 15 and 18
⇒ 2 × 2 × 3 × 5 × 3 = 180
Here, 60 min = 1 h; 180 min = 3 h
Hence, bells would rung after 3 h at 12:00 pm.

10. Required HCF = (280 − 4) and (1245 − 3)
= 276 and 1242

276) 1242 (4
1104
138) 276 (2
276
×

∴ Required greatest number = 138

11. HCF of 45, 75 and 165

45) 75 (1 15) 165 (1
45 15
30) 45 (1 15)15(1
30 15
15) 30 (2 ×
30
×

∴ HCF = 15

12. Required smallest number = LCM of 42, 98 and 70

2	42, 98 ,70
7	21, 49, 35
3	3, 7, 5
5	1, 7, 5
7	1, 7, 1
	1, 1, 1

∴ Required number = 2 × 7 × 3 × 5 × 7 = 1470

13.

2	12, 18, 24
2	6, 9, 12
2	3, 9, 6
3	3, 9, 3
3	1, 3, 1
	1, 1, 1

LCM of 12, 18 and 24 = 2 × 2 × 2 × 3 × 3
= 72

14.

2	42, 70, 98, 126
3	21, 35, 49, 63
7	7, 35, 49, 21
	1, 5, 7, 3,

∴ LCM = 2 × 3 × 7 × 5 × 7 × 3 = 4410

15. 12 = 1 × 2 × 2 × 3;
15 = 1 × 3 × 5
∴ Common factor = 1, 3

16. 16) 20 (1
16
4) 16 (4
16
×

So, 4 is the greatest number.

17. LCM of 15 and 18

2	15, 18
3	15, 9
3	5, 3
5	5, 1
	1, 1

∴ Required number = 2 × 3 × 3 × 5
= 90

18.

2	30, 40, 60
2	15, 20, 30
3	15, 10, 15
5	5, 10, 5
	1, 2, 1

∴ Required LCM = 2 × 2 × 3 × 5 × 2 = 120

19. 48) 144 (3
144
×

Again, 48) 576 (12
48
96
96
×

∴ HCF = 48

20. LCM of 16, 80 and 48

2	16, 80, 48
2	8, 40, 24
2	4, 20, 12
2	2, 10, 6
	1, 5, 3

$\therefore$ LCM $= 2\times2\times2\times2\times5\times3 = 16\times15 = 240$

21.

2	30, 36, 90
2	15, 18, 45
3	15, 9, 45
3	5, 3, 15
5	5, 1, 5
	1, 1, 1

$\therefore$ LCM $= 2\times2\times3\times3\times5 = 180$

36) 90 (2
72
18) 36 (2
36
×
18) 30 (1
18
12) 18 (1
12
6) 12 (2
12
× HCF = 6

$\therefore$ Difference $= 180 - 6 = 174$

22.

2	12, 15, 18
3	6, 15, 9
	2, 5, 3

LCM $= 2\times3\times2\times5\times3 = 180$ s or 3 min
After 3 min the bells will toll together
i.e. 8 : 35 + 3min = 8 : 38 am

23.

2	8, 12, 20, 36
2	4, 6, 10, 18
3	2, 3, 5, 9
	2, 1, 5, 3

LCM $= 2\times2\times3\times2\times5\times3 = 360$

24. The HCF of two co-prime number is always 1.

25. The LCM of 4, 5 and 6 = 60
Hence, after 60 min *i.e.,* after 1 h.
They will ring together *i.e.,* at 9 : 30 am.

26.

2	12, 24, 30
2	6, 12, 15
3	3, 6, 15
	1, 2, 5

$\therefore$ LCM $= 2\times2\times3\times2\times5 = 120$

27.

3	3, 5, 9
	1, 5, 3

$\therefore$ LCM $= 3\times5\times3 = 45$

28. 8) 18 (2
16
2) 8 (4
8
×
2) 24 (12
24
×

$\therefore$ Required HCF = 2

29.

2	2, 4, 6, 8, 10, 12
2	1, 2, 3, 4, 5, 6
3	1, 1, 3, 2, 5, 3
	1, 1, 1, 2, 5, 1

$\therefore$ Required time $= 2\times2\times3\times2\times5 = 120$ s
$= 2$ min

30. 18) 30 (1
18
12) 18 (1
12
6) 12 (2
12
×

The greatest number is 6.

31. $2112 - 4 = 2108$
$2792 - 4 = 2788$
2108) 2788 (1
2108
680) 2108 (3
2040
68) 680 (10
680
×

Hence, the required greatest number is 68.

32.

2	18, 24, 60
2	9, 12, 30
3	9, 6, 15
	3, 2, 5

$\therefore$ LCM $= 2\times2\times3\times3\times2\times5 = 360$

33. 84) 105 (1
84
21) 84 (4
84
×
∴ HCF = 21

34.

2	20, 40, 60
2	10, 20, 30
5	5, 10, 15
	1, 2, 3

∴ LCM = $2 \times 2 \times 5 \times 2 \times 3 = 120$

35. 24) 32 (1
24
8) 24 (3
24
×
8) 44 (5
40
4) 8 (2
8
×
Hence, the greatest measure is 4 m.

Practice Exercise

1. LCM of $2 \times 3 \times 5$ and $3 \times 5 \times 7$ is equal to
(1) 3 (2) 3×5
(3) $2 \times 3 \times 5 \times 7$ (4) $2 \times 3 \times 5 \times 3 \times 5 \times 7$

2. What is the number, which when divided by 8, 12 and 15, leaves a remainder 3 in each case?
(1) 63 (2) 66 (3) 123 (4) 183

3. Which of the following smallest four digit number divisible by 2, 3, 4, 5, 6 and 7?
(1) 1260 (2) 420
(3) 840 (4) 2100

4. Find the LCM of 8,14 and 26.
(1) 728 (2)782 (3) 872 (4) 278

5. Find the LCM of $2 \times 3 \times 5 \times 7$ and $3 \times 5 \times 7 \times 11$.
(1) $2 \times 3 \times 5 \times 7 \times 11$ (2) $2 \times 3^2 \times 5^2 \times 7^2 \times 11$
(3) $3 \times 5 \times 7$ (4) None of these

6. Vishal, Monu and Puneet start running around a circular ground and complete one round in 24 s, 6 s and 14 s respectively, in how much time will they meet again at the starting point?
(1) 1 min 32 s (2) 4 min 8 s
(3) 3 min 25 s (4) 2 min 48 s

7. Hemu, Anshul and Gaurav start running around a circular stadium and complete one round in 27s, 9s, and 36s, respectively. In how much time will they meet again at starting point?
(1) 2 min 36 s (2) 2 min 25 s
(3) 3 min 11 s (4) 1 min 48 s

8. Three bells ring at intervals of 15 s, 21s and 16 s, respectively. All bells ring simultaneously at 12: 00 noon. They will again ring simultaneously at
(1) 28 min past 12
(2) 25 min past 12
(3) 26 min past 12
(4) 24 min past 12

9. Three bells ring at intervals of 12 s, 9 s and 24 s, respectively. All bells ring simultaneously at 3: 00 pm. They will again ring simultaneously after
(1) 2 min 36 s (2) 2 min 12 s
(3) 1 min 12 s (4) 1 min 24 s

10. Raghav, Arun and Rinku joggning around a rectangular park and complete one round in 24 s, 18 s and 10 s, respectively. In how much time will they meet again at strating point?
(1) 5 min (2) 6 min
(3) 5 min 38 s (4) 6 min 14 s

11. Find the LCM of 12, 30, 60 is
(1) 20 (2) 30 (3) 60 (4) 80

12. The greatest number less than 1500, which is divisible by both 16 and 18, is
(1) 1440 (2) 1404 (3) 1386 (4) 1368

13. HCF of $5 \times 7 \times 9 \times 11 \times 13$ and $9 \times 11 \times 13 \times 17$ is equal to
(1) 13
(2) 33
(3) $9 \times 11 \times 13$
(4) $5 \times 7 \times 9 \times 11 \times 13 \times 17$

14. The HCF and LCM of two numbers are 4 and 48, respectively. If one of these number is 12, then the other number is
(1) 16 (2) 12
(3) 8 (4) 4

15. The LCM and HCF of two numbers are 96 and 8, respectively. One number is 32, then the other number is
(1) 256 (2) 24
(3) 12 (4) 768

16. The LCM and HCF of two numbers are 180 and 3, respectively. If one of the two numbers be 45, then the other number is
(1) 12 (2) 60
(3) 135 (4) 540

17. The product of two numbers is 216 and their HCF is 3, then their LCM is
(1) 648 (2) 219 (3) 213 (4) 72

18. HCF of two numbers is 20 and their LCM is 120. If one number is 60 find the other.
(1) 40 (2) 50 (3) 30 (4) 60

19. Find the HCF of 15, 30, 45 is
(1) 10 (2) 15 (3) 20 (4) 25

20. Find the greatest number which divides 36 and 48 completely.
(1) 10 (2) 11 (3) 12 (4) 13

21. Two numbers are in the ratio 3 : 4 and the product of their LCM and HCF is 10800. Find the sum of the numbers.
(1) 190 (2) 70
(3) 210 (4) 200

22. The LCM of two numbers is 1820 and their HCF is 26. If one number is 130, then the other number is
(1) 70 (2) 1690
(3) 364 (4) 1264

Answers

1. (3)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (1)	**6.** (4)	**7.** (4)	**8.** (1)	**9.** (3)	**10.** (2)
11. (3)	**12.** (1)	**13.** (3)	**14.** (1)	**15.** (2)	**16.** (1)	**17.** (4)	**18.** (1)	**19.** (2)	**20.** (3)
21. (3)	**22.** (3)								

Hints and Solutions

1. LCM of $2 \times 3 \times 5$
and $3 \times 5 \times 7 = 2 \times 3 \times 5 \times 7$.

2.

2	8, 12, 15
2	4, 6, 15
3	2, 3, 15
	2, 1, 5

$\therefore$ LCM $= 2 \times 2 \times 3 \times 2 \times 5 = 120$
$\therefore$ To get remainder 3 in each case, the required number $= 120 + 3 = 123$.

3.

2	2, 3, 4, 5, 6, 7
3	1, 3, 2, 5, 3, 7
	1, 1, 2, 5, 1, 7

$\therefore$ LCM $= 2 \times 3 \times 2 \times 5 \times 7 = 420$
Now, smallest number of four digit, which is divisible by 2, 3, 4, 5, 6 and 7 is the multiple of 420.
$\therefore$ $420 \times 3 = 1260$ is the required number.

4.

2	8, 14, 26
2	4, 7, 13
2	2, 7, 13
7	1, 7, 13
13	1, 1, 13
	1, 1, 1

Hence, required LCM $= 2 \times 2 \times 2 \times 7 \times 13 = 728$

5. First number $= 2 \times 3 \times 5 \times 7$
Second number $= 3 \times 5 \times 7 \times 11$
$\therefore$ LCM $= 2 \times 3 \times 5 \times 7 \times 11$

6. Required time to meet again
= LCM of 24, 6 and 14
Now, $24 = 2 \times 2 \times 2 \times 3$
$6 = 2 \times 3$; $14 = 2 \times 7$
$\therefore$ LCM $= 2 \times 2 \times 2 \times 3 \times 7 = 168$ s
$= 2$ min 48s
Clearly, they will meet again afte 2 min 48 s.

7. Required time to meet again = LCM of 27,9 and 36

Now, $27 = 3\times3\times3$

$9 = 3\times3$

$36 = 2\times2\times3\times3$

$\therefore$ LCM $= 3\times3\times3\times2\times2$

$= 108$ s $= 1$ min 48 s

Clearly, they will meet again 1 min 48 s.

8. Required time to ring again = LCM of 15, 21 and 16

Now, $15 = 3\times5$; $21 = 3\times7$

$16 = 2\times2\times2\times2$

$\therefore$ LCM $= 3\times5\times7\times2\times2\times2\times2$

$= 1680$ s $= 28$ min

Clearly, all the bell will ring at 28 min past 12.

9. Required time to ring again = LCM of 12, 9 and 24

Now, $12 = 2\times2\times3$

$9 = 3\times3$

$24 = 2\times2\times2\times3$

$\therefore$ LCM $= 2\times2\times2\times3\times3 = 72$ s

$= 1$ min 12 s

Clearly, all the bell will ring after 1 min 12 s.

10. Required time to meet again = LCM of 24,18 and 10

Now, $24 = 2\times2\times2\times3$

$18 = 2\times3\times3$

$10 = 2\times5$

$\therefore$ LCM $= 2\times2\times2\times3\times3\times5 = 360$ s $= 6$ min

Clearly, they will meet again after 6 min.

11.

2	12, 30, 60
2	6, 15, 30
3	3, 15, 15
5	1, 5, 5
	1, 1, 1

$\therefore$ LCM $= 2\times2\times3\times5 = 60$

12. LCM of 16 and 18

2	16, 18,
8	8, 9,
9	1, 9,
	1, 1,

$= 2\times8\times9 = 144$

On dividing 1500 by 144, then the remainder is 60.

Hence, required number $= 1500 - 60 = 1440$

13. HCF of $5\times7\times9\times11\times13$ and $9\times11\times13\times17$.

The common factors $= 9\times11\times13$

14. $\because$ Other number $= \dfrac{\text{HCF}\times\text{LCM}}{\text{First number}}$

$= \dfrac{4\times48}{12} = 16$

15. The other number is

$= \dfrac{\text{HCF}\times\text{LCM}}{\text{First number}}$

$= \dfrac{96\times8}{32} = 24$

16. Other number $= \dfrac{\text{LCM}\times\text{HCF}}{\text{First number}}$

$= \dfrac{180\times3}{45} = 12$

17. LCM $= \dfrac{\text{Product of two numbers}}{\text{HCF}}$

$= \dfrac{216}{3} = 72$

18. Other number $= \dfrac{20\times120}{60} = 40$

19.

15) 30 (2
30
×

15) 45 (3
45
×

$\therefore$ HCF $= 15$

20.

36) 48 (1
36

12) 36 (3
36
×

$\therefore$ Greatest number is 12 .

21. Let the numbers be $3x$ and $4x$ respectively.

Then, their HCF $= x$ and their LCM $= 12x$

$\therefore 12x\times x = 10800$ or $x^2 = 900$ or $x = 30$

So, the numbers are 90 and 120.

The sum of the numbers $= 210$

22. One of the numbers is 130.

$\therefore$ Other number $= \dfrac{1820\times26}{130} = 364$

Self Practice

1. HCF of 160, 165 and 305 is
(1) 5 (2) 10 (3) 15 (4) 20

2. LCM of 28, 35, 56, 84 is
(1) 84 (2) 252 (3) 840 (4) 420

3. HCF of 48, 144 and 576 is
(1) 576 (2) 144 (3) 48 (4) 1

4. The least number such that, when it divided by 15, 25, 35 and 45, it leaves remainder 7, 17, 27 and 37 respectively, is
(1) 1575 (2) 1557 (3) 1576 (4) 1567

5. The LCM of $2^3 \times 3 \times 5$ and $2^4 \times 5 \times 7$ is
(1) 1680 (2) 840 (3) 210 (4) 630

6. The HCF of two numbers is 38 and their LCM is 98154. If one of the number is 1558. The other number is
(1) 1197 (2) 2394 (3) 4932 (4) 2384

7. The greatest number that will divide 1375 and 4935 exactly is
(1) 5 (2) 1375 (3) 15 (4) 4935

8. The product of two numbers is 23625 and LCM is 315. The HCF of the number is
(1) 315 (2) 23625 (3) 75 (4) 15

9. The least number which is divided by 12, 15, 20 and 25 exactly, is
(1) 150 (2) 200 (3) 600 (4) 300

10. The greatest 4 digit number, such that when it divided by 15, 18, 21 and 24, it leaves remainder 5 in each case is
(1) 7565 (2) 7556 (3) 5756 (4) 6575

11. Five bells beginning together toll at interval 4s, 5s, 7s, 8s and 10s, respectively. After what interval of time will they toll again together?
(1) 2 m 20 s (2) 4 m 40 s (3) 6 m 40 s (4) 2 m 40 s

12. The LCM of two numbers is p and their HCF is q. The product of the two numbers is
(1) pq (2) p / q (3) q/p (4) None of these

13. The smallest 4 digit number such that, when it is divided by 12, 18, 21 and 28, it leaves remainder 3 in each case is
(1) 1008 (2) 1003 (3) 1011 (4) 1014

Answers

1. (1)	**2.** (3)	**3.** (3)	**4.** (4)	**5.** (1)	**6.** (2)	**7.** (1)	**8.** (3)	**9.** (4)	**10.** (1)
11. (2)	**12.** (1)	**13.** (3)							