H.C.F & L.C.M EXERCISE

1. The H.C.F and L.C.M of two numbers are 21 and 4641 respectively. If one of the numbers lies between 200 and 300, then the two numbers are
   (a) 273,357   (b) 273,361
   (c) 273,359   (d) 273,363

2. What is the smallest number which when increased by 5 is completely divisible by 8, 11 and 24?
   (a) 264   (b) 259
   (c) 269   (d) None of these.

3. Which is the least number that must be Subtracted from 1856, so that the remainder when divided by 7,12 and 16will leave the same remainder 4?
   (a) 137   (b) 1361
   (c) 140   (d) 172

4. Find the greatest number that will divide 148,246 and 623 leaving remainders 4, 6 and 11 respectively.
   (a) 11   (b) 12
   (c) 13   (d) 14

5. Three bells chime at an interval of 18, 24 and 32 minutes respectively. At a certain time they begin to chime together. What length of time will elapse before they chime together again.
   (a) 2 hours 24 minutes   (b) 4 hours 48 minutes (c) 1 hour 36 minutes   (d) 5 hours

6. The L.C.M and H.C.F of two numbers are, 84 and 21,respectively. If the ratio of two numbers be 1:4, then the larger of the two numbers is :
   (a) 21   (b) 48
   (c) 84   (d) 108

7. If the L.C.M and H.C.F. of two numbers are 2400 and 16, one number is 480; find the second number.
   (a) 40   (b) 80
   (c) 60   (d) None of these

8. The maximum number of students among them 1001 pens and 910 pencils can be distributed in such a way that each student gets the same number of pens and same number of pencils is
   (a) 91   (b) 910
   (c) 1001   (d) 1011

9. Find the maximum number of students among whom 429 mangoes and 715 oranges can be equally distributed.
   (a) 100   (b) 120
   (c) 160   (d) None of these

10. Two numbers both greater than 29, have H.C.F 29 and L.C.M 4147. Five sum of the number Is:
    (a) 666   (b) 669
    (c) 696   (d) 966

11. Find the greatest number which when subtracted from 3000 is exactly divisible by 7,11, 13.
    (a) 1799   (b) 2099
    (c) 1899   (d) 1999

12. The L.C.M. of two number is 630 and their H.C.F. is 9. If the sum of numbers is 153; their difference is
    (a) 17   (b) 23
    (c) 27   (d) 33

13. Suppose you have 108 green marbles and 144 red marbles. You decide to separate them into packages of equal

number of marbles. Find the maximum possible number of marbles in each package.

(a) 4   (b) 36

(c) 9   (d) 12

14. Find the lowest number which when subtracted from 3000, is exactly divisible by 7,11 and 13

(a) 729   (b) 998

(c) cannot be determined

(d) none of these

15. Find the greatest number that will divide 55, 127 and 175, so as to leave the same remainder in each case.

(a) 11   (b) 16

(c) 18   (d) 24

16. One pendulum ticks 57 times in 58 seconds and another 608 times in 609 seconds. If they started simultaneously, find the time after which they will tick together.

(a) $\frac{211}{19}$s   (b) $\frac{1217}{19}$s

(c) $\frac{1218}{19}$s   (d) $\frac{1018}{19}$s

17. Find the greatest possible rate at which a man should walk to cover a distance of 70 km and 245 km in exact number of days?

(a) 55   (b) 60

(c) 35   (d) 45

18. The least number, which when divided by 2,3,4,5 and 6, leaves in each case, a remainder 1, but when divided by 7 leaves no remainder. The number is

(a) 121   (b) 181

(c) 241   (d) 301

19. I have a certain number of beads which lie between 600 and 900. If 2 beads are taken away the remainder can be equally divided among 3, 4,5,6,7 or 12 boys. The number of beads I have

(a) 729   (b) 842

(c) 576   (d) 961

20. The greatest number which will divide 410, 751 and 1030 leaving a remainder 7 in each case is

(a) 29   (b) 31

(c) 17   (d) 37

21. Three men start together to travel the same way around a circular track of 11 kms. Their speeds are $4,5\frac{1}{2}$ and 8 kms per hour respectively. When will they meet at the starting point?

(a) 22 hrs   (b) 12 hrs

(c) 11 hrs   (d) 44 hrs

22. From 3 drums of milk, 279, 341 and 465 respectively are to be drawn out. To do it in minimum time, the capacity of the measuring can be

(a) 271   (b) 61

(c) 111   (d) 31

23. A man was engaged for a certain number of days for Rs. 404.30 p but being absent for some days he was paid only Rs. 279.90p. His daily wages cannot exceed by:

(a) Rs. 29.10p   (b) Rs. 31.30p

(c) Rs. 31.10 p   (d) Rs. 31.41p

24. Let N be the greatest number that will divide 1305, 4665 and 6905, leaving the same remainder in each case. Then sum of the digits in N is:

(a) 4   (b) 5

(c) 6   (d) 8

25. The L.C.M. of two numbers is 45 times their H.C.F. If one of the numbers is 125 and the sum of H.C.F. and L.C.M. 1150, the other number is:

(a) 215   (b) 220

(c) 225   (d) 235

26. The H.C.F. of two numbers is 23 and the other factors of their L.C.M. are 13 and 14. The larger of the two numbers is:

(a) 276   (b) 299

(c) 322   (d) 345

27. An electric wire is sold only In multiples of 1 meter, and a customer required several lengths of wire, each 85cm long .To avoid any wastage and to minimize labor, he should

purchase minimum lengths of

(a) 8.5 meters   (b) 17 meters

(c) 1.7 meters   (d) l meter

28. There are 4 numbers. The H.C.F. of each pair is 3 and the L.C.M. of all the 4 numbers is 116. What is the product of 4numbers?

(a) 9782   (b) 9396

(c) 9224   (d) 9100

29. Three wheels can complete respectively 60,36,24 revolutions per minute. There is a red spot on each wheel that touches the ground at time zero. After how much time, all these spots will simultaneously touch the ground again?

(a) 5/2 seconds   (b) 5/3 seconds

(c) 5 seconds   (d) 7.5 seconds.

30. Number of students who have opted the subjects A, B, C are 60, 84, 108 respectively. The examination is to be conducted for these students such that only the students of the same subject are allowed in one room. Also the number of students in each room must be same. What is the minimum number of rooms that should be arranged to meet all these condition?

(a) 28   (b) 60

(c) 12   (d) 21

31. What will be the least number which when doubled will be exactly divisible by 12, 18, 21 and30?

(a) 196   (b) 630

(c) 1260   (d) 2520

32. A hall is 13 meters 53 cm long and 8 meters 61 cm broad is to be paved with minimum number of square tiles. The number of tiles required is:

(a) 123   (b) 77

(c) 99   (d) 57

33. In a school there are 391 boys and 323 girls. These are to be divided into the largest possible equal classes, so that there are equal number of boys and girls in each class. How many classes are possible?

(a) 32   (b) 37

(c) 42   (d) 49

34. A shopkeeper has three kinds of sugar 184 kg; 230 kg and 276kg. He wants to store it into minimum number of bags to equal size without mixing. Find the size of the bag and the number of bags required to do the needful.

(a) 23 kg; 30   (b) 38kg;23

(c) 46 kg; 15   (d) 46 kg; 25

35. There are four prime numbers written in the ascending order of magnitude. The product of first three numbers and that of the last three number is 385 and 1001 respectively. The fourth prime number is:

(a) 11   (b) 13

(c) 17   (d) 19

36. If the sum of two numbers is 55 and the H.C.F. and L.C.M. of these numbers are 5 and 120 respectively, then the sum of the reciprocals of the numbers is equal to:

(a) $\frac{55}{601}$ (b) $\frac{601}{55}$

(c) $\frac{11}{120}$ (d) $\frac{120}{11}$

37. Product of two co-prime numbers is 117. Their L.C.M. should be:

(a) 1   (b) 117

(c) equal to their H.C.F.

(d) cannot be calculated

38. The number of prime factors in the expression

$$(6)^{10} \times (7)^{17} \times (11)^{27} \text{ is:}$$

(a) 54   (b) 64

(c) 71   (d) 81

39. The least number of five digits which is exactly divisible by 12,15 and 18, is:

(a) 10010   (b) 10051

(c) 10020   (d) 10080

40. The sum of two numbers is 462 and their highest common factor is 22. What is the maximum number of pairs satisfy these conditions?

(a) 1   (b) 3

(c) 5   (d) 6

41. Three numbers arc in the ratio of 3: 4: 5 and their L.C.M is 2400. Their H.C.F is:

(a) 40   (b) 80

(c) 120   (d) 200

42. A number when divided by 49 leaves 32 as reminder. This number when divided by 7 will have the remainder as

(a) 4   (b) 3

(c) 2   (d) 5

43. The traffic light at three different road crossing changes after 24 second, 36 second, 54 second respectively. If they all changes simultaneously, at 10:15:00 AM then at what time will they again changes, simultaneously

(a) 10:16:54AM

(b) 10: 18:36 AM

(c) 10: 17:02 AM

(d) 10:22:12AM

44. When n is divisible by 5 the remainder is 2. What is the remainder when n^2 is divided by 5.

(a) 2   (b) 3

(c) 1   (d) 4

45. The least number which when divided by 48,64,90,120 will leave the remainders 38,54,80,110 respectively, is

(a) 2870   (b) 2860

(c) 2890   (d) 2880

ANSWER KEY

1. (a)	2. (b)	3. (d)	4. (b)	5. (b)
6. (c)	7. (b)	8. (a)	9. (d)	10. (c)
11. (d)	12. (c)	13. (b)	14. (b)	15. (d)
16. (c)	17. (c)	18. (d)	19. (b)	20. (b)
21. (a)	22. (d)	23. (c)	24. (a)	25. (c)
26. (c)	27. (b)	28. (b)	29. (c)	30. (d)
31. (b)	32. (b)	33. (c)	34. (c)	35. (b)
36. (c)	37. (b)	38. (b)	39. (d)	40. (d)
41. (a)	42. (a)	43. (b)	44. (d)	45. (a)

HINTS & EXPLANATIONS

1. (a) Product of the numbers
   = H.C.F × L.C.M = 21 × 4641
   = 21 × 3 × 7 × 13 × 17
   = 3 × 7 × 3 × 7 × 13 × 17
   ∴The required numbers can be,
   3 × 7 × 13 and 3 × 7 × 17 = 273 and 357

2. (b) Required no. = L.C.M of (8, 11, 24)
   -5 = 264 - 5 = 259

3. (d) Suppose least no. be x
   1856-x = n (L.C.M of 7,12,16) +4
   or 1856 – x = n (336) +4
   we should take n = 5 so that n(336) is nearest to 1856 and n(336)<1856
   1856 – x =1680+4=l684
   x= 1856-1684 = 172

4. (b) Required number
   = H.C.F of(148- 4), (246-6) and (623 - 11)
   = H.C.F of 144,240 and 612 = 12

5. (b) L.C.M of 18,24&32=288
   Hence they would chime after every 288 min. or 4 hrs 48min

6. (c) Let the numbers be x and 4x.
   Then, 84×21 = x×4x
   Or $4x^2$=1764
   or x^2=441 or x=2l
   ⇒ 4x=4×21=84
   Thus the larger number = 84

7. (b) Product of numbers=(L.C.M × H.C.F)
   ⇒480 × second number=2400 × 16
   ⇒second number=80

8. (a) Required number of students=H.C.F of 1001 and 910=91

9. (d) Required number=H.C.F of 429 and 715 = 143

10. Product of numbers = 29 × 4147
    let the number be 29a and 29 b.

Then, 29a × 29b=29 × 4147
ab = 143
Now co-primes with product 143 are(1, 143)and (11,13) so the numbers are (29×1,29× 143) and (29 × 11,29 × 13)
Since both are greater than 29, so suitable pair is (29×11,29 ×13)i.e. (319,377)
Required sum =319+377= 696

11. (d) Required number =3000-L.C.Mof 7, 11, 13 =3000-1001 =1999

12. (c) Let numbers be x and y,
    ∵ Product of two numbers = their (L.C.M × H.C.F)
    ⇒xy=630×9
    Also, x+y = 153 (given)
    since x-y = $\overline{(x+y)^2 - 4xy}$
    ⇒ $x - y = \sqrt{(153)^2 - 4(630 \times 9)}$
    $= \sqrt{23409 - 22680} = \sqrt{729} = 27$

13. (b) Required number=H.C.F of 108 and 144 = 36

14. (b) Required number = 3000 - maximum possible of L.C.M of (7,11 and 13)
    = 3000 – 2(1001) = 998

15. (d) Required number = H.C.F of (127-55), (175-127) and (175-55)
    H.C.F of 72,48 and 120 =24

16. (c) Time gap between two consecutive ticks
    $\frac{58}{57}$ sec. and $\frac{609}{608}$ sec.
    ∴ Required Time = L.C.M of $\frac{58}{57}$ and $\frac{609}{608}$
    $= \frac{\text{L.C.M of 58 and 609}}{\text{H.C.F of 57 and 608}} = \frac{1218}{19}$ sec

17. Rate=H.C.F of 70 and 245=35

18. (d) L.C.M (2, 3, 4, 5, 6) = 60
    ∴Required number is of the form 60 k+1
    Least value of k for which. 60k + 1 is divisible by 7 is k=5

Required number $= 60 \times 5 + 1 = 301$

19. L.C.M of the numbers=420.

    Hence there must be $(420 \times 2) + 2 = 842$ beads.

20. Required number = H.C. F of $(410 - 7)$, $(751-7)$ and $(1030 -7)$
    = H. C. F of 403,744 and 1023 = 31

21. (a) Time taken by them to complete the track
    $= \frac{11}{4}, \frac{11}{11/2}, \frac{11}{8}$ hrs $= \frac{11}{4}, 2, \frac{11}{8}$ hrs
    Required time = L.C.M of $\frac{11}{4}, 2, \frac{11}{8}$
    $= \frac{\text{L.C.M of}(11,2,11)}{\text{H.C.F of }(4,1,8)} = 22$hrs

22. (d) To find the capacity we have to take the H.C.F of 279, 341 and 465.
    $279 = 31 \times 3 \times 3$
    $341 = 31 \times 11$
    $465 = 31 \times 3 \times 5$
    H.C.F$(279,341,465) = 31$
    Capacity of the measuring can be=31 ml.

23. (c) His maximum daily wages must be the H.C.F of 404.30 and 279.90 which is 31.10.

24. (a) N = H.C.F of $(4665 - 1305)$, $(6905 - 4665)$ and $(6905-1305)$
    =H.C.F. of 3360,2240 and 5600=1120
    Sum of digits in N = $(1+1 + 2+0) = 4$

25. (c) Let H.C.F. be h and L.C.M. be l.
    Then, $l = 45h$ and $l + h = 1150$
    $\therefore 45h+h = 1150$ or $h = 25$. So, $l = (1150 - 25)$
    $= 1125$
    Hence, other number $= \left(\frac{25 \times 1125}{125}\right) = 225$

26. (c) Clearly, the numbers are (23×13) and (23×14).
    $\therefore$ Larger number = $(23 \times 14) = 322$.

27. (b) Required length = L.C.M of 100 cm and 85 cm

$=1700$cm $= 17$m

28. (b) Product of 'n' numbers = (H.C.F for each pair)^n × L.C.M of 'n' numbers
    $= (3)^4 \times 116 = 9396$

29. (c) A makes 1 rev. per sec
    B makes $\frac{6}{10}$ rev per sec
    C makes $\frac{4}{10}$ rev. per sec
    In other words A, B and C take 1, $\frac{5}{3}$ & $\frac{5}{2}$ seconds to complete one revolution.
    L.C.M of $1, \frac{5}{3}$ & $\frac{5}{2} = \frac{\text{L.C.M.of 1,5,5}}{\text{H.C.F.of 1,3,2}} = 5$
    Hence, after every 5 seconds the red spots on all the three wheels touch the ground

30. (d) H.C.F of 60,84 and 108 is 12 so each room contain 12 students at minimum
    So that each room contains students of only 1 subject
    $\therefore$ Number of rooms $= \frac{60}{12} + \frac{108}{2} + \frac{84}{12} = 21$ rooms

31. (b) L.C.M. of $12,18,21,30 = 2 \times 3 \times 2 \times 3 \times 7 \times 5 = 1260$
    $\therefore$ Required number = $(1260 \div 2) = 630$.

32. (b) 13 m 53 cm=1353 cm and 8 m 61cm=861 cm.
    H.C.F. of 1353 and 861 is 123.
    Now since minimum tiles are required for having the floor so area of the tile has to be the greatest so its size is greatest which is 123 cm. $\therefore$ the number of square tiles
    $= \frac{\text{Area of the floor}}{\text{Area of the tile}} = \frac{1353 \times 861}{123 \times 123} = 77$

33. (c) The number of boys and girls in each class is the H.C.F. of 391 and 323 which is 17.
    Number of classes $= \frac{391}{17} + \frac{323}{17} = 23+19 = 42$

34. (c) Size of the bag is the H.C.F. of the numbers 184,230, 276 which is 46.

    The number of bags $= \dfrac{184}{46} + \dfrac{230}{46} + \dfrac{276}{46}$

    $= 4 + 5 + 6 = 15$

35. (b) Let p, q, r and s be the four prime numbers, so that $p \times q \times r = 385$ and $q \times r \times s = 1001$

    $\Rightarrow q \times r$ is the H.C.F. of 385 and 1001 which is 77.

    $\therefore s = 1001 \div 77 = 13$

36. Let the numbers be a and b. Then, $a + b = 55$ and $ab = 5 \times 120 = 600$

    $\therefore$ Required sum $= \dfrac{1}{a} + \dfrac{1}{b} = \dfrac{a+b}{ab} = \dfrac{55}{600} = \dfrac{11}{120}$

37. (b) H.C.F of co-prime numbers is 1.

    So, L.C.M. $= 117/1 = 117$.

38. (b) Since, 2, 3, 7, 11 are prime numbers and the given expression is $2^{10} \times 3^{10} \times 3^{17} \times 11^{27}$

    So the numbers of prime factors in the given expression is $(10 + 10 + 17 + 27) = 64$

39. (d) Least number of 5 digits is 10,000.
    L.C.M. of 12,15 and 18 is 180.

    On dividing 10000 by 180, the remainder is 100.

    $\therefore$ Required number $= 10000 + (180-100) = 10080$,

40. (d) There are 6 such pairs:
    (22, 440), (44, 418), (88, 374), (110, 352)

    (176,286), (220,242)

41. Let the numbers are 3x,4x and 5x then their L.C.M=60x

    So, 60x=2400 (given)

    x = 40

    $\therefore$ The number are (3×40), (4×40), $(5 \times 40) = 120,160,200$

    Hence required H.C.F.=40

42. (a) Number=49K+32

    $= (7 \times 7K) + (7 \times 4) + 4$

    $= 7(7K+4) + 4$

    So, the number when divided by 7 gives remainder=4

    Short-method:-32÷7 = (7×4)+4

43. (b) L.C.M of 24,36 and 54 second.

    =216 second

    =3 minute+36 second.

    Required time = 10:15:00 + L.C.M of 24,36 and 54

    = 10:15:00 + 3 min + 36 sec.

    = 10:18:36 AM

44. (d) n = 5K + 2

    Squaring both side

    $n^2 = (5K+2)^2$

    $= 25K^2 + 20K + 4$

    So, the required remainder is 4.

45. (a) Here, (48 -38) = 10, (64 - 54) =10,(90 - 80) = 10 and (120-110) = 10.

    Required number= (L.C.M of 48,64,90 and 120)-10

    = 2870