X. Home work -1 Mark Questions (Real Numbers)

1. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. The minimum number of rooms required if in each room the same number of participants are to be and all of them being the same subject is
   a) 16 b) 14 c) 21 d)10

2. At an international airport, planes take off from five different runways at 3, 4, 8, 12 and15 minutes intervals. At 7.30 am, planes took off from all five runways simultaneously. When will five planes take off together again?
   a)7.45 am b)8.15 am c)9.00 am d)9.30 am

3. The largest number which on dividing 1251, 9377 and 15628 leaves remainders 1,2 and 3 respectively is
   a)450 b)575 c)625 d)750

4. Three bells toll at intervals of 9,12,15 minutes respectively. If they start tolling together, what time will they next toll together ?
   a)After 1 hour b) After 2 hours c) After $2\frac{1}{2}$ hours d) After 3 hours

5. Three bells ring at interval of 4, 7 and 14 minutes. All three bells rang at 6 am. When the three bells will ring together next?
   a) 6.20 am b) 6.24 am c) 6.28 am d) 6.30 am

6. The LCM of 150 and 200 is
   A) 320 b) 400 c) 550 d) 600

7. If HCF of 65 and 117 is expressible in the form 65n-117, the the value of n is ...
   a) 1 b) 2 c) 3 d) 5

8. The values of p and q such that the prime factorisation of 2520 is expressible as $2^3 \times 3^p \times q \times 7$ respectively are
   a) 2,3 b)3,5 c) 2,5 d) 5,7

9. The HCF and LCM of 404 and 96 respectively are
   a) 2,9696 b) 4, 9696 c)8,3636 d)`9,2020

10. If $xy = 180$ and HCF(x,y)=3, then the LCM (x, y) is .....
    a) 30 b) 60 c) 45 d) 50

11. When 156 is expressed as the product of primes we get,
    a) $2^2 \times 3 \times 13$ b) $2^2 \times 3 \times 11$ c) $2 \times 3^2 \times 13$ d) $2 \times 3^2 \times 11$

12. The LCM of two numbers is 182 and their HCF is 13. If one of the number is 26, the other number is
    a) 31 b) 71 c) 61 d) 91

13. When 429 is expressed as product of its prime factors, we get

a) $2\times5\times29$ b) $33\times13\times1$ c) $3\times11\times9$ d) $3\times11\times13$

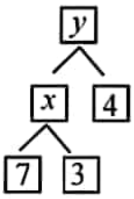
14. If a is a multiple of b, then HCF(a, b) = ...

a) a b) b c) ab d) a b

15. If a and b are co-primes, then a^2 and b^2 are

a) primes b) composites c) co-primes d) none of these

16.



The value of x and y are

a) $x = 84, y = 21$

b) $x = 21, y = 84$

c) $x = 42, y = 24$

d) $x = 24, y = 42$

17. HCF $(a, b)\times$ LCM (a, b) =

a) $a+b$ b) $a-b$ c) $a\times b$ d) $a\div b$

18. The HCF and LCM of 12, 21, 15 respectively are

a) 3,140 b)12,420 c) 3,420 d) 420,3

19. The total number of factors of a prime number is

a)1 b) 0 c) 2 d) 3

20. 325 can be expressed as a product of its prime as:

a) $5^2\times7$ b) $5^2\times13$ c) 5×13^2 d) $2\times3^2\times5^2$

21. The LCM of smallest two -digit composite number and smallest composite number is

a) 12 b) 4 c) 20 d) 44

22. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$; x and y are prime numbers then HCF (a, b) is

a) xy b) xy^2 c) x^3y^3 d) x^2y^2

23. Four bells toll at an interval of 8, 2, 15 and 18 seconds respectively. All the four bells begin to toll together. The number of times they toll together in one hour excluding the one at the start will be

a) 5 b) 8 c) 10 d) 12

24. The LCM of two numbers is 14times their HCF. The sum of LCM and HCF is 600. If one number is 280, then the other number is

a) 20 b) 28 c) 60 d) 80

25. On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm

respectively. The minimum distance each should walk so that each can cover the same distance in complete steps is

a) 1260 cm b) 1920 cm c) 2242 cm d) 2520 cm

26. The HCF of the smallest composite number and the smallest prime number is

a) 1 b) 2 c) 3 d) 5

27. The (HCF $\times$ LCM) for numbers 100 and 190 is

a) 190 b) 1900 c) 19000 d) none of these

28. When 2120 is expressed as the product of its prime factors, we get

a) $2\times5^3\times53$ b) $2^3\times5\times53$ c) $5\times7^2\times31$ d) $5^2\times7\times33$

29. If $n=2^3\times3^4\times5^4\times7$, then the number of consecutive zeros in n; where n is a natural number is

a) 2 b) 3 c) 4 d) 7

30. If p_1 and p_2 are two odd prime numbers such that $p_1>p_2$, then $p_1^2-p_2^2$ is...

a) an even number b) an odd number c) an odd prime number d) a prime number

31. If $a=2^3\times3, b=2\times3\times5, c=3^n\times5$ and LCM $(a, b, c)=2^3\times3^2\times5$, then $n=$

a) 1 b) 2 c) 3 d) 4

32. If 3 is the least prime factor of number a and 7 is the least prime factor of number b, then the least prime factor of $a+b$ is

a) 2 b) 3 c) 5 d) 10

33. $3.\overline{27}$ is

a) an integer b) a rational number c) a natural number d) an irrational number

34. The smallest number by which $\sqrt{27}$ should be multiplied so as to get a rational number is

a) $\sqrt{27}$ b) $3\sqrt{3}$ c) $\sqrt{3}$ d) 3

35. The smallest rational number by which $\frac{1}{3}$ should be multiplied so that its decimal expansion terminates after one place of decimal is

a) $3/10$ b) $1/10$ c) 3 d) $3/100$

36. If n is a natural number, then $9^{2n}-4^{2n}$ is always divisible by

a) 5 b) 13 c) both 5 and 13 d) none of these

37. If n is any natural number, then 6^n-5^n always ends with

a) 1 b) 3 c) 5 d) 7

38. The LCM and HCF of two rational numbers are equal, then the numbers must be

a) prime b) co-prime c) composite d) equal

39. If the sum of LCM and HCF of two numbers is 1260 and their LCM is 900 more than their HCF, then the product of two numbers is
a) 2030400 b) 194400 c)198400 d)205400

40. The remainder when the square of any prime number greater than 3 is divided by 6 is
a) 1 b) 3 c) 2 d) 4

41. The least number that is divisible by all the other numbers from 1 to 10 (both inclusive) is
a) 10 b) 100 c) 504 d) 2520

42. The largest number which divides 70 and 125, leaving remainders 5 and 8 respectively is
a)13 b) 65 c) 875 d) 1750

43. The LCM of two numbers is 740 and their HCF is 37. If one of the numbers is 185, then the other number is
a) 136 b) 140 c) 142 d) 148

44. If the product of two numbers a and b is 1152 and HCF of a and b is 12, then LCM (a, b) is
a)88 b) 90 c) 92 d) 96

45. If LCM of p and 12 is 24 and the HCF of p and 12 is 4, then the value of p is
a) 3 b) 4 c) 6 d) 8

46. The ratio between the LCM and HCF of 5,15,20 is
a) 9:1 b) 4:3 c) 11:1 d) 12:1

47. HCF of two prime numbers is
a) 0 b) 1 c) 2 d) 3

48. If HCF and LCM of two numbers are respectively $(n-1)$ and $(n^2-1)(n^2-4)$, then the product of the two numbers will be
a) $(n^2-1)(n^2-4)$ b) $(n^2+1)(n^2-4)(n^2-1)$
c) $(n^2-4)(n+1)(n-1)^2$ d) $(x^2-1)(x^2+1)(x-4)$

49. If m is z non -zero rational number and n is an irrational number, then $m+n$, $m-n$ and mn are all
a) rational numbers b) irrational numbers
c) either rational or irrational d) neither rational nor irrational

50. The product of HCF and LCM of 72 and 132 is
a) 9540 b) 9045 c) 9504 d) 9054

51. 1245 is a factor of the numbers p and q
Which of the following will always have 1245 as a factor?
(i) $p+q$ (ii) $p\times q$ (iii) $p\div q$
a) only (il) b) only (i) and (ii) c) only (ii) and (iii)
d) all (i), (ii) and (iii)

52. A number of the form 8^n, where n is a natural number greater than 1, cannot be divisible by

a)1 b)40 c)64 d) 2^{2n}

53. Which of the following will have maximum number of 6's when written in decimal form

a) $\frac{666}{1000}$ b) $\frac{3}{6}$ c) $\frac{3}{5}$ d) $\frac{2}{3}$

54. Let a and b be two positive integers such that $a = p^3q^4$ and $b = p^2q^3$,where p and q are prime numbers.

If HCF $(a, b) = p^m q^n$ and LCM $(a, b) = p^r q^s$, then (m+n) (r +s) =

a) 15 b) 30 c) 35 d)72

55. The number $3^{13} - 3^{10}$ is divisible by

a) 2 and 3 b) 3 and 10 c) 2, 3 and 10 d)2,3 and 13

X HOMEWORK – 1 REAL NUMBERS : answers

1) $60 = 2^2 \times 3 \times 5$
$84 = 2^2 \times 3 \times 7$
$108 = 2^2 \times 3^3$

$$\begin{array}{r|l} 2 & 60 \\ \hline 2 & 30 \\ \hline 3 & 15 \\ \hline & 5 \end{array} \quad \begin{array}{r|l} 2 & 84 \\ \hline 2 & 42 \\ \hline 3 & 21 \\ \hline & 7 \end{array} \quad \begin{array}{r|l} 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

$HCF(60, 84, 108) = 2^2 \times 3$
$= 12$ participants in each room

∴ the required minimum no. of rooms

$$= \frac{60}{12} + \frac{84}{12} + \frac{108}{12}$$

$$= 5 + 7 + 9 = 21 \text{ rooms}$$ (c)

2) $3 = 3^1$
$4 = 2^2$
$8 = 2^3$
$12 = 2^2 \times 3$
$15 = 3 \times 5$
$LCM(3, 4, 8, 12, 15) = 2^3 \times 3 \times 5 = 120$ minutes
$= \frac{120}{60} = 2$ hours

∴ the five planes take off together again at

7:30am + 2hours = 9:30am (d)

3) $1251 - 1 = 1250 = 5^4 \times 2$
$9377 - 2 = 9375 = 5^5 \times 3$
$15628 - 3 = 15625 = 5^6$

$$\begin{array}{r|l} 5 & 1250 \\ \hline 5 & 250 \\ \hline 5 & 50 \\ \hline 5 & 10 \\ \hline & 2 \end{array} \quad \begin{array}{r|l} 5 & 9375 \\ \hline 5 & 1875 \\ \hline 5 & 375 \\ \hline 5 & 75 \\ \hline 5 & 15 \\ \hline & 3 \end{array} \quad \begin{array}{r|l} 5 & 15625 \\ \hline 5 & 3125 \\ \hline 5 & 625 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline & 5 \end{array}$$

$HCF(1250, 9375, 15625) = 5^4 = 625$

∴ the required largest number is 625 (c)

4) $9 = 3^2$
$12 = 3 \times 2^2$
$15 = 3 \times 5$
$LCM(9, 12, 15) = 3^2 \times 2^2 \times 5 = 9 \times 4 \times 5 = 180$ minutes
$= \frac{180}{60} = 3$ hours

∴ the three bells toll together next after 3 hours (d)

5) $4 = 2^2$

$7 = 7^1$

$14 = 2 \times 7$

$LCM(4,7,14) = 2^2 \times 7 = 4 \times 7 = 28$ minutes

$\therefore$ the three bells will ring together next at 6:28am (c)

6) $150 = 5^2 \times 2 \times 3$

$200 = 2^3 \times 5^2$

$$\begin{array}{r|l} 5 & 150 \\ \hline 5 & 30 \\ \hline 2 & 6 \\ \hline & 3 \end{array} \qquad \begin{array}{r|l} 2 & 200 \\ \hline 2 & 100 \\ \hline 5 & 50 \\ \hline 5 & 10 \\ \hline & 2 \end{array}$$

$LCM(150,200) = 2^3 \times 5^2 \times 3$

$= 600$ (d)

7) $65 = 5 \times 13$

$117 = 3^2 \times 13$

$HCF(65,117) = 13$

$\therefore 65n - 117 = 13$

$\Rightarrow 65n = 130$

$n = 2$ (b)

8)

$2520 = 2^3 \times 3^2 \times 5 \times 7$

$$\begin{array}{r|l} 5 & 2520 \\ \hline 2 & 504 \\ \hline 2 & 252 \\ \hline 2 & 126 \\ \hline 3 & 63 \\ \hline 3 & 21 \\ \hline & 7 \end{array}$$

$\therefore p = 2$

$q = 5$ (c)

9) $404 = 2^2 \times 101$

$96 = 2^5 \times 3$

$$\begin{array}{r|l} 2 & 404 \\ \hline 2 & 202 \\ \hline & 101 \end{array} \qquad \begin{array}{r|l} 3 & 96 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline & 2 \end{array}$$

$HCF = 2^2 = 4$

$LCM = 2^5 \times 3 \times 101 = 9696$ (b)

10)

$LCM(x,y) \times HCF(x,y) = x \times y$

$\therefore LCM(x,y) = \frac{180}{3}$

$= 60$ (b)

11) $156 = 2^2 \times 3 \times 13$ (a)

$$\begin{array}{r|l} 2 & 156 \\ \hline 2 & 78 \\ \hline 3 & 39 \\ \hline & 13 \end{array}$$

12) We know that, $LCM(a,b) \times HCF(a,b) = a \times b$

$\therefore$ the other number $= \frac{182 \times \cancel{13}^{1}}{\cancel{26}_{2}}$

$= 91$ (d)

13) $429 = 3 \times 11 \times 13$ (d)

$$\begin{array}{r|l} 3 & 429 \\ \hline 13 & 143 \\ \hline & 11 \end{array}$$

14) b (b)

15) Let $a = 3$ and $b = 8$.

Then, $a^2 = 9$ and $b^2 = 64$ (c) co-primes

16) $x = 7 \times 3 = 21$

$y = 21 \times 4 = 84$ (b)

17) $a \times b$ (c)

18) $12 = 3 \times 2^2$

$21 = 3 \times 7$

$15 = 3 \times 5$

HCF $= 3$

LCM $= 3 \times 7 \times 2^2 \times 5 = 420$ (c)

19) 2 (c) i.e, 1 and the number itself

20) $325 = 5^2 \times 13$ (b)

$$\begin{array}{r|l} 5 & 325 \\ \hline 5 & 65 \\ \hline & 13 \end{array}$$

21) smallest two-digit composite number $= 10 = 2 \times 5$

smallest composite number $= 4 = 2^2$

$\therefore LCM(10, 4) = 2^2 \times 5 = 4 \times 5 = 20$ (c)

22) $a = x^3 y^2$

$b = x y^3$

$\therefore HCF(a, b) = x y^2$ (b)

23) $8 = 2^3$

$12 = 2^2 \times 3$

$15 = 5 \times 3$

$18 = 2 \times 3^2$

$LCM(8, 12, 15, 18) = 2^3 \times 5 \times 3^2 = 8 \times 5 \times 9 = 360$ seconds

$= 6$ minutes

In one hour, the bells toll together $\frac{60}{6} = 10$ times (c)

24) $LCM = 14 \times HCF \rightarrow (1)$

Also, $LCM + HCF = 600$

$\Rightarrow 14\,HCF + HCF = 600$

$\Rightarrow 15\,HCF = 600$

$\therefore HCF = \frac{600}{15} = 40$

$LCM = 14 \times 40 = 560$

$\therefore$ the other number $= \frac{HCF \times LCM}{\text{one number}} = \frac{40 \times \cancel{560}^{2}}{\cancel{280}_{1}}$

$= 80$ (d)

25) $40 = 2^3 \times 5$

$42 = 2 \times 3 \times 7$

$45 = 3^2 \times 5$

2 | 40
2 | 20
2 | 10
5

$LCM(40, 42, 45) = 2^3 \times 3^2 \times 5 \times 7 = 2520$ cm

$\therefore$ the required minimum distance covered $= 2520$ cm (d)

26) smallest composite number $= 4 = 2^2$

smallest prime number $= 2$

$\therefore HCF(2, 4) = 2$ (b)

27) $HCF \times LCM =$ product of numbers

$= 100 \times 190 = 19000$ (c)

28) $2120 = 2^3 \times 5 \times 53$ (b)

2 | 2120
2 | 1060
2 | 530
5 | 265
53

29) $n = (2^3 \times 5^3) \times 5 \times 3^4 \times 7$

$= 10^3 \times 5 \times 3^4 \times 7$

$\therefore$ no. of consecutive zeroes $= 3$ (b)

30) Let $p_1 = 5$ and $p_2 = 3$

$\therefore p_1^2 - p_2^2 = 25 - 9 = 16$, an even number (a)

31) $n = 2$ (b)

32) Let $a = 3 \times 5 = 15$
and $b = 7 \times 11 = 77$
then $a + b = 15 + 77 = 92$, even number
Hence, the least prime factor of $a+b$ is 2 (a)

33) a rational number (b)

34) $\sqrt{27} = 3\sqrt{3} \times \sqrt{3}$ (c)
$= 3 \times 3 = 9$

35) $\frac{1}{3} \times \frac{3}{10} = \frac{1}{10} = 0.1$ (b)

36) If $n = 1$, $9^2 - 4^2 = 81 - 16 = 65 = 5 \times 13$ (c)

37) If $n = 1$, $6 - 5 = 1$
If $n = 2$, $6^2 - 5^2 = 36 - 25 = 11$ (a)

38) equal (d)

39) $LCM + HCF = 1260 \rightarrow (1)$
$LCM = HCF + 900 \rightarrow (2)$
On substituting (2) in (1), $HCF + 900 + HCF = 1260$
$2\,HCF = 360$
$HCF = 180$
$LCM = 1080$
$\therefore$ product of two numbers $= HCF \times LCM$
$= 180 \times 1080 = 194400$ (b)

40) $5^2 = 25$
$25 \div 6$, remainder $= 1$
$11^2 = 121$
$121 \div 6$, remainder $= 1$ (a)

41) $LCM(1,2,3,4,5,6,7,8,9,10) = 2520$ (d)

42) $70 - 5 = 65 = 5 \times 13$
$125 - 8 = 117 = 3^2 \times 13$ | $HCF(65, 117) = 13$ (a)

43) LCM(a, b) × HCF(a, b) = a × b

$\therefore$ the other number = $\frac{740 \times \cancel{37}^{1}}{\cancel{185}\,5} = 148$ (d)

44) HCF(a, b) × LCM(a, b) = a × b

$\therefore$ LCM(a, b) = $\frac{1152}{12} = 96$ (d)

45) LCM(a, b) × HCF(a, b) = a × b

$24 \times 4 = p \times 12$

$\therefore p = \frac{24 \times \cancel{4}^{1}}{\cancel{12}\,3} = 8$ (d)

46) $5 = 5^1$

$15 = 3 \times 5$

$20 = 2^2 \times 5$

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

HCF = 5

$\therefore$ LCM : HCF = $\frac{60}{5} = 12 : 1$ (d)

47) 1 (b)

48) product of numbers = HCF × LCM

$= (n-1)(n^2-1)(n^2-4)$

$= (n-1)(n-1)(n+1)(n^2-4)$

$= (n-1)^2 (n+1)(n^2-4)$ (c)

49) irrational no.s (b)

50) HCF × LCM = product of no.s

$= 72 \times 132$

$= 9504$ (c)

51) only (i) and (ii) (b)

52) 40 (b)

53) $\frac{2}{3}$ (d)

54) HCF(a, b) = $p^2 q^3$; LCM(a, b) = $p^3 q^4$

$\therefore m = 2, n = 3, r = 3, s = 4$

$(m+n)(r+s) = (2+3)(3+4) = 5 \times 7 = 35$ (c)

55) $3^{10} \cdot 3^3 - 3^{10} = 3^{10}(3^3 - 1) = 3^{10}(27-1) = 3^{10} \times 26 = 3^{10} \times 2 \times 13$ (d)