परमाणु ऊर्जा शिक्षा संस्था , मुंबई

Atomic Energy Education Society, Mumbai

Session : 2023 – 24

Class : X   **Subject: MATHEMATICS**

WORKSHEET NO.- 1

Name of the Chapter : REAL NUMBERS (CHAPTER – 1)

General Instructions :

1. There are 5 sections in this worksheet.
2. Section – A has 10 multiple choice questions of 1 mark each.
3. Section – B has 10 very short answer questions of 1 mark each.
4. Section – C has 10 short answer questions of 2 marks each.
5. Section – D has 5 short answer questions of 3 marks each.
6. Section – E has 5 long answer questions of 5 marks each.
7. Draw neat diagrams wherever necessary.
8. Use of calculator is not permitted.

Section A

1   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   **[1]**

   a) an even number

   b) an odd prime number

   c) an odd number

   d) a prime number

2   $7 \times 11 \times 13 + 13$ is a/an: **[1]**

   a) odd number but not composite

   b) square number

   c) prime number

   d) composite number

3   The HCF of 95 and 152, is   **[1]**

   a) 57

   b) 19

c) 38

d) 1

4   The HCF of two consecutive numbers is   **[1]**

a) 2

b) 0

c) 3

d) 1

5   If two positive integers 'a' and 'b' are written as $a = pq^2$ and $b = p^3q^2$, where 'p' and   **[1]**
'q' are prime numbers, then LCM(a, b) =

a) pq

b) p^3q^2

c) $p^2\ q^{\ 3}$

d) $p^2\ q^{\ 2}$

6   The HCF of 867 and 255 is   **[1]**

a) 51

b) 35

c) 25

d) 55

7   The exponent of 3 in the prime factorization of 864 is: **[1]**

a) 2

b) 3

c) 4

d) 8

8   A number when divided by 61 gives 27 as quotient and 32 as the remainder, then the   **[1]**
number is:

a) 1796

b) 1569

c) 1679

d) 1967

9    $2 - \sqrt{3}$ is   **[1]**

a) an irrational number

b) an integer

c) a rational number

d) a whole number

10   The sum of the exponents of the prime factors in the prime factorisation of 196, is   **[1]**

a) 2

b) 1

c) 4

d) 6

Section - B

11   Prove $7 - 2\sqrt{2}$ is irrational.   **[1]**

12   Find the HCF of 2825 and 70625.   **[1]**

13   Find the LCM and HCF of 17, 23 and 29 by applying the prime factorization method.   **[1]**

14   If least prime factor of a is 3 and least prime factor of b is 7, what is least prime factor of (a + b)?   **[1]**

15   If the product of two numbers is 1050 and their HCF is 25, find their LCM.   **[1]**

16   If a and b are two positive integers such that a = 14b. Find the HCF of a and b.   **[1]**

17   If product of two numbers is 3691 and their LCM is 3691, find their HCF.   **[1]**

18   Write the sum of exponents of prime factors in the prime factorisation of 250.   **[1]**

19   Find the prime factor of 8 by applying the prime factorization method.   **[1]**

20   Express 140 as a product of its prime factors.   **[1]**

Section – C

21   Find HCF of 81445 and 687897.   **[2]**

22   Find the LCM and HCF of the integers:40, 36 and 126 by applying the prime factorization method.   **[2]**

23   What is the smallest number which when divided by 20, 25, 35 and 40 leaves a remainder of 14, 19, 29 and 34 respectively.   **[2]**
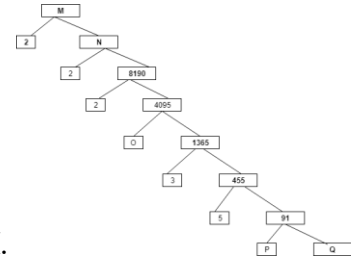
24 **[2]**

Complete the factor - tree and find the composite number M.

25 If the prime factorization of 2520 is expressible as $2^3 \times 3^p \times q \times 7$., then find the values of p and q . **[2]**

26 Express the HCF of 234 and 111 as 234x+ 111y, where x and y are integers. **[2]**

27 Can two numbers have 15 as their HCF and 175 as their LCM ? Give reasons. **[2]**

28 Show that $\frac{2+3\sqrt{2}}{7}$ is not a rational number, given that $\sqrt{2}$ is an irrational number. **[2]**

29 Prove that $\sqrt{p} + \sqrt{q}$ is irrational, where p and q are primes. **[2]**

30 Explain why $2 \times 3 \times 5 + 5$ and $5 \times 7 \times 11 + 7 \times 5$ are composite numbers. **[2]**

Section – D

31 In a school there are two sections, namely A and B, of class X. There are 30 students in section A and 28 students in section B. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B. **[3]**

32 Find the values of a and b if the HCF of the polynomials. $f(x) = (x + 3)(2x^2 - 3x + a)$ **[3]**

and $g(x) = (x - 2)(3x^2 + 10x - b) is (x + 3)(x - 2)$

33 Renu has collected 8 U.S. stamps and 12 international stamps. She wants to display them in identical groups of U.S. and international stamps, with no stamps left over. What is the greatest number of groups Renu can display them in? **[3]**

34 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and if it equal contain cartons of the same drink, what would be the greatest number of cartons each stack would have? **[3]**

35 Show that $\sqrt{6} + \sqrt{2}$ is irrational. **[3]**

Section – E

36 State Fundamental theorem of Arithmetic. Find LCM of numbers 2520 and 10530 by prime factorization method. **[5]**

37 Let a and b be positive integers. Show that $\sqrt{2}$ always lies between $\frac{a}{b}$ and $\frac{a+2b}{a+b}$. **[5]**

38 Prove that for any prime positive integer $\sqrt{p} + \sqrt{q}$ is an irrational number. **[5]**

39 Prove that $\sqrt{5} + \sqrt{7}$ is irrational. **[5]**

40 Show that $\left(4 + 3\sqrt{2}\right)$ is irrational number. **[5]**