PRACTICE PAPER 01 - CHAPTER 01 REAL NUMBERS (2024-25)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : X **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.

(iv). There is no overall choice.

(v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. The exponent of 5 in the prime factorization of 3750 is

(a) 3 (b) 4 (c) 5 (d) 6

2. If two positive integers a and b are written as $a = x^2y^2$ and $b = xy^3$, where x and y are prime numbers, then the LCM (a, b) is:

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

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

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

4. If the HCF of 65 and 117 is expressible in the form 65m –117, then the value of m is

(a) 4 (b) 2 (c) 11 (d) 3

5. Arnav has 40 cm long red and 84 cm long blue ribbon. He cuts each ribbon into pieces such that all pieces are of equal length. What is the length of each piece?

(a) 4 cm as it is the HCF of 40 and 84 (b) 4 cm as it is the LCM of 40 and 84

(c) 12 cm as it is the LCM of 40 and 84 (d) 12 cm as it is the HCF of 40 and 84

6. The largest number which divides 70 and 125 leaving remainders 5 and 8 respectively is

(a) 13 (b) 65 (c) 875 (d) 1750

7. If $6370 = 2^m \times 5^n \times 7^k \times 13^p$, then the value of m + n + k + p is

(a) 2 (b) 3 (c) 4 (d) 5

8. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and LCM (a, b, c) $= 2^3 \times 3^2 \times 5$, then n is equal to

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

9. In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

Assertion (A): If product of two numbers is 5780 and their HCF is17, then their LCM is 340.

Reason (R): HCF is always a factor of LCM.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

10. In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
Assertion (A): 6^n ends with the digit zero, where n is natural number.
Reason (R): Any number ends with digit zero, if its prime factor is of the form $2^m \times 5^n$, where m, n are natural numbers.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

SECTION – B

Questions 11 to 14 carry 2 marks each.

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

12. Two numbers are in the ratio 2 : 3 and their LCM is 180. What is the HCF of these numbers?

13. Show that any number of the form 6^n, where $n \in N$ can never end with digit 0. (2017)

14. The LCM of two numbers is 9 times their HCF. The sum of LCM and HCF is 500. Find the HCF of the two numbers.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. Prove that $\sqrt{3}$ is an irrational number. (2023)

16. 4 Bells toll together at 9.00 am. They toll after 7, 8, 11 and 12 seconds respectively. How many times will they toll together again in the next 3 hours?

17. Given that $\sqrt{3}$ is irrational, prove that $5 + 2\sqrt{3}$ is irrational. (CBSE Sample Paper 2022)

SECTION – D

Questions 18 carry 5 marks.

18. (a) Find the largest possible positive integer that divides 125, 162 and 259 leaving remainder 5, 6 and 7 respectively. (3)
(b) An army contingent of 678 soldiers is to march behind an army band of 36 members in a Republic Day parade. The two groups are to march in the same number of columns. What is the maximum number of columns they can march? (2)

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. A morning walk may help improve your mental clarity and ability to focus throughout the day. A recent study found that amongst older adults, those who started their days with a morning walk improved their cognitive function, compared to those who remained sedentary. Walking may also help you think more creatively. In a morning walk three students step off together, their steps measure 80 cm, 85 cm and 90 cm respectively.

(i) What is the HCF of 80 and 90? (1)
(ii) Find the sum of exponents of the prime factors of total distance. (1)
(iii) What is the minimum distance each should walk so that he can cover the distance incomplete steps? (2)

20. A family room is an informal, all purpose room is a house. The family room is designed to be a place where family and guests gather for group recreation like talking, reading, watching TV and other family activities. The length, breadth and height of a room are 8 m 25 cm, 6 m 75 cm and 4 m 50 cm.

(i) Determine the longest rod which can measure the three dimensions of the room exactly. (2)
(ii) What is LCM of the given three measurements? (1)
(iii) If the HCF (825 and 675) = 75, then find LCM (825 and 675). (1)