SIKSHAM

Mathematics | Computer | Coding & Programming

ADVANCED MOCK ASSESSMENT - X

Mathematics

Time Allowed: 1 Hour 30 Minutes **Maximum Marks: 50 (Written: 45 + Viva: 5)**

General Instructions:

- All questions are compulsory.
- Read all questions carefully before attempting.
- Section A contains 10 Multiple Choice Questions (1 mark each).
- Section B contains 5 Short Answer Type-I questions (2 marks each).
- Section C contains 5 Long Answer Type-I questions (3 marks each).
- Section D contains 2 Long Answer Type-II questions (5 marks each).
- Section E contains a 5-mark Viva-Voce oral evaluation sequence.

SECTION A (10 MARKS)

1. Choose the correct answer from the given four options: **[1×10=10]**

a. If two positive integers are written as a and b, such that HCF(a, b) = 1, then the two numbers are always:

(i) Composite numbers (ii) Co-prime numbers

(iii) Even numbers (iv) Square numbers

b. If the sum of the zeroes of a quadratic polynomial is 0 and one zero is 4, then the polynomial is:

(i) $x^2 - 16$ (ii) $x^2 + 16$

(iii) $x^2 - 4$ (iv) $x^2 + 4$

c. The graphical lines representing the pair of equations $x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$ are:

(i) Intersecting lines (ii) Parallel lines

(iii) Coincident lines (iv) Perpendicular lines

d. The discriminant of the quadratic equation $x^2 + x + 1 = 0$ is:

(i) 3 (ii) –3

(iii) 5 (iv) –5

e. If a pair of linear equations is consistent, then the corresponding graphical lines can be:

(i) parallel only (ii) coincident only

(iii) intersecting or coincident (iv) parallel or intersecting

f. If the roots of $2x^2 - kx + 2 = 0$ are real and equal, then the value of k is:

(i) ± 2 (ii) ± 4

(iii) ± 1 (iv) 0

g. The linear equation $3x – 5y = 15$ cuts the y-axis at the point:

(i) (5, 0) (ii) (0, –3)

(iii) –5, 0) (iv) (0, 3)

h. The exponent of 5 in the prime factorization of 3750 is:

(i) 3 (ii) 4

(iii) 5 (iv) 2

i. If one root of $ax^2 + bx + c = 0$ is the reciprocal of the other, then:

(i) a = b (ii) b = c

(iii) a = c (iv) a + b = 0

j. A cubic polynomial can have at most how many real zeroes?

(i) 1 (ii) 2

(iii) 3 (iv) 4

SECTION B (10 MARKS)

2. Find the HCF of 135 and 225 by using Euclid's Division Algorithm. **[2]**

3. Find a quadratic polynomial whose zeroes are $2 + \sqrt{3}$ and $2 – \sqrt{3}$. **[2]**

4. Solve the following system of linear equations by using the substitution method: **[2]**

$$7x – 15y = 2$$
$$x + 2y = 3$$

5. Determine the nature of the roots of the quadratic equation $2x^2 – 4x + 3 = 0$$. **[2]**

6. Show that the number 15^n can never end with the digit 0 for any natural number n. **[2]**

SECTION C (15 MARKS)

7. Prove that the number $5 – \sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is known to be irrational. **[3]**

8. Find the zeroes of the quadratic polynomial $x^2 – 2x – 8$ and verify the relationship between its zeroes and coefficients. **[3]**

9. Solve the following pair of simultaneous linear equations by using the elimination method: **[3]**

$$3x + 4y = 10 \quad \text{and} \quad 2x – 2y = 2$$

10. Solve the following quadratic equation by the factorization method:

$$x^2 - 3x - 10 = 0$$ **[3]**

11. If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k. **[3]**

SECTION D (10 MARKS)

12. A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Saritha paid Rs 27 for a book kept for seven days, while Susy paid Rs 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day. **[5]**

13. A budget of Rs 480 was allocated for food for a student picnic. However, eight students failed to attend, causing the food cost for each remaining student to increase by Rs 10. How many students actually attended the picnic? **[5]**

SECTION E (5 MARKS — VIVA VOCE ASSESSMENT LOOP)

14. Answer the following conceptual questions during oral evaluation: **[1×5=5]**

1. State the Fundamental Theorem of Arithmetic.
2. What is the relationship between the degree of a polynomial and the maximum number of times its graph can intersect the x-axis?
3. What algebraic condition must the coefficients satisfy for a pair of linear equations to have a unique solution?
4. What can you conclude about the roots of a quadratic equation if its discriminant is greater than zero but not a perfect square?
5. Is it possible for the HCF of two distinct numbers to be equal to their LCM? Explain your reasoning.

--- END OF EXAM PAPER ---