PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 5 : Quadratic Equations

(Algebra)

Maximum Marks: 40 ***Time allowed: One and a half hours***

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the question paper.*
3. ***The time given at the head of this Paper is the time allowed for writing the answers.***
4. *Attempt* ***all*** *questions from* ***Section A*** *and* ***any two*** *questions from* ***Section B****.*
5. ***All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***
6. ***Omission of essential working will result in loss of marks.***
7. *The intended marks for questions or parts of questions are given in brackets [ ].*
8. *Mathematical tables are provided.*

SECTION A (20 Marks)

*(Attempt **all** questions from this Section.)*

Question 1

Choose the correct answers to the questions from the given options. [8]

(Do not copy the question, write the correct answers only.)

(i) The discriminant of the quadratic equation $3x^2 - 7x + 2 = 0$ is:

(a) 25
(b) 73
(c) 49
(d) 1

(ii) The roots of the quadratic equation $4x^2 - 12x + 9 = 0$ are:

(a) real and unequal
(b) real and equal
(c) not real
(d) rational and unequal

(iii) The value of k for which the roots of the equation $x^2 - 6x + k = 0$ are equal is:

(a) 6
(b) 3
(c) 9
(d) 36

(iv) **Assertion (A):** The roots of the equation $x^2 - 4x + 1 = 0$ are rational.

Reason (R): The roots of a quadratic equation with integer coefficients are rational if its discriminant is a perfect square.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

(v) If $x = 2$ is a root of the equation $x^2 + kx - 10 = 0$, then the value of k is:

(a) -3
(b) 7
(c) 2
(d) 3

(vi) The solutions of the equation $x^2 - 5x = 0$ are:

(a) 5 only
(b) 0 and -5
(c) 0 and 5
(d) ± 5

(vii) The quadratic equation whose roots are -2 and 5 is:

(a) $x^2 + 3x - 10 = 0$
(b) $x^2 - 3x + 10 = 0$
(c) $x^2 + 3x + 10 = 0$
(d) $x^2 - 3x - 10 = 0$

(viii) **Assertion (A):** The roots of the equation $2x^2 - 5x + 2 = 0$ are 2 and ½.

Reason (R): If the product of two factors is zero, then at least one of the factors is zero.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

Question 2

(i) Find the values of k for which the equation $(k + 1)x^2 - 2(k - 1)x + 1 = 0$ has equal roots. [4]

(ii) Solve the quadratic equation $6x^2 + x = 2$ by factorisation. [4]

(iii) Solve the quadratic equation $x^2 - 6x + 4 = 0$ using the quadratic formula. Give your answers correct to 2 decimal places. [4]

SECTION B (20 Marks)

*(Attempt **any two** questions from this Section.)*

Question 3

(i) Without solving, state the nature of the roots of each equation: [3]

(a) $2x^2 + 5x - 3 = 0$

(b) $9x^2 - 24x + 16 = 0$

(c) $5x^2 - 4x + 1 = 0$

(ii) If $x = 2$ is a root of the equation $px^2 - 7x + 6 = 0$, find the value of p. Hence, find the other root of the equation. [3]

(iii) If $x = 3$ and $x = -\frac{1}{2}$ are the roots of the equation $2x^2 + px + q = 0$, find the values of p and q. [4]

Question 4

(i) Solve the equation $2x^2 - 7x - 15 = 0$ and write the solution set when: [3]

(a) $x \in Z$

(b) $x \in Q$

(ii) Solve: $\frac{2}{x+1} + \frac{3}{x+2} = 2, \quad x \neq -1, -2.$ [3]

(iii) Using the substitution $y = x^2 + 3x$, solve the equation $(x^2 + 3x)^2 - 2(x^2 + 3x) - 8 = 0$. [4]

Question 5

(i) Solve the equation $5x^2 - 8x + 2 = 0$ using the quadratic formula. Leave your answers in surd form. [3]

(ii) Solve the equation $3x^2 - 7x + 1 = 0$. Give your answers correct to 3 significant figures. [3]

(iii) Solve the equation $2x^4 - 9x^2 + 4 = 0$ for real values of x. [4]

Question 6

(i) Find the quadratic equation, with integral coefficients, whose solution set is $\{-3, 5/2\}$. [3]

(ii) Find the value of m for which the equation $(m + 1)x^2 + 2(m + 3)x + (m + 8) = 0$ has real and equal roots. Hence, find the roots of the equation. [3]

(iii) Find the greatest integral value of k for which the equation $2x^2 - 6x + k = 0$ has real roots. Hence, solve the equation for this value of k. [4]

— End of Question Paper —