PRACTICE PAPER

# ICSE CLASS 10 – MATHEMATICS

## Chapter 8 : Remainder and Factor Theorems

*(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. *Where a question asks for the Remainder Theorem or the Factor Theorem, the working must use it (long division is not a substitute).*

## 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 remainder when $x^3 - 2x^2 + 3x - 4$ is divided by $(x - 2)$ is:

(a) 2
(b) −2
(c) 6
(d) 10

(ii) If $(x - 3)$ is a factor of $x^2 - kx + 6$, then the value of k is:

(a) 3
(b) 5
(c) −5
(d) 6

(iii) The remainder when $2x^3 - x + 5$ is divided by $(2x + 1)$ is:

(a) 21/4
(b) −21/4
(c) 5
(d) 11/4

(iv) **Assertion (A):** $(x + 2)$ is a factor of $x^3 + 8$.

**Reason (R):** If $f(a) = 0$ for a polynomial $f(x)$, then $(x - a)$ is a factor of $f(x)$.

(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) When $x^3 - 6x^2 + ax + 4$ is divided by $(x - 1)$, the remainder is 2. The value of a is:

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

(vi) Which of the following is a factor of $x^3 - 3x^2 - x + 3$?

(a) $x + 3$
(b) $x - 2$
(c) $x + 2$
(d) $x - 3$

(vii) The number which must be added to $x^2 + x + 3$ so that it is exactly divisible by $(x - 1)$ is:

(a) 5
(b) −5
(c) 3
(d) −3

(viii) **Assertion (A):** If a polynomial f(x) is divided by (2x − 3), the remainder is f(3).

**Reason (R):** The remainder when f(x) is divided by (ax − b) is f(b/a).

(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 remainder when: [4]

(a) $3x^3 - 4x^2 + x - 5$ is divided by $(x - 2)$
(b) $4x^3 - 2x^2 + x - 3$ is divided by $(2x + 1)$

(ii) Find the value of a if the polynomials $ax^3 + 3x^2 - 2x + 4$ and $2x^3 - ax^2 + 3x - 4$ leave the same remainder when divided by $(x - 1)$. [4]

(iii) Using the Factor Theorem, show that $(x + 3)$ is a factor of $2x^3 + 3x^2 - 11x - 6$. Hence factorise the expression completely. [4]

## SECTION B (20 Marks)

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

**Question 3**

(i) Find the value of k if $(2x + 1)$ is a factor of $4x^3 + kx^2 - 3x + 2$. [3]

(ii) The polynomial $2x^3 + ax^2 + bx - 6$ is exactly divisible by $(x - 2)$ and leaves the remainder $-12$ when divided by $(x + 1)$. Find the values of a and b. [3]

(iii) If the polynomials $px^3 + 4x^2 - 3$ and $2x^3 - 5x + p$ leave the same remainder when divided by $(x + 1)$, find the value of p. Hence find that remainder. [4]

**Question 4**

(i) Show that $(x - 2)$ is a factor of $x^3 - 4x^2 + x + 6$ and hence factorise it completely. [3]

(ii) Using the Factor Theorem, factorise $2x^3 - x^2 - 13x - 6$ completely. [3]

(iii) Factorise $3x^3 + x^2 - 20x + 12$ completely. Hence solve the equation $3x^3 + x^2 - 20x + 12 = 0$. [4]

**Question 5**

(i) Using the Remainder Theorem, find which of $(x - 1)$, $(x + 3)$ and $(x + 2)$ are factors of $x^3 + 2x^2 - x - 2$. [3]

(ii) What number must be added to $3x^3 - x^2 + 2x$ so that the resulting polynomial leaves the remainder $-2$ when divided by $(x + 1)$? [3]

(iii) If $(x + 2)$ and $(x - 3)$ are factors of $2x^3 + ax^2 - 7x + b$, find the values of a and b. With these values, factorise the expression completely. [4]

**Question 6**

(i) The remainder when $x^3 + kx^2 - 3x + 4$ is divided by $(x - 2)$ is twice the remainder when it is divided by $(x + 1)$. Find k. [3]

(ii) Use the Factor Theorem to factorise $x^3 - 13x + 12$ completely. [3]

(iii) If $(2x - 3)$ and $(x + 1)$ are factors of $2x^3 + ax^2 + bx + 3$, find the values of a and b. Hence factorise the expression completely. [4]

**— End of Question Paper —**