B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

PRE MID TERM (2026-27)
APPLIED MATHEMATICS (241)
SET-A

Class: XI (041) Duration: 1 Hr

Date: 23.07.26 Max. Marks: 25

Admission No: _____ Roll No.: ___

GENERAL INSTRUCTIONS

(i) All questions are compulsory.

(ii) Marks are indicated against each question.

(iii) For MCQ and Assertion-Reason, write ONLY the letter of the correct option.

(iv) Use of set notation is mandatory wherever applicable.

(v) Venn diagrams may be drawn for conceptual clarity but are not compulsory unless asked.

SECTION A | Multiple Choice Questions (1 mark each)

1. If X= $\{8^n - 7n - 1, n \in N\}$ and Y = $\{49n - 49, n \in N\}$, Then: 1

(a) X subset Y (b) Y subset X (c) X = Y (d) X∩Y =∅

2. If n elements are common to A and B , then number of elements common in AXB and BXA is 1

(a) n (b) n^2 (c) n^3 (d) 2n

3. For sets A and B defined over universal set U, which of the following is ALWAYS false? 1

(a) $A \cap A' =$ empty set (b) $A \cup A' =$ = U

(c) (A')'= A (d) $A \cap B' = A \cup B'$

4. A relation R is defined from {2,3,4,5} to {3,6,7,10} by :xRy such that x is relatively prime to y. Then domain of R is 1

(a) {2,3,5} (b) {3,5} (c) {2,3,4} (d) {2,3,4,5}

5. If n(U) = 150, n(A) = 60, n(B) = 45 and n(A union B) = 85, then n(A' intersect B') equals: 1

(a) 5 (b) 25 (c) 35 (d) 60

Directions: Read both statements carefully and choose the correct option.

(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.

6. Assertion (A): For a subset A of the universal set U , n(A') = n(U) – n(A) 1

Reason (R): For any two sets A and B, n(A-B) = n(A) –n(B)

SECTION B | Short Answer (2 marks)

7. Find a linear relation between the components of the ordered pair of the relation R = $\{(0,2), (-1,5), (2,4), \ldots\}$. 2

8. Two sets are given: P = {x : x = 2n, n is a natural number, $n \leq 4$} and Q = {2, 4, 6, 8}. 2

prove or disprove that P = Q using the definition of equal sets.

Also state the number of proper subsets of P.

SECTION C | Short Answer (3 marks)

9. Three sets A, B and C satisfy the following: 3

A = {1, 2, 3, 4, 5, 6}, B = {2, 4, 6, 8}, C = {1, 3, 5, 7}

(i) Find $(A \cap B) \cup (A \cap C)$.

(ii) Verify the distributive law using these sets.

(iii) Comment on whether A and C are disjoint.

10. Draw appropriate Venn diagram for the following : 3

i) $(A \cap B)'$ ii) $A' \cap B'$ iii) $(A \cup B)'$

SECTION D | Long Answer (5 marks)

11. A survey shows that 67% of the people like product P1 whereas 73% like product P2. If x% of the people like both the products P1 and P2 , find the value of x. If 1000 people were there in survey then find the number of people like product only P1 and only P2.

SECTION E | Competency-Based Case Study (4 marks)

12 If R is the relation " is greater than" from A= $\{1,2,3,4,5\}$ to B =$\{1,3,4\}$. 4

i) Write R as the set of ordered pair.

ii) Write domain and range of R

iii) Also find R^{-1}