B.K. BIRLA CENTRE FOR EDUCATION

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

PRE MID TERM 2025-26
MATHEMATICS

Class: XI | **Time: 1hr**
Date: 02/08/25 | **Max Marks: 25**
Admission no: | **Roll no:**

General Instructions:

1. This Question Paper has 4 Sections A, B, C and D.
2. Section A has 5 MCQs carrying 1 mark each
3. Section B has 2 questions carrying 02 marks each.
4. Section C has 2 questions carrying 03 marks each.
5. Section D has 2 questions carrying 05 marks each.
6. All Questions are compulsory.

SECTION A

1. Empty set is a _____. **1m**
(a) Infinite set (b) Finite set (c) Unknown set (d) None of these

2. The number of elements in the Power set P(S) of the set S = {1, 2, 3} is **1m**
(a) 4 (b) 8 (c) 2 (d) None of these

3. If $f(x) = x^2 + 2$, $x \in R$, then the range of f(x) is **1m**
(a) $[2, \infty)$ (b) $(-\infty, 2]$ (c) $(2, \infty)$ (d) None of these

4. If f(x) = ax + b, where a and b are integers, f(–1) = – 5 and f(3) = 3, then a and b are equal to **1m**
(a) a = – 3, b = –1 (b) a = 2, b = – 3 (c) a = 0, b = 2 (d) None of these

5. Let n (A) = m, and n (B) = n. Then the total number of non-empty relations that can be defined from A to B is **1m**

(a) m^n (b) $n^m - 1$ (c) $mn - 1$ (d) $2^{mn} - 1$

SECTION B

6. **List all the elements of following sets:** **2m**
A = $\{x : x \text{ is an integer}, -1 < x < 5\}$
B = $\{x : x \text{ is a vowel in the English alphabet which precedes } k\}$

7. **Find the domain and the range of the function: f (x) =** $\sqrt{x^2 - 4}$ **2m**

SECTION C

8. **Write the following as intervals:** **3m**
(i) $\{x : x \in R, -2 < x < 5\}$
(ii) $\{x : x \in R, -2 \leq x < 5\}$
(iii) $\{x : x \in R, -2 \leq x \leq 5\}$

9. **If f and g are two real valued functions defined as f(x) = 2x + 1, g(x) = x^2 + 1, then find.** **3m**
(i) f + g (ii) f - g (iii) fg (iv)f/g

SECTION D

10. **(a) If U = {1,2,3,4,5,6,7,8,9}, A= {2,4,6,8} and B = {2,3,5,7}** **5m**
Verify that (i) (A U B)' = A' ∩ B'
(ii) (A ∩ B)' = A' U B'

(b) Draw appropriate Venn diagram for each of the following:
(i) (A U B)'
(ii) (A ∩ B)'

11. **Maths teacher started the lesson Relations and Functions in Class XI. He explained the following topics:** **5m**
Ordered Pairs: The ordered pair of two elements a and b is denoted by (a, b): a is first element (or first component) and b is second element (or second component). Two ordered pairs are equal if their corresponding elements are equal. i.e., (a, b) = (c, d) ⇒ a = c and b = d
Cartesian Product of Two Sets: For two non-empty sets A and B, the cartesian product A x B is the set of all ordered pairs of elements from sets A and B. In symbolic form, it can be written as A x B= {(a, b): a ∈ A, b ∈ B}
Based on the above topics, answer the following questions.
(i) If (a – 3, b + 7) = (3, 7), then find the value of a and b
(ii) If (x + 6, y – 2) = (0, 6), then find the value of x and y
(iii) If (x + 2, 4) = (5, 2x + y), then find the value of x and y
(iv) Find x and y, if (x + 3, 5) = (6, 2x + y).

***************BEST OF LUCK***************