11th UNIT WISE TEST – 1

MATHEMATICS

SETS, RELATIONS AND FUNCTIONS

MARKS: 25 **TIME**: 45 min

SECTION – A

I) CHOOSE THE CORRECT ANSWER:- $5 \times 1 = 5$

1. If $A = \{(x, y): y = e^x, x \in R\}$ and $B = \{(x, y): y = e^{-x}, x \in R\}$, then $n(A \cap B)$ is _____
   (1) Infinity (2) 0 (3) 1 (4) 2
2. Let A and B be subsets of the universal set N, the set of natural number. Then $A \cup [(A \cap B) \cup B']$ is ____
   (1) A (2) A' (3) B (4) N
3. If $n\big((A \times B) \cap (A \times C)\big) = 8$ and $n(B \cap C) = 2$ then $n(A)$ is _____
   (1) 6 (2) 4 (3) 8 (4) 16
4. The function $f: [0,2\pi] \to [-1,1]$ defined by $f(x) = sin\ sin\ x$ is _____
   (1) One-to-one (2) Onto
   (3) bijection (4) cannot be defined
5. The range of the function $\frac{1}{2-sinsin\,x}$ is _____
   (1) $(-\infty, -1) \cup (\frac{1}{3}, \infty)$ (2) $(-1, \frac{1}{3})$
   (3) $[-1, \frac{1}{3}]$ (4) $(\infty, -1) \cup [\frac{1}{3}, \infty)$

SECTION – B

II) VERY SHORT ANSWER:- $2 \times 2 = 4$

1. By taking suitable sets A, B, C verify the following results:
   (i) $A \times (B \cap C) = (A \times B) \cap (A \times C)$
   (ii) $(B - A) \cup C = (B \cup C) - (A - C)$
2. Define – Equivalence relation.

III) SHORT ANSWER:- $2 \times 3 = 6$

1. Write the values of f at -3,5,2,-1,0 if
   $f(x) = \{x^2 + x - 5\ if\ x \in (-\infty, 0)\ x^2 + 3x - 2\ if\ x \in (3, \infty)\ x^2 if\ x \in (0,2)\ x^2 - 3, otherwise$
2. If $f: R \to R$ is defined by $f(x) = 2x - 3$ prove that f is a bijection and find its inverse.

SECTION – C

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IV) VERY LONG ANSWER:- $2 \times 5 = 10$

1. Let $f, g: R \to R$ be defined as $f(x) = 2x - |x|$ and $g(x) = 2x + |x|$. Find fog
2. Write the steps to obtain the graph of the function $y = 3(x-1)^2 + 5$ from the graph $y = x^2$.

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