10th UNIT WISE TEST – 1

MATHEMATICS

RELATIONS & FUNCTIONS

MARKS: 25 **TIME**: 45 min

SECTION – A

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

1. If $n(A \times B) = 6$ and $A = \{1,3\}$ then $n(B)$ is _____
   (1) 1 (2) 2 (3) 3 (4) 6
2. If there are 1024 relations from a set $A = \{1,2,3,4,5\}$ to set B, then the number of elements in B is_____
   (1) 3 (2) 2 (3) 4 (4) 8
3. If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a, b)is_____
   (1) $(2,-2)$ (2) (5,1) (3) (2,3) (4) (3,-2)
4. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then fog is_____
   (1) $\frac{3}{2x^2}$ (2) $\frac{2}{3x^2}$ (3) $\frac{2}{9x^2}$ (4) $\frac{1}{6x^2}$
5. $f(x) = (x+1)^3 - (x-1)^3$ represents a functions which is _____
   (1) Linear (2) cubic (3) reciprocal (4) quadratic

SECTION – B

II) ANSWER IN SHORT:- $5 \times 2 = 10$

1. Let $A = \{1,2,3\}$ and $B = \{x | x \text{ is a prime number less than } 10\}$. Find $A \times B$ and $B \times A$.
2. Define – Relation.
3. Given $f(x) = 2x - x^2$. Find (i) $f(1)$ (ii) $f(x+1)$ (iii) $f(x) + f(1)$
4. Write the names of functions.
5. Using the functions f and g given below, find fog and gof. Check whether $fog = gof$.
   (i) $f(x) = x - 6, g(x) = x^2$
   (ii) $f(x) = \frac{2}{x}, g(x) = 2x^2 - 1$

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SECTION - C

III) ANSWER IN DETAIL:- $2 \times 5 = 10$

1) Consider the functions $f(x), g(x), h(x)$ as given below. Show that $(fog)oh = fo(goh)$ in each case.
   (i) $f(x) = x - 1, g(x) = 3x + 1$ and $h(x) = x^2$
   (ii) $f(x) = x - 4, g(x) = x^2$ and $h(x) = 3x - 5$

2) If the function $f: R \to R$ is defined by $f(x) = \begin{cases} 2x + 7, x < -2 \\ x^2 - 2, -2 \leq x < 3 \\ 3x - 2, x \geq 3 \end{cases}$
   (i) $f(4)$ (ii) $f(-2)$ (iii) $=f(4) + 2f(1)$ (iv) $\frac{f(1)-3f(4)}{f(-3)}$

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