CLASS –XI **SUBJECT – MATHEMATICS**
ASSIGNMENT- 3 **TOPIC– RELATIONS & FUNCTIONS**

Q1. If A = {2, 3}, B = {4, 5}, C = {5, 6} Find (i) A x B (ii) A x (B U C) (iii) A x (B U C)
Find (i) A x (B U C) = (A x B) U (A x C)
(ii) A x (B – C) = (A x B) – (A x C)

Q2. If the ordered pairs (x, -1) and (5, y) belong to the set {(a, b) : b = 2a – 3}, find the values of x and y.

Q3. If A and B are two sets having 3 elements in common. If n(A) = 5, n(B) = 4, find n (A x B) and n (A x B) ∩ (B x A)

Q4. Determine the domain and range of the following relations:-

(i) $R_1 = \left[\left[x, \frac{1}{x} \right] : 0 < x < 6, x \in N \right]$ (ii) $R_2 = \left[\left[x, x^3 \right] : x \text{ is a prime number less than a } 10 \right]$

Q5. Write all possible relation from A= {1, 2} to B = {0}.

Q6. How many relations are possible from a set A of n elements to another set B of n elements ?

Q7. Find the domain for which the functions $f(x) = 3x^2 - 1$ and $g(x) = 3 + x$ are equal.

Q8. Express the following functions as set of ordered pairs and determine their ranges.

(a) $f : A \to R$, $f(x) = x^2 + 1$, where A = {-1, 0, 2, 4}

(b) $g : A \to N$, $g(x) = 2x$, where A – {x : x ∈ N, x ≤ 10}

Q9. Let a function f be defined by $f(x) = \frac{x}{x^2 + 1}$, x ∈ R

Find (i) $f\left(\frac{1}{x}\right)$ $x \neq 0$ (ii) f (2x) (iii) f (x – 1)

Q10. If $f(x) = \frac{x-1}{x+1}$, $x \neq -1$, then show that $f(f(x) = \frac{-1}{x}$, provided that $x \neq 0$

Q11. Let $f(x) = x^2$ and $g(x) = 2x + 1$ be two real functions find (i) (f + g) (x) (ii) (f – g) (x) (iii) (f g) (x) (iv) $\left(\frac{f}{g} \right)$

Q12. If a real function f is defined by $f(x) = (|x| - x) / 2x$, find its range.

Q13. Find the domain of each of the following real valued functions :-

(i) $f(x) = \frac{1}{x+2}$, (ii) $f(x) = \frac{x-1}{x-3}$,

(iii) $f(x) = \frac{2x-3}{x^2-3x+2}$, (iv) $f(x) = \frac{x^2+3x+5}{x^2-5x+4}$,

(v) $f(x) = \sqrt{x-2}$, (vi) $f(x) = \frac{1}{\sqrt{1-x}}$, (vii) $f(x) = \sqrt{4-x^2}$,

Q14. Find the domain and range of the real function f(x) given by

(i) $f(x) = \frac{x-2}{3-x}$ Ans. D = R – {3} Range = R – {-1}

(ii) $f(x) = \frac{1}{\sqrt{x-5}}$ Ans. D = (5, ∞) Range = (0, ∞)

(iii) $f(x) = \sqrt{16-x^2}$ Ans. D = [-4, 4] Range = [0, 4]

(iv) $f(x) = \frac{x}{1+x^2}$ Ans. D = (R) Range = [-½, ½] – {0}

(v) $f(x) = \frac{3}{2-x^2}$ Ans. D = R – { $-\sqrt{2}$, $\sqrt{2}$ } Range = (∞, 0) U [3/2, ∞]

(vi) $f(x) = \frac{x^2-9}{x-3}$ Ans. D = R – { 3} R = R – {6}

Q15. If R = {(x, y): x, y ∈ I, $4x^2 + 8y^2 = 36$}, then represent R by arrow diagram.

Q16. Give A ={-2, -1, 0, 1, 2} and B = {-3, -1, 1, 5}. List all elements of f {(x, y) : $y = 2x^2 - 3$, x ∈ A, Y ∈ B}. Is f a function ?