# CLASS XII
# SAMPLE PAPER
# MATHS

## RELATION AND FUNCTION - 1

(Answer ALL questions)

1)
   a) $|A| = m$, $|B| = n$
      No of relations from A to B = ?
      No of functions from A to B = ?
      No of one – one functions from A to B = ? (for m<n and m>n)

2) Show that $a \equiv b \pmod 5$ is equivalence relation, find its equivalence classes.

3) R defined on N×N such that $(a, b)R(c, d) \Leftrightarrow ad = bc$. Prove that R is an equivalence relation, also find the equivalence class for (2,3).

4) Prove that intersection of two equivalence relations is also an equivalence relation on A.

**OR**

   Find the domain and range of f:R→R. (**Any two**)
   a) $f(x) = \sqrt{(x^2-1)}$.
   b) $f(x) = Sinx$.
   c) $f(x) = 1 / (x^2 + 1)$.

5) Test the following functions for Surjectivity, Injectivity or Bijectivity.
   (**Any two**)
   a) $f(x) = x^2 + x$, $f:Z\to Z$.
   b) $f(x) = Sinx$, $f:R\to R$
   c) $f(x) = |x - 1|$, $f:R\to R$

**OR**

   If f and g are two functions from R to R, $f(x) = x^2$, $g(x) = 2x + 1$, Find fog and gof. Is fog = fog. Find the domain and range of fog and gof.

6) Let f:X→Y and g:Y→Z are bijections. Show that (gof): X→Z is also bijection. Also show that (gof) $^{-1}$ = f $^{-1}$og $^{-1}$.

7) Find the domain and range of f(x). (**Any two**)

(a) $f(x) = \dfrac{x^2}{x^2 + 1}$   (b) $f(x) = \dfrac{|x-3|}{(x-3)}$   (c) $f(x) = \sqrt{16 - x^2}$   (d) $f(x) = \dfrac{1}{\sqrt{x-[x]}}$

8) f(x) = e$^x$ , g(x) = Log $_e$ x , (x > 0), then find fog and gof. If fog = gof?

9) State whether the following function f(x) is invertible?

$f : R - \{-1\} \to R - \{-1\}$ where $f(x) = \dfrac{x}{x+1}$. Also find $f^{-1}$.

10) Prove that every function can be expressed as sum of even and odd function. Split y = e$^x$ into sum of odd and even function.

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