

M.C.Q. [one - Mark Questions]

$[1 \times 5 = 5]$

Q1] A function $f: R \rightarrow A$ defined as $f(x) = x^2 + 1$ is onto, if A is:

- (a) $(-\infty, \infty)$ (b) $(1, \infty)$ (c) $[1, \infty)$ (d) $[-1, \infty)$

Q2] The domain of the function defined by $f(x) = \sin^{-1} \sqrt{x-1}$ is:

- (a) $[1, 2]$ (b) $[-1, 1]$ (c) $[0, 1]$ (d) None of these.

Q3] Let $A = \{3, 5\}$. Then number of Reflexive Relations on A is:

- (a) 2 (b) 4 (c) 0 (d) 8

Q4] The value of the Expression $2\sec^{-1} 2 + \sin^{-1} \frac{1}{2}$ is:

- (a) $\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $\frac{\pi}{6}$ (d) 1

Q5] If $\cos(\sin^{-1} \frac{2}{\sqrt{5}} + \cos^{-1} x) = 0$, then x is equal to:

- (a) $\frac{1}{\sqrt{5}}$ (b) $-\frac{2}{\sqrt{5}}$ (c) $\frac{2}{\sqrt{5}}$ (d) 1

[Two Marks Questions]

$[2 \times 6 = 12]$

Q6] Find value of $\tan^{-1} \left[\tan \left(2 \cos^{-1} \frac{\sqrt{3}}{2} \right) \right] = \frac{\pi}{3}$

Q7] Find the domain of the function $f(x) = \sin^{-1}(x^2 - 4)$. Also find its range.

Q8] Evaluate $\tan^{-1} \left(\frac{-1}{\sqrt{3}} \right) + \cot^{-1} \left(\frac{1}{\sqrt{3}} \right) + \tan^{-1} \left(\sin \left(\frac{\pi}{2} \right) \right) + \tan^{-1} \left(\tan \frac{2\pi}{3} \right)$

Q9] Prove that: $\cos^{-1} \frac{12}{13} + \sin^{-1} \frac{3}{5} = \sin^{-1} \frac{56}{65}$

Q10] Find the value of x , if $\sin [\cot^{-1}(x+1)] = \cos(\tan^{-1} x)$

Q11] Simplify: $\cos^{-1} x + \cos^{-1} \left[\frac{x}{2} + \frac{\sqrt{3-3x^2}}{2} \right], \frac{1}{2} \leq x \leq 1$.

[Three Marks Questions]

$[3 \times 6 = 18]$

Q12] Let $A = R - \{3\}$ and $B = R - \{1\}$. A function $f: A \rightarrow B$ is defined by $f(x) = \left(\frac{x-2}{x-3} \right)$. Find whether f is one-one and onto.

Q13] A Relation R on a set $A = \{1, 2, 3, 4, 5\}$ is defined as $R = \{(x, y) : |x^2 - y^2| < 8\}$. Check whether the Relation R is reflexive, symmetric and transitive.

Q14] Check whether the Relation S in the set of real numbers R defined by $S = \{(a, b) : \text{where } a - b + \sqrt{2} \text{ is an irrational number}\}$ is reflexive, symmetric or transitive.

Q15] Let $f: N \rightarrow N$ be defined by $f(n) = \begin{cases} \frac{n+1}{2}, & \text{if } n \text{ is odd} \\ \frac{n}{2}, & \text{if } n \text{ is even} \end{cases}$

Not one one
But onto

State whether the function f is bijective. Justify your answer.

Q16] Express $\tan^{-1}\left(\frac{\cos x}{1 - \sin x}\right)$, where $-\frac{\pi}{2} < x < \frac{\pi}{2}$ in the simplest form.

Q17] Find the value of $\tan^{-1}\left(\tan \frac{3\pi}{5}\right) + \cos^{-1}\left(\cos \frac{13\pi}{6}\right) + \sin^{-1}\left(-\frac{1}{5}\right)$.

$\rightarrow -\frac{2\pi}{5}$