RELATIONS AND FUNCTIONS

COMPOSITE AND INVERTIBLE FUNCTION

EXERCISE

Q.1 If $f : R \to R$, $f(x) = 2x - 1$ and $g : R \to R$, $g(x) = x^2 + 2$, then (gof) (x) equals-

(A) $2x^2 - 1$ (B) $(2x - 1)^2$

(C) $2x^2 + 3$ (D) $4x^2 - 4x + 3$

Q.2 If $f : R \to R$, $f(x) = 4x^3 + 3$, then $f^{-1}(x)$ equals-

(A) $\left(\frac{x-3}{4}\right)^{1/3}$ (B) $\left(\frac{x^{1/3}-3}{4}\right)$

(C) $\frac{1}{4}(x - 3)^{1/3}$ (D) None of these

Q.3 $f(x) = \sqrt{|x-1|}$ and $g(x) = \sin x$ then (fog) (x) equals -

(A) $\sin\left\{\sqrt{|x-1|}\right\}$

(B) $\left|\sin\frac{X}{2} - \cos\frac{X}{2}\right|$

(C) $|\sin x - \cos x|$

(D) None of these

Q.4 If $f : R \to R$, $f(x) = 2x + 1$ and $g : R \to R$, $g(x) = x^3$,then $(gof)^{-1}(27)$ equals -

(A) -1 (B) 0

(C) 1 (D) 2

Q.5 The domain of function $f(x) = \sqrt{2^x - 3^x}$ is -

(A) $(-\infty, 0]$ (B) R

(C) $[0, \infty)$ (D) No value of x

Q.6 The domain of the function $f(x) = \sin^{-1}\left(\log_2 \frac{x^2}{2}\right)$ is -

(A) $[-2, 2] - (-1, 1)$ (B) $[-1,2] - \{0\}$

(C) $[1, 2]$ (D) $[-2,2] - \{0\}$

Q.7 The range of function $f(x) = \frac{x^2}{1+x^2}$ is -

(A) $R - \{1\}$ (B) $R^+ \cup \{0\}$

(C) $[0, 1]$ (D) None of these

Q.8 If $f(x) = \frac{2^x + 2^{-x}}{2}$, then $f(x + y) \cdot f(x - y)$ is equal to -

(A) $\frac{1}{2}[f(x+ y) + f(x - y)]$

(B) $\frac{1}{2}[f(2x) + f(2y)]$

(C) $\frac{1}{2}[f(x+ y). f(x - y)]$

(D) None of these

Q.9 If $g(x) = x^2 + x - 2$ and $\frac{1}{2}(gof)(x) = 2x^2 - 5x + 2$, then $f(x)$ is equal to -

(A) $2x - 3$ (B) $2x + 3$

(C) $2x^2 + 3x + 1$ (D) $2x^2 - 3x - 1$

Q.10 If f (x) = |x| and g(x) = [x], then value of $\text{fog}\left(-\frac{1}{4}\right) + \text{gof}\left(-\frac{1}{4}\right)$ is -

(A) 0 (B) 1

(C) –1 (D) $\frac{1}{4}$

ANSWER KEY

1. (D) $4x^2 - 4x + 3$
2. (A) $\left(\frac{x-3}{4}\right)^{1/3}$
3. (B) $\left|\sin\frac{X}{2} - \cos\frac{X}{2}\right|$
4. (C) 1
5. (A) $(-\infty, 0]$
6. (A) $[-2, 2] - (-1, 1)$
7. (D) None of these
8. (B) $\frac{1}{2}$ [f (2x) + f (2y)]
9. (A) 2x – 3
10. (B) 1