MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 17

Total Marks : 36

Max. Time : 34 min.

Topics : Function, Quadratic Equation

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3	**(3 marks, 3 min.)**	**[9, 9]**
Multiple choice objective (no negative marking) Q.4,5,6	**(5 marks, 4 min.)**	**[15, 12]**
Subjective Questions (no negative marking) Q.7	**(4 marks, 5 min.)**	**[4, 5]**
Match the Following (no negative marking) Q.8	**(8 marks, 8 min.)**	**[8, 8]**

1. Suppose f is a real function satisfying f(x + f(x)) = 4f(x) and f(1) = 4. Then the value of f(21) is

(A) 16 (B) 21 (C) 64 (D) 105

2. Let f be a real valued function defined by $f(x) = \frac{e^x - e^{-|x|}}{e^x + e^{|x|}}$, then the range of f(x) is :

(A) R (B) [0, 1] (C) [0, 1) (D) $\left[0, \frac{1}{2}\right)$

3. If $f(x) = -\frac{x|x|}{1+x^2}$, then $f^{-1}(x)$ equals

(A) $\sqrt{\frac{|x|}{1-|x|}}$ (B) (sgn (–x)) $\sqrt{\frac{|x|}{1-|x|}}$ (C) $-\sqrt{\frac{x}{1-x}}$ (D) (sgn(x)) $\sqrt{\frac{|x|}{1+|x|}}$

4. If $f\left(2x+\frac{y}{8}, 2x-\frac{y}{8}\right) = xy$, then f(m, n) + f(n, m) is

(A) depends over m and n both (B) periodic and odd function
(C) constant number (D) even function

5. The period of function $\frac{|\sin x|+|\cos x|}{|\sin x-\cos x|+|\sin x+\cos x|}$ is

(A) π (B) $\frac{\pi}{2}$ (C) 2π (D) $\frac{2\pi}{3}$

6. If $\sum_{r=0}^{21} f\left(\frac{r}{11}+2x\right)$ = constant $\forall\ x \in R$ and f(x) is periodic, then period of f(x) is

(A) 1 (B) $\frac{1}{11}$ (C) 2 (D) 4

7. For what values of 'a' the equation $x^2 - x(1 - a) - (a + 2) = 0$ has integral roots.

8.

Column - I		**Column - II**	
(A)	$f: R \to \left[\frac{\pi}{4}, \pi\right)$ and $f(x) = \cot^{-1}(2x - x^2 - 2)$, then f(x) is	(p)	one-one
(B)	$f: R \to R$ and $f(x) = e^{ax} \sin bx$ where $a,b, \in R^+$, then f(x) is	(q)	into
(C)	$f: R^+ \to [2, \infty)$ and $f(x) = 2 + 3x^2$, then f(x) is	(r)	many-one
(D)	$f: X \to X$ and $f(f(x)) = x\ \forall\ x \in X$, then f(x) is	(s)	onto
		(t)	invertible

Answers Key

1. (C) **2.** (D) **3.** (B) **4.** (B C D)

5. (A B C) **6.** (C D) **7.** – 2, 0

8. (A)→(q,r), (B)→(r,s), (C)→(p,q), (D)→(p,s, t)