DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 1**

Topic :- RELATIONS AND FUNCTIONS

1. Let $A = \{x : -1 \leq x \leq 1\}$ and $f : A \to A$ such that $f(x) = x|x|$, then f is
   a) A bijection
   b) Injective but not surjective
   c) Surjective but not injective
   d) Neither injective nor surjective

2. The domain of the function $\sin^{-}\left(\log_2 \frac{x^2}{2}\right)$ is
   a) [-1, 2]-{0} b) [-2, 2]-(-1, 1) c) [-2, 2]-{0} d) [1, 2]

3. If $f(x) = ax + b$ and $g(x) = cx + d$, then $f\{g(x)\} = g\{f(x)\}$ is equivalent to
   a) $f(a) = f(c)$ b) $f(b) = g(b)$ c) $f(d) = g(b)$ d) $f(c) = g(a)$

4. The period of the function $f(x) = \sin^4 3x + \cos^4 3x$ is
   a) $\pi/2$ b) $\pi/3$ c) $\pi/6$ d) None of these

5. Given $f(x) = \log_{10}\left(\frac{1+x}{1-x}\right)$ and $g(x) = \frac{3x+x^3}{1+3x^2}$, then $fog\ (x)$ equals
   a) $-f(x)$ b) $3\ f(x)$ c) $[f(x)]^3$ d) None of these

6. Which of the following functions is not an are not an injective map(s)?
   a) $f(x) = |x + 1|, x \in [-1, \infty)$
   b) $g(x) = x + \frac{1}{x}, x \in (0, \infty)$
   c) $h(x) = x^2 + 4x - 5, x \in (0, \infty)$
   d) $h(x) = e^{-x}, x \in [0, \infty)$

7. If $f: R \to R$ and $g: R \to R$ are defined by $f(x) = x - [x]$ and $g(x) = [x]$ for $x \in R$, where $[x]$ is the greatest integer not exceeding x, then for every $x \in R, f(g(x))$ is equal to
   a) x b) 0 c) $f(x)$ d) $g(x)$

8. The domain of definition of $f(x) = \sqrt{\frac{\log_{0.3}|x-2|}{|x|}}$, is
   a) $[1, 2) \cup (2, 3]$ b) $[1, 3]$ c) $R - (1, 3]$ d) None of these

9. $f: R \to R$ given by $f(x) = 5 - 3\sin x$, is
   a) One-one b) Onto c) One-one and onto d) None of these

10. If $f(x + 2y, x - 2y) = xy$, then $f(x, y)$ equals
    a) $\frac{x^2-y^2}{8}$ b) $\frac{x^2-y^2}{4}$ c) $\frac{x^2+y^2}{4}$ d) $\frac{x^2-y^2}{2}$

11. If $f: R \to R$ is defined as $f(x) = (1-x)^{1/3}$, then $f^{-1}(x)$ is
a) $(1-x)^{-1/3}$ b) $(1-x)^3$ c) $1-x^3$ d) $1-x^{1/3}$

12. If $f(x+2y, x, x-2y) = xy$, then $f(x,y)$ equals
a) $\frac{x^2-y^2}{8}$ b) $\frac{x^2-y^2}{4}$ c) $\frac{x^2+y^2}{4}$ d) $\frac{x^2-y^2}{2}$

13. Let $f: [4,\infty[\to [4,\infty[$ be defined by $f(x) = 5^{x(x-4)}$ then $f^{-1}(x)$
a) $2-\sqrt{4+\log_5 x}$ b) $2+\sqrt{4+\log_5 x}$ c) $\left(\frac{1}{5}\right)^{x(x-4)}$ d) Not defined

14. If $f: [2,3] \to R$ is defined by $f(x) = x^3 + 3x - 2$, then the range $f(x)$ is contained in the interval
a) [1, 12] b) [12, 34] c) [35, 50] d) [-12, 12]

15. The period of $\sin^2\theta$, is
a) π^2 b) π c) 2π d) $\pi/2$

16. If $n \in N$, and the period of $\frac{\cos nx}{\sin\left(\frac{x}{n}\right)}$ is 4π, then n is equal to
a) 4 b) 3 c) 2 d) 1

17. Foe real x, let $f(x) = x^3 + 5x + 1$, then
a) f is one-one but not onto R
b) f is onto R but not one-one
c) f is one-one and onto R
d) f is neither one-one nor onto R

18. The range of the function $f(x) = \frac{1}{2-\cos 3x}$, is
a) $[-1/3, 0]$ b) R c) $[1/3, 1]$ d) None of these

19. Let $A = \{2, 3, 4, 5, \ldots, 16, 17, 18\}$. Let be the equivalence relation on $A \times A$, cartesian product of A and A, defined by $(a,b) \approx (c,d)$ if $ad = bc$, then the number of ordered pairs of the equivalence class of $(3, 2)$ is
a) 4 b) 5 c) 6 d) 7

20. Let n be the natural number. Then, the range of the function $f(n) = 8 - n_{P_{n-4}}$, $4 \le n \le 6$, is
a) {1, 2, 3, 4} b) {1, 2, 3, 4, 5, 6} c) {1, 2, 3} d) {1, 2, 3, 4, 5}