DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : MATHS**
DATE : **DPP NO. :2**

Topic :-RELATIONS AND FUNCTIONS

1. Let X and Y be subsets of R, the set of all real numbers. The function $f:X\to Y$ defined by $f(x) = x^2$ for $x \in X$ is one-one but not onto, if (Here, R^+ is the set of all positive real numbers)
   a) $X = Y = R^+$ b) $X = R, Y = R^+$ c) $X = R^+, Y = R$ d) $X = Y = R$

2. If $f(x).f(1/x) = f(x) + f(1/x)$ and $f(4) = 65$, then $f(6)$ is
   a) 65 b) 217 c) 215 d) 64

3. The graph of the function of $y = f(x)$ is symmetrical about the line $x = 2$, then
   a) $f(x+2) = f(x-2)$ b) $f(2+x) = f(2-x)$ c) $f(x) = f(-x)$ d) $f(x) = -f(-x)$

4. If $f(x) = \begin{cases} -1; & x < 0 \\ 0; & x = 0 \\ 1; & x > 0 \end{cases}$ and $g(x) = x(1-x^2)$, then
   a) $fog\ (x) = \begin{cases} -1; & -1 < x < 0 \text{ or } x > 1 \\ 0; & x = 0, 1, -1 \\ 1; & 0 < x < 1 \end{cases}$
   b) $fog\ (x) = \begin{cases} -1; & -1 < x < 0 \\ 0; & x = 0, 1, -1 \\ 1; & 0 < x < 1 \end{cases}$
   c) $fog\ (x) = \begin{cases} -1; & -1 < x < 0 \text{ or } x > 1 \\ 0; & x = 0, \ 1, -1 \\ 1; & 0 < x < 1 \text{ or } x < -1 \end{cases}$
   d) $fog\ (x) = \begin{cases} 1; & -1 < x < 0 \text{ or } x > 1 \\ 0; & x = 0, 1, -1 \\ 1; & 0 < x < 1 \text{ or } x < -1 \end{cases}$

5. $x_2 = xy$ is a relation which is
   a) Symmetric b) Reflexive and transitive
   c) Transitive d) None of these

6. The period of
   $f(x) = \sin\left(\frac{\pi x}{n-1}\right) + \cos\left(\frac{\pi x}{n}\right), n \in Z, \ n > 2$, is
   a) $2n\,\pi(n-1)$ b) $4(n-1)\,\pi$ c) $2n\,(n-1)$ d) None of these

7. $f:[-4,0]\to R$ is given by $f(x) = e^x + \sin x$, its even extension to $[-4,4]$, is
   a) $-e^{|x} - \sin|x|$ b) $e^{-|x|} - \sin|x|$ c) $e^{-|x|} + \sin|x|$ d) $-e^{-|x|+\sin|x|}$

8. Let $f:R \to R$ be a function defined by $f(x) = -\frac{|x|^3 + |x|}{1 + x^2}$, then the graph of $f(x)$ lies in the
   a) I and II quadrants b) I and III quadrants c) II and III quadrants d) III and IV quadrants

9. The domain of the real valued function $f(x) = \sqrt{1 - 2x} + 2\sin^{-1}\left(\frac{3x-1}{2}\right)$ is
   a) $\left[-\frac{1}{3}, 1\right]$ b) $\left[\frac{1}{2}, 1\right]$ c) $\left[-\frac{1}{2}, \frac{1}{3}\right]$ d) $\left[-\frac{1}{3}, \frac{1}{2}\right]$

10. The domain of function $f(x) = \log_{(x+3)}(x^2 - 1)$ is
   a) $(-3, -1) \cup (1, \infty)$
   b) $[-3, -1) \cup [1, \infty)$
   c) $(-3, -2) \cup (-2, -1) \cup (1, \infty)$
   d) $[-3, -2) \cup (-2, -1) \cup [1, \infty)$

11. The range of the function $f(x) = x^2 - 6x + 7$ is
   a) $(-\infty, 0)$ b) $[-2, \infty)$ c) $(-\infty, \infty)$ d) $(-\infty, -2)$

12. The inverse of the function $f:R \to (-1,3)$ is given by $f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}} + 2$
   a) $\log\left(\frac{x-1}{x+1}\right)^{-2}$ b) $\log\left(\frac{x-2}{x-1}\right)^{1/2}$ c) $\log\left(\frac{x}{2-x}\right)^{1/2}$ d) $\log\left(\frac{x-1}{3-x}\right)^{1/2}$

13. If $f(x) = \frac{4^x}{4^x + 2}$, then $f\left(\frac{1}{97}\right) + f\left(\frac{2}{97}\right) + \ldots + f\left(\frac{96}{97}\right)$ is equal to
   a) 1 b) 48 c) -48 d) -1

14. The period of the function
$f(x) = \frac{\sin 8x \cos x - \sin 6x \cos 3x}{\cos 2x \cos x - \sin 3x \sin 4x}$ is
   a) π b) 2π c) $\frac{\pi}{2}$ d) None of these

15. Let $f:R \to R: f(x) = x^2$ and $g:R \to R: g(x) = x + 5$, then gof is
   a) $(x + 5)$ b) $(x + 5^2)$ c) $(x^2 + 5^2)$ d) $(x^2 + 5)$

16. The function $f(x) = \log_{2x-5}(x^2 - 3x - 10)$ is defined for all x belonging to
   a) $[5, \infty)$ b) $(5, \infty)$ c) $(-\infty, +5)$ d) None of these

17. Range of the function $f(x) = \frac{x^2}{x^2 + 1}$ is
   a) (-1, 0) b) (-1, 1) c) [0, 1) d) (1, 1)

18. Let $f(x) = |x - 1|$. Then,
   a) $f(x^2) = [f(x)]^2$
   b) $f(|x|) = |f(x)|$
   c) $f(x + y) = f(x) + f(y)$
   d) None of these

19. If $f(x) = a^x$, which of the following equalities do not hold?
    a) $f(x+2) - 2f(x+1) + f(x) = (a-1)^2 f(x)$
    b) $f(-x)f(x) - 1 = 0$
    c) $f(x+y) = f(x)f(y)$
    d) $f(x+3) - 2f(x+2) + f(x+1) = (a-2)^2 f(x+1)$
20. Let $A = \{x \in R : x \leq 1\}$ and $f: A \to A$ be defined as $f(x) = x(2-x)$. Then, $f^{-1}(x)$ is
    a) $1 + \sqrt{1-x}$ b) $1 - \sqrt{1-x}$ c) $\sqrt{1-x}$ d) $1 \pm \sqrt{1-x}$