DPP
DAILY PRACTICE PRODUCTS

CLASS : XIIth **SUBJECT : MATHS**

DATE : **DPP NO. : 9**

Topic :- CONTINUITY AND DIFFERENTIABILITY

1. For the function $f(x)=\begin{cases}\frac{x^3-a^3}{x-a}, & x\neq a\\ b, & x=a\end{cases}$, if $f(x)$ is continuous at $x=a$, then b is equal to

a) a^2 b) $2a^2$ c) $3a^2$ d) $4a^2$

2. If $y=f(x)=\frac{1}{u^2+u-1}$ where $u=\frac{1}{x-1}$, then the function is discontinuous at $x=$

a) 1 b) 1/2 c) 2 d) -2

3. If $f(x)=\text{Min}\{\tan x, \cot x\}$, then

a) $f(x)$ is not differentiable at $x=0, \pi/4, 5\pi/4$

b) $f(x)$ is continuous at $x=0, \pi/2, 3\pi/2$

c) $\int_0^{\pi/2} f(x)dx = \ln\sqrt{2}$

d) $f(x)$ is periodic with period $\frac{\pi}{2}$

4. If $f(x)=\{|x|-|x-1\}^2$, then $f'(x)$ equals

a) 0 for all x

b) $2\{|x|-|x-1|\}$

c) $\begin{cases}0 \text{ for } x<0 \text{ and for } x>1\\ 4(2x-1) \text{ for } 0<x<1\end{cases}$

d) $\begin{cases}0 \text{ for } x<0\\ 4(2x-1) \text{ for } x>0\end{cases}$

5. If $f(x)=(x-x_0)\phi(x)$ and $\phi(x)$ is continuous at $x=x_0$, then $f'(x_0)$ is equal to

a) $\phi'(x_0)$ b) $\phi(x_0)$ c) $x_0\phi(x_0)$ d) None of these

6. The function defined by

$f(x)=\begin{cases}\left(x^2+e^{\frac{1}{2-x}}\right)^{-1} & x\neq 2\\ k, & x=2\end{cases}$ is continuous from right at the point $x=2$, then k is equal to

a) 0 b) $\frac{1}{4}$ c) $-\frac{1}{2}$ d) None of these

7. If $f(x)=\begin{cases}\frac{1-\sin x}{(\pi-2x)^2}\cdot\frac{\log\sin x}{(\log 1+\pi^2-4\pi x+x^2)}, & x\neq\frac{\pi}{2}\\ k, \; x=\frac{\pi}{2}\end{cases}$ is continuous at $x=\pi/2$, then $k=$

a) $-\frac{1}{16}$ b) $-\frac{1}{32}$ c) $-\frac{1}{64}$ d) $-\frac{1}{28}$

8. If $f(x)=\begin{cases}\frac{\sin 5x}{x^2+2x}, & x\neq 0\\ k+\frac{1}{2}, & x=0\end{cases}$ is continuous at $x=0$, then the value of k is

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

9. Let $f(x)=\begin{cases}x^n\sin\frac{1}{x}, & x\neq 0\\ 0, & x=0\end{cases}$. Then, $f(x)$ is continuous but not differentiable at $x=0$, if

a) $n\in(0,1]$ b) $n\in[1,\infty)$ c) $n\in(-\infty,0)$ d) $n=0$

10. The function $f(x)=\begin{cases}|x-3|, & \text{if } x\geq 1\\ \frac{x^2}{4}-\frac{3x}{2}+\frac{13}{4}, & \text{if } x<1\end{cases}$ is

a) Continuous and differentiable at $x=3$
b) Continuous at $x=3$, but not differentiable at $x=3$
c) continuous and differentiable everywhere
d) continuous at $x=1$, but not differentiable at $x=1$

11. Let $f(x)=|x|$ and $g(x)=|x^3|$, then
a) $f(x)$ and $g(x)$ Both are continuous at $x=0$
b) $f(x)$ and $g(x)$ Both are differentiable at $x=0$
c) $f(x)$ is differentiable but $g(x)$ is not differentiable at $x=0$
d) $f(x)$ and $g(x)$ Both are not differentiable at $x=0$

12. If $f(x)=\begin{cases}\frac{\sin(a+1)x+\sin x}{x}, & x<0\\ c, & x=0\\ \frac{\sqrt{x+bx^2}-\sqrt{x}}{bx\sqrt{x}}, & x>0\end{cases}$ is continuous at $x=0$, then

a) $a=-\frac{3}{2}, b=0, c=\frac{1}{2}$
b) $a=-\frac{3}{2}, b=1, c=-\frac{1}{2}$
c) $a=-\frac{3}{2}, b\in R-\{0\}, c=\frac{1}{2}$
d) None of these

13. If $f(x)=\begin{cases}\frac{36^x-9^x-4^x+1}{\sqrt{2}-\sqrt{1+\cos x}}, & x\neq 0\\ k, & x=0\end{cases}$ is continuous at $x=0$, then k equals

a) $16\sqrt{2}\log 2\log 3$ b) $16\sqrt{2}\ln 6$ c) $16\sqrt{2}\ln 2\ln 3$ d) None of these

14. Let [ ] denotes the greatest integer function and $f(x)=[\tan^2 x]$. Then,
a) $\lim_{x\to 0} f(x)$ does not exist b) $f(x)$ is continuous at $x=0$
c) $f(x)$ is not differentiable at $x=0$ d) $f(x)=1$

15. Let a function $f:R\to R$, where R is the set of real numbers satisfying the equation $f(x+y)=f(x)+f(y), \forall x,y$ if $f(x)$ is continuous at $x=0$, then
a) $f(x)$ is discontinuous, $\forall x\in R$ b) $f(x)$ is continuous, $\forall x\in R$
c) $f(x)$ is continuous for $x\in\{1,2,3,4\}$ d) None of the above

16. Let $f(x)=\begin{cases}\sin x, \text{ for } x\geq 0\\ 1-\cos x, \text{ for } x\leq 0\end{cases}$ and $g(x)=e^x$. Then, $(gof)'(0)$ is

a) 1 b) -1 c) 0 d) None of these

17. The function $f(x)\begin{cases}(x+1)^{2-\left(\frac{1}{|x|}+\frac{1}{x}\right)}, x\neq 0\\ 0, \quad x=0\end{cases}$ is

a) Continuous everywhere
b) Discontinuous at only one point
c) Discontinuous at exactly two points
d) None of these

18. If $f(x)=\begin{cases}\frac{\log(1+ax)-\log(1-bx)}{x}, x\neq 0\\ k, \quad x=0\end{cases}$ and $f(x)$ is continuous at $x=0$, then the value of k is

a) $a-b$ b) $a+b$ c) $\log a+\log b$ d) None of these

19. The value of $f(0)$, so that the function $f(x)=\frac{(27-2x)^{1/3}-3}{9-3(243+5x)^{1/5}}(x\neq 0)$ is continuous is given by

a) $\frac{2}{3}$ b) 6 c) 2 d) 4

20. The function $f:R/\{0\}\rightarrow R$ given by

$$f(x)=\frac{1}{x}-\frac{2}{e^{2x}-1}$$

Can be made continuous at $x=0$ by defining $f(0)$ as function

a) 2 b) -1 c) 0 d) 1