

ASSIGNMENT-1

EE24BTECH11057-SHIVAM SHILVANT*

- 9) The slope of tangent to curve $y=f(x)$ at $[x, f(x)]$ is $2x + 1$. If the curve passes through the point $(1, 2)$, then the area bounded by curve, the x axis and the line $x = 1$ is (1995S)

- a) $\frac{5}{6}$ b) $\frac{6}{5}$ c) $\frac{1}{6}$ d) $\frac{6}{1}$

- 10) If $f(x) = \frac{x}{\sin x}$ and $g(x) = \frac{x}{\tan x}$, where $0 < x \leq 1$, then in this interval (1997 – 2Marks)

- a) both $f(x)$ and $g(x)$ are increasing functions.
 b) both $f(x)$ and $g(x)$ are decreasing functions.
 c) $f(x)$ is an increasing function.
 d) $g(x)$ is an increasing function.

- 11) The function $f(x) = \sin^4 x + \cos^4 x$ increases if

(1999 – 2Marks)

- a) $0 < x < \frac{\pi}{8}$ c) $\frac{3\pi}{8} < x < \frac{5\pi}{8}$
 b) $\frac{\pi}{4} < x < \frac{3\pi}{8}$ d) $\frac{5\pi}{8} < x < \frac{3\pi}{4}$

- 12) Consider the following statements in S and R

(2000S)

S: Both $\sin x$ and $\cos x$ are decreasing functions in the interval $\left(\frac{\pi}{2}, \pi\right)$

R: If a differentiable function decreases in a interval (a, b) , then its derivative also decreases in (a, b) .

Which of the following is true ?

- a) Both S and R are wrong.
 b) Both S and R are correct, but R is not the correct explanation of S.
 c) S is correct and R is correct explanation for S.
 d) S is correct and R is wrong.

- 13) Let $f(x) = \int e^x (x - 1)(x - 2) dx$. Then f decreases in the interval

(2000S)

- a) $(-\infty, -2)$ c) $(1, 2)$
 b) $(-2, -1)$ d) $(2, +\infty)$

14) If normal to curve $y = f(x)$ at the point $(3, 4)$ makes an angle $\frac{3\pi}{4}$ with the positive x -axis, then $f'(3) =$ (2000S)

- a) $-\frac{1}{3}$ c) $\frac{4}{3}$
 b) $-\frac{3}{4}$ d) 1

15) Let $f(x) = \begin{cases} |x|, & \text{for } 0 < |x| \leq 2 \\ 1, & \text{for } x = 0 \end{cases}$ then at $x = 0$, f has (2000S)

- a) a local maximum
 b) no local maximum
 c) a local minimum
 d) no extremum

16) For all $x \in (0, 1)$ (2000S)

- a) $e^x < 1 + x$
 b) $\log_e(1 + x) < x$
 c) $\sin x > x$
 d) $\log_e x > x$

17) If $f(x) = xe^{x(1-x)}$, then $f(x)$ is (2001S)

- a) increasing on $\left[-\frac{1}{2}, 1\right]$
 b) decreasing on \mathbb{R}
 c) increasing on \mathbb{R}
 d) decreasing on $\left[-\frac{1}{2}, 1\right]$

18) The triangle formed by tangent to curve $f(x) = x^2 + bx - b$ at the point $(1, 1)$ and the coordinate axes, lies in the first quadrant. If its area is 2, then the value of b is (2001S)

- a) -1 c) -3
 b) 3 d) 1

19) Let $f(x) = (1 + b^2)x^2 + 2bx + 1$ and let $m(b)$ be the minimum value of $f(x)$. As b varies, the range of $m(b)$ is (2001S)

