Model Question Paper

Application of differentiation- I - Part IV

12th Standard

Business Maths

Reg.No. :

I.Answer all the questions.
II.Use Blue pen only.
III.Question No 13 is compulsory.

Time : 01:15:00 Hrs

Total Marks : 75

Section-A

4 x 1 = 4

1) The slope of the normal to the curve $\sqrt{x}+\sqrt{y}=5$ at (9, 4) is

(a) $\frac{2}{3}$ (b) $-\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$

2) For the curve $y=1+ax-x^2$ the tangent at (1 , -2) is parallel to x - axis . The value of `a' is

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

3) The slope of the tangent to the curve y= cost , x = sin **t** at $t=\frac{\pi}{4}$ is

(a) 1 (b) 0 (c) $\frac{1}{\sqrt{2}}$ (d) -1

4) The point at which the tangent to the curve $y^2=x$ makes an angle $\frac{\pi}{4}$ with the x-axis is

(a) $\left(\frac{1}{2},\frac{1}{4}\right)$ (b) $\left(\frac{1}{2},\frac{1}{2}\right)$ (c) $\left(\frac{1}{4},\frac{1}{2}\right)$ (d) $(1,-1)$

Section-B

5 x 6 = 30

5) Find the slope of the tangent line at the point (0 , 5) of the curve $y=\frac{1}{3}(x^2+10x-15)$. At what point of the curve the slope of the tangent line is $\frac{8}{5}$?

6) For the cost function $y=3x(\frac{x+7}{x+5})+5,$ prove that the marginal cost falls continuously as the output x increases .

7) Find the equations of the tangents and normals to the following curves $y^2=4x\ at(1,2)$

8) Find the equation of the tangent and normal to the demand curve $y=36-x^2$ When y = 11 .

9) At what points on the curve $3y=x^2$ the tangents are inclined at 45^o to the x - axis .

Section-C

4 x 10 = 40

10) Find the equation of the tangent and normal to the supply curve $y=x^2+\ x+\ 2$ When x = 6.

11) prove that $\frac{x}{a}+\frac{y}{b}=1$ touches the curve $y=b\,e^{-x/a}$ at the point where the curve cuts the y - axis.

12) prove that the curves $y=x^2-3x+1$ and $x(y+3)=4$ intersect at right angles at the point (2 , -1) .

13) a) Find the equation of the tangent and normal to the curve $y(x-2)\ (x-3)\ -x+7=0$ at the point where it cuts the x axis.

(OR)

b) Find the equation of the tangent and normal at the point $(a\ sec\theta, b\ tan\theta)$ on the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1.$

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