Business Maths

Reg.No. : ☐☐☐☐☐☐

I.Answer all the questions.
II.Use Blue pen only.
III.Question No 14 is compulsory.

Time : 01:00:00 Hrs

Total Marks : 85

Section-A

4 x 1 = 4

1) The stationary value of x for $f(x) = 3(x-1)(x-2)$is

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

2) The maximum value of $f(x) = cosx$ is

   (a) 0   (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) 1

3) $y = x^3$ is always

   (a) an increasing fuction of x   (b) decreasing function of x   (c) a constant function   (d) none of these

4) The curve $y = 4 - 2x - x^2$ is

   (a) concave upward   (b) concave downward   (c) straight line   (d) none of these.

Section-B

5 x 6 = 30

5) Prove that $75 - 12x + 6x^2 - x^3$ always decreases as x increases.

6) Separate the intervals in which the function $x^3 + 8x^2 + 5x - 2$ is increasing or decreasing.

7) Find the stationary points and the stationary values of the function $f(x) = 2x^3 + 3x^2 - 12x + 7$.

8) Find the maximum and minimum values of the function $x^3 - 6x^2 + 7$

9) Find the points of the inflection of the curve $y = x^4 - 4x^3 + 2x + 3$.

Section-C

5 x 10 = 50

10) Show that the function $x^3 + 3x^2 + 3x + 7$ is an increasing function for all real values of x.

11) For the following total revenue functions, find when the total revenue (R) is increasing and when it is decreasing. Also discuss the behaviour of marginal revenue(MR)
    $(i)R = -90 + 6x^2 - x^3$ $(ii)R = -105x + 60x^2 - 5x^3$

12) For the total cost functions, find when the total cost(c) is increasing and when it is decreasing.Also discuss the behaviour of marginal cost(MC).
    $(i)C = 2000 + 600x - 45x^2 + x^3$ $(ii)C = 200 + 40x - \frac{1}{2}x^2$

13) Find the absolute (global) maximum and minimum values of the function $f(x) = 3x^5 - 25x^3 + 60x + 15$ in the interval $\left[-\frac{3}{2}, 3\right]$

14) a)   Show that the maximum value of the function $f(x) = x^3 - 27x + 108$ is 108 more than the minimum value.

    (OR)

    b)   Find the intervals in which the curve $y = x^4 - 3x^3 + 3x^2 + 5x + 1$ is convex upward and convex downward.

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