10/12/2012

DOON UNIVERSITY, DEHRADUN

Semester Final Examination,2012

School of Social Sciences

MSc Economics, Semester I

Course: SSE 143 : Mathematics

Time Allowed:3 hours

Maximum Marks: 50

Note: Attempt Questions from Sections A, B, C.

Section A: Answer all of the following questions

[10X 1=10]

1. Why do we have a constant of integration.
2. If total cost TC $=\frac{1}{10}x^3+5x^2+10x+5$, find marginal cost(MC).
3. If a curve is concave upwards or convex downwards, its rate of change will_________and d^2y/dx^2 will _____.
4. Using diagram show what is a 'point of inflexion'.
5. What are implicit functions?
6. Integrate $\int(x^7+\text{Cos}x)dx$
7. If demand function is $p=2(100-\frac{x}{4})$.Find the total revenue function where x is the output.
8. If $g(x)=5x^3+2x^2+3x+2$.Find $g''(x)$.
9. $y=\log(\log x)$, find dy/dx.
10. What do you understand by 'range' of a function?

Section B:Answer **any four** questions from this section

[4X5=20]

1. Integrate
   (a) $I=\int x^2 e^{3x} dx$ (b) $I=\int e^{2x}\frac{1+Sin2x}{1+Cos2x}dx$

2. Find dy/dx for the following functions in parametric form
   (a) $X=at^2$, $y=2at$ (b) $x=a\log t$, $y=bt^2$

3. If $u=x^2y+y^2z+z^2x$, show that
   $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=(x+y+z)^2$

4. A company's average cost function is given by $AC=\frac{100}{x}-5x+2$ and revenue function is 3x. Find x at which profit of the company is maximized.

5. If the demand function is $p=4-5x^2$, For what value of x the elasticity of demand will be unity?

Section C: Answer all the questions **[10X2=20]**

1. A demand function for a monopolist's product is $p=400-2x$ and the average cost function is $AC=0.2x+4+\frac{400}{x}$. Find the profit maximizing output and price. If the government imposes a tax of rupees 22 per unit on the monopolist, find the new profit maximizing output and price. What is the profit now?

2. Discuss the concept of maxima and minima of a function using suitable diagrams. In this context discuss the concepts of 'immediate neighbourhood', 'extreme values', 'several maximun' and 'necessary and sufficient conditions'.