LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.A.DEGREE EXAMINATION – **ECONOMICS**

FIRST SEMESTER – **NOVEMBER 2018**

16/17/18UEC1MC02– MATHEMATICS FOR ECONOMICS

Date: 24-10-2018   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART-A

Answer any FIVE Questions in about 75 words each: **(5 × 4 = 20Marks)**

1. State the quadratic function with an example. Where do we use it in economics?

2. Write a note on 'differentiability of a function'.

3. Let A = $\begin{pmatrix} 3 & 6 \\ 7 & 0 \end{pmatrix}$, B = $\begin{pmatrix} -1 & 7 \\ 8 & 4 \end{pmatrix}$ and C = $\begin{pmatrix} 5 & 4 \\ 1 & 9 \end{pmatrix}$ verify that (A+B) – C = A + (B – C).

4. Let A = $\begin{pmatrix} 1 & 4 & 0 \\ 2 & 5 & 0 \\ 3 & 6 & 0 \end{pmatrix}$, verify that A is singular or non singular matrix. Also find the rank of a matrix.

5. Find the derivative of the function Z with respect to X, If $Y = X^2 + 3X$ and $Z = Y^2 + 1$.

6. Evaluate $\int (8X^3 - 3X^2 + X - 1)dx$.

7. State the conditions for maximization and minimization of the function Y = f (X).

PART-B

Answer any FOUR Questions in about 300 words each: **(4 × 10 = 40Marks)**

8. Given the demand and supply function as D = 80 – 3P and S = 2P +20, find out the price and output

   level of the market. Also show the equilibrium price and output level in the graph.

9. Explain the different types of functions using suitable diagrams.

10. Find the inverse of the matrix A = $\begin{pmatrix} 1 & 3 & -4 \\ -1 & -2 & 1 \\ 2 & 4 & -5 \end{pmatrix}$

11. Explain any five properties of determinants with suitable examples.

12. Differentiate the following

   (a) $Y = (X^3 + 3)(2X^2 - 3X^3)$.

   (b) $Y = \dfrac{X^3 + 2X}{X^2 + 1}$.

13. Given the total cost function $C = 50 - 2Q + 7Q^2 + Q^3$, find the MC, AC, AVC, TC, TVC and TFC when Q = 5.

14. Find the first and second order partial derivatives of the following function

$U = X^2\, Y^2 + X^5 + Y^6$ and also verify that $\dfrac{\partial^2 U}{\partial X\, \partial Y} = \dfrac{\partial^2 U}{\partial Y\, \partial X}$.

PART-C

Answer any TWO Questions in about 900 words each: $\qquad$ **(2 × 20 = 40 Marks)**

15. Solve the following equations by using cramers' rule.

$2X + 3Y - Z = 9$

$X + Y + Z = 9$

$3X - Y - Z = -1$

16. (a) Explain the mathematical relationship between TR, AR, MR and elasticity of demand.

(b) Find the elasticity of demand and MR, at P =2, if the demand function $q = 30 - 5p - p^2$.

17. Given the demand function $P = 8-2X$ and the supply function $P = 2+X$, find the consumer's surplus and the producer surplus. Also show these consumer surplus and producer surplus in diagram.

18. Consider a monopolist who faces a linear demand function $q = 50 - 0.5p$ and also has a linear total cost function, $C = 50 + 40q$ what will be the equilibrium level of output, price and profits? Also prove the second order condition for profit maximization.

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