

M. A. DEGREE (C.S.S.) EXAMINATION, NOVEMBER 2017**SEMESTER I – ECONOMICS****(2017 Admission Regular, 2016 Admission Supplementary/Improvement & 2015 Admission Supplementary)****EC1C05M – QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS - I****Time: Three Hours****Maximum Marks: 75****PART A****I. Answer any five questions. Each question carries 3 marks.**

1. Define inverse of a matrix.
2. Explain Input- Output model.
3. Give applications of Euler's theorem in economics.
4. Explain 1st and 2nd order partial derivatives.
5. Integrate $(\log x)^2$ with respect to x .
6. What are slack and surplus variables?
7. What are shadow prices?

(5x3=15)**PART B****II. Answer any six questions. Each question carries 5 marks.**

8. Find AB and BA if $A = \begin{bmatrix} 6 & 0 \\ 9 & 5 \\ -1 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 10 & 6 \\ 9 & 20 & 12 \end{bmatrix}$

9. Show that $\begin{bmatrix} 3 & 4 & 2 \\ 0 & 1 & -3 \\ 2 & -2 & 8 \end{bmatrix}$ is non-singular.

10. Examine whether the input output system with the coefficient matrix $\begin{bmatrix} 0.8 & 0.2 \\ 0.9 & 0.7 \end{bmatrix}$ is feasible.

11. The demand functions of two commodities X and Y are $P_1 = 8 - 2x$ and $P_2 = 14 - y^2$ and joint cost function is $C = 10 + 4x + 2y$. Determine the quantities that maximize the profit of the monopolist and also the maximum profit.

12. Find the total differential of $z = x^2 - 2xy^2 + y^2$

13. Verify Euler's theorem for the Cobb- Douglass production function.

14. Integrate (i) $(lx^2 + mx + n)^3 (2lx + m)$ with respect to x .
(ii) $5e^{3x}$ with respect to x

15. Find the dual of the following L.P.P. Minimize $z = 4x + 2y$ subject to the conditions $x + 2y \geq 20$, $3x + y \geq 30$, $4x + 3y \geq 60$, $x \geq 0$, $y \geq 0$.

16. Explain the various steps involved in solving L.P.P. by Simplex method.

(6x5=30)

PART C

III. Answer any two questions. Each question carries 15 marks.

17. Given the technology matrix and final demand calculate the equilibrium output levels

$$A = \begin{bmatrix} 0.125 & 0.333 & 0.250 \\ 0.500 & 0.167 & 0.250 \\ 0.250 & 0.167 & 0.250 \end{bmatrix} \quad \text{and} \quad F = \begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix}$$

18. The average revenue (AR) and total cost (TC) of a monopolist are given by

$$AR = 16 - 2Q, TC = 20 + 4Q - Q^2.$$

Find a) Profit maximizing output.

b) equilibrium price.

c) Maximum profit.

19. (a) Explain the applications of integration in Economics.

(b) Find the producers surplus when the supply function is given by $p = 8 + 2q$ and equilibrium price is Rs. 14.

20. Solve the following Linear Programming Problem using the Graphical method

$$\text{Maximize } z = 4x + 10y,$$

$$\text{Subject to the constraints } 2x + y \leq 50$$

$$2x + 5y \leq 100$$

$$2x + 3y \leq 90$$

$$x, y \geq 0$$

(2x15=30)