Reg. No.............................. Name: .... **Q. Code: P149**

M A DEGREE END SEMESTER EXAMINATION 2014 -15

SEMESTER -1: ECONOMICS

COURSE: P1ECOT05 - QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS – I

Time: 3 Hours Maximum: 75 Marks

Part A

Answer **all** questions

1. What are the important laws of matrix addition? Give examples.
2. Define CES production function.
3. What do you mean by linearly homogeneous functions?
4. State any two basic rules of integration. Give examples.
5. Define basic feasible solution.

(5 x 2 = 10)

Part B

Answer any **Seven** of the Followings

6. Given $A = \begin{bmatrix} 2 & 4 \\ -1 & 3 \end{bmatrix}, B = \begin{bmatrix} 3 & 8 \\ 0 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 0 & 9 \\ 6 & 1 & 1 \end{bmatrix}$ then show that

   (a) $(A+B)^T = A^T + B^T$ (b) $(AC)^T = C^T A^T$

7. Show that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$.

8. Explain input-output model and its solution in detail.

9. Discuss the economic application of partial differentiation on elasticity and demand.

10. Evaluate the first and second–order partial derivatives of $u = \left(x^2 + 2xy - y^2\right) e^x$ and verify that the order of partial derivation is immaterial.

11. Find the total differential of the function $y = \frac{x_1 + x_2}{2x_1^2}$.

12. Show that $z = \left(x^2 + y^2\right) e^{x^2 - y^2}$ has a minimum value at x=y=0.

13. Integrate the following functions

(i) $\frac{4x}{x^2 + 1}$ (ii) $4x \exp(x^2 + 3)$

14. Explain the Big-M method of finding solution to a LPP.

15. What do you mean by duality in LPP? Discuss its interpretation.

(5 x 7 = 35)

Part C

Answer any **Two** of the following

16. Find the solution of the equation system

$$\begin{aligned} 7x_1 - x_2 - x_3 &= 0 \\ 10x_1 - 2x_2 + x_3 &= 8 \\ 6x_1 + 3x_2 - 2x_3 &= 7 \end{aligned}$$

17. A firm has the following total-cost and demand functions

$$C = \frac{1}{3}Q^3 - 7Q^2 + 111Q + 50$$
$$Q = 100 - P$$

What is the maximum profit?

18. Solve the following linear programming problem by the simplex method Maximize $Z = 6x_1 + 2x_2 + 5x_3$

subject to $\begin{bmatrix} 2 & 3 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 5 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \leq \begin{bmatrix} 10 \\ 8 \\ 19 \end{bmatrix}$

and $x_1, x_2, x_3 \geq 0$.

(2 x 15 = 30)

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