### ECN-4033 ECONOMIC ANALYSIS AND PROBLEMS

Answer all questions                                        Time: 3 hours

1.  Explain the followings.

     i.      Assumptions of input output model
     ii.     Technology matrix
     iii.    Production elasticity
     iv.     Econometric models
     v.      Social welfare function.

(20 Marks)

2.  i.    With the following general demand equation

$$Q = b. \, P^{\alpha} . I^{\beta} . P_c^{\gamma}$$

Demonstrate $\alpha$ is the price elasticity, $\beta$ is the income elasticity, $\gamma$ is the cross elasticity.

(5 Marks)

    ii.    A special degree student of the department of Economics, Eastern University decided to study the daily demand for the Jaya ice cream among the staff of the department. She estimated the following demand function from the collected data.

$$Q_C = 100 - 3P_c + 4P_y - 0.01 \, M + 2A$$

$Q_C$ - Quantity demanded.
$P_c$ - Unit Price of the Ice cream.
$P_y$ - Price of the other good
$M$ - Monthly Income of staff.
$A$ - Advertisement cost

Suppose that Jeya Ice cream sells at Rs 15/=, Good Y sells at Rs 20/= and the company utilises 50 units of advertising. if average monthly income of staff is Rs 20,000/=, calculate and interpret price elasticity, cross elasticity, income elasticity for the above demand function.

(15 Marks)

3. i. By using Cobb-Douglas production function in its general form
$$Q = A K^\alpha . L^\beta \quad (\alpha + \beta = 1)$$
Prove that

$$MP_K = \alpha A \left( \frac{K}{L} \right)^{\alpha - 1}$$

$$MP_L = \beta A \left( \frac{K}{L} \right)^{1-\beta.}$$

(6 Marks)

ii. Production functions for Maruthi car and TATA car have been estimated as follows
$$Q_M = 100 \, K^{0.25} \, L^{0.75}$$

$$Q_T = 100 \, K^{0.25} \, L^{0.8}$$

Q – Output, K –Capital, L – Labour
Suppose that both companies use same proportion of inputs.

    a. Which company has the higher marginal productivity of labour?
    b. Show in which law of returns to scale they are operating?

(8 Marks)

iii. Suppose that production function of a firm is $Q = 100 \, K^{0.5} \, L^{0.5}$ if the w =4 and r = 2 and the firm is producing 1000 units of output, calculate the efficient input combination.

(6 Marks)

4. i. What is meant by welfare Economics?

(5 Marks)

ii. Distinguish between neo classical and Paretian welfare economics.

(5 Marks)

iii. State marginal conditions for Pareto optimality. How are the conditions affected by the presence of
    a. Externality in production
    b. Public goods

(10 Marks)

5. Solve the following linear programming model by using graphical method.

Maximum Profit $Z = 30X_1 + 40X_2$

Subject to, $\quad 4X_1 + 2X_2 \leq 16$
$\quad\quad\quad\quad 2X_1 - X_2 \geq 2$
$\quad\quad\quad\quad\quad X_2 \leq 2$

$$X_1, X_2 \geq 0$$

(20 Marks)