TDC Even Semester Exam., 2018

ECONOMICS

(Honours)

(2nd Semester)

Course No : ECOH–203

Full Marks : 50
Pass Marks : 17

Time : 2 hours

The figures in the margin indicate full marks for the questions

Arts students will answer ECOH–203 (A) and Science students will answer ECOH–203 (B)

(For Arts Students)

OPTION : A

Course No : ECOH–203 (A)

(MATHEMATICS FOR ECONOMICS)

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. (a) Find y_c, y_p, the general solution and the definite solution of the following : 3+3=6

(i) $2\frac{dy}{dx} + 4y = 6;\ y(0) = 1$

(ii) $\frac{dy}{dx} + ay = b$

(b) Solve :

$$\frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 12y = 0$$

2. (a) Solve the following differential equation :

$$\frac{dy}{dt} + \frac{y(1+2t)}{t(1+t)} = 0$$

(b) The demand and supply functions, where p is price, Q_d is quantity demanded and Q_s is quantity supplied, are given as

$$Q_d = 10 - 0 \cdot 8p$$

$$Q_s = -6 + 1 \cdot 2p$$

and $\frac{dp}{dt} = 0 \cdot 6(Q_d - Q_s)$. Find the time path of price.

UNIT—II

3. (a) A consumer faces a utility function of the form $u = 2 \cdot q_1^{0 \cdot 6} \cdot q_2^{0 \cdot 4}$, where q_1 and q_2 are quantities of two goods (good 1 and good 2) respectively. Price of good 1 is ₹ 10 per unit and that of good 2 is ₹ 1 per unit. The consumer has a budget of ₹ 100. Find the optimum amount of q_1 and q_2.

(b) Find the price elasticity of demand for the following function at $P = 5$: 5

$$Q - 1 \cdot 5P + 3 = 0$$

4. (a) If the total cost function is

$$C = \frac{1}{3}Q^3 - 3Q^2 + 9Q$$

find at what level of output AC be minimum and show that at that level of output AC = MC. 3+2=5

(b) Suppose that the demand and total cost functions of a monopolist are $P = 20 - 4x$ and $C = 4x$ respectively. If a tax of $\frac{1}{2}$ per unit quantity produced is imposed, find the quantity and the price that would correspond to the maximum profit of monopolist. What will be the maximum profit? 4+1=5

UNIT—III

5. (a) Define linear homogeneous production function with a suitable example. 4

(b) Determine the level of homogeneity and returns to scale for the following production function : 6

(i) $Q = 0 \cdot 9K^{0 \cdot 2}L^{0 \cdot 6}$

(ii) $Q = \alpha K + \beta L$

(iii) $Q = K^{0.64} \cdot L^{0.36}$

6. Given the function, $u = Ax^b y^c$; A, b and c a constants.

(a) Find the conditions under which this is linear homogeneous function.

(b) Apply Euler's theorem if these conditio hold true.

(c) Show that for Cobb-Douglas producti function, elasticity of substitution unity.

UNIT—IV

7. (a) Prove that in an open input-outp model, a unique solution can be obtain from the equation

$$\bar{x} = (I - A)^{-1} \cdot F$$

Where A = input-output coefficie matrix and F = final demand.

(b) Verify whether Hawkins-Sim conditions are true for the follow technological coefficient matrix :

$$A = \begin{bmatrix} 0.75 & 0.32 \\ 0.48 & 0.36 \end{bmatrix}$$

(Con

8. Given

$$A = \begin{bmatrix} 0\cdot1 & 0\cdot3 & 0\cdot1 \\ 0 & 0\cdot2 & 0\cdot2 \\ 0 & 0 & 0\cdot3 \end{bmatrix} \quad F = \begin{bmatrix} F_1 = 20 \\ F_2 = 0 \\ F_3 = 0 \end{bmatrix}$$

Find the output levels of x_1, x_2 and x_3. Verify Hawkins-Simon condition. 7+3=10

UNIT—V

9. *(a)* Given technological coefficient matrix

$$A = \begin{bmatrix} 0\cdot4 & 0\cdot1 \\ 0\cdot7 & 0\cdot6 \end{bmatrix}$$

and output vector

$$x = \begin{bmatrix} 176\cdot5 \\ 558\cdot8 \end{bmatrix}$$

(i) Find the gross value added.

(ii) Find the output level disposal to final demand.

(iii) Show that the total disposal to final demand is equal to the total value added. 4+2+1=7

(b) State the uses of input-output analysis. 3

10. *(a)* Show that in closed input-output model, the solution is indeterminate. 7

(b) Discuss the limitations of input-output analysis. 3

(For Science Students)

OPTION : B

Course No : ECOH–203 (B)

(ELEMENTS OF MATHEMATICAL ECONOMI

Answer **five** questions, taking **one** from each

UNIT—I

1. *(a)* Define the term 'player' in the gam theory. Solve the following game whe the pay-off matrix of firm A is give below :

	Firm B		
Firm A	B_1	B_2	B_3
A_1	1	3	1
A_2	0	– 4	–3
A_3	1	5	–1

(b) What do you mean by saddle-poin equilibrium of a game?

2. *(a)* Explain the following concept : 2+2

(i) Pay-off matrix

(ii) Mixed strategy

(iii) Two-person zero-sum game

(b) Distinguish between dominant strategie and dominated strategies.

(Contin

UNIT—II

3. Given the technology matrix

$$A = \begin{bmatrix} 0\cdot3 & 0\cdot2 & 0\cdot2 \\ 0\cdot2 & 0\cdot1 & 0\cdot5 \\ 0\cdot2 & 0\cdot4 & 0\cdot2 \end{bmatrix}$$

The consumption demand vector

$$C = \begin{bmatrix} 80 \\ 30 \\ 50 \end{bmatrix}$$

(a) Find the output level consistent with the model. 4

(b) Check Hawkins-Simon conditions. 3

(c) Find the intermediate uses of the three commodities. 3

4. Given

$$A = \begin{bmatrix} 0\cdot2 & 0\cdot3 & 0\cdot2 \\ 0\cdot4 & 0\cdot1 & 0\cdot2 \\ 0\cdot1 & 0\cdot3 & 0\cdot2 \end{bmatrix}$$

and final demands are F_1, F_2 and F_3.

(a) Find the output level consistent with the model. 5

(b) What will be the output levels if $F_1 = 10$, $F_2 = 5$ and $F_3 = 6$? 2

(c) Check Hawkins-Simon condition for the above. 3

UNIT—III

5. (a) Write a short note on input-output analysis.

(b) What are the limitations of input-output analysis?

6. (a) What is a dynamic input-output system? How is this system used in economic planning? Elaborate.

(b) In a closed input-output model, unique solution of the system is not possible. Comment.

UNIT—IV

7. (a) Distinguish between feasible solutions and basic feasible solutions in a linear programming problem.

(b) Solve the following linear programming problem by graphic method :

Maximize

$$\pi = 4x_1 + 3x_2$$

subject to

$$x_1 + x_2 \leq 4$$
$$2x_1 + x_2 \leq 6$$
$$x_1 \geq 0, x_2 \geq 0$$

(Contin

(a) What is meant by simplex tableau? 4

(b) Solve the following linear programming problem by simplex method : 6

Maximize

$$\pi = 2x_1 + 5x_2$$

subject to

$$x_1 + 4x_2 \leq 24$$
$$3x_1 + 4x_2 \leq 21$$
$$x_1 + x_2 \leq 9$$
$$x_1, x_2 \geq 0$$

UNIT—V

(a) Explain the concept of duality with the help of an economic example. 4

(b) Find the dual of the following linear programming problem : 6

Maximize

$$Z = c_1 x_1 + c_2 x_2$$

subject to

$$a_{11} x_1 + a_{12} x_2 \leq b_1$$
$$a_{21} x_1 \leq b_2$$
$$a_{32} x_2 \leq b_3$$
$$x_1, x_2 \geq 0$$

(a) Give a general formulation of linear programming problem of cost minimization. 5

(b) Prove that the dual of the dual is the primal. 5

★★★