

**SIXTH SEMESTER B.A. DEGREE EXAMINATION, MARCH 2017**

(CUCBCSS—UG)

Economics

ECO 6B 12—MATHEMATICAL ECONOMICS

Time : Three Hours

Maximum : 80 Marks

*Answers may be written either in English or in Malayalam.***Part A**

*Answer all questions.  
Each question carries ½ mark.*

1. Objective of linear programming for an objective function is to :
  - (a) Maximize or minimize.
  - (b) Subset or proper set modeling.
  - (c) Row or column modeling.
  - (d) Adjacent modeling.
2. If the order of matrix A is  $m \times p$ . And the order of B is  $p \times n$ . Then the order of AB is ?
  - (a)  $n \times p$ .
  - (b)  $m \times p$ .
  - (c)  $m \times n$ .
  - (d)  $n \times m$ .
3. When marginal costs are below average total costs ?
  - (a) Average fixed costs are rising.
  - (b) Average total costs are rising.
  - (c) Average total costs are falling.
  - (d) Average total costs are minimized.
4.  $(AB)^t = ?$ 
  - (a)  $B^t A^t$ .
  - (b)  $A^t B^t$ .
  - (c) AB.
  - (d) BA.
5. Suppose the price of a product increases from Rs. 12 to Rs. 20 and the quantity demanded falls from 55 a week to 45, What is the Price Elasticity of Demand ?
  - (a) 0.4.
  - (b) - 0.4.
  - (c) 2.5.
  - (d) - 2.5.

Turn over

6. In the short-run, which of the following always gets smaller as output increases ?
- (a) Average fixed cost. (b) Average variable cost.  
(c) Short-run average cost. (d) Short-run marginal cost.
7. In matrices, inter-industry demand is summarized as :
- (a) Input-output matrix. (b) Output-input matrix.  
(c) Linear buying matrix. (d) Linear selling matrix.
8. According to determinant properties, multiple of one row is added to another row then determinant :
- (a) Changed. (b) Unchanged.  
(c) Multiplied. (d) Added.
9. Suppose a demand curve runs from the price axis to the quantity axis in a straight line. Whereabouts will Price Elasticity of Demand =  $-1.0$  ?
- (a) Where the curve meets the price axis.  
(b) Everywhere along the curve.  
(c) At the mid-point of the curve.  
(d) Nowhere along the curve.
10. An isoquant that is :
- (a) Further from the origin represents greater output.  
(b) Flatter represents the trade-offs between inputs that are poor substitutes.  
(c) Negatively sloped represents input combinations associated with Stage I of production.  
(d) All of the above are correct.
11. The law of diminishing returns begins at the level of output where ?
- (a) Marginal cost is at a minimum.  
(b) Average variable cost is at a minimum.  
(c) Average fixed cost is at a maximum.  
(d) None of the above is correct.
12. Two matrices A and B are equal if :
- (a) Both are rectangular.  
(b) Both have same order.  
(c) No. of columns of A is equal to columns of B.  
(d) Both have same order and equal corresponding elements.

(12 × ½ = 6 marks)

**Part B (Very Short Answer Questions)**

*Answer any ten questions.  
Each question carries 2 marks.*

13. Define Production possibility curve.
14. Define Mathematical Economics.
15. Define linear programming problem.
16. Define feasible solution.
17. Define Demand function.
18. Explain production function.
19. Define Marginal Revenue.
20. Define Leontief matrix.
21. Define Investment function.
22. Define Input-output model.
23. Define return to scale.
24. Define isocost line.

(10 × 2 = 20 marks)

**Part C (Short Essay Questions)**

*Answer any six questions.  
Each question carries 5 marks.*

25. If  $D = 40 - 5p$  and  $S = 30 - p$  are the demand and supply functions in a market show that a specific tax of Re. 1 per unit will cause a decline in the market price.
26. Explain the conditions for maxima and minima.
27. Explain market equilibrium.
28. Explain the relationship between MC and AC.
29. If  $AR = 6$ ,  $MR = 4$  find price elasticity of demand.
30. Given the line  $2x + 3y = 20$ , find the slope and Y intercept.
31. Write a note on LPP.
32. Explain the importance of mathematical economics.

(6 × 5 = 30 marks)

Turn over

**Part D (Essay Questions)**

*Answer any two questions.*

*Each question carries 12 marks.*

33. If  $D = 150 - 5P$  and  $S = 200 - 10P$  are the demand and supply function of a market equilibrium price and quantity. Show that the system is stable according to Marshall and unstable according to Walras.

34. Maximise (Graphically)  $Z = 15X_1 + 16X_2$ .

subject to

$$4X_1 + 6X_2 \leq 360$$

$$3X_1 + 0X_2 \leq 180$$

$$0X_1 + 5X_2 \leq 200$$

$$X_1, X_2 \geq 0$$

35. Two industries I and II input-output relations are given below in A with final demand vector B (in units) :

$$\begin{array}{rcc}
 & \begin{array}{cc} \text{I} & \text{II} \end{array} & \\
 \text{A} = \begin{array}{l} \text{I} \\ \text{II} \end{array} & \begin{array}{cc} 50 & 75 \\ 100 & 50 \end{array} & \begin{array}{l} \text{B} = \\ \text{I} \\ \text{II} \end{array} \begin{array}{cc} 75 \\ 50 \end{array}
 \end{array}$$

If the gross output increases to  $\begin{array}{c} \text{I} \ 400 \\ \text{II} \ 600 \end{array}$ , determine the final demand which can be satisfied.

36. A monopolist is facing a linear demand,  $p = 100 - 4q$ . His linear cost function is given by  $C = 50 + 20q$ . Calculate the equilibrium price, quantity and the maximum profit.

(2 × 12 = 24 marks)