

**SIXTH SEMESTER B.A. DEGREE EXAMINATION, MARCH/APRIL 2018**

(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. Linear programming used to optimize mathematical procedure and is :

- (a) Subset of mathematical programming.
- (b) Dimension of mathematical programming.
- (c) Linear mathematical programming.
- (d) All of above.

2. If  $\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix} A = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{bmatrix}$

then order of matrix A = ?

- (a)  $2 \times 2$ .
  - (b)  $2 \times 3$ .
  - (c)  $3 \times 2$ .
  - (d)  $3 \times 3$ .
3. Which of the following statements is false ?
- (a) Price elasticity of demand is negative for most products.
  - (b) Price elasticity of supply is positive for most products.
  - (c) Income elasticity of demand is positive for normal goods.
  - (d) Cross elasticity of demand is positive between complements.
4. The "law of demand" states that, other things remaining the same, the quantity demanded of any good is :
- (a) Inversely related to its price.
  - (b) Directly related to its price.
  - (c) Positively related to its price.
  - (d) Directly related to the supply of the good.

**Turn over**

5. Example of linear equation involving two variables is
- (a)  $7x + 3y + 4z = 20$ . (b)  $6x + 2y = 10$ .  
(c)  $8x = 2 + 10$ . (d)  $7a + 8b + 9c = 10 + 5$ .
6. In linear equation ' $ax + by = c$ '  $a$ ,  $b$  and  $c$  are considered as :
- (a) Variable. (d) Constants.  
(c) Zero. (d) Real numbers.
7. Which of the following short-run cost curves declines continuously ?
- (a) Average total cost. (b) Marginal cost.  
(c) Average fixed cost. (d) Average variable cost.
8. The market demand curve for a perfectly competitive industry is  $QD = 12 - 2P$ . The market supply curve is  $QS = 3 + P$ . The market will be in equilibrium if :
- (a)  $P = 6$  and  $Q = 9$ . (b)  $P = 5$  and  $Q = 2$ .  
(c)  $P = 4$  and  $Q = 4$ . (d)  $P = 3$  and  $Q = 6$ .
9. The demand curve faced by a monopolistically competitive firm is
- (a) Perfectly elastic. (b) Elastic.  
(c) Unit elastic. (d) Inelastic.
10. Which of the following is not a type of market structure ?
- (a) Competitive monopoly.  
(b) Oligopoly.  
(c) Perfect competition.  
(d) All of the above are types of market structures.
11. If  $AB$  exists, then  $(AB)^{-1}$  is :
- (a)  $A^{-1} B^{-1}$ . (b)  $B^{-1} A^{-1}$ .  
(c)  $AB$ . (d) None of Above.
12. Two matrices  $A$  and  $B$  are added if :
- (a) Both are rectangular.  
(b) Both have same order.  
(c) No of columns of  $A$  is equal to columns of  $B$ .  
(d) No of rows of  $A$  is equal to no of columns of  $B$ .

(12 × ½ = 6 marks)

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

Answer any **ten** questions.

Each question carries 2 marks.

13. Find the slope of the curve  $2x = -4y + 6$ .
14. Define Consumption function.
15. If  $C = 200 + 0.5 Y$ ,  $I = 200$ . Find the equilibrium level of income.
16. Define Income elasticity.
17. Explain the properties of Cobb Douglas production function.
18. Explain the relationship between Average and marginal cost.
19. Find the slope and intercept on Y axis of the straight line  $2y - 4x + 16 = 0$ .
20. Explain the conditions for Maximization.
21. Given the  $AR = 100 - 2q$  obtain MR when  $q = 5$ .
22. Write a note on input output analysis.
23. Write a note on production possibility curve.
24. Explain market equilibrium.

(10 × 2 = 20 marks)

**Part C (Short Essay Questions)**

Answer any **six** questions.

Each question carries 5 marks.

25. Write a note on Homogeneous production function.
26. Write a note on Price, income and cross elasticities of demand.
27. Explain the necessary and sufficient conditions for equilibrium of a firm under perfect competition.
28. Write a note on Linear programming problem.
29. Find the optimum commodity purchase for a consumer whose utility function  $U = 10 q_1 q_2$ . Budget equation of the consumer is  $100 = 50q_1 + 10q_2$ .
30. If  $D = -50p + 250$  and  $S = 25p + 25$  are the demand and the supply functions of a certain product. Plot both the curves and obtain the equilibrium price and the quantity

**Turn over**



31. Explain the importance of mathematical representation of economic models.
32. The long run cost function of a firm is  $C = q^3 - 8q^2 + 20q$ . Prove that  $MC = AC$  at the minimum point of AC.

(6 × 5 = 30 marks)

**Part D (Essay Questions)**

*Answer any two questions.*

*Each question carries 12 marks.*

33. Given the demand function  $Q_d = 100 - 3P$  and the supply is  $Q_s = 200 - 8P$ .
- Find the equilibrium price and quantity.
  - Find the price and quantity sold if a tax of 2.5 Rs per unit is imposed.
  - If a specific subsidy of Rs 2.5 per unit is given, calculate new equilibrium values.
  - What will be the total revenue of the government?
34. The utility function of the consumer is given by  $u = X_1 X_2^2 - 10X_1$  where  $X_1$  and  $X_2$  are the quantities of two commodities consumed. Find the optimal utility value if his income is 116 and product prices are 2 and 8 respectively.
35. Solve the following LPP graphically.
- Maximize  $Z = 3x_1 + 4x_2$   
 subject to the constraints  
 $4x_1 + 2x_2 \leq 80$   
 $2x_1 + 5x_2 \leq 180$   
 $x_1, x_2 \geq 0$ .
36. Given the demand curve of the monopolist  $P = 100 - 4q$ . His cost function is  $TC = 50 + 20q$ . Find the profit of the firm at this level of output.

(2 × 12 = 24 marks)