

Reg. No.....  
**FIFTH SEMESTER (CBCSS-UG) DEGREE EXAMINATION, NOVEMBER 2023**

Economics

ECO 5B 10—MATHEMATICAL ECONOMICS

(2019 Admission onwards)

Time : Two Hours and a Half

Maximum : 80 Marks

**Section A**

*Short Answer Questions.*

*Maximum marks in this section is 25.*

*Students can attempt all questions.*

*Each question carries a maximum of 2 marks.*

1. Define linear programming.
2. What do you mean by objective function ?
3. Distinguish between dependent and independent variables.
4. Compare elasticity of luxury goods and inferior goods.
5. Define production function. Give example.
6. What is meant by elasticity of demand ?
7. State the meaning and features of an economic model.
8. What do you mean by  $MRS_{xy}$  ?
9. Point out the relationship between AC and MC.
10. What do you mean by optimization ?
11. State the relationship between primal and dual problem.
12. Write a note on Leontief matrix.
13. The total cost function is  $TC = 60 - 12x + 2x^2$ . Find the MC.
14. Explain discriminating monopoly.
15. Establish the relationship between MPC and MPS.

(25 marks)

**Turn over**

### Section B

*Short Essay / paragraph Questions.*  
*Maximum marks in this section is 35.*  
*Students can attempt all questions.*  
*Each question carries a maximum of 5 marks.*

16. Discuss the economic applications of optimization technique
17. Distinguish between maxima and minima points. Find the local maxima and minima of  
 $f(x) = 3x^4 + 4x^3 - 12x^2 + 15$ .
18. Solve the following LPP graphically :  
 Maximize  $Z = 3x_1 + 4x_2$   
 Subject to the constraints  $4x_1 + 2x_2 \leq 80$   
 $2x_1 + 5x_2 \leq 180$   
 $x_1, x_2 \geq 0$ .
19. Explain meaning and importance of Mathematical Economics
20. Distinguish between demand and supply functions. Assume that the demand and supply are  $Q_d = 20 - 2P$  and  $Q_s = -10 + 2P$  respectively. Determine equilibrium price and quantity.
21. Describe the features and equilibrium conditions of firm under monopoly
22. Define input output analysis. What are the features of input-output analysis?
23. What are the importance marginal concepts in economics ?

### Section C

*Long Essay Questions.*  
*Answer any two questions.*  
*Each question carries a maximum of 10 marks.*

24. Explain the conditions of equilibrium in the perfect competitive market. Assume that a competitive market faces  $P = \text{Rs. } 4$  and  $TC = X^3 - 7X^2 + 12X + 5$ . Find the best level of output for the firm. Also find the profit of the firm at this level of output.
25. Define homogeneous production function. Explain Cobb Douglas production function and prove the properties of Cobb Douglas production function.

26. Explain the application of Lagrange multipliers in utility maximization. Assume that the utility function of the consumer is given by  $u = x_1 x_2^2 - 10x_1$  where  $x_1$  and  $x_2$  are quantities of two commodities consumed. Find the optimal utility value if his income is 116 and product prices are 2 and 8 respectively.
27. Explain elasticity of demand. What are the different types of elasticity and their methods of measurement?

(2 × 10 = 20 marks)