D 10764   (Pages : 2)   Name..

Reg. No....................................

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS–UG)

Economics

ECO 5B 10—MATHEMATICAL ECONOMICS

(2019 Admissions)

Time : Two Hours and a Half   Maximum : 80 Marks

Section A (Short Answer Questions)

Answer at least **ten** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 30.

1. Define production function

2. Given the utility function $u = xy + 4x + 5y$, find the marginal utility of x and y.

3. What is meant by elasticity of demand ?

4. Define Mathematical Economics.

5. What do you mean by factor intensity ?

6. Distinguish between homogenous products and heterogeneous products.

7. What is meant by economic model ?

8. Define Marginal Rate of Substitution.

9. Distinguish between primal and dual problem in linear programming.

10. Explain homogeneous production function.

11. What is meant by linear programming ?

12. State Euler's theorem.

13. What is optimal solution ?

14. What do you mean by a production possibility curve ?

15. Calculate MPC :

Income	Consumption
200	150
300	220

(10 × 3 = 30 marks)

Turn over

Section B (Short Essay/Paragraph Questions)

Answer at least **five** *questions.*
Each question carries 6 marks.
All questions can be attended.
Overall Ceiling 30.

16. What is meant by discriminating monopoly ? Briefly explain the necessary conditions for price discrimination.

17. Define AR and MR. Illustrate the relationship between AR and MR with the help of a diagram.

18. Explain utility function. Show the first and second order conditions for consumer equilibrium for a given utility function $U = f(Q_1, Q_2)$ and the budget constraint $M = P_1Q_1 + P_2Q_2$.

19. Explain the meaning and significance of Lagrange multipliers.

20. Solve the following linear programming problem using graphical method :

    Maximize $z = x_1 + 1.5\,x_2$

    subject to the constraint $2x_1 + 2x_2 \leq 16$
    $$x_1 + 2x_2 \leq 12$$
    $$4x_1 + 2x_2 \leq 28$$
    $$x_1, x_2 \geq 0.$$

21. Discuss the economic applications of optimization technique.

22. The demand curve of a monopolist is given by $p = \dfrac{50 - x}{5}$. Find the marginal revenue for any output. What is marginal revenue when $x = 25$?

23. Explain input output analysis. What are the features of input-output analysis ?

$(5 \times 6 = 30 \text{ marks})$

Section C (Essay Questions)

Answer any **two** *questions.*
Each question carries 10 marks.

24. Explain Cobb Douglas production function. State and prove the properties of Cobb Douglas production function.

25. Discuss the conditions for profit maximization. Consider $TC = Q^3 - 8Q^2 + 120Q + 420$, $TR = 1200Q - 5Q^2$. Find the profit maximizing output.

26. Explain the meaning and characteristics of perfect competition. Assume that a perfectly competitive firm faces a price of Rs. 9 and has a total cost function $C = 2Q^2 + 2Q + 15$. What quantity should the firm produce in the short run ?

27. Explain price elasticity of demand. What are the degrees of elasticity ? Suppose price increases from 40 to 45 and demand falls from 200 to 150. Calculate price elasticity of demand.

$(2 \times 10 = 20 \text{ marks})$