N – 1104

Reg. No. : ....

Name : ....

Sixth Semester B.A. Degree Examination, April 2022

First Degree Programme Under CBCSS

Economics

EC 1661.3 : MATHEMATICAL ECONOMICS

(2018 Admission)

Time : 3 Hours   Max. Marks : 80

SECTION – I

Answer **all** questions. Answer in **one** or **two** sentences.

1. Define demand function.

2. What is mathematical economics?

3. Inflection point.

4. Define ordinal utility.

5. MRS_{xy}.

6. Income elasticity of demand.

7. Producer surplus.

8. Production function.

9. Isoquants.

10. Average cost.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not exceeding one paragraph. **Each** question carries **2** marks.

11. If good x is a neutral good what is its MRS for good y.

12. If price is 10 and elasticity is 2, find marginal revenue.

13. Find Marginal utility of good x from the total utility function $U = 5xy^2 + 4x^3 + 7y^2$.

14. If the demand function $Qd = 50 - 3P$ and the supply function, $Qs = 10 + P$. Find the equilibrium price and quantity.

15. What is corner solution?

16. What do you mean by optimisation?

17. Find the marginal product of the production function $Q = 5X^3 - 7X + 19$.

18. If demand is $Q = 12 - 2P$, what is the price elasticity at $P = 3$.

19. Given the equation of production function isoquant $40K^{\frac{2}{4}}L^{\frac{2}{4}} = 1200$. Find $MRTS_{LK}$.

20. What is the significance of Lagrange Multiplier?

21. Check whether the production function $Q = \dfrac{5K}{2L}$ is a linearly homogenous production function or not.

22. Show the relationship between Average Product and Marginal Product under Cobb Douglas production function.

23. What do you mean by elasticity of substitution?

24. Write a note on first degree price discrimination.

25. What are the conditions for equilibrium of a firm under perfectly competitive market?

26. Write a note on profit function.

(8 $\times$ 2 = 16 Marks)

SECTION – III

Answer **any six** of the following. Each answer should not exceed **120** words. **Each question carries 4 marks.**

27. What are the ingredients of a mathematical model?

28. Given the profit function $\pi = 160x - 3x^2 - 2xy - 2y^2 - 120y - 18$ for a firm producing two goods x and y. Maximise the profit function and find out the maximum profit.

29. Prove that at minimum point of *AC, AC* equals *MC*.

30. Show the relationship between *AR, MR* and elasticity.

31. Briefly explain the process of model building.

32. Find the elasticity of substitution for the CES production function $q = 75\left(0.3K^{-0.4} + 0.7L^{-0.4}\right)^{-2.5}$.

33. Maximize utility $U = 4X^2 + XY + 3Y^2$ subject to the budget constraint $X + Y = 60$.

34. Given the demand function $P = 45 - 0.5Q,$ find consumer surplus when $P_0 = 32.5$ and $Q_0 = 25$.

35. What are the main features of monopoly market?

36. Explain law of variable proportion.

37. Write a note on adding up theorem.

38. Write a note on multi-plant monopoly.

(6 $\times$ 4 = 24 Marks)

SECTION – IV

Answer **any two** of the following. Each answer should not exceed 4 pages. **Each question carries 15 marks.**

39. Explain the nature, scope and significance of mathematical economics.

40. The monopolist faces two demand functions;

    $Q_1 = 24 - 0.2P_1$ and $Q_2 = 10 - 0.05P_2$.

    Where *TC* = 35 + 40*Q*. What price will the firm charge (a) with discrimination and (b) without discrimination.

41. State and prove the properties of Cobb-Douglass Production function.

42. What is demand forecasting? Briefly explain the methods of demand forecasting.

43. Explain the conditions of consumer equilibrium.

44. Derive Slutsky theorem.

(2 × 15 = 30 Marks)

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