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FOURTH SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2026

(CBCSS)

Econometrics

ECM4E05—MATHEMATICAL ECONOMICS

(2020 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Part A

Answer **all** *questions.*
Each question carries a weightage of 1/5.

Multiple Choice Questions :

1. 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.

2. Which of the following factors does not affect the slope and position of a consumer's budget line between two products, A and B ?

   (a) The shape and position of the consumer's indifference curves.

   (b) The price of A.

   (c) The price of B.

   (d) The consumer's income.

3. A profit-maximizing monopolist finds that if it remains open, the best output is 50 a week, but at this output it would make a loss. Under what circumstances should it shut down?

   (a) If AR at this output is below SAC.

   (b) If AR at this output is below AVC.

   (c) If MR at this output is below SAC.

   (d) MR at this output is below AVC.

Turn over

4. A mathematical model assumes ———— relationship between variables.

   (a) Exact.
   (b) Inexact.
   (c) Probable.
   (d) None of the above.

5. Given TR = $10x$, TC = $5x + 2$, the Profit function is :

   (a) $5x - 2$.
   (b) $5x + 2$.
   (c) $10x - 2$.
   (d) $5x$.

6. In Cobb Douglas production function, elasticity of substitution is :

   (a) Greater than one.
   (b) Equal to one.
   (c) Less than one.
   (d) None of these.

7. In game theory, a choice that is optimal for a firm no matter what its competitors do is referred to as :

   (a) The game-winning choice.
   (b) Super optimal.
   (c) A gonzo selection.
   (d) The dominant strategy.

8. The slope of curve will be positive if and only if the marginal cost curve lies above the AC curve.

   (a) ATC.
   (b) MC.
   (c) AC.
   (d) MP.

9. AR /(AR-MR) gives the :

   (a) Elasticity of demand.
   (b) Elasticity of cost.
   (c) Iso revenue live.
   (d) Elasticity of supply.

10. In an input-output matrix, the principal diagonal of this matrix represents the amount of input each industry takes from output.

   (a) Other industry's.
   (b) Government sector's.
   (c) Household sector's.
   (d) Its own output.

11. Which of the following is condition of economic viability and technological feasibility of Leontief's static system ?

    (a) Marshall - Edgeworth conditions.

    (b) Kuhn Tucker conditions.

    (c) Hawkin Simon condition.

    (d) Edgeworth conditions.

12. P = $a - b$Q is the demand cure of a monopolist. Which of the following statements is true ?

    (a) AR and MR are equal.

    (b) The rate of decline of MR is twice the rate of decline of AR.

    (c) The demand curve has unit elasticity.

    (d) slope of MR is zero.

13. R = R (Q) and C = C (Q) are the revenue and cost functions of a firm. The first order conditions for firm's short run equilibrium is :

    (a) R' (Q) = C' (Q). (b) R' (Q) < C* (Q).

    (c) R'(Q)>C'(Q). (d) None of the above.

14. 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 = 3 and Q = 6.

    (c) P = 4 and Q = 4. (d) P = 5 and Q = 2.

15. Total cost function is TC = $10 + 2x + 3x^2$. Its average cost is :

    (a) $2 + 6x$. (b) $10/x + 2 + 3x$.

    (c) $2x + 3x^2$. (d) None of these

(15 × 1/5 = 3 weightage)

Part B

Answer any **five** *questions.*

Each question carries weightage of 1.

16. Define cross elasticity of demand.

17. Define production function.

18. What is a profit function ?

19. What is meant by linear homogeneous production function.

20. What do you mean by an input output model ?

21. What is price discrimination ?

22. The demand function is given P = 200 – 2Q. find marginal and average revenue function.

23. Compute Average cost given TC = $8Q^2 + 45Q + 16$.

(5 × 1 = 5 weightage)

Part C

Answer any **seven** *questions.*

Each question carries weightage of 2.

24. Elucidate elasticity of substitution. Explain it with reference to CES production function.

25. Write a brief note on Linear Expenditure System.

26. If the demand for a commodity X in Mangalore is Q = 2000 + 5Y where Q is the quantity demanded, Y is per capita income in rupees. Find income elasticity of demand when per capita income is Rs. 15,000.

27. The total cost function is given by $C = 5q^2 + 7q + 10$. Find the quantity at which the average cost is minimum.

28. Explain various types of discriminating monopoly.

29. The demand curve of a monopolist is given by $P = (50 - x)/5$.Find the marginal revenue for any output. What is marginal revenue when $x = 25$.

30. What is input output analysis ? What are the uses of input output analysis ?

31. Explain indirect utility function.

32. Check whether the following function is homogeneous or not $f(x, y) = x^5 - xy + y^5$.

33. What do you mean by Hawkins Simon condition for technological viability ?

    Given the technological coefficient matrix find whether this input output system is viable ?

(7 × 2 = 14 weightage)

Part D

Answer any **two** *questions.*

Each question carries weightage of 4.

34. Given the technology matrix A and final demand vector F, find the gross output of the three sectors :

$$A = \begin{bmatrix} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.2 \\ 0.1 & 0.3 & 0.2 \end{bmatrix} F = \begin{bmatrix} 10 \\ 5 \\ 6 \end{bmatrix}$$

35. State and explain the major properties of Cobb-Douglas production function.

36. Given two isolated markets supplied by a single monopolist. Let the corresponding demand functions be $p_1 = 100 - q_1, p_2 = 120 - 0.5q_2$. The monopolist has a constant marginal cost of Rs. 40. What will price and sales be in two markets under a regime of price discrimination ?

37. Explain different types and degrees of elasticity of demand.

(2 × 4 = 8 weightage)