D 110355 (Pages : 3) Name...

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

FIFTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2024

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. What is $MRTS_{LK}$?

2. Define production function.

3. What do you mean by factor intensity ?

4. Define economic model.

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

6. Point out relationship between AC and MC.

7. Define market equilibrium.

8. Differentiate between autonomous and induced consumption.

9. What is optimal solution ?

10. Given a consumption function, C = 100 + 0.5 Y, find MPC and MPS.

11. Define feasible solution.

12. Find the Average Product for the production function $Q = 40 \, K^{0.7} L^{0.1}$.

13. What is meant by input output table ?

14. Determine the shapes of AR and MR curves under monopoly

15. What are Giffen goods and their elasticity ?

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. What do you mean by Marginal Rate of Substitution ? Find MRSxy for the function $U = 12x + y$.

17. Define discriminating monopoly. What are the necessary conditions for price discrimination?

18. Distinguish between AR and MR. Illustrate the relationship between AR and MR with the help of a diagram

19. Define perfect competition. Assume that a perfectly competitive market faces P = Rs. 4 and $TC = X^3 - 7X^2 + 12X + 5$. Find the best level of output of the firm. Also find the profit of the firm at this level of output.

20. Maximize $Z = 3x_1 + 4x_2$
    Subject to the constraints
    $4x_1 + 2x_2 \leq 80$
    $2x_1 + 5x_2 \leq 180$
    $x_1, x_2 \geq 0$

21. Explain the meaning and applications of Lagrange multipliers.

22. Illustrate the input output matrix of technical co-efficients in $X = (I - A)^{-1} B$ format.

23. Explain the meaning and significance of production possibility curve.

Section C (Long Essay Questions)

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

24. Differentiate between optimization of single variable function and multivariable function. Describe the problem of constrained minimization of cost, $C = wL + rK$.

25. Discuss meaning and significance of Mathematical Economics. Derive the mathematical applications in economics using examples of Utility function and Profit function.

26. Explain linear homogeneous production function. State and prove any *four* properties of Cobb Douglas production function

27. Explain various degrees of price elasticity of demand.

    Given $Q1 = 100 - P1 + 0.75P2 - 0.25P3 + 0.0075Y$

    At $P1 = 10, P2 = 20, P3 = 40$ and $Y = 10,000$, find the different cross elasticities of demand.

    $(2 \times 10 = 20$ marks$)$

D 110355–A   (Pages : 4)

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ECO 5B 10—MATHEMATICAL ECONOMICS

(2019 Admission onwards)

(Multiple Choice Questions for SDE Candidates)

Time : 15 Minutes	Total No. of Questions : 20	Maximum : 20 Marks

INSTRUCTIONS TO THE CANDIDATE

1. This Question Paper carries Multiple Choice Questions from 1 to 20.

2. The candidate should check that the question paper supplied to him/her contains all the 20 questions in serial order.

3. Each question is provided with choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and enter it in the main answer-book.

4. The MCQ question paper will be supplied after the completion of the descriptive examination.

ECO 5B 10—MATHEMATICAL ECONOMICS

(Multiple Choice Questions for SDE Candidates)

1. For a utility function $u = xy + 3x + 4y$, marginal utility of good x is :

   (A) $xy + 3x + 4y$.

   (B) $y + 3$.

   (C) $x + 4$.

   (D) $y + 3x$.

2. ———— function shows the functional relation between investment and rate of interest or income:

   (A) Consumption

   (B) Production.

   (C) Investment

   (D) Income.

3. ———— function expresses the relationship between price of the good and quantity of the good demanded.

   (A) Supply.

   (B) Consumption.

   (C) Demand.

   (D) Income.

4. ———— function was designed by J M Keynes to show the relationship between real disposable income and consumer spending.

   (A) Consumption.

   (B) Investment.

   (C) Demand.

   (D) Utility.

5. When total cost in a production is given by $C = 4x + 500$ then fixed cost is ————.

   (A) 0.

   (B) 500.

   (C) 504.

   (D) 4.

6. Demand function for a commodity is $D = 44 - 7P$ and supply function $S = 2P - 10$, then the equilibrium price is :

   (A) 4.

   (B) 6.

   (C) 8.

   (D) 10.

7. When the total revenue functions is $R = 100 - X^2$, the marginal revenue is :

(A) $100 - 2X$.

(B) 100.

(C) $-2X$.

(D) $-X2$.

8. The elasticity of demand for the demand curve of a firm under perfect competition is :

(A) 1.

(B) 0

(C) -1.

(D) α.

9. ———————— indicates what proportion of the increased income will be saved.

(A) MPS.

(B) MPC.

(C) MPI.

(D) GDP.

10. The government wants to reduce the consumption of electricity by 5 %. The price elasticity of demand for electricity is 00.4. The government should :

(A) Raise the price of electricity by 2 %.

(B) Lower the price of electricity by 0.4 %.

(C) Raise the price of electricity by 12.5 %

(D) Raise the price of electricity by 0.8 %.

11. Necessities have ———————— elasticity of demand of between 0 and +1.

(A) Cross.

(B) Price.

(C) Income.

(D) Any of these.

12. Football socks are found to have a cross-elasticity of demand of -2 with respect to product Y. Which of the following products is most likely to be product Y :

(A) Cricket boots.

(B) Tennis shoes.

(C) Tennis socks.

(D) Football boots.

13. For a cost function $TC = 3Q^2 + 7Q + 12$, AC is :

(A) $3Q + 7$.

(B) $6Q + 7$.

(C) $3Q + 7 + \dfrac{12}{Q}$.

(d) Undefined.

Turn over

14. The Cobb Douglas Production function $Q = AL^{\alpha}K^{1-\beta}$ represents :

    (A) Diminishing returns to scale.   (B) Increasing returns to scale.

    (C) Constant returns to scale.   (D) None of the above.

15. Feasible solution of LPP is :

    (A) Values of decision variables satisfy the constraints.

    (B) Values of decision variables satisfy the objective functions.

    (C) Values of variable satisfy the objective functions.

    (D) The value of the objective function.

16. A production function is said to be —————, if, when each input factor is multiplied by a positive real constant k, the constant can be completely factored out :

    (A) Homogenous.   (B) Non-homogenous.

    (C) Additive.   (D) Heterogonous.

17. In input-output analysis, ————— shows the transactions of the whole economy in the form of output of each industry as distributed among the other industries as intermediate products and the final demand sector.

    (A) The transaction matrix.   (B) Objective functions.

    (C) Non-negativity constrains.   (D) The technology matrix.

18. In input-output analysis, ————— is obtained by dividing the input of the desired sector by the total output of the same sector.

    (A) The transaction matrix.   (B) A technology co-efficient.

    (C) Non-negativity constrains.   (D) The technology matrix.

19. In monopoly, marginal revenue is :

    (A) Equal to AR.   (B) Less than AR.

    (C) More than AR.   (D) Initially less than AR then more than AR.

20. One difference between perfect competition and monopolistic competition is that :

    (A) In perfect competition, the products are slightly differentiated between firms.

    (B) There are a larger number of firms in monopolistic competition.

    (C) There are a smaller number of firms in perfectly competitive industries.

    (D) Firms in monopolistic competition have some degree of market power.