C 60214 (Pages : 4) Name.....

Reg. No.....

SIXTH SEMESTER B.A. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

Economics

ECO 6B 12—MATHEMATICAL ECONOMICS

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries ½ mark.

1. A linear function is in the form :

   (a) $y = a + bx$.

   (b) $y = a + bx + cx^2$.

   (c) $y = ax^n$.

   (d) $y = a^x$.

2. For the consumption function, $C = 100 + 0.8y$, MPC is :

   (a) 100.

   (b) 0.8y.

   (c) 0.8.

   (d) None of the above.

3. If the total revenue function is given as, $R = 2x^2 - 10x$, MR is :

   (a) $x^2 - 5$.

   (b) $4x$.

   (c) $4x - 10$.

   (d) $2x^3 - 10x^2$.

4. If change in price, either rise or fall, is followed by a fall in total outlay, the Elasticity of demand said to be :

   (a) Less than unity.

   (b) Greater than unity.

   (c) 1.

   (d) 0.

5. For the demand function, $D = 100 - 2P$, price elasticity is :

   (a) $\frac{-2P}{100 - 2P}$.

   (b) $-2P$.

   (c) -2.

   (d) $\frac{100 - 2P}{2P}$.

Turn

6. The sufficient condition for maximum is :

(a) $f''(x) > 0$. (b) $f'(x) > 0$.

(c) $f'(x) = 0$. (d) $f''(x) < 0$.

7. Marginal utility for the utility function $U = 20x^4 + 7x^3 + 13x^2 + 12x + 9$ is :

(a) $80x^3 - 7x^2 - 13x$. (b) $80x^3 + 21x^2 + 26x + 12$.

(c) $80x^3 + 12$. (d) $80x^3 + 21x^2 + 13x$.

8. In order to maximize profit, a firm must choose the output level such that its :

(a) MR < MC. (b) MR > MC.

(c) MR = MC. (d) MR ≠ MC.

9. If the production function is a linear homogeneous production function then the elasticity substitution between capital and labour is :

(a) 0. (b) Greater than one.

(c) Less than one. (d) Equal to one.

10. Linear Programming as an economic tool was first developed and applied by :

(a) Prof. Danzig. (b) Von Neumann.

(c) Morgenstern. (d) Prof. W.W. Leontif.

11. The quantity of the supply of a product at a given price depends upon the nature of its :

(a) AC curve. (b) MC curve.

(c) MR curve. (d) AR curve.

12. Input-Output analysis assumes :

(a) Increasing returns to scale. (b) Diminishing returns to scale.

(c) Constant returns to scale. (d) None of the above.

(12 × ½ = 6 mark

Part B (Very Short Answer Questions)

Answer any **ten** *questions.*
Each question carries 2 marks.

13. Distinguish between Leontief open and closed input-output model.
14. What is a linear homogeneous function ?
15. What is optimal solution ?
16. Define cross elasticity of demand.
17. Define production possibility curve.
18. For the total utility function $U = 20x^4 + 7x^3 + 13x^2 + 12x + 9$, compute marginal utility.
19. What is an economic model ?
20. Define Marginal propensity to consume.
21. If the price of a commodity is Rs. 5 and MR is Rs. 10, find the elasticity of demand.
22. Define market equilibrium.
23. What is an isoquant ?
24. Compute Average cost for the Total cost $C = 8x^3 + 3x^2 - 6x + 3$.

(10 × 2 = 20 marks)

Part C (Short Essay Questions)

Answer any **six** *questions.*
Each question carries 5 *marks.*

25. What is meant by input-output analysis ? What are the various uses of input-output analysis ?
26. Explain the concepts of maxima and minima of functions. How are they estimated ?
27. Discuss the conditions for profit maximization under monopoly.
28. For a firm under perfect competition, it is given that $p = 3$ and $c = 100 + .015x^2$. Find how many items are produced to maximize the profit. What is the profit ?
29. Determine Marginal Utilities of x and y at $x = 3$ and $y = 2$ for the Total Utility Function $U = 5x^2 y + 2xy^3 + 3x + 9y$.

30. What are the applications of Linear Programming methods ?

31. Calculate marginal productivity of labour and capital from the following production func

(i) $X = L^2 + 2L + 10$; (ii) $X = K^2 + 3K^3$.

32. Write a note on indifference curve. What are the properties of indifference curve ?

$(6 \times 5 = 30$ m

Part D (Essay Questions)

Answer any **two** *questions.*
Each question carries 12 *marks.*

33. Solve the following LPP graphically :

Maximize $Z = 2x_1 + 3x_2$
subject to $x_1 + x_2 \leq 1$
$3x_1 + x_2 \leq 4$
$x_1 \geq 0, x_2 \geq 0.$

34. Given the utility function $U = f(x, y)$, the prices are p_1= Rs. 5 and p_2 = Rs. 5 and consu income for the period is Rs. 50. Find out the consumer's equilibrium level of consumpti commodity x and y. Also prove the conditions for maximization.

35. Given the following Revenue (R) and Cost (C) functions for a firm $R = 20q - q^2$ and $C = q^2 + 8q$ find the equilibrium level of output, price, total revenue, total cost and profit.

36. Given the Demand and the Average Cost Functions of a monopolistic firm $P = 32 - 3q$, $AC = q + 8 + \frac{5}{q}$, what level of output maximizes total profit and what are corresponding values of R, AR, MR, C, AC, MC and Profit ?

$(2 \times 12 = 24$ m