D 93824 (Pages : 4) Name.....

Reg. No.....

FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Mathematics

ME 1C 01—MATHEMATICAL ECONOMICS

Time : Three Hours Maximum : 80 Marks

Part A

Answer all the **twelve** *questions.*
Each question carries 1 *mark.*

1. The demand curve shows the relationship between :

   (a) Price and quantity. (b) Income and quantity.

   (c) Consumption and quantity. (d) Consumption and income.

2. The elasticity of demand at different points on the same demand curve is :

   (a) Same. (b) Zero.

   (c) Different. (d) None.

3. The total of the quantities demanded by all consumers in an economy at each price is called :

   (a) Market demand curve. (b) Market supply curve.

   (c) Market equilibrium. (d) None of the these.

4. Sum of explicit cost and implicit cost gives :

   (a) Total cost. (b) Average cost.

   (c) Marginal cost. (d) None of these.

5. The ratio of total cost to the quantity produced is called :

   (a) Average cost. (b) Marginal cost.

   (c) Total variable cost. (d) None.

6. When marginal cost is greater than average cost, the total cost elasticity will be :

   (a) Greater than 1. (b) Less than 1.

   (c) Equal to 1. (d) None.

Turn over

7. The concept of indifference curves was developed by :

(a) J.R. Hicks. (b) R.G.D. Allen.

(c) J.R. Hicks and Allen. (d) None of these.

8. The equilibrium of a consumer purchasing one commodity is attained when :

(a) $\frac{du}{dQ} < P$. (b) $\frac{du}{dQ} = P$.

(c) $\frac{du}{dQ} > P$. (d) $\frac{du}{dQ} = 0$.

9. The point at which the marginal utility first increases, reaches the maximum, then diminishes is called :

(a) Point of inflexion. (b) Minimum point.

(c) Saturation point. (d) None of these.

10. Let $10 + 30kk^2$ be a production function, where k represents capital. Then the marginal productivity when $k = 3$ is :

(a) 116. (b) 16.

(c) 58. (d) 24.

11. When the average revenue function is AR = 10 – .5q, the marginal revenue is :

(a) $0.5q^2$. (b) $10 - q$.

(c) $10q0.5$. (d) 10.

12. Behaviour of the function defined by $y = x^4 - 6x^3 + 4x^2 - 13$ at $x = 4$ is :

(a) Decreasing. (b) None.

(c) Increasing. (d) Stationary.

(12 × 1 = 12 marks)

Part B

Answer any **six** *questions in two* **or** *three sentences.*
Each question carries 3 *marks.*

13. What is a Demand Function ?

14. Write any three factors determining supply.

15. What is price elasticity of demand ?

16. Define average revenue and marginal revenue.

17. Define elasticity of total cost.

18. Write a note on Legrange's multiplier.

19. What do you mean by utility ?

20. Find average cost and marginal cost from the total cost function $TR = 10 + x + 2x^2$.

21. Show that the function $3x^3 + 3x^2 + x - 1$ is monotonic increasing.

(6 × 3 = 18 marks)

Part C

Answer any **six** *questions from the following.*
Each question carries 5 *marks.*

22. Describe various elasticities of demand.

23. What are the determinants of elasticity of demand ?

24. Give the nature and property of a demand function for a normal good.

25. Cost function is given by $\pi = a + bq + cq^2$. Prove that $\frac{d(AC)}{dq} = \frac{MC - AC}{q}$.

26. What are the similarities between utility approach and indifference curve approach ?

27. Find the maximum profit : Given the profit function $\pi = -Q^3 - 6Q^2 + 1440Q - 545$.

28. Find the critical points of $z = 3x^2 - xy + 2y^2 - 4x - 7y + 12$.

29. $z = \left(\frac{x+y}{x+2}\right)$. Find dz.

30. Find all the four second order partial derivatives of $z = 3x^3y^2$.

(6 × 5 = 30 marks)

Part D

Answer any **two** *questions from the following.*
Each question carries 10 *marks.*

31. Write short notes on determinants of price elasticity of demand.

32. (a) Prove that marginal cost (MC) must equal marginal revenue (MR) at the profit-maximizing level of output.

(b) The total cost function of a firm is given by $TC = 400 - 10q + q^2$. Find the optimum size of output.

33. Explain briefly properties of indifference curves.

34. Given the profit function $\pi = 160x - 3x^2 - 2xy - 2y^2 + 120y - 18$ for a firm producing two goods x and y. Find the maximum profit.

(2 × 10 = 20 marks)