

14. Define equilibrium price and equilibrium quantity.
15. Define cross elasticity of demand.
16. Define the terms total revenue and average revenue.
17. Distinguish between short run and long run.
18. State the law of diminishing marginal utility.
19. What is meant by marginal rate of substitution?
20. Given the demand function $= 30 - 2Q$, find the marginal revenue function.
21. Given $Q = 700 - 2P + 0.02Y$, where $P = 25$ and $Y = 5000$, find the income elasticity of demand.

III. Short essay or paragraph questions. Answer any five questions

(5 x 2 = 10 weightage)

22. Explain income effect and substitution effect which account for law of demand.
23. A consumer purchases 80 units of a commodity when its price is Rs. 1 per unit and purchases 48 units when price rises to Rs. 2 per unit. What is the price elasticity of demand for the commodity?
24. Give reasons for the U-shape of a long run average cost curve.
25. Given the demand function $P = 100 - 4Q$, calculate the total, average and marginal revenue functions.
26. State the law of equimarginal utility. Explain its limitations.
27. What are indifference curves. State the assumptions made in indifference curve analysis.
28. Use Lagrange's multipliers to optimize $z = 4x^2 - 2xy + 6y^2$ subject to $x + y = 72$.

IV. Essay questions. Answer any 2 questions

(2 x 4 = 8 weightage)

29.
 - (a) Explain how would you measure price elasticity of demand at a point on the demand curve.
 - (b) Suppose that price elasticity of demand for petrol is equal to unity and at Rs. 15 per litre on individual consumer 80 litres of petrol in a week. How much price of petrol should be fixed so that he demands 60 litres of petrol.
30. Explain why consumers indifference curves
 - (a) Slope downward to the right
 - (b) Convex at the origin
 - (c) Do not intersect
31. A firm producing two goods x and y has the profit function.

$$\pi = 64x - 2x^2 + 4xy - 4y^2 + 32y - 14$$

Find the profit maximizing level and makes sure that profits are maximized.

FIRST SEMESTER B.Sc. DEGREE EXAMINATION
MATHEMATICAL ECONOMICS (COMPLEMENTARY COURSE)
ME1C01: MATHEMATICAL ECONOMICS
Model Question Paper 2

Time: 3 hrs.

Maximum Weightage: 30

I. Objective type questions. Answer all 12 questions (12 x ¼ = 3 weightage)

1. Demand for a commodity refers to:
(a) desire for a commodity (b) need for a commodity
(c) ability to pay for a commodity (d) desire for a commodity backed by ability to pay for it
2. Which of the following gives the measure of price elasticity of demand
(a) the ratio of change in demand to the change in price
(b) the ratio of change in price to the change in demand
(c) the ratio of % change in demand to % change in price
(d) none of the above
3. Which of the following elasticity measures a movement along a curve rather than a shift in the curve.
(a) the cross elasticity of demand (b) the price elasticity of demand
(c) the income elasticity of demand (d) the price elasticity of supply
4. The cost function of a firm is $C = 8 + 4x + x^2$, then the fixed cost (FC) is
(a) $4 + 2x$ (b) 4 (c) 8 (d) 12
5. The derivative $\frac{dy}{dx}$ of the implicit function $3y - 12x + 17 = 0$ is
(a) 4 (b) ¼ (c) -4 (d) -¼
6. If the change in price; of a good does not bring about any change in total revenue, then the demand elasticity is
(a) greater than 1 (b) less than 1 (c) equal to 1 (d) none of the above
7. A consumer is in equilibrium when
(a) $MU_x/P_x = MU_y/P_y$ (b) $MU_x/P_y = MU_y/P_x$
(c) $MU_x \cdot P_x = MU_y \cdot P_y$ (d) $MU_y/P_x = MU_y/P_y$
8. If the income elasticity of demand is greater than 1, the commodity is
(a) a necessary (b) a luxury (c) an inferior good (d) a non related good
9. If the elasticity of AR curve is unity, MR is
(a) greater than 1 (b) less than 1 (c) equal to 1 (d) none of the above
10. The marginal propensity to consume (MPC) for the consumption function $c = c_0 + by$ is
(a) c_0 (b) b (c) $c_0 + b$ (d) None of these
11. The cross partial derivative of $Z = 3x^2 + 12xy + 5y^2$ is

- (a) 6 (b) 10 (c) 12 (d) 3

12. The total revenue from the sale of the good X is given by the equation $R = 60Q - Q^2$, then the MR function is

- (a) $60 - Q$ (b) $60 - 2Q$ (c) $60 - Q^2$ (d) None of these

II. Short answer type questions. Answer all 9 questions (9x1 = 9 weightage)

13. State the law of demand.

14. If demand for a commodity is inelastic, how will a rise in price affect the total revenue?

15. Find the marginal Product of Capital (MP_K) for the production function $Q = 36KL - 2K^2 - 3L^2$.

16. Define income elasticity of demand.

17. Given $PQ = 500$, What happens to price elasticity of demand as price falls?

18. State the law of equimarginal utility.

19. Find the differential of the function $y = 4x^3 + 5x^2 - 7$.

20. Why does supply curve generally slopes upward to the right?

21. What is the relationship between AC and MC?

III. Short essay or paragraph questions. Answer any 5 questions from 7

(5 x 2 = 10 weightage)

22. Define price elasticity of demand and distinguish between point and arc elasticity.

23. Maximise the utility function $U = xy + 3x + y$ subject to the prices $p_x = 8$, $p_y = 12$ and the consumers income $B = 212$.

24. Explain the marginal rate of substitution.

25. Suppose the price elasticity of demand for petrol is equal to unity and at Rs. 15 per litre, an individual consumes 80 litres of petrol in a week. How much price of petrol should be fixed so that he demands 60 litres of petrol?

26. What are the properties of indifference curves?

27. Find the profit maximizing level of output, price and profit for a monopolist with the demand functions, $x = 50 - 0.5 p_x$, $y = 76 - p_y$ and the total cost function $C = 3x^2 + 2xy + 2y^2 + 55$.

28. What combination of goods x and y should a firm produce to minimize costs when the joint cost function is $C = 6x^2 + 10y^2 - xy + 30$ and the firm has a production quota of $x + y = 34$. Estimate the effect of costs if the production quota is reduced by 1 unit?

IV. Essay questions. Answer any 2 questions from 3 (2 x 4 = 8 weightage)

29. A producer has the possibility of discriminating between the domestic and foreign markets for a product where the demands respectively are $Q_1 = 21 - 0.1P_1$, $Q_2 = 50 - 0.4P_2$. Total cost = $2000 + 10Q$; $Q = Q_1 + Q_2$. What price will the producer charge in order to maximize profits (i) with discrimination between markets and (ii) without discrimination?

30. Explain the law of Diminishing marginal utility.

31. Show that in the case of linear demand curve, MR curve cuts half-way the distance between AR curve and the Y axis. Using this derive the relation

$$MR = AR \left(1 - \frac{1}{e_p} \right), \text{ where } e_p \text{ is the price elasticity of demand.}$$