

BACHELOR OF ARTS EXAMINATION, 2025

(2<sup>nd</sup> Year, 1<sup>st</sup> Semester)

( MICROECONOMICS 1 )

Time : 2 Hours

Full Marks : 30

GROUP—A (CO1)

Answer any two :

8×2=16

1. (a) Draw the budget line for the consumer under following case :

A consumer has income of ₹ 1,000. Price of first good  $X$  is 10 and that of good  $Y$  is 20. Government provides subsidies for consumption of good  $Y$  at the rate 40% for  $Y \geq 40$  and consumers pay a tax of 30% on good  $X$  for consumption over 70 units of  $X$ , or for  $X > 70$ . Draw the budget line.

- (b) Suppose the utility function of consumer is  $u = \frac{xy}{x+y}$ , with prices  $p_x$  and  $p_y$  and money income  $M$ .

(i) Find out the indirect utility function.

(ii) Then find out the expenditure function.

(iii) Determine the compensated demand for the commodities. 2+3+1+2

( 2 )

2. (a) What is the economic interpretation of Lagrange multiplier in a utility maximization problem?

(b) Consider the following utility function of an individual who consumes housing ( $h$ ) at price  $p_h$  and food ( $f$ ) at price  $p_f$  and sells his labour at the wage rate  $w$ . We assume work hour is  $L$  and leisure time is  $l$  where total hour  $H = L + l$ . Suppose his utility function is

$$U = h^\alpha + f^\alpha - L$$

- (i) Determine his demand function for food, housing and labour supply schedule.
- (ii) Suppose Government gives free housing for all. What will be the impact on labour supply and leisure time?
- (iii) Now suppose Government gives free housing but introduces tax at the rate  $t$  on labour income. How does it affect the labour supply? Give intuitive explanation. 3+2+1+2

3. (a) Consider the following utility function :

$$u = 3(x_1 - 1)^{1/2} x_2^{1/3}$$

Where initially  $p_1 = 4, p_2 = 1$  and  $I = 100$ . Now suppose  $p_1$  falls to 2.

Determine compensated variation and equivalent variation for the above price change.

- (b) (i) Using revealed preference theory prove that substitution effect is always negative.
- (ii) Hence prove the Slutsky equation.

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( 5 )

8. Suppose that in a town the daily demand for auto rides is

$$Q = 2100 - 100P$$

where  $P$  is the price in ₹. Suppose also that the daily cost of operating each auto is a sum of ₹ 100 as daily rental cost per vehicle, plus a variable cost of  $\frac{q^2}{2}$ , where  $q$  is the number of auto rides per auto per day. That is  $C(q) = 100 + \frac{q^2}{2}$  for  $q > 0$   $C(q) = 0$ , otherwise.

If auto drivers can freely enter and exit in the market, find out the number of vehicles that will operate in a day and also determine the price per ride and total number of rides.

#### GROUP—D (CO-4)

Answer any one :

4×1=4

9. Let  $f(x_1, \dots, x_n)$  be the production function for a firm under perfect competition. Suppose each factor  $x_i$  is paid its marginal product  $w_i = pf_i(x_1, \dots, x_n)$ . Show that the total product is exhausted. 4

10. Suppose a firm faces the following technology :

$y = K^{0.5} + 2L^{0.5}$ . Find out the input demands if capital costs  $r$  and labour costs  $w$  and price of product is  $p = 10$ . If wage rate goes up to  $2w$ , how will profit maximizing input demand change? 2+2

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4. (a) What is weak axiom of revealed preference? When the prices were (5, 1), Veena chose the bundle  $(x, y) = (6, 3)$ . Now at the new prices  $(p_x, p_y)$ , she chooses the bundle  $(x, y) = (5, 7)$ . Under what condition Veena's behaviour would be consistent with the weak axiom of revealed preference?
- (b) Prove that if the consumer is a lender, then it turns out that if interest rate increases, the consumer must remain a lender.
- (c) Suppose Mr. Roy survives for two periods. His utility function is  $U = \ln c_1 + 0.8 \ln c_2$   
In period 1 he earns ₹ 8,00,000 but pays a tax of 20%. In period 2 he will get a pension which is 50% of his present income and another ₹ 2.5 lakhs as retirement benefit.
- (i) He does not have to pay any tax on pension and retirement benefit. If interest rate is 4.5%, will he be a net lender or borrower in period 1, where  $p_1 = 1, p_2 = 1$ ?
- (ii) Suppose there is an inflation of 5% over the period. How will this affect  $C_1$  and  $C_2$ ? 1+3+2+2

**GROUP—B (CO-2)**

Answer any one : 6×1=6

5. (a) Give suitable example to validate the following statement :  
If a firm's production function exhibits decreasing marginal returns in each factor, then it must also exhibit decreasing returns to scale.

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[ Turn Over ]

( 4 )

- (b) What is elasticity of substitution? Determine the same for the following production function : 2+1+3

$$Y = x_1^{1/3} + x_2^{1/3}$$

6. (a) Explain critically why short-run average cost is always greater than long-run average cost of a firm.
- (b) A firm's long-run total cost curve is  $TC(Q) = 40Q - 10Q^2 + Q^3$ .

Over what range of output does the production function exhibit economies of scale? Over what range does it exhibit diseconomies of scale? At what quantity do you get minimum efficient scale? 3+3

**GROUP—C (CO-3)**

Answer any one : 4×1=4

7. (a) Differentiate between shutdown point and break-even point for a firm in perfectly competitive industry.
- (b) Suppose the cost of production of  $X$  in short-run of a firm in a perfectly competitive market is

$$C = q^3 - 2q^2 + 2q + 2$$

Find out the short-run supply function. 2+2

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