

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIRST SEMESTER EXAMINATION, DECEMBER 2019

FIRST YEAR [BATCH 2019-22]

ECONOMICS [Honours]

Paper : I (CC1)

Date : 11/12/2019

Time : 11 am – 1 pm

Full Marks : 50

1. Answer any three questions of the following: [3×4]
- a) Assume that the marginal cost of production is greater than the average variable cost. Can you determine whether the average variable cost is increasing or decreasing? Explain.
- b) Evaluate the elasticity of substitution for the production function  $z = Ax^\alpha y^{1-\alpha}$  where  $A, \alpha$  are constants,  $0 < \alpha < 1$ .
- c) i) Please show whether two indifference curves can intersect.  
ii) 'If a consumer's demand curve for a good slopes upward, then an increase in his income would shift the curve to the left.' Is the statement justified? (2+2)
- d) Check if WARP is satisfied in each of the following cases by comparing the choices in each situation: i.  $M=20, (p_1, p_2)=(1,1)$ , choice=(5,15); with  $M=20, (p_1, p_2)=(2,0.50)$ , choice=(8,8); ii.  $M=5, (p_1, p_2)=(1,2)$ , choice=(1,2); with  $M=5, (p_1, p_2)=(2,1)$ , choice=(2,1). (2+2)
- e) i) A consumer treats commodities X and Y as perfect substitutes. Draw the indifference map of the consumer.  
ii) A consumer likes both commodities X and Y, but does not like to consume them together. Draw the indifference map of the consumer. (2+2)
- f) A producer produces a good Y with labour (L) and capital (K) using fixed-coefficient technology. Write down the production function and draw the corresponding isoquant map. (2+2)
2. Answer any one question of the following: [1×8]
- a) Suppose the long-run total cost function for an industry is given by the cubic equation —  $TC = a + bq + cq^2 + dq^3$ . Show (using calculus) that total cost function is consistent with a U-shaped average cost curve for at least some values of  $a, b, c$ , and  $d$ .
- b) i) Suppose there are two goods X and Y, and money income of the consumer is given as  $M$ . Using a diagram, show how you split the effect of a fall in price of X into substitution and income effects.  
ii) Show how your diagrammatic representation will change if you consider X to be an inferior good. Do the same exercise considering X as a Giffen good. 4+(2+2)

3. Answer **any two** questions of the following:

[2×15]

- a) i) Show that for the price equation  $\log p = 100 - \frac{1}{2} \log q$ , where  $q$  is the quantity demanded, the commodity is supposed to be a luxury good.
- ii) Discuss in detail the construction of long run average cost (LAC) curve from various short run average cost (SACs) curves. (7+8)
- b) i) Distinguish between economies of scale and economies of scope. Why can one be present without the other?
- ii) Can constant returns to scale co-exist with diminishing marginal product? Explain your answer using a suitable production function.
- iii) For the production function —  $q = 100(K^{0.8}L^{0.2})$ ; beginning with a capital input of 4 units and a labor input of 49 units, show that the marginal product of labor and the marginal product of capital are both decreasing.
- Does this production function exhibit increasing, decreasing, or constant returns to scale? (4+5+6)

- c) i) Ram earns a monthly income of  $M$  which he spends on buying soaps ( $x$ ) and perfumes ( $y$ ). His utility function is given by
- $$U = \min\{x, y\}$$
- Perfume is a numeraire commodity. Suppose soaps can either be bought at a fixed price of Rs. 2 per unit from local store; or it can be bought at a reduced price of Rs.  $(2-P)$  per unit from a distant shopping mall, while paying for an auto fare of Rs.  $T$ . Express the value of  $P$  in terms of  $T$  and  $M$  so that the consumer is indifferent between buying soaps from the local store and the shopping mall (meaning Ram pays the same price, *net of transportation costs*, no matter where he buys soaps from).
- ii) I. Consider a situation where a poor family is given a food stamp of Rs 200. In a diagram, show the budget line with food and all other goods on the horizontal and vertical axes respectively. Also show the equilibrium in the same diagram if the family chooses to consume at the point of kink in the budget line.
- II. Let the family can freely trade the food stamps in exchange of cash in the black market. In the above diagram, check if the family is now better-off.
- III. Now suppose, the family is able to get only 10% of the face value of the food stamps in the black market, due to increased policing. How does your answer change with respect to your answer in II? Explain using the same diagram.
- IV. In a couple of sentences, please write the desirability of the black markets in light of your responses in previous questions. [7+(2+2+2+2)]
- d) i) Suppose there are 100 consumers in a market, each with different utility function over potatoes and milk and with different incomes. The market price of potatoes is Rupees 10 per kilo while the same for milk is Rupees 20 per litre.

- I. Assuming well-behaved preferences for all, find a value (or a range of) value(s) for *Marginal Rate of Substitution* (MRS) between potato and milk for the richest person at consumer equilibrium. Will the poorest person have greater *Marginal Rate(s) of Substitution* at consumer equilibrium as compared to the richest person's?
  - II. How does your last answer change if the utility function for the poorest person is changed to  $U = P + M$  (where  $P$  and  $M$  respectively denote the consumption of potatoes (in kilos) and that of milk (in litres) for the poorest person) while the utility functions are unchanged for the other individuals?
  - III. Derive the Income and Price Consumption curves for milk graphically, for the poorest person with the utility function in part II.
- ii) Raja has the budget line  $3x+4y=25$  where  $x$  denotes pens and  $y$  denotes bread. His utility function is given by  $U(x, y) = 12x + 16y - x^2 - y^2$  where  $x \geq 0$  and  $y \geq 0$ .
- I. Find the optimum bundle.
  - II. What happens to the optimum commodity bundle if, instead of Rs. 25, the consumer has Rs. 50 or more to spend on the two goods?

$$[(2+2)+1+3]+[(4+3)]$$

\_\_\_\_\_ × \_\_\_\_\_