

B.A. (Honours) Examination, 2022

Semester-III

Economics

Course: CC-5

(Intermediate Microeconomics I)

Time: 3 Hours

Full marks: 60

Questions are of value as indicated in the margin.

Answer **Question no 1** and **any three** from the rest of the following questions

1. Consider the following utility function.

$$U(x, y) = \sqrt{x} + \sqrt{y}.$$

The price of good x is P_x and the price of good y is P_y . We denote income by M , as usual, with $M > 0$. Also $x > 0$ and $y > 0$.

- (i) Is the utility function increasing in x ? Is the utility function concave in x ?
- (ii) The consumer maximizes utility subject to a budget constraint. Write down the utility maximization problem of the consumer with respect to x and y .
- (iii) Solve explicitly for x^* and y^* as a function of P_x , P_y , and M .
- (iv) Check the second order condition.
- (v) Can you guess the solutions for x^* and y^* for the following utility function?

$$U(x, y) = (\sqrt{x} + \sqrt{y})^2.$$

(1+1)+1+5+4+3

2. A firm has the following total-cost and demand functions:

$$C = \frac{1}{3}Q^3 - 7Q^2 + 111Q + 50$$

$$Q = 100 - P$$

- (i) Does the total-cost function satisfy the coefficient restrictions in the short run context?
- (ii) Write out the total-revenue function R in terms of Q .
- (iii) Formulate the total-profit function π in terms of Q .

(iv) Find the profit-maximizing level of output, Q^* .

11

(v) What is the maximum profit?

111.3

4+2+4+5

3. (i) Show that diminishing marginal utility is neither necessary nor sufficient condition for regular strictly quasi concavity of the utility function or convexity of indifference curve.

(ii) Interpret the Lagrange Multiplier in an optimization problem with equality constraint.

(iii) Show that the sum of own price elasticity, income elasticity and cross price elasticity is zero.

7+5+3

4. (i) "An inflection point must be a stationary point."- True or False? Explain your answer.

(ii) Derive and interpret the Slutsky equation for a consumer with utility function $U = xy$.

5+10

5. (i) Explain Walrasian and Marshallian stability conditions with the help of demand and supply curves.

(ii) Give an example of equilibrium which is stable according to Walrasian condition but not according to Marshallian condition.

(iii) (a) Verify that a cubic function $z = aX^3 + bX^2 + cX + d$ is in general neither quasiconcave nor quasiconvex.

(b) Is it possible to impose restrictions on the parameters such that the function becomes quasiconcave and quasiconvex simultaneously for $X \geq 0$? Explain.

4+4+(4+3)

6. (i) ~~Proof~~ that for the CES production function, the sum of output elasticities is one.

(ii) Show that for Cobb-Douglas production function the expansion path is a straight line through the origin.

(iii) Show that Cobb-Douglas production function is a limiting case of CES production function.

4+5+6

7. (i) State and explain the Weak Axiom of Revealed Preference.

(ii) Consider the following dataset of consumer in a world with only two goods.

when prices $p_1 = 1$ and $p_2 = 2$ the chosen bundle (x_1, x_2) was $(10, 1)$;

when $(p_1, p_2) = (2, 1)$, $(x_1, x_2) = (5, 5)$;

when $(p_1, p_2) = (1, 2)$, $(x_1, x_2) = (5, 4)$.

Check whether the above date set satisfies the Weak Axiom of Revealed Preference.

4+11