INTERMEDIATE MICROECONOMICS - I
Tutor Marked Assignments

Course Code: BECC-105
Assignment Code: Asst /TMA /2025-26
Total Marks: 100

Assignment One

Answer the following Descriptive Category questions in about 500 words each. Each question carries 20 marks

2 × 20 = 40

1. (a) What role does the marginal utility of income play in the Lagrangian formulation of consumer equilibrium?

   (b) Consider a consumer's utility function

$$u(x_1, x_2) = 300 + \sqrt{x_1} + \sqrt{x_2}$$

   Assuming price of good x_1 and good x_2 to be p_1 and p_2, respectively and income of the consumer be M. Determine the optimal choice of consumption of goods x_1 and x_2.

   (c) Compare and contrast the effects of an income tax and a commodity tax on consumer equilibrium.

2. (a) Explain Hicks-neutral, labour-augmenting, and capital-augmenting technological progress.

   (b) If a production function $f(x_1, x_2)$ has the equation

$$f(x_1, x_2) = \left[a + b\frac{x_1}{x_2}\right]^{-1} x_1$$

   for positive parameters *a*, and *b*, calculate the marginal product of each input, and the marginal rate of technical substitution. Does the production function exhibit decreasing, constant, or increasing returns to scale? Explain briefly.

   (c) Sketch isoquants of a Leontief function and explain the absence of factor substitution.

Assignment Two

Answer the following Middle Category questions in about 250 words each. Each question carries 10 marks.

3 × 10 = 30

3. (a) Write the general form of a Cobb-Douglas production function. How do you derive the profit function from it?

   (b) Determine the profit function, the supply function, and the (unconditional) input demand functions for a perfectly competitive firm with a production function

$$f(x_1, x_2) = \sqrt{\frac{x_1 x_2}{x_1 + 1}}$$

4. (a) Graphically represent a concave utility function for a risk-averse person. Indicate how the certainty equivalent is derived.

   (b) Consider the vNM expected utility function

   $$U(W) = 200 - \frac{1}{W}$$

   The individual has initial wealth W. An opportunity arises to invest half of his wealth W in a stock. With probability π the stock will triple in value (to $\frac{3W}{2}$); with probability $1 - \pi$ the stock will be worthless. What must π be in order for this person to be willing to make this investment?

5. (a) What is an expansion path? Show and explain the shape of a typical expansion path under a Cobb-Douglas production function.

   (b) Given a CES production function

   $$f(x_1, x_2) = \left(\sqrt{x_1} + \sqrt{x_2}\right)^3$$

   where $f(x_1, x_2)$ is the quantity of output, and x_1 and x_2 are the quantities used of two inputs. Derive the conditional demand function for the inputs x_1 and x_2. Also compute the firm's cost function.

Assignment Three

Answer the following Short Category questions in about 100 words each. Each question carries 6 marks.

$5 \times 6 = 30$

6. What are the key properties of the profit function? Explain the concept of convexity in this context.
7. Under what circumstances can a firm in perfect competition continue producing even when it is making losses in the short run?
8. Distinguish between unconditional and conditional input demand functions.
9. What does the elasticity parameter in CES production function signify?
10. How does the marginal utility of a good behave in the case of quasi-linear preferences?