EX0012

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF ECONOMICS

BACHELOR OF SCIENCE HONOURS DEGREE IN ECONOMICS

MICROECONOMICS: EC 213 (3)

DURATION: 3 HOURS

NOV 2024

INSTRUCTIONS TO CANDIDATES

1. Answer any four (4) questions.
2. The paper carries six (6) questions.
3. All questions carry equal marks of 25 each.
4. No cellphones allowed in the exam room.

Question 1

a. Suppose a consumer's utility function is $U(x_1, x_2) = x_1^{\frac{2}{5}} + 5x_2^{\frac{3}{5}}$. Given that the prices for goods x_1 and x_2 are \$2 and \$3 respectively and the consumer's weekly income is \$60.
   i. Find the consumer's optimal consumption bundle. **[8 Marks]**
   ii. Calculate the price elasticity of demand for good x_1 if its price falls to \$1. **[6 Marks]**

b. Suppose that the government decides to ration consumption of x_1 and institute a policy such that consumption of x_1 for the first 6 units will cost \$1.50 less. Draw the consumer's budget line and show the coordinates of the kink. **[11 Marks]**

Question 2

a. Explain any three (3) axioms of consumer theory. **[9 Marks]**
b. Use graph(s), to explain
   i. Why indifference curves should not cross. **[4 Marks]**
   ii. Convexity of indifference curves. **[4 Marks]**
c. With the aid of diagrams, explain the following terms as used in consumer preferences
   i. Marginal Rate of Substitution (MRS) **[4 Marks]**
   ii. Satiation point **[4 Marks]**

Question 3

A firm has a production function of the Cobb-Douglas nature given as:

$$Q = 12L^{3/4}K^{1/5}$$

where Q is output, L is labour and K is capital

a. Calculate:
   i. The marginal productivities of factors **[4 Marks]**
   ii. MRS_{LK} and comment on your results **[4 Marks]**
   iii. The returns to scale and comment **[4 Marks]**
b. Given that the wage rate is \$2 per hour and the rental rate of capital is \$3. Compute the minimum cost of producing 100 units for this producer. **[13 Marks]**

Question 4

The following utility function represents preferences for a Bindura resident over two consumption bundles X_m and X_c:

$$U(X_m, X_c) = X_m{}^{0.25} X_c{}^{0.75}$$

The resident's monthly income is \$600. Let P_m denote the dollar price of a unit of good X_m and P_c denote the dollar price of a unit of good X_c

a. Suppose that $P_m = \$3$ and $P_c = \$1.50$. Find the resident's optimal consumption bundle **[6 Marks]**
b. Suppose now that the government subsidises good X_m. Specifically, the price of good X_m falls from \$3 to \$1 for the first ten units of the good. In a neat and clear diagram, graph the president's budget line. Determine the coordinates of the kink point. **[12 Marks]**
c. Using illustrations, explain the law of diminishing marginal returns **[7 Marks]**

Question 5

a. All sugar cane growers have the following cost function both in the long-run and short-run: $C(x) = 20 + 0.5x$. The demand function is $D(P) = 150 - 5p$.
   i. Find each firm's short run supply function **[6 Marks]**
   ii. Suppose that there are five firms. Find the short-run equilibrium price and quantity. **[7 Marks]**

b. Explain using relevant examples the returns to scale concept **[10 Marks]**
c. Define the monotonicity principle **[2 Marks]**

Question 6

a. The monopolist faces a demand curve given by $D(p) = 100 - 2p$. Its cost function is $C(y) = 2y$.
   i. Calculate the optimal level of output and price **[8 Marks]**
b. Distinguish between a budget constraint and a budget liner **[5 Marks]**
c. Explain any two (2) properties of a budget line **[4 Marks]**
d. Use a graph to explain indifference curves of the following categories of goods
   i. Perfect substitutes **[4 Marks]**
   ii. Perfect complements **[4 Marks]**

END OF PAPER