

UNIVERSITY OF LESOTHO

EC2502: Intermediate Microeconomics

BA Examination

[SUPPLEMENTARY]

August 2023

Marks 100

Time: 3 Hours

Instructions:

- 1. Show all necessary workings and make clear drawings of graphs.*
- 2. Answer questions one (Compulsory) and any other three.*

Question 1

The Lesotho government has a food stamp program for families whose income falls below a certain poverty threshold. Food stamps have a dollar value that can be used at supermarkets for food purchases as if the stamps were cash, but the food stamps cannot be used for anything other than food.

a) Suppose the program provides M500 of food stamps per month to a particular family that has a fixed income of M1,000 per month.

i. With “maloti spent on food” on the horizontal axis and “dollars spent on non-food items” on the vertical, illustrate this family’s monthly budget constraint. How does the opportunity cost of food change along the budget constraint you have drawn? **[8 marks]**

ii. How would this family’s budget constraint differ if the government replaced the food stamp program with a cash subsidy program that simply gave this family M500 in cash instead of M500 in food stamps? **[6 marks]**

iii. Which would the family prefer, and what does your answer depend on? **[5 marks]**

iv. How would the budget constraint change if the government simply agreed to reimburse the family for half its food expenses? **[5 marks]**

v. If the government spends the same amount for this family on the program described in (iii) as it did on the food stamp program, how much food will the family consume? Illustrate the amount the government is spending as a vertical distance between the budget lines you have drawn. **[8 marks]**

b). Write down the mathematical expression for the choice set you drew in A(i), letting x_1 represent Maloti spent on food and x_2 represent dollars spent on non-food consumption. How does this expression change in A(ii) through (iv)? **[8 marks]**

Question 2

Preliminary findings from the 2017 Household Budget Survey (HBS) indicate that food and housing (i.e., rental houses like a duplex) are the only two goods consumed by residents of Maseru. The report further shows that the price of food has increased in Maseru. As you read through the preliminary report, you realise that demand for housing (or rental houses) decreases with an increase income.

a) What type of good is housing (or rental houses)? Explain. **[5marks]**

- b) Decompose (graphically) the total effect of the price change into the Substitution and Income effects for both goods. Label the horizontal axis the amount of food. [15 marks]

Question 3

Suppose a consumer-facing a linear budget constraint has preferences given by a Cobb-Douglas utility function: $U(x_1, x_2) = x_1^2 x_2$ such that the optimal consumption bundle is (x_1^*, x_2^*) . If his exogenous income is M180 while the initial prices are M2 and M10 for x_1 and x_2 , respectively.

- a) State two conditions for optimality. [5 marks]
- b) Find the optimal utility maximising consumption bundle is (x_1^*, x_2^*) . [10marks]
- c) Find the numerical value of utility from the optimal bundle. [5marks]

Question 4

Beltma (PTY) Ltd is the only firm in health industry in Leribe and it is faced with the following inverse demand function $P(q) = 140 - q$ and the upward sloping marginal cost (MC) as $20 + 2q$. Against this background;

- a) Draw an appropriate graph to depict this information and calculate the equilibrium quantity and price charged by Beltma. Accurately show them in the graph. [5 marks]
- b) Calculate the consumer surplus, producer surplus and dead-weight loss. [15 marks]

Question 5

Consider a firm that uses two inputs to produce its output. Let z_1 be the quantity of input 1 that is used, and z_2 be the quantity of input 2 and the price of input 1 is w and input 2 is r . Suppose the firm has the following production function:

$$y = Az_1^\alpha z_2^\beta$$

- a) Draw a sketch of an isoquant and iso-cost for the production function. [4 marks]
- b) Calculate the marginal product for each input and the Marginal Rate of Technical Substitution (MRTS) and explain in words what the latter means. [8 marks]

- c) Use the optimality condition to determine the quantities of the inputs to maximize the production and show them accurately on a graph draw from question a. **[8 marks]**