



**MAASAI MARA UNIVERSITY**  
**REGULAR UNIVERSITY EXAMINATIONS**  
**2022/2023 ACADEMIC YEAR**  
**FIRST YEAR FIRST SEMESTER**

**SCHOOL OF BUSINESS & ECONOMICS**

**MASTER OF SCIENCE IN ECONOMICS, MASTER OF  
SCIENCE IN AGRICULTURAL ECONOMICS & MASTER OF  
SCIENCE IN ECONOMICS & STATISTICS**

**COURSE CODE: ECO 8101**

**COURSE TITLE: MICROECONOMICS I**

**DATE: DECEMBER 2022**

**TIME:**

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**INSTRUCTIONS TO CANDIDATES**

Answer ALL questions

*This paper consists of **three** printed pages. Please turn over*

## QUESTION ONE

Suppose that firm's production technology in a certain industry is such that all input is essential in the production process. There are only two inputs Labor (L) and Capital (K). Labor accounts for 75% of a unit of output while the input Capital accounts for the rest. All firms in the industry are equally efficient. Letting  $w$  and  $r$  be the unit prices of the two inputs L and K respectively.

- (a) State the described production function **(6 marks)**
- (b) The firm plans to restructure its technology by laying off its labor force. By how much would the firm have to increase capital to preserve output. **(6 marks)**
- (c) "The cost function is a sufficient statistic for the technology since all the economically relevant information about the technology can be obtained from the cost function" Demonstrate this statement from the technology specified in (a) above. **(6 marks)**

## QUESTION TWO

A maize farmer produces using two inputs labor, (L) and fertilizer, (K). The farmer's profit function is given by

$$\Pi(p, w_1, w_2) = 0.0819w_1^{-5}w_2^{-4}p^{10}$$

Where  $P$  is price of maize per bag and  $w_1$  and  $w_2$  are the unit prices of fertilizer and labor respectively. Fertilizer is measured in 1kg bag, while labor is measured in man hours.

- (a) A legitimate profit function is convex, and positively linearly homogenous in both input and output prices. Is the above function legitimate? Show your working. **(6 marks)**
- (b) If maize sells at Sh 5 per bag, labor costs Sh 2 per hour and fertilizer cost Sh 3 per kg bag, determine the number of bags of maize that will maximize the farmer's profit. **(9 marks)**

## QUESTION THREE

Consider  $V(P, M) = P_1^{-a}P_2^{a-1}M$

Where  $P_1$  and  $P_2$  are the prices for two goods  $X_1$  and  $X_2$  respectively, and  $M$  is the consumer income.

- (a) State and derive the Slutsky's equation. **(10 marks)**
- (b) Given the indirect utility function above, demonstrate the Slutsky's equation. **(5 marks)**

#### **QUESTION FOUR**

Clearly distinguish between the following pairs of concepts:

- (i) Production possibilities set; Input requirement set **(3 marks)**
- (ii) Hotelling's lemma; Shepherds lemma **(3 marks)**
- (iii) Compensated demand function; Uncompensated demand function **(3 marks)**
- (iv) Technical Efficiency; Economic Efficiency. **(3 marks)**
- (v) The Roy's Identity; The Slutsky's Equation. **(3 marks)**