



# **MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS**

**2023/2024 ACADEMIC YEAR**

**SECOND YEAR FIRST SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS  
BSC. AGRICULTURAL ECONOMICS RESOURCE  
MANAGEMENT & BSC. AGRIBUSINESS  
MANAGEMENT.**

**COURSE CODE: ARE 2104-1**

**COURSE TITLE: AGRICULTURAL PRODUCTION  
ECONOMICS**

**DATE: 15/12/2023**

**TIME: 1100-1300 HRS**

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**INSTRUCTIONS TO CANDIDATES**

1. Answer Question **ONE** and any other **TWO** questions

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

### QUESTION ONE (20 MARKS)

a) A firm has the following production function and budget constraint respectively.

$$Q=K^{0.4}L^{0.6}$$

$$4K+12L=24$$

- i. Set up constrained output maximization problem from the given information **(2marks)**
  - ii. Determine the critical values of K,L and  $\lambda$  **(5 marks)**
  - iii. By applying the second order condition , confirm that the critical values of K and L present maximum Q **(3 marks)**
  - iv. Determine the stationary values of the lagrangian function **(2 marks)**
- b) Explain the meaning of the following concepts:
- i. Isoquant **(2marks)**
  - ii. Marginal Rate of Technical Substitution **(2marks)**
  - iii. Elasticity of Input Substitution **(2marks)**
  - iv. Isocost line **(2marks)**

### QUESTION TWO (15 MARKS)

a) Suppose that the price of the output is ksh3, the price of the input  $X_1$  is ksh5, and the price of input  $X_2$  is ksh4. Is it possible to produce and achieve a profit? Explain. What are the necessary and sufficient conditions for profit maximization? **(4marks)**

b) Suppose that the production function is given by

$$y = X_1^{0.5} X_2^{0.333},$$

Find

- i. The *MPP* of  $X_1$  **(2marks)**
- ii. The *MPP* of  $X_2$  **(2marks)**
- iii. The Marginal rate of substitution of  $X_1$  for  $X_2$  **(3marks)**
- iv. Draw the isoquants for this production function. Do they lie closer to the  $X_1$  or the  $X_2$  axis? Explain. What relationship does the position of the isoquants have relative to the productivity of each input? **(4marks)**

### QUESTION THREE (15 MARKS)

- a) For the following production functions, does the law of diminishing returns hold? **(4marks)**
- i.  $y = X^{0.5}$
  - ii.  $y = 3X$
  - iii.  $y = X^3$
  - iv.  $y = 6X - 0.10X^2$
- b) Explain the scope of agricultural production economics **(6marks)**
- c) Agricultural economists are frequently accused of spending too little time in the real world. A preoccupation with abstract theoretical issues means that agricultural economists are sometimes unable or unwilling to look at the fundamental issues linked to the production and marketing of agricultural commodities. Explain your answer. **(5marks)**

### QUESTION FOUR (15 MARKS)

- a) Is the shadow price of a dairy feed ration different from the price the farmer pays per shilling of the ration? Explain. Of what importance is a shadow price to a farmer seeking to maximize profits from a dairy herd? **(3marks)**
- b) The real world is dynamic. If so, why do agricultural economists continue to rely so heavily on comparative statics? **(4marks)**
- c) Explain four characteristics of pure competition. **(4marks)**
- d) Explain four mitigation measure of risks and uncertainties **(4marks)**

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