



**MANICALAND STATE UNIVERSITY OF
APPLIED SCIENCES.
FACULTY OF AGRIBUSINESS AND COMMERCE
Agricultural Economics and Development Department**

APPLIED AGRICULTURAL PRODUCTION ECONOMICS

CODE: AEDT 211

SEASONAL EXAMINATIONS

JANUARY 2022

DURATION: 3 HOURS

EXAMINER: MR. N. JAMBO

INSTRUCTIONS

1. Answer **four** (4) questions in total
2. Each question carries 25 marks
3. Total marks 100

QUESTION 1

- a) Define production economics [3]
- b) Outline any **six** (6) uses of economics in agriculture [6]
- c) Discuss the **four** (4) factors of production in agriculture. [12]
- d) List the **four** (4) forms in which a production function can be expressed. [4]

QUESTION 2

- a) Explain the following types of efficiency.
 - i. Technical efficiency [2]
 - ii. Economic efficiency. [2]
 - iii. Allocative efficiency [2]
- b) Discuss the characteristic features of stage 1 in the production process. [10]
- c) Determine the state of elasticity of production at the **three** (3) stages of production. [9]

QUESTION 3

- a) Explain the following terms:
 - i. Isoquant [2]
 - ii. Marginal Rate of Technical Substitution (MRTS) [2]
- b) Consider the Cobb Douglas Production function:

$$Q = 3X_1^{0.5}X_2^{0.5}$$

Where X_1 and X_2 are two variable input factors employed in the production of Q. Determine the marginal rate of technical substitution (MRTS) of X_1 for X_2 . [5]

- c) Suppose you are given the following production functions. Calculate the MRTS of labor (L) for capital (K).
 - i. $Q = LK$ [4]
 - ii. $Q = 3L + 6K$ [4]
 - iii. $Q = L^{0.4}K^{0.6}$ [4]
 - iv. $Q = 4L^{1/3}K^{2/3}$ [4]

QUESTION 4

- a) Suppose you are given a production function: $Y = 20 + 8X - X^2$, where the Price of X is \$4 and the Price of Y is \$8.
- Determine the levels of input and output required to maximize profit. [6]
 - Calculate the optimum profit. [4]
- b) Assume that a firm produces its product in a system described in the following production function: $Q = 3X + 5Y + XY$, where $P_X = \$3$ and $P_Y = \$6$
Here, X and Y are two variable input factors employed in the production of Q.
- It is possible to express the cost function associated with the use of X and Y in the production of Q as $Cost = P_X X + P_Y Y$ or $Cost = 3X + 6Y$. Use the Lagrangian technique to determine the maximum output that the firm can produce operating under a R1000 budget constraint for X and Y. [12]
 - Find the value of lambda (λ) [3]

QUESTION 5

- a) Define the Law of Diminishing Marginal Returns [2]
- b) Discuss the following laws of returns:
- Law of increasing returns [3]
 - Law of constant returns [3]
 - Law of decreasing returns [3]
- c) Consider the following production function:

$$Y = 9X_1 - 3X_1X_2 + 6X_2$$

Where: Y is maize output; X_1 represents the number of units of fertilizer input and X_2 represents the number of units of seed input.

- Find the level of X_1 and X_2 required to maximize the maize output. [4]
- Suppose the cost of fertilizer per unit is \$2 and the cost of seed per unit is \$4. Find the values of X_1 and X_2 that maximize output if the farmer's budget is \$100. [10]

END OF EXAM