GWANDA STATE UNIVERSITY

FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

BACHELOR OF SCIENCE HONOURS DEGREE IN AGRICULTURAL ECONOMICS

Applied Agricultural Production Economics: LAE2201

Second Semester Final Main Examination Paper

JUNE 2025

This examination paper consists of 4 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **Calculator, Graph paper**

Examiner's Name: **N.T Muzeza**

INSTRUCTIONS

1. Answer **all** questions in Section A
2. Answer **two** questions in Section B

MARK ALLOCATION

QUESTION	**MARKS**
SECTION A	**60**
SECTION B	**40**
TOTAL ATTAINABLE MARKS	**100**

SECTION A: Answer ALL questions in section A

Question 1

a) Giving examples, explain the following terms in agricultural production economics**:**
   i. Marginal physical product **[2]**
   ii. Average physical product. **[2]**
   iii. Total Physical Product **[2]**

b) Gwanda state University is conducting and experiment to test effectiveness of Nitrogen nutrient on maize production on a specified production function. Given the following production function, calculate the Total Physical Product (TPP), Marginal Physical Product (MPP) and Average Physical Product (APP) and put the answers in the appropriate columns: **[16]**

$Y= 75x + 42\ x^2 + 0.0023\ x^3$

X Nitrogen	**TPP**	**MPP**	**APP**
0			
20			
40			
60			
80			
100			
120			
140			
160			
180			
200			
220			
240			

c) From results calculated in the table above, on a graph paper, plot a graph, Illustrating the Neoclassical Production Function Theory's three stages of production and, the relationship among TPP, MPP, APP and Marginal diminishing returns **[10]**

Question 2

The table below shows the relationship between Total Physical Product, Average Physical Product, Marginal Physical Product and Marginal Value Product. If the price of output per is

$1 per unit of input, complete the table: **[5]**

Input	TPP	APP	MPP	TVP	AVP	MVP
0	**0**					
10	**75**					
20	**245**					
30	**435**					
40	**560**					
50	**648**					

Question 3

Assume a maize production function is given by the following function:

$Y = 4 + 3x + 24\,x^2 - 4x^3$

a) Find the input level that maximise output? **[5]**
b) What is the maximum output (maize yield) at the calculated level of input? **[3]**

Question 4

Discuss the classical measures of the following farm cost functions: Total Cost, Fixed Cost, Variable Cost and Marginal Cost. **[8]**

Question 5

a) List features of an Isoquant **[4]**

b) Give reasons why the isoquant line cannot cross **[3]**

SECTION B: Answer TWO questions in section B

Question 6

a) Describe four factors of production as used in production economics. **[12]**
b) Outline four assumptions of the production functions. **[8]**

Question 7

a) Explain fully the properties Cobb Douglass production function, and clearly illustrate its properties using the Algebraic expression function **[10]**
b) Describe the criteria of determining a Homogenous production function, and the different conditions of returns to scale **[10]**

Question 8

Clearly illustrate the General Conditions for Profit Maximization in agricultural production Economics. Further, explain the sufficient conditions for the maximization or minimization of a function? **[20]**

Question 9

Mr Segaldo, an Agricultural Economist suggested the following two input production function for Nitrogen and Phosphate in maize production**.**

$$Y = 10x_1 - 10x_2 + x^2_1 + 10x_1x_2$$

Given that inputs in the production function are represented by x_1 and x_2 for Nitrogen and Phosphate respectively, calculate the following:

a) Find the input levels that satisfy the necessary and sufficient conditions for maximum or minimum output. **[7]**
b) Confirm that output is a maximum or a minimum **[3]**
c) Further find level input that maximise profit given the price for maize output per unit is $3.00 and, the input price is $0.15 per unit of Nitrogen and $0.10 per unit of Phosphate **[7]**
d) Indicate if the profits are at point of maximum or at point of minimum **[3]**

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END OF EXAMINATION PAPER