MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF AGRIBUSINESS AND COMMERCE

DEPARTMENT OF AGRICULTURE ECONOMICS

AND

DEVELOPMENT

APPLIED AGRICULTURAL PRODUCTION ECONOMICS

CODE: AEDT 211

SESSIONAL EXAMINATIONS
AUGUST 2022

DURATION: 3 HOURS

EXAMINER: MR. N. JAMBO

INSTRUCTIONS

1. *Answer ANY Four (4) questions*

2. *Be concise and clear*

3. *Start a new question on a fresh page*

4. *Total marks 100*

QUESTION 1

a) Define the term production. **[1]**

b) The table below shows the calculation of the optimum production level at an input price (Px) of $12 per unit and an output price (Py) of $2 per unit.

Complete the table below and show that profit is maximum when VMP = Px **[24]**

UNITS OF INPUT (X)	TOTAL PRODUCT (Y)	VALUE OF MARGINAL PRODUCT (VMP)	VALUE OF TOTAL PRODUCT (VTP)	TOTAL INPUT COSTS (TIC)	TOTAL PROFIT (∏)
0	0	-	-	-	-
1	3	-	-	-	-
2	12	-	-	-	-
3	24	-	-	-	-
4	38	-	-	-	-
5	53	-	-	-	-
6	67	-	-	-	-
7	78	-	-	-	-
8	86	-	-	-	-
9	92	-	-	-	-
10	96	-	-	-	-
11	98	-	-	-	-
12	94	-	-	-	-

QUESTION 2

a) Explain the following terms:

i. Isoquant **[2]**

ii. Marginal Rate of Technical Substitution (MRTS) **[2]**

b) Outline any **four** (4) characteristics of an isoquant. **[4]**

c) Consider the Cobb Douglas Production function:

$$Q = 4X_1^{1/2}X_2^{1/2},$$

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]**

d) With the aid of diagrams, discuss the following categories of isoquants:

i. Isoquants with fixed proportion combination of inputs, **[4]**

ii. Isoquants with constant rate of substitution between inputs, **[4]**

     iii.   Isoquants with varying rate of substitution between inputs.   **[4]**

QUESTION 3

a) A farmer is considering undertaking the production of either maize or beans. Study the following information about the two crops then answer the questions that follow:

	Maize	Beans
Yield per ha	5 500 kg	5 000 kg
Price	$15 per kg	$50 per kg
Cost of cultivation/ha	$3 000	$3 600
Amount of seeds/ha	25 kgs	20 kgs
Cost of seeds/kg	$100	$800
Labor requirements/ha	50 man-days	75 man-days
Cost of labor	$50 per man-day	$200 per man-day
Cost of DAP fertilizer/bag	$1 500	$1 500
Amount of DAP fertilizer/ha	3 bags	2 bags
Amount of CAN fertilizer/ha	3 bags	1 bag
Cost of CAN fertilizer/bag	$1 000	$1 000
Cost of sprays	-	$3 000

     i.   Calculate the gross margins for each crop.   **[14]**

     ii.   From your calculations, which crop is more profitable to grow?   **[2]**

b) Suppose a production function is given by: $Y = 5L^{0.8}$

Where, the price per unit of labor (L) is $4 and the price of Y is $2.

     i.   Calculate the level of output required to maximize the profit.   **[6]**

     ii.   What is the profit at this optimum level of production?   **[3]**

QUESTION 4

a) Distinguish between short run and long run in the context of agricultural production.

     [4]

b) With the aid of a graph, discuss the characteristic features of stage one (1) in the

production process.   **[10]**

c) Determine the state of elasticity of production at the **three** (3) stages of production.

     [6]

d) Outline any **five** (5) uses of production functions.   **[5]**

QUESTION 5

a) Define the following terms:

    i.   Increasing returns to scale   **[2]**

    ii.   Decreasing returns to scale   **[2]**

    iii.   Constant returns to scale   **[2]**

b) Determine whether the following production functions exhibit constant, or increasing or decreasing returns to scale. In each case show whether economies or diseconomies of scale exist.

    i. $Q = 2L + K$ **[3]**

    ii. $Q = 2L^{\vartheta}3K^{1-\theta}$ **[3]**

    iii. $Q = 5L^{0.2}K^{0.9}$ **[3]**

c) A farm has a contract to produce 1000 tons of maize. The farm uses labor (L) and capital (K) to produce the maize. The price of labor (P_L) is \$10 per hour and the price of capital (P_K) is \$40 per tractor hour.

The production function for the maize output is given as:

$$Q = f(L, K) = 20L^{1/2}K^{1/2}$$

Determine the amount of labor and capital required to minimize the cost of producing the 1000 tons of maize.   **[10]**

END OF EXAMINATION