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UNIVERSITY OF SWAZILAND

Department of Agricultural Economics & Management

FINAL EXAMINATION PAPER

PROGRAMME: BSc. Agric. Economics and Agribusiness Management Year 4

COURSE CODE: AEM 405

TITLE OF PAPER: PRODUCTION ECONOMICS

TIME ALLOWED: TWO (2) HOURS

INSTRUCTION:

- 1. ANSWER ALL QUESTIONS**
- 2. EACH QUESTION CARRIES 25 MARKS**
- 3. DO NOT WRITE ON THIS QUESTION PAPER**

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THE CHIEF INVIGILATOR**

Question one

- a) Given a classical production function ($Y = f(x)$), at what stage of the production function do the following statements apply, and explain the elasticity of production of which:

Statements	Elasticity of Production	Stage on the Production Function/Curve
a) MPP is less than APP		
b) MPP is at maximum		
c) MPP = APP		
d) APP is at maximum		
e) MPP is Zero		
f) MPP is negative		

(12 marks)

- b) Given a production function $Y = X - X^2 + X^3$, Find the exact elasticity of production when $X = 1, 2$ and 3

(6 Marks)

- c) Assuming the same production function, (i) AVC and APP, MC and MPP are inversely related, (ii) furthermore when APP is maximum - $APP = MPP$. Using calculus, qualify/prove these statements

(7 Marks)**Question Two**

- a) Suppose the production function is given by $Y = X_1^{0.5} X_2^{0.25}$; where y is output and X_1 and X_2 are inputs. If the unit price of X_1 is E1, price of X_2 is E1 and output unit price is E4, and the money to spend on the inputs is readily available, estimate the expansion path and what are the value of each two inputs at the least cost combination, and the value of maximum profits?

(15 Marks)

- b) Mr. Dlamini is a renowned farmer and wants to use both fertilizer (F) and Pesticide (Z) to maximize profits using the least combination. This farmer is faced with a production function of $Y = FZ$. The price of the fertilizer is E1 and the price of pesticide is E2, the total amount of money available to spend is E100 and he targets to sell his maize at E10 per Kilogram. As an agricultural economist, advise him on how much of each inputs would he purchase to maximize output, and how much profit would the farm earn?

(10 Marks)

Question Three

- (a) You are to start-up a commercial farm employing about 1000 employees (L) to produce product butternut (B) and pumpkins (P). The production function for butternut is given by $B = 100 + 4L - 0.02L^2$ and the production function for pumpkin is given by $P = 200 + 120L - 0.4L^2$. The market price for Butternut is E25 per kg while the price for Pumpkin is E10 per kg. How will you allocate the 1000 employees to produce both the butternut and Pumpkin commercially and at the same time be able to maximize profit from each of the two products?

(15 Marks)

- c) With the aid of graphs, describe the following concepts:
- Production possibility function
 - Iso-revenue
 - Complementary products
 - Supplementary products
 - Joint Product

(10 Marks)

Question Four

- a) The farmers id faced with a variable cost function as: $TVC = 50Y - 12Y^2 + 2Y^3$, and a fixed Cost = E100.
- Derive his Average Total Cost (ATC), Average Variable Cost (AVC) and the Average Fixed Cost (AFC) curves, respectively.
 - Derive the Marginal Cost Curve and estimate the value of MC when at minimum.
 - At what level of output is the average variable cost minimum?

(10 Marks)

- b) Consider a farm's production function $Y = 2X^{1/4}$, where Y is the output and X is capital inputs. Suppose the fixed costs are E500 and price of capital input is E16.
- Derive the total cost, marginal cost and Average Cost functions
 - What is the value of the TC and MC functions derived in (i) when $Y = 100$?

(5 marks)

- c) Calculate and fill the blank columns in the Table below.

X (Kg)	TPP (Kg)	APP	TVC (E)	MC
0	0		0.00	
1	4		5.00	
2	10		10.00	
3	15		15.00	
4	18		20.00	
5	20		25.00	

(10 marks)