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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: BSc. in Agricultural Economics and Agribusiness  
Management Year 4

COURSE CODE: AEM 405

TITLE OF PAPER: PRODUCTION ECONOMICS

TIME ALLOWED: TWO (2): HOURS

INSTRUCTION: 1. ANSWER ALL FOUR QUESTIONS  
2. EACH QUESTION CARRIES 25 POINTS

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CHIEF INVIGILATOR.

**Question 1**

- a) What do you understand by the following terms:
  - i. Scarcity **3 MARKS**
  - ii. Law of diminishing returns **3 MARKS**
  
- b) Using words, differentiate between Average Physical Product (APP) and Marginal Physical Product and (MPP): **7 MARKS**
  
- c) As a society our resources are insufficient to produce all the goods and services we might desire. What are the scarce resources in the viewpoint of society? Discuss briefly. **12 MARKS**

**Question 2**

- a) Assume  $TC = 100 + 6Y - 0.4Y^2 + 0.02Y^3$ 
  - i. Compute the following: Average Variable Cost (AVC), Average Fixed Cost (AFC) and Marginal Cost (MC). **3 MARKS**
  
  - ii. Prove that AVC is minimum when output (Y) = 10 **5 MARKS**
  
  - iii. Prove that at Y = 10,  $AVC = MC$  **5 MARKS**
  
- b) Where should a rational firm produce? In your answer discuss why the rational firm should produce or not produce in stages I, II and III. **12 MARKS**

**Question 3**

- a) Suppose a farmer: uses two inputs in his production process (i.e. inputs:  $X_1$  and  $X_2$ ); has E18 to spend on variable inputs (i.e. Total variable cost (TVC) = E18); and has a total variable cost function given by  $TVC = P_{X_1}X_1 + P_{X_2}X_2$  and the prices  $P_{X_1} = E2$ ;  $P_{X_2} = E3$ :
  - i. Find the equation of the isocost line **3 MARKS**
  - ii. What is the slope of the isocost line **3 MARKS**
  - iii. What is the intercept on the  $X_1$  axis **3 MARKS**

- b) Suppose you have 100 workers (variable input,  $X$ ) to employ in order to produce product N and product M. The production function for N is given by  $N = 10 + 2X - 0.01X^2$  and the production function for M is given by  $M = 20 + 12X - 0.2X^2$ . The market price for N is E20 per kg while the price for M is E5 per kg.

How will you allocate the 100 workers to produce the two products for the market and at the same time be able to maximize profit from each of the two products? **16 MARKS**

#### Question 4

Assume a Cobb-Douglas production function  $Y = X_1^{1/5} X_2^{3/5}$  with prices as follows:  $P_{X_1} = E3$ ;  $P_{X_2} = E1$ ;  $P_Y = E10$ . Find the least cost combination of inputs and the level of output at which net returns are maximized. **25 MARKS**