UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER

PROGRAMME: BACHELOR OF SCIENCE IN
                  AGRICULTURAL
                  ECONOMICS YEAR IV

COURSE CODE: AEM 405

TITLE OF PAPER: PRODUCTION ECONOMICS

TIME ALLOWED: TWO (2) HOURS

INSTRUCTION: ANSWER ALL FOUR (4) QUESTIONS

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Question 1

(a) Consider the production function : $Y = P \times Q$, where Y is output and P and Q are variable inputs. The price of P is equal to E10 and the price of Q is equal to E20. How much of each of the two inputs would you purchase to produce the maximum output possible given that you have E100 to spend on them?   **12 MARKS**

(b) Suppose fertilizer is the only resource that is varied in producing cowpeas. As fertilizer is increased, output of cowpeas increases at a decreasing rate and eventually decreases. Show graphically, the relationship between output of cowpeas, the marginal physical product and the average physical product of cowpeas.   **8 MARKS**

(c) Why are resources sometimes fixed?   **8 MARKS**

(d) With the help of figures, show the physical (total physical product, marginal physical product, average physical product) and cost (marginal cost, average total cost, average variable cost) relationships in the three stages of production.   **12 MARKS**

Question 2

(a) State clearly the principle of diminishing marginal returns. Does this apply over all ranges of output? Explain.   **6 MARKS**

(b) Consider the production function $Y = X^{1/2}$

   (i) Give the exact MPP equation and calculate its value when $X = 4$
        5 MARKS
   (ii) At how many units of X are the net returns maximum when $Px = E1$ and $Py = E4$ **4 MARKS**

(c) Write short notes on the following:
   (i) Expansion path and isocost line.   **3 MARKS**
   (ii) Production possibility curve and isorevenue line   **6 MARKS**
   (iii) Isoquants and isocost lines   **6 MARKS**

Question 3

(a) You are given the following production function $Y = 20X^{1/3}$ where X is man-hours and the wage rate is E80 per day. Derive the marginal cost and average cost functions.   **15 MARKS**

(b) Consider two production functions for products Y_1 and Y_2 where $Y_1 = 10 + 2X - 0.1X^2$ and $Y_2 = 5 + 4X - 0.2 X^2$; $P_{y1} = E2$ and $P_{y2} = E1$. How will you allocate 10 units of X among the enterprises?   **15 MARKS**

Question 4

(a) What do you understand by the least cost combination criterion?   **5 MARKS**

(b) Given the following combinations of X_1 and X_2 to produce 100 units of product Y, calculate the appropriate marginal rates of substitution.

Combination	Units of X_1	Units of X_2
1	0	60
2	5	40
3	10	25
4	15	15
5	20	7
6	25	3
7	30	0

8 MARKS

(c) If the prices of X_1 and X_2 are E5 and E2 respectively, determine the appropriate combinations of the two inputs to apply and justify your answer.   **6 MARKS**

(d) Suppose the production function is given by $Y = X_1^{1/5} \times X_2^{4/5}$ where Y is output and X_1 and X2 are inputs. Given that the price of X_1 is E 200, price of X_2 is E300 and output price is E100, what is the marginal cost and marginal product of each of the two inputs at the least cost combination of these inputs?   **11 MARKS**