



SUPP. 2013/2014

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UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER

PROGRAMME: BSc. in Agricultural Economics and Agribusiness Management

COURSE CODE: AEM 405

TITLE OF PAPER: PRODUCTION ECONOMICS

TIME ALLOWED: TWO HOURS

INSTRUCTION: 1. ANSWER ALL QUESTIONS
2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS

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Question one

- (a) Derive the Average Variable Cost and Marginal Cost functions with respect to a classical production function and state why these functions have the particular shapes. **9 MARKS**
- (b) Average Total Cost is given by $ATC = 100/Y - 3Y + 4Y^2$. Give the numerical value of TFC, TVC when $Y = 2$ and the level of Y at which AVC is at a minimum. **9 MARKS**
- (c) Explain why costs are only computed and graphed in stage I and stage II of the classical production function. **7 MARKS**

Question Two

Given the Profit function: Profit = $P_y f(X) - P_x X - TFC$, Where P_y = output(Y) price, $f(X)$ = production function, P_x = Price of variable input X, TFC = Total fixed cost

- (a) Derive the conditions for profit maximization with respect to input X **6 MARKS**
- (b) Derive the conditions for profit maximization with respect to output Y **6 MARKS**
- (c) 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? **13 MARKS**

Question Three

- (a) Consider the production function: $Y = P \times Q$, where Y is output and P and Q are variable inputs. Suppose the price of P is equal to E10, price of Q is equal to E20 and price of Y is equal to E100. How much of each of the two inputs would you purchase to produce the maximum output possible given that you have E1000 to spend on them? How much profit would you earn? **12 MARKS**
- (a) Suppose the production function is given by $Y = X_1^{1/3} \times X_2^{1/3}$ where Y is output and X_1 and X_2 are inputs. If the price of X_1 is E3, price of X_2 is E3 and output price is E18, and the funds to purchase the needed inputs are readily available, what is the marginal product of each of the two inputs at the least cost combination of these inputs? **13 MARKS**

Question Four

Assuming that the mathematical production functions are available:

- (a) State the condition(s) that are met when least cost combination of resources are employed. **5 MARKS**
- (b) Show a situation (graphically and by equation) whereby (a) is not met and state what steps should be taken. **5 MARKS**
- (c) State the conditions met when profit is maximized from the production of a good using optimum amounts of two resources. **5 MARKS**
- (d) State the conditions that should be met to carry out production when funds to purchase inputs are rather limited. **5 MARKS**
- (e) Differentiate between complementary and competitive enterprises **5 MARKS**