



EASTERN UNIVERSITY, SRI LANKA

FINAL EXAMINATION IN AGRICULTURE (500 SERIES) 2000/2001

AG551: ADVANCED PRODUCTION ECONOMICS

Answer **ALL** questions.

Time allowed : 03 hours.

1. (a) Define a Production Function.
(b) Briefly discuss the assumptions of Production Function Analysis.
(c) What are the different forms of Production Functions. Give the algebraic forms of these Production Functions.
(d) Explain the consequences to the farmer if the production function for milk is a linear function of the amount of feed fed to each cow.

2. A single variable production function representing corn yield response to nitrogen fertilizer is given below.

$$Y = 16 X^2 - 4 X^3$$

Where Y = Corn yield Kg / ha.
 X = Nitrogen fertilizer Kg.

- (a) Find the input levels that form the boundaries of Stage – II
 - (b) Sketch TPP, APP and MPP on a common set of axes and show the locations of the Stages of Production.
 - (c) Check all the relevant Second Order conditions.
3. (a) Given the Production Function $Y = A X_1^{b_1} X_2^{b_2}$. Find the equation of the isoline defined by $RTS = 1$.
(b) Show that the production function. $Y = 10X_1^2 + 11 X_1 X_2 + 19X_2^2$ exhibits increasing returns to scale.
(c) What do you mean by linearly homogenous production function ?
(d) Are the following functions homogenous or not ? If they are homogenous, indicate their degree of homogeneity. Indicate all your work clearly.

1. $Y = b_1 X_1 + b_2 X_2$

3. $Z = 14 v_1^2 + 13V_1 V_2 + 12 V_2^2$

2. $Y = A X_1^{b_1} X_2^{b_2}$

4. $Y = \frac{a_1 X_1 + b_1 X_2}{a_2 X_2 + b_2 X_2}$

4. Consider a farm that produces both corn and soyabeans. Suppose that the production function for corn is $Y_c = f(X_1, X_c)$, where X_1 is fertilizer used in corn production and X_c is land devoted to corn production. Let the production function for soyabeans be $Y_s = F(X_s)$ where X_s is land devoted to soybean production. Find the First Order conditions for Profit maximization for this firm assuming a fixed land base X^0 , that is, $X_c + X_s = X^0$

5. (a) Given the Variable Cost (VC) Function $VC = 0.5y^3 - 4y^2 + 12y$ (where y = output and Fixed Cost $b = 4$ and) and price of output $(P_y) = 9.50$ Find out the Average Variable Cost (AVC)

- (i) Find the output which maximizes the profit
- (ii) Find the output which maximizes the AVC. What is the value for AVC?
- (iii) What is the firm's supply function.

(b) Assume that a firm operating in a purely competitive market has the following implicit production function :

$$X - Y_1^2 - Y_2^2 = 0$$

Where: X = Input (kg); and Y_1 & Y_2 are Outputs (kg)

- (i) Set up the Lagrangian revenue maximization function.
- (ii) Find out the First Order conditions.
- (iii) What is the Output Expansion Path equation ?
