WOMEN'S UNIVERSITY IN AFRICA

Addressing gender disparity and fostering equity in University Education

FACULTY OF AGRICULTURAL SCIENCES

BSc AGRICULTURE HONOURS DEGREE IN AGRIBUSINESS MANAGEMENT

MAIN PAPER

AG 224 : CROP AND LIVESTOCK PRODUCTION ECONOMICS

INTAKE : FOURTH YEAR SECOND SEMESTER

DATE : JANUARY 2021 TIME: 3HOURS

INSRUCTIONS TO CANDIDATES
Answer any four questions

QUESTION ONE

(a) Draw the classical production function showing the Total Physical Product, Marginal Physical Product and Average Physical Product curves, on two separate but related graphs, clearly showing how the three are related for varying levels of an input. [15]

(b) Describe the behavior of the three curves as the amount of input is varied. [10]

QUESTION TWO

a) Discuss the categorisation of inputs as either fixed or variable in relation with the concept of time. [4]

b) Consider a Production Function $TPP = X^2 – 1/30X^3$,

Where; TPP (Y) is quantity of output and X is the quantity of input.

i. At what levels of input use does the MPP, APP and TPP reach their maximum? [10]

ii. At what level of X does the Law of Diminishing Returns set in? [2]

c) i. Suppose the following production function data and given output sells for $5 and input costs $4. Fill in the blanks.

Input (x)	Output (y)	VPP	AVP
0	0		
10	50		
25	75		
40	80		
50	85		

[5]

ii. In the table above, what appears to be the profit maximizing level of input use? Verify this by calculating the TVP and TFC for each level of input use. [4]

QUESTION THREE

Consider the following table;

Combination	Units of x_1	Units of x_2	$MRSx_1x_2$	$MRSx_2x_1$
A	10	1	-	-
B	5	2	-	-
C	3	3	-	-
D	2	4	-	-
E	1.5	5	-	-

a. Complete the table. [10]

b. Suppose that the price of x_1 and x_2 is each a dollar. What combination of x_1 and x_2 would be used to achieve the least-cost combination of inputs needed to produce 100 tonnes of maize? [3]

c. Suppose that the price of x_2 increased to \$2. What combination of x_1 and x_2 would be used to produce 100 tonnes of maize?
[3]

d. If the farmer was capable of producing 100 tonnes of maize when the price of x_1 and x_2 were both \$1, would he or she necessarily also be able to produce 100 tonnes of maize when the price of x_2 increases to \$2? Explain. [4]

e. Assume that a farmer has available \$200. What is the slope of the isocost line when

i. $v_1 = \$1$; $v_2 = \$2.00$?

ii. $v_1 = \$3$; $v_2 = \$1.75$? [5]

QUESTION FOUR

a. For the following production functions, does the law of diminishing returns hold?

i. $y = x^{0.2}$

ii. $y = 3x$

iii. $y = x^3$

iv. $y = 6x - 0.10x^2$ [4]

b. Suppose the production function; $y = 18x_1 – x_1^2 + 14x_2 – x_2^2$ and given;

$Py = \$0.65$
$Px_1 = \$9.00$
$Px_2 = \$7.00$

Find the optimal combination of inputs x_1 and x_2 at which the farmer maximizes profit. [9]

c. Graphically illustrate the relationship between TVP, VMP, AVP, and MFC under the assumptions that the output price is constant, and the market price for the input, factor, or resource does not vary with the amount that an individual farmer purchases. [8]

d. Suppose that the revenue (R) and cost (C) functions are given by;

$R = 6y^{0.5}$
$C = 3y^2$
Find the necessary and sufficient conditions for profit maximization. [4]

QUESTION FIVE

Explain the following concepts of short-run production in crop and livestock production economics:

(a) Total physical product; [5]

(b) Production function; [5]

(c) Average physical product; [5]

(d) Marginal physical product; and [5]

(e) Law of diminishing marginal product. [5]

QUESTION SIX

Examine the applicability of production economics in crop and livestock production in Zimbabwe. Illustrate your answer with examples. [25]

END OF QUESTION PAPER