



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

SECOND YEAR 1ST SEMESTER
MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE
EDUCATION AND EXTENSION

COURSE CODE: AEC 225
COURSE TITLE: PRODUCTION ECONOMICS

DATE: 17TH JUNE 2021

TIME: 2 – 4 PM

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 4 printed pages. Please Turn Over 

KIBU observes ZERO tolerance to examination cheating

QUESTION ONE = 30 MARKS (Compulsory)

1. a) What do you understand by the term production function (2Mks)
b) Briefly interpret the production function of the form $y=f(X_1/X_2, X_3, X_4, \dots, X_n)$ (4Mks)
c) Explain what you understand by the following terms as used in production economics
i) Total physical product-(2mks)
ii) Marginal physical product(2mks)
iii) Average physical product (2mks)
d) The table below shows the data of a biogas producing plant of a farmer who added maize grain to a fixed amount of cowdung and water to generate biogas as an output. Fill in the marginal physical product and average physical product values of each level of output (18mks)

Amount of grains (kg)	Bio gas output(kg)	MPP	APP
0	50		
4	75		
8	105		
12	115		
16	123		
20	128		
24	124		
28	122		
32	119		

QUESTION TWO = 20 MARKS

- a) State the law of diminishing marginal returns (3mks)
b) Within a range of 1-5 of input use and with intervals of 1, compute the values of output y and the corresponding marginal physical product (MPP in each case (15mks)
i) $y=3x$
ii) $y= x^3$
iii) $y= x^{0.5}$

c) Determine which of the production functions above exhibits the law of diminishing marginal returns? Give a reason for your answer (2mks)

QUESTION THREE = 20 MARKS

- a) List the four factors of production and their corresponding factor payments (4mks)
- b) Discuss any four strategies agricultural production unit may explore to cushion itself against risks and uncertainties (16mks)

QUESTION FOUR = 20 MARKS

5. A farmer's production of maize using nitrogen fertilizer as a variable input is described by the production function $y=0.75x+0.0042x^2-0.000023x^3$. If the price per unit of input and output is \$ 0.15 and \$ 3 respectively:

- a) Determine how many units of input would exactly be required to maximize profits (6mks)
- b) Determine the output level at which profits will be maximized (2mks)
- c) Determine the exact level of profit in dollars at that level of input (2mks)
- d) The following combinations of inputs X_1 and X_2 were used to produce 100 kilograms of maize. Calculate and fill in the values of $MRS_{X_1X_2}$ and $MRS_{X_2X_1}$ in the table below (10mks).

Combination	Units of X_1	Units of X_2	$MRS_{X_1X_2}$	$MRS_{X_2X_1}$
A	10	1		
B	5	2		
C	3	3		
D	2	4		
E	1.5	5		

QUESTION FIVE = 20MARKS

Whereas the total cost of production in a production function can be determined by price of input multiplied by quantity of input, it can also be determined in terms of output.

- a) Sketch a graph of total cost (TC) against output. (6mks)
- b) Assuming the producer will sell the produce at going market price, insert the total revenue function on the same graph (2mks)

c) Derive the profit function by sketching it just below the total cost versus output graph and indicate zone of minimum, Zero and maximum profit respectively (12mks)