

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**RESIT/SPECIAL EXAMINATION**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN  
AGRICULTURAL EDUCATION**

**AGEC 241: PRODUCTION ECONOMICS**

**STREAMS:**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 24/07/2018**

**11.30 A.M. – 1.30 P.M.**

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*Section A, answer all Questions*

1. For each of the following production functions, find the marginal physical product. Output is denoted by  $y$  and the inputs are denoted by  $x$  and  $z$  (4 marks)
  - a)  $y=25-1/x-1/z$ : at  $x=2$  and  $z=2$
  - b)  $y= 5xz-2x^2-2z^2$ : at  $x= 5$  and  $z = 5$
  - c) Given a single-variable factor production  $y=16x^2-4x^3$ 
    - i. Find the input levels that form the boundaries of stage II of production (8 marks)
  - d) State and explain the characteristics of factors of production and their returns (4 marks)
- 2 A smallholder farmer can produce two products namely; finger millet and maize when given set of inputs in the following combinations.

Combination	Finger millet ( $y_1$ )	Maize ( $y_2$ )	MRPS for $y_2$ for $y_1$
A	570	1519	
B	747	1461	
C	912	1390	
D	1064	1305	
E	1204	1209	
F	1331	1099	
G	1447	976	
H	1550	841	

- a) Calculate the MRPS  $Y_2$  for  $Y_1$  and complete the last column. (*Clearly show your workings using algebraic method*) (10 marks).
- b) Use the information in the table to determine the combination of finger millet and maize that will maximize returns when the prices of products are (4 marks)
  - i.  $P_{y_2} = \text{ksh } 20$ ;  $p_{y_1} = \text{ksh } 30$

**Section B, answer any two**

- 3 In Waku's farm, the farmer feeds cows with hay and concentrates. In order to produce 70 litres of milk, the amount of feed required is as follows:

Kg. hay ( $x_1$ )	Kg concentrate ( $x_2$ )
40	34
50	31.5
60	30
70	29
80	28.2
90	27.4
100	27
110	25.5
120	23.8
130	22.5
140	20
150	17

- a) Calculate the marginal rate of substitution of hay for grain (15 marks)
  - b) Which combination of feed will enable the farmer to minimize costs (5 marks)
- 4 Mbaka farm has the following production function,  $Y = f(x_1, x_2, x_3, \dots, x_n)$ . It must pay \$ 1 per unit of fertilizer and \$10 for the fixed inputs of land

Output (Y)	Fertilizer	Land
0	0	15
20	7	15
40	17	15
60	30	15
80	55	15
100	95	15
120	180	15

- a) Calculate the farm
- a. average variable cost (2 marks)
  - b. Average fixed cost (2 marks)
  - c. Fixed cost (2 marks)
  - d. Variable cost (2 marks)
  - e. Total cost (2 marks)
  - f. Average total cost (2 marks)
  - g. Marginal cost (4 marks)
- b) Draw curves for the data given (4marks)

- 5 Given the cost function  $TC = 20 - 6y^2 + 8y^3$  and the price of output  $p_y = 50$
- a. Determine the profit maximizing level of output (5 marks)
  - b. Determine the maximum profit (5 marks)
  - c. Explain measures that can be put in place to mitigate risks and help farmer to maximize his output (10 marks)
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