CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

RESIT/SPECIAL EXAMINATION

FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS

AGEC 241: PRODUCTION ECONOMICS

STREAMS: AGEC, AGBM & AGED   **TIME: 2 HOURS**

DAY/DATE: TUESDAY 02/02/2021   **11.30 A.M – 1.30 P.M.**

INSTRUCTIONS
- Answer **QUESTION ONE** and any other **THREE** questions.
- Do not write on the question paper.

QUESTION ONE

a. Using a diagram explain the law of diminishing returns   **(6 Marks)**

b. Distinguish the following concepts as applied in production economics:

    (i) Ridge line and isoclines   **(2 Marks)**

    (ii) Short run and long run production functions   **(2 Marks)**

c. Lucerne Hay and maize combinations necessary to produce 50 litres of milk per day by a Holstein cow at a Nyahururu dairy farm has been given in table below. It shows how and to what extent Hay could be substituted for maize.

Combination number	Maize (X_1) (kg)	Hay (X_2)(kg)	MRS X_2 for X_1
1	13.0	8	
2	9.4	10	
3	7.1	12	
4	5.7	14	
5	4.7	16	
6	3.9	18	
7	3.4	20	
8	2.9	22	
9	2.6	24	
10	2.3	26	

a) Calculate the MRS X_2 for X_1 and complete the last column **(9 Marks)**

b) If the price of maize is kshs 9 per kilogram and hay it is ksh 3 per kilogram, use this information to determine the least cost combination of maize and hay for use by the dairy farm. Clearly explain your answer **(6 Marks)**

QUESTION TWO

a. Given the production function below:

$$Y=8x + 6x^2 -0.2x^4,$$

   (i) Find the Average Physical Product (APP), Marginal Physical Product (MPP), and the Elasticity of production. **(5 Marks)**

   (ii) Evaluate APP and MPP when x = 3 **(3 Marks)**

   (iii) At what level of x does stage II begin and end? **(2 Marks)**

b. Using a graph, explain economies and diseconomies of scale **(5 Marks)**

QUESTION THREE

a. How can you explain to a farm manager in OlJabet that it is irrational to produce at stage 1 and III of the classical production function? **(4 Marks)**

b. Distinguish between technical, economical and allocative efficiency **(6 Marks)**

QUESTION FOUR

a. Differentiate between risk and uncertainty **(5 Marks)**

b. List and briefly explain five ways farmers can deal with the risk and uncertainty in agricultural production using examples from current situation affecting horticultural production in Kenya **(10 Marks)**

QUESTION FIVE

   a) Given the following quadratic equation;

   $Y=18X_1 -X_1^2 +4X_2-X_2^2$

(i) Workout the least cost combination of X_1 and X_2 given that the price of X_1 and X_2 are $PX_1 = 2$ and $PX_2 = 3$. **(5 marks)**

(ii) Derive his Average Total Cost (ATC), Average Variable Cost (AVC) and Average Fixed cost (AFC) curves, respectively **(5 Marks)**

b) Derive the Marginal Cost Curve and estimate the value of MC at its minimum. **(5 Marks)**