FACULTY	AGRICULTURE AND NATURAL RESOURCES		
DEPARTMENT	AGRICULTURAL ECONOMICS		
SUBJECT	PRODUCTION ECONOMICS		
SUBJECT CODE	AEC 3682		
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DURATION	**3 HOURS**	**MARKS**	**100**

SECOND OPPORTUNITY EXAMINATION

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This question paper consists of four (4) pages including this front page.

Instructions

Answer all the questions

All questions carry equal marks (20 marks each)

Please write legibly and number your questions clearly

You are allowed to use a calculator

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QUESTION 1 **[20]**

a) Briefly explain the assumption of the level of technology with reference to production process. [2]

b) A shoe factory has 500 employees and produces a thousand pairs of shoes per hour.

i. What is the shoe factory's productivity per worker per hour? [2]

ii. The factory hires one new worker. Now, the factory produces 1,002 shoes per hour. Then the factory hires one more worker. Production rises to 1,004 per hour. Does the factory have diminishing, constant, or increasing marginal returns at this level of production? [2]

iii. Graph the production function (total product curve) of the shoe factory at these levels of production, carefully labelling all lines and points. [5]

c) Consider the following short run production function and answer the questions below:

$$Q = 6L^2 - 0.4L^3$$

i. Find the value of L that maximizes output. [3]

ii. Find the value of L that maximizes average product. [3]

iii. Find the Elasticity of production. [3]

QUESTION 2 **[20]**

a) The following data applies to a crop production problem. There are 12 ha of land, 48 hours of labour and N$3600 of working capital available to produce maize, soya beans and or oats. To produce 1 ha of maize requires 6 hours of labour and N$360 of capital; 1 ha of soya beans requires 6 hours of labour and N$240 of capital; 1 ha of oats requires 2 hours of labour and N$180 of capital. The expected gross margins for 1 ha of maize, soya beans and oats are N$400, N$300 and N$200 respectively. Set up the initial linear programme matrix and use the simplex method to show – with reasons, which activity will enter and which row will leave the basis. **DO NOT** complete the iteration. [10]

b) Briefly describe the major steps of graphical method to solve linear programming problems. [10]

QUESTION 3 [20]

Suppose Ogongo farm has fixed costs of $N\$15000$ for its maize product and variable costs given by $140 + 0.04x$ dollars per kilogram, where x is the total number of units. The selling price of the maize product is given by $300 - 0.06x$ dollars per kilogram.

a) Formulate the functions for total cost and total revenue. [3]

b) Find the break-even quantities. [4]

c) Find the level of sales that maximizes revenue. [4]

d) Formulate the profit function and find the level of production and sales that maximizes profit. [4]

e) Find the profit (or loss) at the production levels found in (c) and (d). [5]

QUESTION 4 [20]

a) Given two inputs Grain (X_1) kg and Hay kg (X_2), and that price of grain is N$4.40/kg and Hay is N$3/kg, calculate the least cost ratio for these two inputs using the following information. PR=price ratio [14]

Grains kg (X_1)	Hay kg (X_2)
825	1350
900	1130
975	935
1050	770
1125	630
1200	520
1275	440

b) For the production function $y = 3x_1 + 2x_2$

Find: i. MPP of x_1 [2]

ii. MPP of x_2 [2]

iii. The marginal rate of substitution $x_1 \; for \; x_2$ [2]

QUESTION 5 [20]

a) If the weekly total cost of producing milk at Neudamm farm is given by C(x) = 50000 +105x, where x is the amount of litres produced per week, then the average cost per unit is given by

$$C\,(x) = \frac{50000 + 105x}{x}$$

i. What is the average cost per litre if 3000 litres were sold? [2]

ii. Graph the function in (a) above. [3]

iii. Does the average cost per litre continue to fall as the amount of litres produced increases? [2]

b) Study the information in the table below

Number of workers	Cultivated hectares
0	0
1	5
2	10
3	16
4	25
5	28
6	32
7	31

Calculate:

i. Average hectares per worker. [3]

ii. Marginal hectares. [4]

iii. Draw the graph showing cumulative hectares cultivated, average hectares, marginal hectares. [4]

iv. At what point should you stop hiring labour, give reasons for your answer. [2]

ALL THE BEST