UNIVERSITY OF FORT HARE

AGRICULTURAL PRODUCTION ECONOMICS

AGE 211

DEGREE EXAMINATIONS

MAY / JUNE

2025

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Time: 3 HOURS

Subject: AGE 211

Marks: 100

This question paper consists of 6 pages including the cover page

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INSTRUCTIONS

Please answer each of the questions below. Show your work and explain your reasoning. Please leave a blank line between your answers.

Question 2 **[25 marks]**

Assume that you are a farmer, and that your objective is to maximise the profit from your maize production enterprise.

Suppose you have the following data on a variable input, Nitrogen, measured in bags per hectare; and an output, Maize yield, measured in kilograms per hectare. *In your exam book, please reproduce the table as you see it here.*

Nitrogen (bags / hectare)	Maize yield (kg / hectare)	Marginal Physical Product (MPP = ΔM/ΔN)	Gross Margin per hectare
0	200	*Na*	
1	320		
2	400		
4	480		
6	500		

2.1 In your table, fill in the values for the Marginal Physical Product. [5]

2.2 Is this production function characterised by negative marginal returns, constant marginal returns, decreasing marginal returns, increasing marginal returns, or some combination of these (and if so, of which)? Justify your answer. [3]

2.3 Apparently, the price of the output, P_M, is R6/kg, and the price per bag of fertiliser is R200. What is the Inverse Price Ratio (IPR)? [2]

2.4 Apply the equi-marginal principle in order to determine the optimal number of bags of fertiliser. Explain the reasoning behind your answer. [5]

2.5 In your table, fill in the values for the Gross Margin per hectare. [5]

2.6 Suppose you have 10 hectares that are identical in terms of inherent fertility and suitability for producing maize, and you want to apply the optimal solution you have derived for one hectare to all 10. Suppose further that you have Fixed Costs of R8000. *What is your profit?* [5]

3.5 What is the optimal combination of maize and soybean output per hectare that will maximise your profits? State your answer clearly, and how you arrived at it. [4]

3.6 What is the total revenue at this optimal combination of maize and soybeans? [4]

3.7 As best you can, replicate the graph above into your exam book. Add to it the optimal solution you found in 3.5, and the Total Value of Production line is consistent with the total review you found in 3.6. [4]

3.8 Suppose the price of maize declines R150 per tonne and the price of soybeans declines to R200 per tonne.

3.8.1 What is the optimal solution given the price changes? Explain why the solution changed or did not change in the manner that it did. [4]

3.8.2 What was the impact of the price changes on total revenue? [2]

Question 4 **[5 marks]**

4.1 Suppose you have a production function involving one output and two inputs. The inputs are designated as X_1 and X_2, and the output as Y.

You are given two data points on the production function, that is, two different combinations of input and output levels:

	Y	X_1	X_2
Data point 1	200	24	32
Data point 2	350	42	56

Given the evidence at hand, is this production function characterised by constant, increasing or decreasing returns to scale? State your answer and explain how you know. [5]