



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES
DEPARTMENT OF AGRICULTURAL SCIENCES AND AGRIBUSINESS

QUALIFICATION: BACHELOR OF SCIENCE IN AGRICULTURE	
QUALIFICATION CODE: 07BAGA	LEVEL: 6
COURSE CODE: PPE621S	COURSE NAME: PRINCIPLES OF PRODUCTION ECONOMICS
SESSION: JULY 2025	PAPER: 1
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS
<ol style="list-style-type: none">1. This question paper consists of five (5) questions.2. Answer ALL questions in blue or black ink.3. Start each question on a new page in your answer booklet.

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Including this front page)

Question 1

(a) Find the derivative of the following functions.

(i) $y = 80 + 4.2x^2$ (2 Marks)

(ii) $y = 5 + 0.8x - 4x^2 + 6x^3$ (2 Marks)

(iii) $y = x + 4x^2 - 0.2x^3$ (2 Marks)

(iv) $y = 8x + 2x^2 - 3x^3$ (2 Marks)

(v) $y = 4 + 24x - 4x^2$ (2 Marks)

(b) Suppose the production function for beetroot yield and Nitrogen application is given as:

$$y = 50 + 4.93x^3$$

(i) Find the 1st derivative of the production function with reference to MPP. (2 Marks)

(ii) Given the first derivative of the production function with reference to MPP, interpret the function in relation to:

(1) Direction of the MPP graph. (2 Marks)

(2) The law of diminishing marginal returns. (2 Marks)

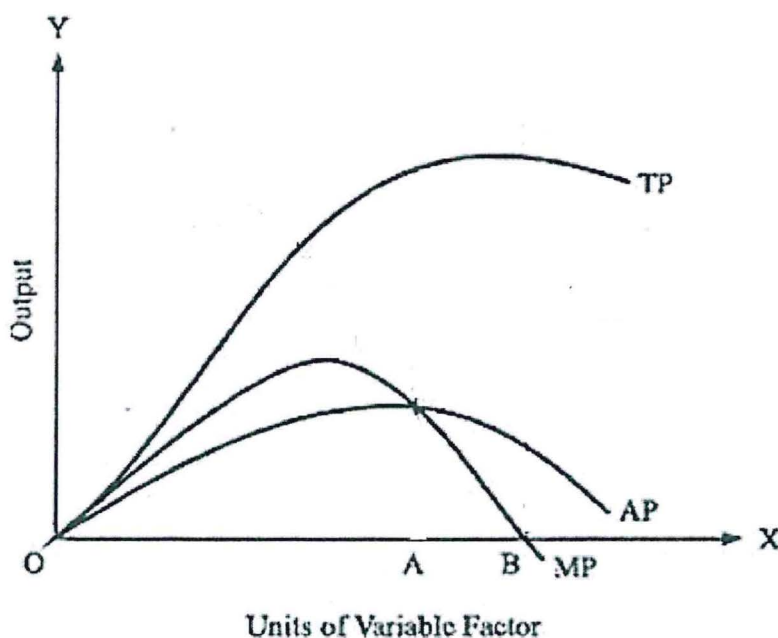
(3) The influence of additional units of Nitrogen in relation to beetroot yield. (2 Marks)

(iii) Calculate the yield of beetroot when you add 4 units of kraal manure. (2 Marks)

Sub-Total (20 Marks)

Question 2

Below is the production graph, please copy the graph as it is in your answering book and answer the questions that follows.



- (a) Explain the relationship of total output and the units of the variable factor? (3 Marks)
- (b) With the aid of lines and labels, indicate three stages of production on the graph. (3 Marks)
- (c) Clearly indicate on the graph where the inflexion point is found. (2 Marks)
- (d) By shading, indicate the stage in which the rational firm will operate? (2 Marks)
- (e) Explain why the rational firm should operate at that stage? (2 Marks)
- (f) Explain why TPP declines as units of the variable factor increase? (2 Marks)
- (g) Discuss the relationship of TPP, MPP and APP in stage I and stages II of the production function. (6 Marks)
- Sub-Total (20 Marks)**

Question 3

- (a) Determine whether each of the following production functions exhibits increasing, constant or decreasing returns to scale. Show your calculations. (10 Marks)

(i) $Q = 1.5x^{0.7}y^{0.3}$

(ii) $Q = 0.4x + 0.5y$

(iii) $Q = 2.0xy$

(iv) $Q = 1.0x^{0.6}y^{0.5}$

(v) $Q = 2x^{0.4}y^{0.3}$

- (b) Consider the cost function.

$$VC = 150Q - 6Q^2 + 0.3Q^3$$

If the fixed cost is N\$150, determine the following cost functions. (10 Marks)

- (i) Total cost function
- (ii) Average fixed cost
- (iii) Average variable cost
- (iv) Average total cost
- (v) Marginal cost

Sub-Total (20 Marks)

Question 4

Mr Thomas produces maize from a 10 Ha piece of land. He took a loan of N\$100 000.00 from Agribank. He has a record of all his yields and his total variable cost for five production seasons. The Price of maize is N\$8, and he pays an installment of N\$100 every month.

- (a) Assuming that the loan is the only fixed investment, complete the Table below: (10 Marks)

Yield	TVC	FC	TC	AVC	AFC	ATC
20	80					
30	120					
40	160					
50	200					

(b) Distinguish between the following concepts. (8 Marks)

(i) Isoquant and Isocost.

(ii) Isocline and expansion path.

(iii) Technical and Allocative efficiency

(iv) Productivity and productive efficiency.

(c) Mention any characteristic of an isoquant. (2 Marks)

Sub-Total (20 Marks)

Question 5

The table below shows the relationship between Total Physical Product (TPP), Average Physical Product (APP), Marginal Physical Product (MPP) and Marginal Value Product (MVP). If the price of output is N\$2 per unit of input,

(a) complete the Table. (10 Marks)

Input	TPP	APP	MPP	TVP	AVP	MVP
0	0					
10	75					
20	245					
30	435					
40	560					
50	648					

(b) Assume a firm has the following cost function;

$$TC = 40 + 18Q - 2.7Q^2 + 0.15Q^3$$

Calculate the Total Cost (TC), Total Variable Cost (TVC), Average Total Cost (ATC), Average Variable Cost (AVC), and Marginal Cost (MC) if this firm produces quantities of output that vary from zero to 5 units. Present your results in a Table. (10 Marks)

Sub-Total (20 Marks)

End!