



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCE SCIENCES

QUALIFICATION : BACHELOR OF SCIENCE IN AGRICULTURE	
QUALIFICATION CODE: 07BAGA	LEVEL: 7
COURSE CODE: PPE611S	COURSE NAME: PRINCIPLES OF PRODUCTION ECONOMICS
SESSION: JUNE 2022	SESSION: JUNE
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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<p style="text-align: center;">INSTRUCTIONS</p> <ol style="list-style-type: none">1. This paper consists of two sections: Section 1 has five (5) multiple choice questions, section 2 is made up of five essay type questions.2. Answer ALL questions and in blue or black ink.3. Start each question on a new page in your answer booklet.4. Questions relating to this paper may be raised in the initial 30 minutes after the start of the examination. Thereafter, students must use their own initiative to deal with any perceived error or ambiguities & any assumption made should be clearly stated.

THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

Section 1

Question 1

Which of the following statements is correct?

- A. Elasticity of production is greatest when the ratio of marginal and average physical products is greatest?
- B. Elasticity of production is greatest when the ratio of marginal and average physical products is < 1 ?
- C. Elasticity of production is greatest when the ratio of marginal and average physical products is $= 1$?
- D. Elasticity of production is greatest when the ratio of marginal and average physical products is < 0 ?

(1 mark)

Question 2

The concavity of the production function is associated with the following except one

- A. Maximum total physical production
- B. Zero elasticity of production
- C. Zero marginal physical product
- D. Zero average physical products

(1 mark)

Question 3

Which of the following functions is homogeneous?

- A. $y = b_1x_1 + b_2x_2$
- B. $y = ax_1^{b_1} + x_2^{b_2}$
- C. $y = ax_1 + bx_1^2 + cx_2 + dx_2^2$
- D. $Q = 3x^2y^2 - 0.2x^3y^3$

(1 mark)

Question 4

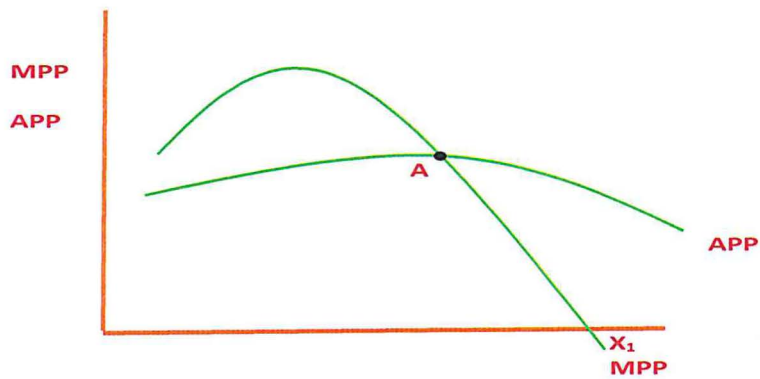
Consider a production function $y = 4 + 3x$. Which of the following statement is not correct?

- A. The value of y gives the total physical product.

- B. The function shows a variable return to scale
- C. The graph of this relationship is a straight line
- D. The value of y gives the total output
- E. As more inputs are used, more positive quantities of output are produced.

(1 mark)

Question 5



The graph shows the relationship between the Marginal Physical Product (MPP) and the Average Physical Product (APP). Which of the following statement is incorrect about point A.

- a. Point A corresponds to the point of inflection.
- b. At point A, APP in maximum.
- c. At point A, $MPP = APP$.
- d. After point A, a declining MPP pulls APP down.
- e Beyond point A, APP is decreasing but positive.

(1 mark)

Section 2

Question 1

1.1. Mr Holward is a retired policeman who plans to invest his pension money in agriculture. As an Agricultural Production Economics student explain the concept of agricultural production to Mr Holward. Advise him on how to be successful in the farming business. (5 marks)

1.2. Measuring productivity is a daunting task. Explain why we use the following in production economics.

- a) Average physical productivity (2 marks)
- b) Marginal Physical Productivity (2 marks)
- c) Elasticity of production (2 marks)

1.3. Assume a production function

$$q = 3 + 0.6v - 3v^2 + 4v^3$$

Give the value for the following functions at two units of the input

- a) Average Physical Production (3 marks)
- b) Marginal Physical Production (3 marks)
- c) Elasticity of production (3 marks)

Question 2

2.1. Assume cornflakes has a quadratic production function represented by

$$y = 6x + 2x^2$$

And an inverse product price demand function of

$$p = 16 - 2y$$

Derive the function for the following physical products

- a) Average physical product (3 marks)
- b) Marginal physical product (3 marks)

- c) Total value product (3 marks)
- d) Marginal value product (3 marks)
- e) Value of marginal product (3 marks)

2.2. Suppose a production function is given as

$$y = 10 + 8x - 2x^2$$

Find the input level that maximizes output (3 marks)

2.3. Is output maximum or minimum at this input level (2 marks)

Question 3

3.1. Consider the production function

$$y = 0.7x + 0.042x^2 - 0.023x^3$$

- a) Find the exact level of input that maximizes profit assuming output price is N\$4 and input cost is N\$0.15 (5 marks)
- b) Show that the profit is maximum or minimum (2 marks)
- c) Calculate total profit? (1 mark)

3.2. Define the following

- a) Partial elasticity of production (1 mark)
- b) Function coefficient of production (1 mark)

3.3. For the two input production function

$$y = 2x_1^{0.8} x_2^{0.4}$$

Find the function coefficient at input level of two units (10 marks)

Question 4

4.1

- a) Distinguish between the following concepts
- b) Economies of size and economies of scale (2)

marks)

- c) Economies of scale and diseconomies of scale (2 marks)
- d) Constant return to scale and increasing return to scale (2 marks)
- e) Return to scale and degree of homogeneity of a function (2 marks)

4.2. Find the degree of homogeneity and returns to scale for the following production functions

- a) $y = 2x_1x_2$ (2 marks)
- b) $y = 2x_1^2 + 3x_1x_2 + 2x_2^2$ (2 marks)
- c) $y = \alpha L^\beta K^{1-\beta}$ (2 marks)
- d) $y = \frac{2x^3 + 3y^3}{6x^2 - 2y^2}$ (2 marks)
- e) $y = 2x^{0.5}y^{0.5}$ (2 marks)

4.3

- a) All production functions are homogeneous, True or False (1 mark)
- b) Cobb-Douglas function is a non-linear multiplicative function (1 mark)

Question 5

5.1. The total cost of producing an item is N\$100. The cost of capital per unit of production is N\$25 and Labour cost per unit is N\$25.

- a) Determine the Iso-cost equation (5 marks)
- b) Draw the Isocost line (5 marks)
- c) What is the unit of labour used when capital per unit was 3? (5 marks)