



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES**

**DEPARTMENT OF AGRICULTURAL SCIENCES AND AGRIBUSINESS**

<b>QUALIFICATION: BACHELOR OF SCIENCE IN AGRICULTURE</b>	
<b>QUALIFICATION CODE: 07BAGA</b>	<b>LEVEL: 7</b>
<b>COURSE CODE: PPE611S</b>	<b>COURSE NAME: PRINCIPLES OF PRODUCTION ECONOMICS</b>
<b>SESSION: JUNE 2024</b>	<b>PAPER: 1</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 100</b>

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	DR DAVID UCHEZUBA
<b>MODERATOR:</b>	DR THINAH MOYO

<p style="text-align: center;"><b>INSTRUCTIONS</b></p> <ol style="list-style-type: none"><li>1. This paper consists of three sections: Section A has 15 multiple-choice questions and 5 True or False questions. Section B is made up of four essay-type questions.</li><li>2. Answer ALL questions in blue or black ink.</li><li>3. Start each question on a new page in your answer booklet.</li><li>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 initiative to deal with any perceived error or ambiguities &amp; any assumption made should be clearly stated.</li></ol>
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**THIS QUESTION PAPER CONSISTS OF 9 PAGES (Including this front page)**

## SECTION A: MULTIPLE CHOICE QUESTIONS

### Question 1

The function,  $\text{Log } Y = \log A + b_1 \log X_1 + b_2 \log X_2 + b_3 (\log X_1)^2 + b_4 (\log X_2)^2 + b_5 (\log X_1 * \log X_2)$  is an example of a

- A). Cobb-Douglas function
- B). Transcendental function
- C). Quadratic function
- D). Translog function

### Question 2

Production activities that are independent of one another are known as

- A). Homo-periodic production
- B). Homothetic production
- C). Homogenous production
- D). Heterogenous production

### Question 3

A firm has a technical efficiency of 81% and an allocative efficiency of 67.7%. What is the production efficiency of this firm?

- A). 13.3%
- B). 12.9%
- C). 12%
- D). 23%

### Question 4

Alternatively, the process of organising production activities to determine how the various levels of inputs (factors, resources etc.) and outputs are combined while leaving other factors constant. The phrase *leaving other factors constant* implies.

- A). *Ceteris paribus*

- B). Return to scale
- C). Partial elasticity of substitution
- D). Homogeneity to degree zero

**Question 5**

Output (TPP) transformed into dollar terms is known as

- A). Total marginal value
- B). Total value product
- C). Total input value
- D). Total value of marginal product

**Question 6**

When all inputs are increased proportionally, if output more than doubles.

- A). Economies of scale exist
- B). Diseconomies of scale exist
- C). Both economies and diseconomies of scale exist
- D). Neither economies nor diseconomies of scale exist

**Question 7**

Find the value of output (TPP) for the following production function,  $y = 16x + 3x^2 - 6$  when the input level is 2 units.

- A). 22
- B). 24
- C). 25
- D). 18

**Question 8**

Suppose a production is  $y = x + 4x - 3x^3$ . Find the function for the average physical product.

- A).  $y = 8x - 6x^2$

- B).  $y = 1 + 4 - 3x^2$
- C).  $y = 1 - 8x - 6x^2$
- D).  $y = 1 + 4x - 6x^2$

**Question 9**

Which statement is incorrect? At the boundary of stage I and II,

- A). The total physical product is increasing at an increasing rate.
- B). The elasticity of production is equal to one.
- C). The marginal and average physical products are equal.
- D). The total physical product is increasing at a decreasing rate.

**Question10**

Which of the following is correct about the total physical product (TPP) growth curve?

- A). It is concave to the horizontal axis before the inflexion point, and convex to the horizontal axis after inflexion.
- B). It is convex to the horizontal axis before the inflexion point, and concave to the horizontal axis at maximum TPP.
- C). It is concave to the horizontal axis before the inflexion point, and concave to the horizontal axis at maximum TPP.
- D). It is convex to the horizontal axis before the inflexion point and convex to the horizontal axis at maximum TPP.

**Question 11**

A function linking output to input is called.

- A). Production function
- B). Demand function
- C). Aesthetic function
- D). Anesthetic function

**Question 12**

If input use increase by one unit and output increases by one unit. This implies.

- A). No return to scale
- B). Variable return to scale
- C). Decreasing return to scale
- D). Constant return to scale

**Question 13**

At maximum, the slope of total physical product is zero. This implies.

- A). Diseconomies of scale
- B). Average physical product is zero
- C). Marginal physical product is zero
- D). The elasticity of production is greater than one

**Question 14**

Which of the following is a measure of variable proportion?

- A). The law of variable returns.
- B). The law of diminishing return.
- C). The law of constant returns.
- D). The law of increasing returns.

**Question 15**

In a perfectly competitive market, price is given both at input and output market

- A). at monopoly market only
- B). at input market only
- C). at both at input and output market
- D). at output market only

## TRUE OR FALSE QUESTIONS

Indicate whether the question is True or False

- Question 16. In long-run production, variable inputs are used to produce fixed level of outputs. True or False?
- Question 17. If the output price is constant, the total value product function has the same shape as the total physical product function. True or False?
- Question 18. Every point on the expansion path is a point of least cost combination. True or False?
- Question 19. All production functions are homogeneous. True or False?
- Question 20. If elasticity of production is large this means marginal physical product is large relative to average physical product. True or False?

## SECTION B: ESSAY-TYPE QUESTIONS

### Question 1

- 1.1. Draw a neoclassical production map showing total, average and marginal productivities. (2 Marks)
- 1.2. Using the map in question 1.1 above, explain the relationship between, the
- 1.2.1 Total Physical Product (TPP)
- 1.2.2. Average Physical product (APP)
- 1.2.3. Marginal Physical Product (MPP) (9 Marks)
- 1.3. Explain the term "Economic region of production". (1 Marks)
- 1.4. Explain why neoclassical production surface is a sigmoid curve and not an infinite increasing productivity function. (2 Marks)
- 1.5. Give reasons to explain why we undertake the following assumptions in production economics.
- 1.5.1. Output homogeneity (2 Marks)
- 1.5.2. Mono-periodic production (2 Marks)

**Question 2**

2.1. Determine whether each of the following production functions exhibits increasing, constant or decreasing returns to scale.

a.  $Q = 1.5x^{0.7}y^{0.3}$

b.  $Q = 0.4x + 0.5y$

c.  $Q = 2.0xy$

d.  $Q = 1.0x^{0.6}y^{0.5}$

e.  $Q = 2x^{0.4}y^{0.3}$

(10 Marks)

2.2. Determine if the following production functions are homogenous and, if so, the degree of homogeneity.

a.  $Q = 2x^{0.7} + 3y^{0.7}$

b.  $Q = 2x^{0.5} + y^{0.5}$

c.  $Q = \frac{2x^3 + 3y^3}{6x^2 - 2y^2}$

d.  $Q = 3x^2y^2 - 0.1x^3y^3$

e.  $Q = 2x^{0.8} + 3y^{0.7}$

(10 Marks)

**Question 3**

Consider the cost function.

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

1.1. If the fixed cost is N\$150, determine the following cost functions.

- a). Total cost function
- b). Average fixed cost
- c). Average variable cost
- d). Average total cost
- e). Marginal cost

(10 Marks)

1.2. Using the above function, determine the value of Q that minimizes.

- a). Average variable cost function
- b). Marginal cost function
- c). Mr Jones produces corn from his ten-hectare plot of land with a loan of N\$100 000.00 he got from the bank. He has a record of his yield and his total variable cost for five production seasons. If the price of corn is N\$8 and he pays N\$100 instalment. Assuming the loan is the only fixed investment complete the table below

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

(10 Marks)

#### Question 4

4.1. Distinguish between the following concepts.

(8 Marks)

- a). Isoquant and Isocost
- b). Isocline and expansion path
- c). Technical and Allocative efficiency
- d). Production and productive efficiency

4.2. List the features of an Isoquant.

(4 Marks)



- 4.3. Give reasons why an Isoquant line cannot cross.
- 4.4. Given the slope of Isoquant, and its rate of change, the nature of the Isoquant patterns can be derived. State the conditions that define Isoquant patterns and state the type of technical substitution that underlies the pattern. (8 Marks)