NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

DEPARTMENT OF AGRICULTURAL SCIENCES AND AGRIBUSINESS

QUALIFICATION: BACHELOR OF SCIENCE IN AGRICULTURE	
QUALIFICATION CODE: 07BAGA	**LEVEL:** 7
COURSE CODE: PPE611S	**COURSE NAME:** PRINCIPLES OF PRODUCTION ECONOMICS
SESSION: JULY 2023	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS

1. This paper consists of three sections: Section 1 has ten (10) multiple-choice questions, section 2 has ten (10) fill-in-the-space questions, and Section 2 is made up of four essay-type questions.
2. Answer ALL questions 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 initiative to deal with any perceived error or ambiguities & any assumption made should be clearly stated.

THIS QUESTION PAPER CONSISTS OF 7 PAGES (Including this front page)

Section1 Multiple choice question (10 Marks)

Question 1

Which of the following statements is correct?

A). The average physical product is above the marginal physical product in stage I.

B). The marginal physical product is equal to the average physical product in stage I.

C). At the inflexion point, the TPP function changes from increasing at a decreasing rate to increase at a decreasing rate.

D). At the inflexion point, the TPP function changes from increasing at an increasing rate to increase at a decreasing rate.

Question 2

Which of the following statements is incorrect about stage I of the neoclassical production function?

A). MPP > APP which causes APP to decrease.

B). MPP initially increases, then decreases until it is equal to APP at the end of Stage I.

C). APP is positive and the APP curve has a positive slope.

D). Stage I ends at the boundary where MPP = APP.

Question 3

Which of the following statements is incorrect about stage II of the neoclassical production function?

A). The slope becomes flatter with each additional unit of the variable input.

B). The MPP curve intersects the horizontal quantity axis at the end of Stage II.

C). APP is positive and the APP has a positive slope.

D. The APP curve is at its maximum at the beginning of Stage II.

Question 4

Which of the following statements is incorrect about the stage III of the neoclassical production function?

A). The TPP has not reached its peak and is heading down.

B). MPP is negative and the MPP curve has a negative slope.

C). The MPP curve intersects the horizontal axis and is moving down.

D). APP remains positive but the APP curve has a negative slope.

Question 5

Which stage of the neoclassical production function is referred to as the economic region of production?

A). Stage I

B). Stage III

C). Stage I & II

D). Stage II

Question 6

Which of the following statements is incorrect about the elasticity of production?

A). If $E_P > 1$: output responds strongly to a unit increase in input use.
B). If $E_P = 1$: output responds proportionately to a unit change in input.
C). If $0 < E_P < 1$: output responds more than proportionately to a unit change in input.
D). If $E_P < 0$: Output declines as the level of input increases.

Question 7

Which of the following statements is incorrect about the relationship between MPP, APP and elasticity of production?

A). The E_P is greatest when the ratio of MPP/APP is greatest. This occurs at inflexion when MPP is maximum.
B). The $E_P = 1$ at the point where APP is maximum, MPP is decreasing, MPP = APP.
C). The $Ep < 1$, when APP is decreasing, MPP is decreasing, APP > MPP.
D) The $E_p = 0$, when MPP = 0, APP increasing but > 0 (Positive).

Question 8

Consider the production function, $y = 2x^3$ and find the elasticity of production when the input level is 4 units.

A).3
B).6
C).2
D).4

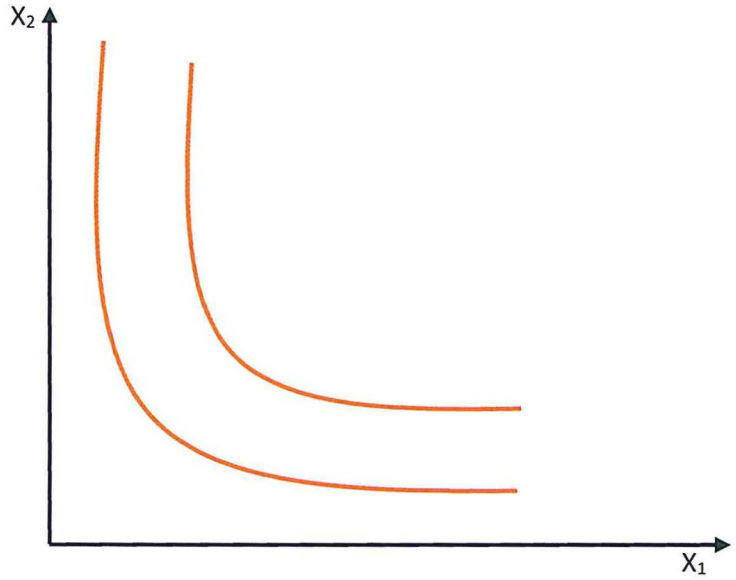
Question 9

Suppose a production function is given as $y = 8x - 2x^2$. What is the input level that maximises output?

A). 8
B).2
C).4
D).3

Question 10

The type of substitution represented by the Isoquant shown below is known as?



A). Convex substitution
B). Perfect substitution
C). Imperfect substitution
D). Zero substitution

Section 2 Fill in the space questions (10 Marks)

1. If MPP is in the positive quadrant, and the 2nd derivative of the MPP function is positive, this indicates that

_____

2. If MPP is in the negative quadrant, a positive sign on the 2nd derivative of the MPP function indicates that

_____

3. When MPP is in the positive quadrant, a negative sign on the 2nd derivative of the MPP function indicates
that_____

4. When MPP is in the negative quadrant, a negative sign on the 2nd derivative of the MPP function indicates that

_____

5. If the 2nd derivative of the MPP function is zero, this indicates that _____

6. If MPP is constant this indicates that _____

7. For a particular value of input use, a positive sign on the 1st derivative of an APP function, indicates_____

8. For a particular value of the input, a negative sign on the 1st derivative of an APP function, indicates _____

9. For a particular value of the input, a positive sign on the 1st derivative of an APP function indicates_____

10. A negative sign on the 2nd derivative of an APP function indicates that_____

Section 3 Essay-type questions (80 Marks)

Question 1

Distinguish between the following; **(20 Marks)**

1.1. Function coefficient and partial elasticity of production. (2 Marks)

1.2. Economies and diseconomies of scale. (2 Marks)

1.3. Constant and increasing return to scale. (2 Marks)

1.4. Production and production function. (2 Marks)

1.5. Explain the main underlying assumptions of production economics. (12 Marks)

Question 2 **(20 Marks)**

2.1. With the help of a schematic diagram, explain the following production terms.

2.1.1 Isoquant. (2 Marks)

2.1.2. Isocost. (2 Marks)

2.1.3. Isocline. (2 Marks)

2.1.4. Expansion path. (2 Marks)

2.1.5. Least cost production. (2 Marks)

2.2. Give three properties that underly the concept of Isoquant. (3 Marks)

2.3. What do you understand by the term Marginal Rate of Technical Substitution? (2 Marks)

2.4. The budget constraint of a corn producer is N$12000, the per unit cost of fertiliser, is N$40 and the per unit cost of seed is N$30.

2.4.1. Find the possible combination of the inputs that the farmer should utilise that gives the same cost outlay. (3 Marks)

2.4.2. Sketch the Isocost line. (2 Marks)

Question 3 **(20 Marks)**

3.1. Determine the type of return to scale exhibited by each of the following production functions.

3.1.1. $Q = 10xy - 2x^2 - y^2$ (2 Marks)

3.1.2. $Q = 0.4x + 0.5y$ (2 Marks)

3.1.3. $Q = \alpha L^{\beta} K^{1-\beta}$ (2 Marks)

3.1.4. $Q = \alpha L^{\beta_1} K^{\beta_2}$ (2 Marks)

3.1.5. $Q = 1.0x^{0.6} y^{0.5}$ (2 Marks)

3.2. For the given two input production functions, determine the function coefficient.

3.2.1 $y = Ax_1^{\beta_1} x_2^{\beta_2}$ (5 Marks)

3.2.2. $y = Ax_1^{0.5} x_2^{0.8}$ (5 Marks)

Question 4 **(20 Marks)**

4.1. A firm's cost function is given by the relationship,

$TC = 20 + 5Q + Q^2$.

The demand for the output of the firm is given as a function of price as follows:

$Q = 25 - P$.

Using the equations, derive the function for the firms.

4.1.1. Total revenue. (2 Marks)

4.1.2. Marginal revenue. (2 Marks)

4.1.3. Marginal cost. (2 Marks)

4.1.4. Total profit. (2 Marks)

4.2. Determine the output level where total profits are maximised. (2 Marks)

4.3. At the profit-maximising level of output, determine.

4.3.1. Total profit. (2 Marks)

4.3.2. The selling price. (2 Marks)

4.4. Consider the following cost function.

$AVC = 4Q^2 - 8Q + 16$

Derive an equation for the following.

4.4.1. The Total Variable Cost (TVC). (2 Marks)

4.4.2. The Marginal Cost. (2 Marks)

4.5. At what unit of output does the average variable cost (AVC) reach minimum? (1 Mark)

4.6. At what unit of output does marginal cost (MC) reach minimum? (1 Mark)

END