BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF ECONOMICS

BACHELOR OF SCIENCE HONOURS DEGREE IN ECONOMICS

AGRICULTURAL PRODUCTION ECONOMICS (EC 403)

EXAMINATION   DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. **Answer four (4) questions**
2. **The paper carries six questions**
3. **All questions carry equal marks of 25 each**

Nov 2024

Question 1

The following are states of nature and income that might obtain for a farmer who can either grow maize or wheat.

Table 1: Income and probability for a tobacco/cotton farmer

		Probability	Income (USD)	
			Maize	Wheat
State of weather:	Bad	0.3	5,000	10,000
	Fair	0.2	20,000	30,000
	Good	0.5	100,000	80,000

(a) Determine the expected incomes for maize and wheat.   **[9 marks]**

(b) If the farmer's utility function is logarithmic in income, such that U=ln(income), calculate the expected utility for each crop.   **[9 marks]**

(c) Give possible reasons why farmers do not always choose to pursue the strategy with the greatest expected income.   **[7 marks]**

Question 2

A cotton farmer who uses capital, K, and labour, L, has the following production function:

$$q = 0.1LK + 3L^2K - 0.1L^3K$$

(a) Determine the short-run production function if capital is fixed at K=10.

[5 marks]

(b) Determine the formulas for the marginal product of labour and the average product of labour.

[5 marks]

(c) Draw and explain two figures, one above the other. In the top figure, show the relationship between output (total product) and labour. In the bottom figure show the MP_L and AP_L curves.

[10 marks]

(d) Determine the values of labour for which this production function is valid.

[5 marks]

Question 3

"Mechanization policy is about the comparative impact of different types of mechanical innovation on input, employment, income distribution and farm size". Using examples from a country of your choice discuss the importance of mechanical innovations as opposed to biological innovations. **[25 marks]**

(a)

Question 4

Suppose that tobacco, T, and cotton, C, are produced using a single input which is ammonium nitrate fertilizer, X, which is fixed at 36 units. If the following are the production functions of the two crops:

$$T = 0.7X^{0.3}$$
$$C = 0.3X^{0.7}$$

(a) Derive the production possibility frontier of the farmer. **[10 marks]**

(b) What is the optimal combination of T and C that the farmer should produce?

[10 marks]

(c) What is the total revenue that the farmer will get if the price of tobacco is $2 and the price of cotton is $1?

[5 marks]

Question 5

(a) Distinguish between risk and uncertainty in agricultural production.

[5 marks]

(b) Suggest the strategies that a farmer might use to deal with risk and uncertainty.

[20 marks]

Question 6

"In his famous "efficient but poor" hypothesis, Schultz argued that low-income levels in developing country agriculture are a result of the low productivity of the available factors of production, not of inefficiencies in their allocation" (Ball and Pounder 1996, p.735) In light of this statement present the procedure used to test peasant farmers' efficiency and highlight the major shortcomings of the hypothesis. **[25 marks]**

END OF PAPER