



UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER

PROGRAMMES: BSc. Agric. Econ 2, BSc Agric. Econ 3 (Diploma Holders)

COURSE CODE: LUM 208

TITLE OF PAPER: POST-HARVEST TECHNOLOGY

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: PSYCHROMETRIC CHART

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER
QUESTIONS

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THE CHIEF INVIGILATOR**

QUESTION 1

a. A sorting machine consistently separates a feed batch into 80% product and 20% reject. If the product contains 70% good while the reject contains 15% good, determine the;

(i) Purity in each case

(ii) Sorting efficiency **[10 marks]**

b. From the psychometric chart, give all the thermodynamic properties of air that has a dry-bulb temperature [T_{db}] of 35°C and enthalpy [h] of 61 kJ/kg dry air. **[5 marks]**

c. A bin of grain is to be dried with air at a dry-bulb temperature [T_{db}] of 45°C and airflow rate per unit area of 3.55m³/m²/s. The ambient air conditions are;

Enthalpy [h] = 61 kJ/kg dry air

Dry-bulb temperature [T_{db}] = 35°C

Given that the relative humidity of the outlet air after passing through the grain is 80%, determine;

(i) Thermodynamic properties of the outlet air

(ii) Amount of sensible heat required per hour to heat the air.

(iii) Amount of moisture removed from the grain per day if the dryer is operated for 10 hours daily. **[20 marks]**

d. List the factors you would consider in selecting a grain cleaner. **[5 marks]**

QUESTION 2

- a. Briefly describe one primary and one secondary method of determining grain moisture content. **[10 marks]**
- b. Two packs of maize are labeled 20% moisture content [wet basis] and 25% moisture content [dry basis], respectively. To have maximum value for your money, which of the two would you choose, and why? **[10 marks]**
- c. Given that the volume of a storage bin is 150 m^3 , how would you determine its weight capacity if dried maize is to be stored in it? **[10 marks]**

QUESTION 3

- a. Briefly discuss 'grain storage techniques in Swaziland'. **[10 marks]**
- b. Find the amount of moisture to be removed in drying 3 tones of rough rice, initially at 25% moisture, wet basis [w.b] to 14% [w.b]. Also, estimate the weight of the dried rough rice. **[15 marks]**
- c. Outline and discuss the operation of refrigerators. **[5 marks]**

QUESTION 4

- a. A grain moisture tester operates such that the grain moisture content measured is directly proportional to the temperature and inversely proportional to the square of the resistance both indicated by its gauge. At a time, when the grain moisture content was 20% [wet basis], the gauge read 30°C and 4Ω . Determine the corresponding moisture content when the gauge reads 29°C and 3.5Ω . **[15 marks]**

b. Distinguish between;

- (i) Packaging and wrapping
- (ii) Package and pack
- (iii) Bag storage and bulk storage
- (iv) Sizing and storage
- (v) Cleaning and storage

[15 marks]