



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC AGRIC 4 (CP), BSC HE 4, BSC HEE 4**

**COURSE CODE: LUM 404**

**TITLE OF PAPER: POST-HARVEST TECHNOLOGY**

**TIME ALLOWED: TWO (2) HOURS**

**SPECIAL MATERIAL REQUIRED: NONE**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO  
OTHER QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

**SECTION ONE: COMPULSORY**

**QUESTION ONE**

- (a) Explain three different methods that can be used to determine the moisture content of a grain product. (12 marks)
- (b) Describe the process involved in solar drying of maize using plastic sheet. (8 marks)
- (c) A bin full of maize grain is to be dried with air at a dry bulb temperature of 50°C and an airflow rate of 33 m<sup>3</sup>/min. The ambient air conditions are 30°C(Td.b.) and 22°C(Tw.b.) while the outgoing air is fully saturated, determine:
  - (i) The amount of heat required per hour to heat the air. (10 marks)
  - (ii) The amount of water removed per hour from the grain. (10 marks)

**SECTION II: ANSWER ANY TWO QUESTIONS**

**QUESTION TWO**

- (a) Explain the factors that determine the extent of losses incurred in grain during storage. (10 marks)
- (b) Discuss the desired characteristics of grain protectants that are used to prevent produce losses while in storage. (10 marks)
- (c) Name five different insects that are threats to grains during storage and suggest ways of eliminating them. (10 marks)

**QUESTION THREE**

- (a) What are the relevant factors that should be considered in the selection of a drying method? (5marks?)
- (b) Briefly discuss the effect of drying on grain quality. (10 marks)

**QUESTION THREE**

- (c) Table 1 shows the results of a grain drying experiment. Using the information given, determine:
- (i) The moisture content at 85minutes after the experiment commenced. (5 marks)
  - (ii) The equilibrium moisture content. (5 marks)
  - (iii) The critical moisture content of the grain. (5 marks)

Table1: Data from grain drying experiment

Time (min)	0	30	60	90	120	150	180	210	240	270	300
Moisture Content (%)	35.0	32.5	30.0	27.5	25.0	23.5	22.5	21.8	21.4	21.2	21.1

**QUESTION FOUR**

- (a) What are the major problems confronting mechanical harvesting. Briefly make suggestions on how the problems can be solved. (5 marks)
- (b) Describe the sequence of operation of a maize combine harvester. (10 marks)
- (c) Write short notes on the following:
- (i) Crib drying;
  - (ii) Sun drying;
  - (iii) Solar drying;
  - (iv) Batch dryers; and
  - (v) Continuous-flow dryers. (15 marks)

