

2nd SEM.2014/2015



**UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER**

PROGRAMME: BSC

COURSE CODE: ABE 406

TITLE OF PAPER: CROP PROCESSING AND STORAGE

TIME ALLOWED: TWO (2) HOURS

**SPECIAL MATERIAL REQUIRED: CALCULATOR &
PSYCHROMETRIC CHART**

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

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GRANTED BY THE CHIEF INVIGILATOR.**

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SECTION ONE: COMPULSORY

QUESTION ONE

- (a) Precisely describe the moisture movement mechanisms during grain drying.
(10 Marks)

- (b) Describe the procedure for determining throughput capacity of a hammer mill.
(10 Marks)

- (c) Define fineness modulus and outline carefully how it can be determined using basic equipment.
(10 Marks)

- (d) Modern crop production techniques such as use of hybrid seeds, application of chemical fertilisers, herbicides, improved tillage techniques, irrigation technology, pest and disease control etc, have contributed tremendously to higher crop yields. Whilst this is an acceptable development in terms of food security, these modern systems have brought with them a lot of challenges. Outline post-harvest related challenges that are faced by farmers who have adopted the new technologies.
(10 Marks)

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SECTION II: ANSWER ANY TWO QUESTIONS

QUESTION TWO

- (a) With the aid of neat schematic representations, explain the principles of operation of the following artificial dryers;
- i) Cross flow **(5 Marks)**
 - ii) Counter flow **(5 Marks)**
 - iii) Concurrent flow **(5 Marks)**
- (b) Draw a sketch of the psychrometric chart and using labelled arrows indicate the drying process. **(5 Marks)**
- (c) Two samples of air both have a RH of 50%. The Tdb of one is 32 °C and the other is 38 °C.
- (i) How much moisture does each sample contain? **(5 Marks)**
 - (ii) How much energy does each air contain? **(5 Marks)**

QUESTION THREE

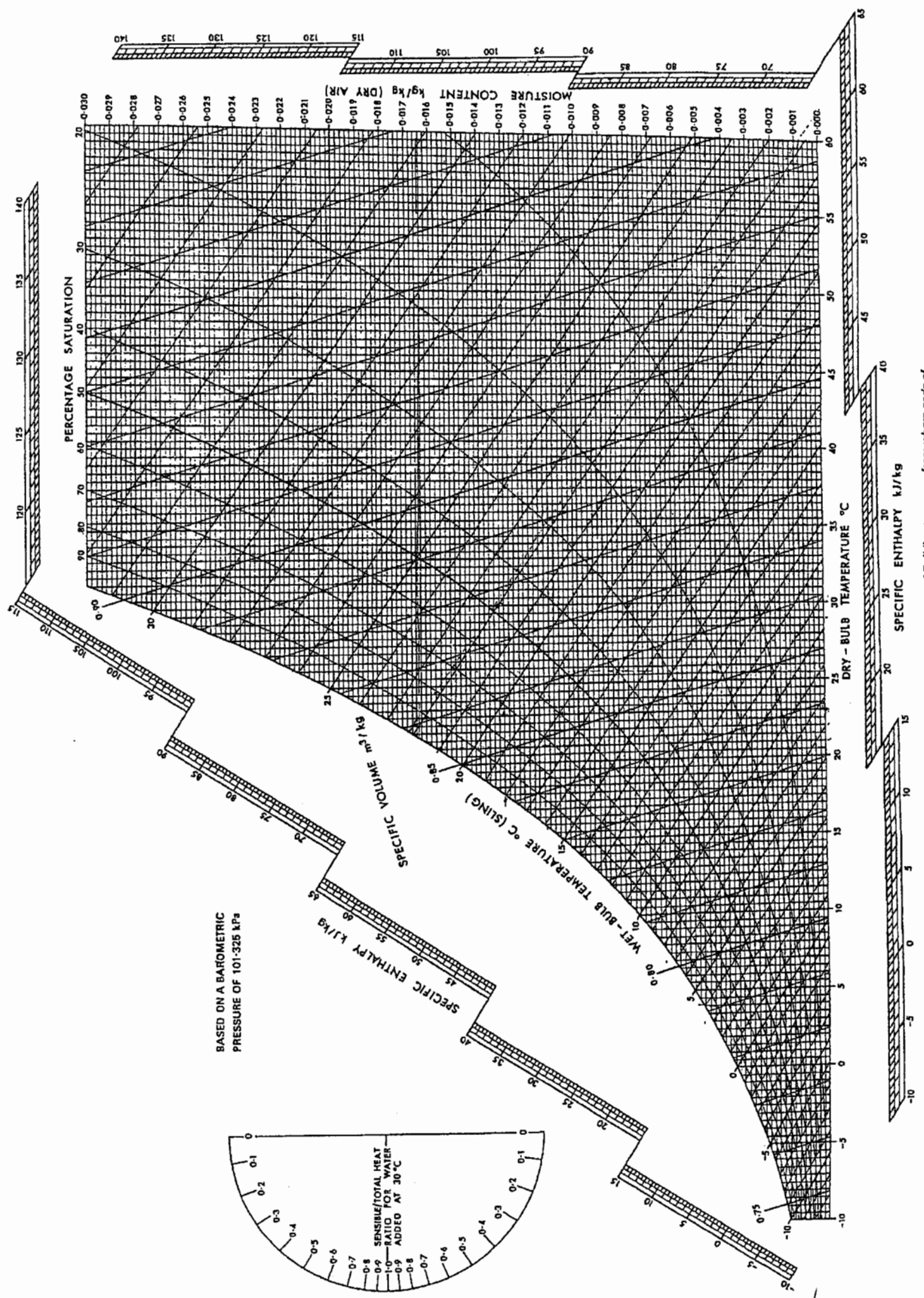
- (a) State five advantages of processing agricultural produce. **(10 Marks)**
- (b) State four (4) main devices used in conveying agricultural materials over short distances. **(4 Marks)**
- (c) In most agricultural processing industries, electric motors are predominately used, what would you say is responsible for this? **(6 Marks)**
- (d) Outline two direct methods of determining moisture content of maize. **(10 Marks)**

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QUESTION FOUR

Discuss briefly the operations of the following crop processing machinery;

- a. Maize dehuller (10 Marks)**
- b. Screw press oil expeller (10 Marks)**
- c. Omega peanut butter mill (10 Marks)**



BASED ON A BAROMETRIC
 PRESSURE OF 101.325 kPa