



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: DIP IN AGRIC 3, DIP IN AGRIC EDUC 3**

**COURSE CODE: LUM 301 (OLD PROGRAMME)**

**TITLE OF PAPER: FARM MACHINERY**

**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 I: COMPULSORY QUESTION**

**QUESTION 1**

- (a) Define tillage. (5 Marks)
- (b) Discuss the following
  - (i) Primary tillage.
  - (ii) Secondary tillage. (10Marks)
- (c) Calibration of planters can be stationary or dynamic. Explain how each one is carried out and whether one should expect both to yield the same results. (15 Marks)
- (d) In calibrating a boom sprayer the following data were collected:
 

Length of run	30 metres
Time taken per run	12 seconds
Spacing between nozzles	300 mm
Operating pressure	30 kPa
Amount of spray material collected from one nozzle	270 ml
Effective boom width	6 metres

Calculate the application rate (litres/hectare) and the discharge rate. (10 Marks)

**SECTION II: ANSWER TWO QUESTIONS FROM THIS SECTION**

**QUESTION 2**

- (a) Give two reasons why disc ploughs are the preferred ploughs in dry tropical climates. (10 Marks)
- (b) Major operational adjustments for disc implements are the disc angles. Using the disc plough as example, discuss the adjustments that can be made to the disc angles and their effect. (10 Marks)

**QUESTION 2 (continued)**

- (c) Discuss power harrows. (10 Marks)

**QUESTION 3**

- (a) The results of a screen analysis of maize meal are reported in the table below in terms of percentage of material by weight remaining on each screen.

Mesh, inches	Size of opening	Per cent
3/4	9.42 mm	
4	4699 microns	1
8	2362 microns	11
14	1168 microns	32
28	589 microns	27
48	295 microns	15
100	147 microns	11
Pan		3

Calculate both the fineness modulus and uniformity index of the maize meal. (20 Marks)

- (b) Explain why it is necessary to report both fineness modulus and the uniformity index. (10 Marks)

**QUESTION 4**

The many problems of machinery management are each quite varied in their nature. Following are some typical examples of the more important problems. In each case the decision could make a difference of several hundreds or thousands of Emalangenzi a year in profit:

- (i) How much equipment should be owned?
- (ii) What size equipment is needed?
- (iii) How often should machinery be traded?
- (iv) Should a custom operator be hired or a machine be leased or hire a contractor?

(30 Marks)