

**SUPP.2006/2007**

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**UNIVERSITY OF SWAZILAND  
SUPPLIMENTARY 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) Briefly explain the procedure for the stationary calibration of a boom sprayer.  
(10 Marks)

- (b) In calibrating a maize planter the following were noted:

|   |          |
|---|----------|
| The planter metering mechanism is operated by a press wheel |          |
| Whose diameter is   | 700 mm   |
| The press was rotated                                       | 30 times |
| The row spacing was   | 900 mm   |
| The amount of seed collected was                            | 135 g    |
| The amount of fertiliser collected was                      | 1.2 kg   |

Calculate both the seed rate and fertiliser rate.

(15 Marks)

- (c) If the seed or fertiliser rate were not as recommended, how could they be changed?

(10 Marks)

- (d) Would you expect the same application rates if the calibration was dynamic? Give reasons for your answer.

(5 Marks)

**SECTION II: ANSWER TWO QUESTIONS FROM THIS SECTION****QUESTION 2**

- (a) Briefly explain the principles of minimum-/optimum-/reduce-/ and economy-tillage.

(10 Marks)

- (b) With the aid of a diagram, outline the construction features and operation of a rotary cultivator.

(10 Marks)

- (c) Explain the justification for subsoiling.

(10 Marks)

**QUESTION 3**

- (a) Write short notes on:
- (i) Material capacity; and
  - (ii) Throughput capacity.
- (10 Marks)
- (b) Determine the size of a plough that would complete ploughing 400 hectares in 90 days given the following:
- (i) A workday is 9 hours;
  - (ii) Field efficiency is estimated at 80 per cent; and
  - (iii) Ploughing speed is 6 km/h.
- (10 Marks)
- (c) Explain how the following affect field efficiency:
- (i) Unmatched machine capacity; and
  - (ii) Field conditions.
- (10 Marks)

**QUESTION 4**

- (a) A typical drying curve shows that the drying cycle can be considered to consist of a number of well-defined zones or periods. Briefly describe these periods or zones.
- (15 Marks)
- (b) Agricultural materials must be dried by different methods because of their inherent characteristics, which would determine, among others, the maximum allowable drying temperature. Briefly explain the factors that would influence the maximum allowable drying temperature for maize.
- (15 Marks)