



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSc ABE 2

COURSE CODE: ABE202/ABE 205

TITLE OF PAPER: FARM MECHANISATION

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

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

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SECTION 1: COMPULSORY**Question 1**

- a. What are the key tasks performed during planting operations? **[15 marks]**
- b. Briefly explain the following terms as used to describe machinery performance:
- i. Field (area) capacity **[5 marks]**
 - ii. Field efficiency **[5 marks]**
 - iii. Commodity throughput **[5 marks]**
- c. Mouldboard ploughs are very popular with farmers on Swazi Nation Land. State any five likely reasons for the preference of mouldboard ploughs by farmers. **[10 marks]**

SECTION 2: ANSWER ANY TWO (2) QUESTIONS**Question 2**

- a. Discuss the time elements considered when computing the time efficiency of the use of a machine. **[10 marks]**
- b. During the static calibration of a two row planter, the following results were obtained after collecting data from both seed hoppers;

Measurement	Value
Diameter of wheel	40 cm
Row width	90 cm
Number of wheel turns	50
Amount of seed collected	10 kg

Determine the amount of seed that the farmer must buy to plant in a three hectare field.

[10 marks]

- c. Briefly discuss the five (5) functions performed by a maize planter during planting operations. **[10 marks]**

Question 3

- a. A farmer has two weeks (an 8 hour working day and 5 working days per week) to till a field of 160 hectares in preparation for planting. Tillage is carried out at a depth of

250 mm using a chisel plough that is drawn at 7 kph and a field efficiency of 95% is achieved. The specific soil resistance is estimated to be 22 kN/m after the first rains.

Determine,

- i. the expected work rate of tillage operations, [5 marks]
 - ii. the appropriate width of the chisel plough, [5 marks]
 - iii. implement draught force, [5 marks]
 - iv. the recommended tractor brake power if drawbar power is estimated to be $\frac{2}{3}$ of the engine brake power. [5 marks]
- b. Discuss the implications of the following parameters on tillage operations.
- i. Soil moisture content [4 marks]
 - ii. Adhesive properties of soil [3 marks]
 - iii. Frictional characteristics of the soil [3 marks]

Question 4

- a. Discuss any four (4) factors that farmer has to consider to determine and/or select a tractor for his/her farm. [20 marks]
- b. Discuss the different methods of planting [10 marks]