



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC ABE. II**

**COURSE CODE: 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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GRANTED BY THE CHIEF INVIGILATOR**

**SECTION I      COMPULSORY**

**QUESTION 1**

- a) Discuss any five constraints that prohibit the widespread use of farm machines in Swaziland. [10 marks]
- b) Machine performance is critical in the management of farm machinery. Field efficiency is one of the major factors used to determine machine performance. Discuss any three ways of improving field efficiency of farm machines. [15 marks]
- c) A 4 row forage harvester is used to harvest maize planted at a row spacing of 50 cm and makes an average stop of 4 minutes every time it off loads its 2 ton silage tank. The gross yield of the field is 2.1 t/ha. Material losses are estimated at 0.1 t/ha. The operating speed is 4.8 kmph. The field is 500 m long and 30 s are required for turning at the headlands.

Calculate

- i) The field capacity; [5 marks]  
ii) Material capacity; [5 marks]  
iii) Field efficiency; [5 marks]

**SECTION II      ANSWER ANY TWO QUESTIONS**

**QUESTION 2**

- a) A three bottom disc plough is to be used at Luyengo for ploughing at 300 mm where the soil resistance at that depth is 22 kN/m of cutting width. If each bottom has an effective cutting width of 45cm, determine the draught power required from the tractor if ploughing is conducted at an average speed of 5 kmph. [10 marks]
- b) Select a tractor to be used if drawbar power is estimated to be 75% of engine power. [5 marks]

- c) A regularly ploughed field has been optimally yielding crops . Suddenly plant growth is thwarted and appears as in Figure 1.
- i) What could be wrong with the field? [5 marks]
  - ii) What would you do to rectify the situation? [5 marks]
  - iii) How would your action in ii) above affect the field conditions that influence plant growth? [5 marks]

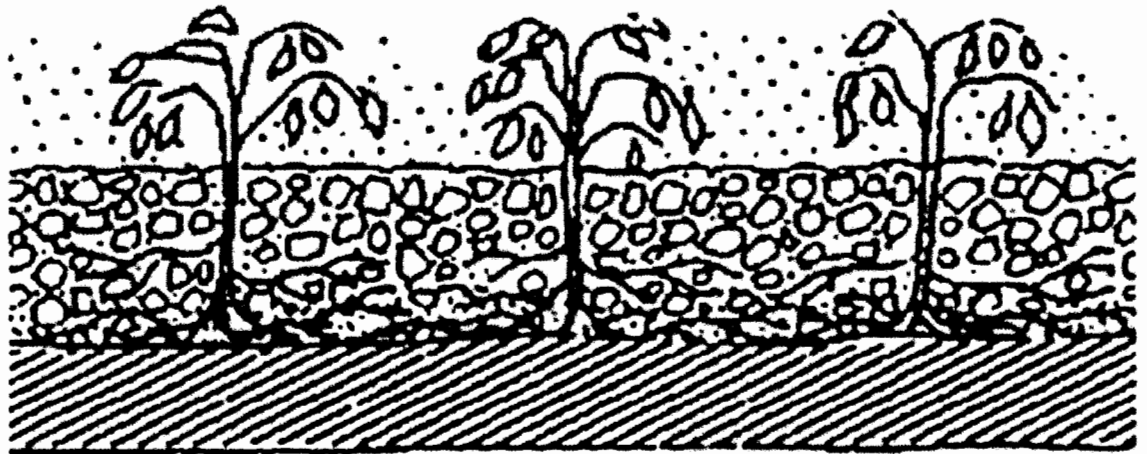


Figure 1. Sudden poor growth conditions of plants in a field.

### QUESTION 3

- a) How does the use of planting equipment influence seed germination and seedling emergency? [9 marks]
- b) Classify planting equipment by the method of placing seeds on the surface. [6 marks]

- c) Name the operations that should be performed by planting equipment during field planting operations.

[10 marks]

Also name the equipment component responsible for such operations.

[5 marks]

#### QUESTION 4

- a) Mechanisation employs a lot of equipment to improve productivity on the farm;

- (i) What factors affect the size (capacity) of machinery needed on a farm?

[6 marks]

- (ii) Discuss any three of the factors given in (i) above.

[9 marks]

- b) Discuss the factors that affect the following parameters during the application of a chemicals for the control of insects:

- (i) Application rate;

[5 marks]

- (ii) Droplet size;

[5 marks]

- (iii) Drift.

[5 marks]