



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSCABE. 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) Briefly outline the operations involved in conventional tillage, indicating any two objectives of each operation.
[8 Marks]
- (b) Explain why disc ploughs are preferred to mouldboard ploughs in tropical countries.
[10 Marks]
- (c) A farmer has 60 kW two wheel drive tractor with a mass of 6000 kg. The best operating speed is 7 km/h when using a chisel plough in hard dry soils. The chisel plough applies a draught of 10.3 kN/m when operating at a depth of 250 mm. Assuming that only 2/3 of engine power is available at the drawbar, calculate the maximum width of a plough that should be used?
[13 Marks]
- (d) Explain the effects of the following parameters on the application rate of sprayer used in plant protection:
- i) operating pump pressure.
 - ii) nozzle size.
 - iii) operating ground speed.

[9 Marks]

SECTION II ANSWER ANY TWO QUESTIONS**QUESTION 2**

- (a) Discuss the widespread use of knapsack sprayers by farmers practising agriculture on the Swazi Nation Land of Swaziland.
[10 Marks]
- (b) List any five safety measures you would take when planning and conducting spraying activities.
[10 Marks]
- (c) In a calibration exercise, 15L of water was collected from 20 nozzles spaced 50cm apart when the tractor was operating at a speed of 3.0 km/h and had covered a distance of 150m.
- (i) What is the discharge from each nozzle in L/min?
- (ii) What is the application rate?
[10 Marks]

QUESTION 3

- (a) Briefly discuss five effects of farming equipment on the germination and emergence of seedlings
[15 Marks]
- (b) Why is it important to calibrate a planter?
[5 Marks]
- (c) What are the five methods of planting?
[10 Marks]

QUESTION 4

- (a) What factors influence the performance of field machines

[6 Marks]

- (b) Briefly explain the following terms as used in the measurement of machine performance.

i) field capacity

ii) material capacity

iii) machine through put

[9 marks]

- (c) A forage harvester was timed during its field operations and the following data was recorded:

Activity	Time taken (min/ha)
1 Turning at headlands	15
2 Unhitching and hitching trailers	15
3 Actual forage harvesting	40
4 Adjusting machine units	15
5 Other down time	25

Determine

- i) the productive time when the harvester is doing its intended farm task.

[3 Marks]

- ii) the field efficiency of the forage harvester.

[7 Marks]

- iii) suggest activities that may contributed to the "other down time" in the Table for data above.

[5 marks]