



**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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SECTION I COMPULSORY

QUESTION 1

- a) (i) With the aid of a diagram, explain the effect of soil moisture content on soil strength. [5 marks]
- (ii) Discuss the implications of the soil moisture content on the tillage operations. [10 marks]
- b) Distinguish between conventional and conservation tillage. [4 marks]
- c) An agricultural extension officer informs farmers that average maize yield in Swaziland is 44,444 cobs per hectare. Maize rows are normally 90 cm apart.
- (i) Determine the intra-row spacing between plants that farmers are expected to use. [10 marks]
- (ii) What two parameters can the farmer change on the planter to change the spacing within a row? [4 marks]
- d) Briefly discuss the three major groups of hazards that plants must be protected from in order to grow and yield optimally? [9 marks]

SECTION II ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Discuss the benefits of using chisel ploughs for tillage in the Lowveld region of Swaziland. [10 marks]
- b) A farmer uses 60 kW tractor to pull a chisel plough through a field at a recommended depth of 200 mm and speed of 5 kph. Determine
- the draught force if $\frac{2}{3}$ of tractor power is used as drawbar power. [6 marks]
 - maximum width of the chisel plough that would be used if the draught force required to pull the plough at 200 mm is 5.76 kN/m [6 marks]
- c) Figure 1 shows four possible angles of furrow slices in the field after ploughing using a mouldboard plough. What parameters affect the angles of furrow slices? [8 marks]

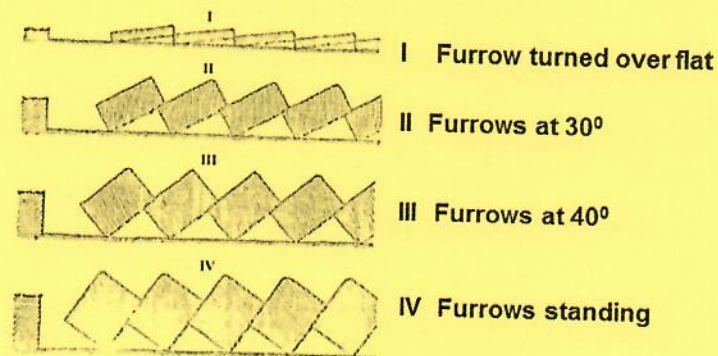


Figure 1. Angles of furrow slices after ploughing

QUESTION 3

- a) Distinguish between sprayers and dusters as mechanisms of plant protection. [4 marks]
- b) Classify sprayers and dusters by the power supply mode [8 marks]
- c) Explain the safety features considered when handling spraying/dusting operations. [7 marks]
- d) Table below shows the time obtained during the calibration of a knapsack sprayer.

Activity	
Distance moved	50 m
Time taken	5 min
Width of spray	25 cm
Quantity sprayed	2 L

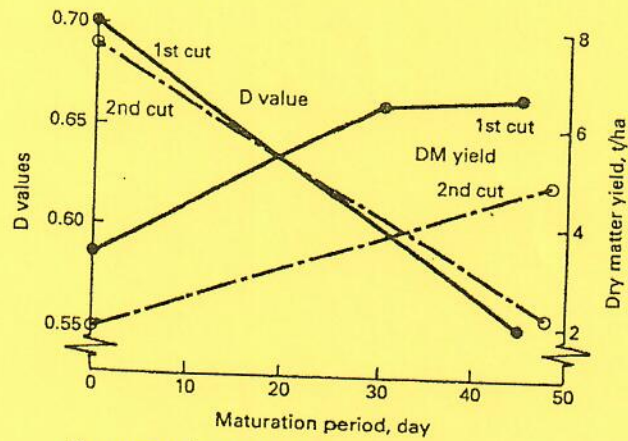
Determine

- i. The speed of spraying. [3 marks]
- ii. The chemical application rate [5 marks]
- iii. The discharge of the nozzle [3 marks]

QUESTION 4

- a) What processes are involved in grain harvesting to obtain the cereal from the stock to clean individual cereal grains? [6 marks]
- b) Discuss the methods of providing three forms of forage to animals. [9 marks]

- c) Figure 2 shows a graph of the effect of days past physiological maturity of forage grass on nutritive value (digestible organic matter, D) and the dry matter yield, DM of the grass. Discuss the graph indicating the importance of effective mechanised grass harvesting: [15 marks]



Dry matter yield and D values for first and second cuts of S24

Figure 2 Dry matter yield and digestible organic matter content of a perennial grass (s24 rye).