



**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) (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 [5 marks]
- c) Table 1 (attached) shows a Field Day Worksheet for a farm of 90 hectares where maize is grown on 60 hectares and beans on 30 hectares. Determine the field days for each equipment operation on the farm and the total number field days for the labour force. (show the equations you have used for columns 6 and 7) [20 marks]

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

- a) Figure 1 shows disc and tilt angles as on a disc of a plough. Discuss the effect of changing the values of the angles on the ploughing performance.

[15 marks]

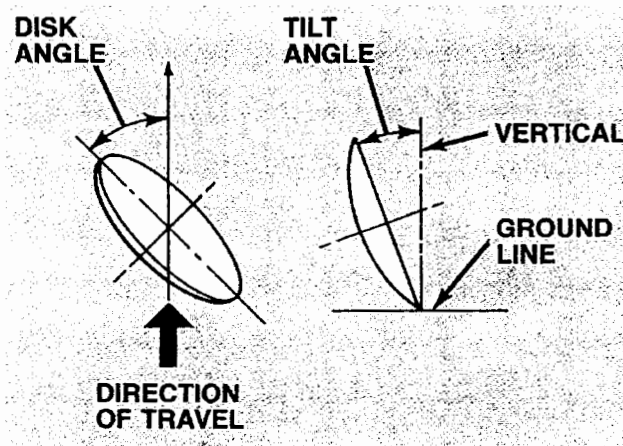


Figure 1. Disc- and Tilt-Angles of a disc plough.

- b) In order to meet planting deadlines, a 30 ha field should be ploughed in 6 field days, when working 12 hours per day.
- i) What is the expected field capacity? [7 marks]
- ii) Determine the minimum width of cut if an operating speed of 5 kph and a field efficiency of 80% are expected. [8 marks]

QUESTION 3

- a) How does the use of planting equipment influence seed germination and seedling emergency? [12 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. [8 marks]
- Also name the equipment component responsible for such operations. [4 marks]

QUESTION 4

- a) (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;
 - (ii) Droplet size;
 - (iii) Drift.
- [15 marks]

CANDIDATE'S NUMBER _____

Table 1. Field Days Worksheet

1	2	3	4	5	6	7
Type of operation	Total area covered (ha)	Implement size (m)	Field Capacity (ha/hr)	Labour availability (h/day)	Area/day (ha/day)	Field days (days)
ALL TILLAGE AND PRE-PLANT PREPARATION						
Plough		1.35	0.5	10		
Apply basal		5.0	4.5	10		
Tandem disc (twice)		3.6	3.0	10		
Ridging potatoes		2.4	2.0	10		
				Total Pre-planting Preparation		
PLANTING						
Maize Planting		3.6	2.0	10		
Potato planting		1.2	0.5	10		
Maize cultivation		2.7	2.0	10		
Potato Herb. appl (twice)		4.0	4.0	10		
Maize insect appl		3.6	3.0	10		
				Total Planting time		
HARVESTING						
Harvest maize		0.9	1.0	10		
Harvest potatoes		1.2	0.6	10		
				Total Harvesting time		
		Overall total labour days				