



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSC AGRIC ECON. AGBMGT. II
BSC AGRIC EDUC. II
BSC AGRON. II
BSC ANI. SC. II
BSC ANI. SC. (DAIRY) II
BSC HORT. II

COURSE CODE: ABE 210

TITLE OF PAPER: PRINCIPLES OF 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) List any five power transmission systems and five power transformation systems. [10 marks]
- b) Explain why chains and sprockets are the preferred power transmission units in planters. [10 marks]
- c) Table 1 (pages 4, 5 and 6) shows 10 different types of agricultural equipment. Name the equipment and the categories they belong to in the table. [20 marks]

SECTION II ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Name any **FIVE** animal species used for draught work and indicate the type of work each species is most suited for. [10 marks]
- b) List and explain cattle conformation features that influence their potential use in draught work. [10 marks]
- c) A span of draught oxen generates a pull in the trek chain of 3.55 kN when walking steadily at an average speed of 300 mm/s. Given that the angle of pull is 20° , and the plough width of cut is 200 mm, calculate:
- (i) Draught force; [2 marks]
 - (ii) The power generated by the oxen; [2 marks]
 - (iii) The number of days required to plough one hectare, if the animals work for 5 hours per day; [2 marks]
 - (iv) The distance travelled to complete one hectare; [2 marks]
 - (v) The work done by the oxen in ploughing one hectare. [2 marks]

75

QUESTION 3

- a) Discuss the measures that can be taken to reduce spray drift when using conventional boom sprayers. [10 marks]
- b) Determine the nozzle flow rate of a sprayer that will travel at 7 kph and has a nozzle spacing of 50 cm on a 20 m boom given that the desired application rate is 240 L/ha. [12 marks]
- c) What are the advantages of using Ultra Low Volume (ULV) sprayers by farmers practicing climate smart agriculture in the peri-urban areas of Swaziland. [8 marks]

QUESTION 4

- a) Define tillage. [3 marks]
- b) Explain why disc ploughs are preferred to mouldboard ploughs in tropical countries. [10 marks]
- c) A three bottom plough is to be attached to a tractor before setting out to the field. The width of cut per bottom is 45 cm.
 - (i) Determine the total width of cut of the plough. [5 marks]
 - (ii) Calculate the centre of load from the furrow wall of the previous pass, i.e. from the wing of the first bottom. [6 marks]
- d) Distinguish between single acting, offset and tandem disc harrows. [6 marks]

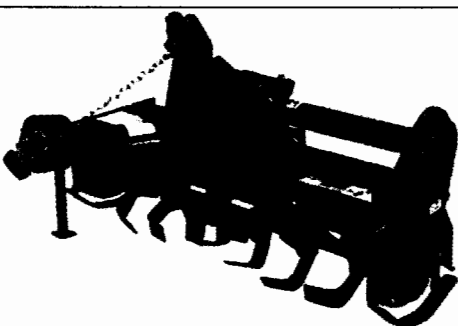


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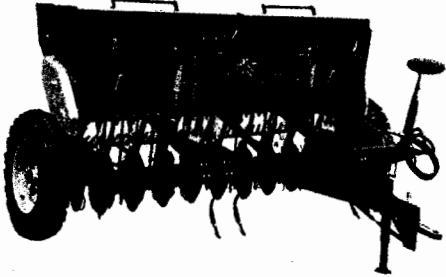
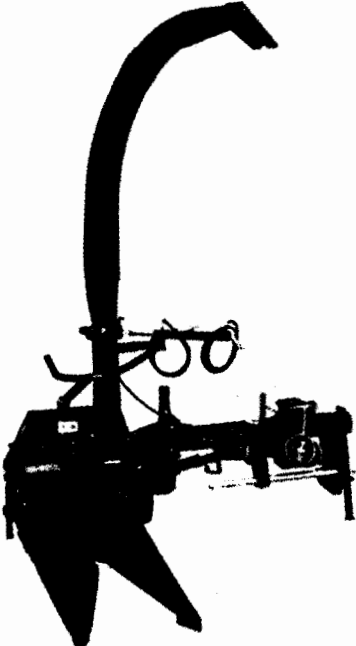

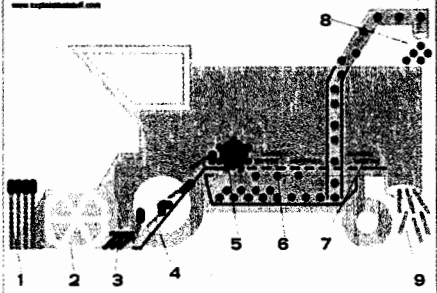
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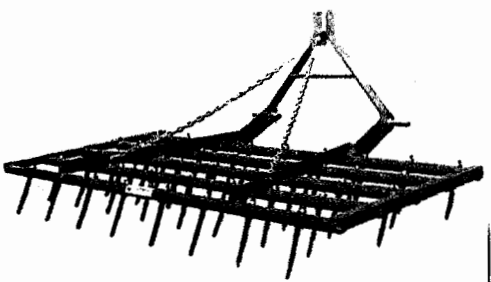
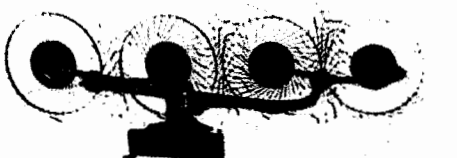

QUESTION 1 c)

Fill in missing information in the appropriate cells. The first one has been done for you. [20 marks]

Table 1 common agricultural equipment

	Picture	Name of equipment	Category of equipment
0		Rotary till / rotovator	Secondary tillage implement
1			
2			

	Picture	Name of equipment	Category of equipment
3			
4			
5			
6			

	Picture	Name of equipment	Category of equipment
7			
8			
9			
10	