



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSC AGRON. 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.**

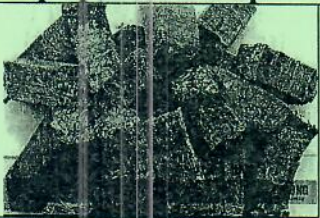
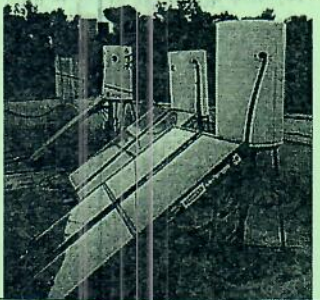
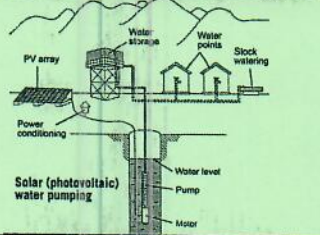
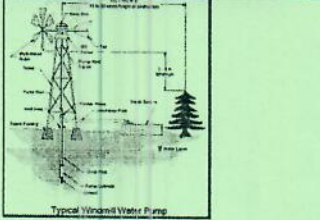
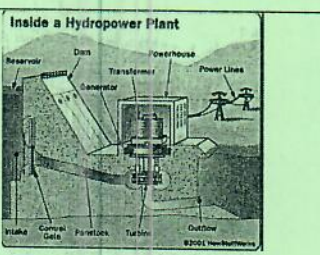
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SECTION I COMPULSORY**QUESTION 1**

- a) Animals are still a vital source of power for rural farmers in southern Africa.
- (i) What is Draught Animal Power (DAP)? [2 marks]
 - (ii) State, giving reasons for your choice, the animal breed that is suitable for Eswatini [4 marks]
 - (iii) Distinguish between elimination and judging as steps used to select animals for draught power. [4 marks]
- b) Name the possible sources of biomass that can be used to provide renewable energy? [6 marks]
- c) Table 1 (next page) shows possible energy sources and their uses. Fill in the appropriate energy sources and their applications in the empty cells provided. The first row shows an example of the expected format of answers. [10 marks]
- d) A three bottom plough is to be attached to a tractor before setting out to the field. The width of cut per bottom is 35 cm.
- i. Calculate the total width of cut? [4 marks]
 - ii. If a soil resistance of 20 kN/m of cut is experienced, what will be the total force the tractor must overcome? [5 marks]
 - iii. Determine the power to pull the plough if ploughing is done at a speed of 5 kmph. [5 marks]

QUESTION 1c) CANDIDATE No. _____

Table 1 renewable energy sources and their uses.

	Equipment setup	Energy source	Application
1		Biomass briquettes	Burn for heat
2			
3			
4			
5			
6			

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

- a) What is tillage? [3 marks]
- b) What operations are conducted in conventional tillage? [10 marks]
- c) What are the objectives of tillage? [7 marks]
- d) Figure 1 shows a three bottom tractor mounted disc plough.
 - (i) Name the parts labelled. [5 marks]
 - (ii) State the functions of each part. [5 marks]

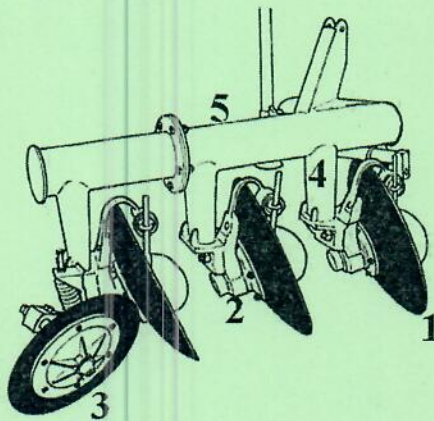


Figure 1 Parts of a disc plough.

QUESTION 3

- a) What are the cropping systems that farming equipment must adapt to? [4 marks]
- b) Name two examples of crops grown in eSwatini for each cropping system mentioned in a). [4 marks]
- c) Distinguish between motion transmission and motion transformation as a means of conveying power from a source to a task. [6 marks]
- d) Name the types of motion transformation systems. [8 marks]

- e) Name the categories by which wheeled tractors can be identified when considering the way the wheels are driven and steered. [3 marks]
- f) Figure 2 shows two wheeled tractors (1 and 2). State the features you would see on tractors 1 and 2 to determine their categories. [5 marks]

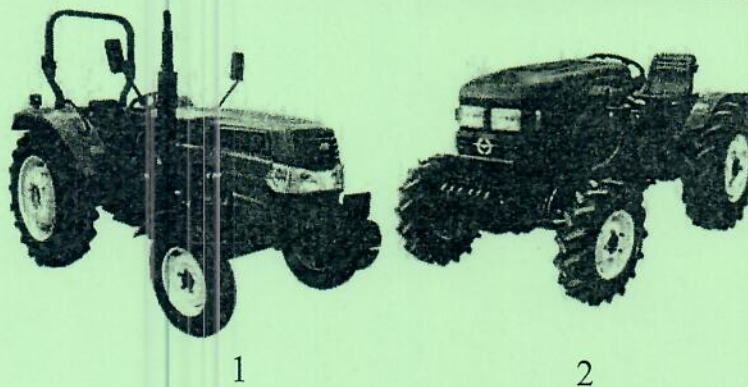


Figure 2 Two common wheeled tractors.

QUESTION 4

- a) Ploughing is one the major operations for Swati farmers.
- Name the different methods of ploughing [6 marks]
 - Which method of ploughing is most suitable for an irregular field? [2 marks]
 - Why is a rectangular marked field preferred to a square marked field for tillage operations? [4 marks]
- b) Explain the terms 'back furrow' and 'dead furrow' as they arise from ploughing. [8 marks]
- c) Explain the operations performed by equipment during the planting of seed in the soil. [10 marks]