



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC AGRON. II
BSC ANI. SC. II
BSC ANI. SC. (DAIRY) II**

COURSE CODE: ABE208 / 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.**




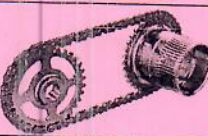
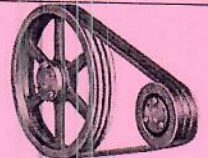
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SECTION I COMPULSORY

QUESTION 1

- a) Table 1 shows common transmission elements used in agricultural machinery. Name the elements and give one example of a farm equipment where you have seen each of them. [10 marks]

Table 1 transmission elements used in agricultural machinery.

	Drive	Name	Example of application
1			
2			
3			
4			
5			

- b) Explain why chains and sprockets are the preferred power transmission units in planters. [8 marks]
- c) The two processes of selecting draught animal power are elimination and judging.
- i. Distinguish between elimination and judging. [4 marks]
 - ii. What factors are considered during judging? [6 marks]
- d) Discuss the influence of farm equipment on the seed germination and seedling emergency [12 marks]

SECTION II ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Distinguish between active solar and passive solar as applied in renewable energy agricultural applications. [6 marks]

State an example each for active and passive solar use in Swaziland. [4 marks]

- b) Figure 1 shows the measurements that are usually taken from a draught animal to determine its mass. If a recommended mass 312 kg and the girth (G) at A is one and half times the length (L) BC, determine the girth and length you expect to measure on the animal.

[Use the equation $mass = \frac{G^2 L}{10816}$, where the G and L are in cm]

[10 marks]

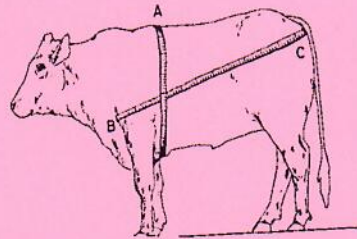


Figure 1 Measurements used to determine mass of an animal.

- c) At what points on a tractor can farm machinery be attached? [6 marks]
- d) Name features that are used to identify a four wheel drive tractor. [4 marks]

QUESTION 3

- a) What tillage processes are necessary for proper preparation of the soil throughout the crop life? [8 marks]
- b) A farmer applies the required fertilizers, irrigation, etc. but still the crop remains stunted as shown in Figure 2.

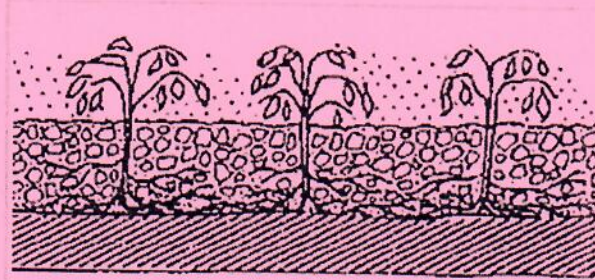


Figure 2 Stunted field crops

- i. Describe the possible cause of stunting [6 marks]
- ii. Suggest the possible mechanisation activity that may be applied to rectify. [3 marks]
- iii. What is the effect of the activity on the soil? [3 marks]
- c) Why is it necessary to perform secondary tillage in a field? [4 marks]
- d) Distinguish between harrowing and cultivation [6 marks]

QUESTION 4

- a) What are the differences between broadcasting, drilling and precision planting? [6 marks]
- b) Discuss the preference of mouldboard ploughs over disc ploughs by small scale farmers in Swaziland. [10 marks]
- c) Figure 3 shows a two stage gear reduction system for a forage harvester.

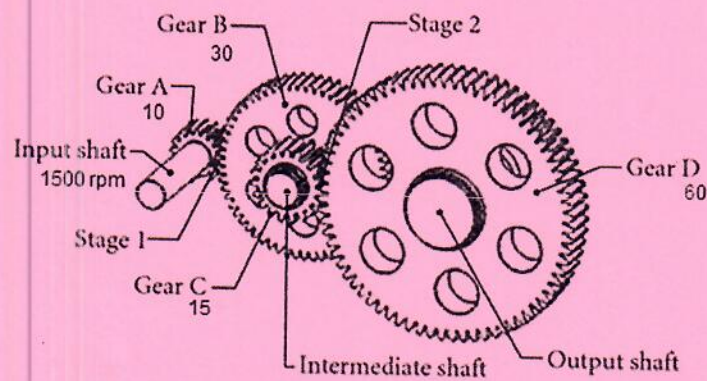


Figure 3 A two stage gearbox

- (i) Determine the speed of the intermediate shaft. [4 marks]
- (ii) What is the gear ratio of the gearbox? [6 marks]
- (iii) What is the speed of the output shaft? [4 marks]