



**UNIVERSITY OF ESWATINI
FINAL EXAMINATION PAPER**

PROGRAMME: BSC AGRON. II
BSC AGRIC EXT. II
BSC ANI. SC. II
BSC ANI. SC. (DAIRY) II

COURSE CODE: ABE208

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 [40 MARKS]

- a) (i) Distinguish between stationary and tractive agricultural tasks. [4 marks]
- (ii) List any three tractive and three stationary agricultural tasks. [6 marks]
- b) Discuss the factors that hinder the mechanisation of small-scale farming in Eswatini. [14 marks]
- c) You are expected to transport an ox (Figure 1) in a cart. You are told that the ox has girth dimension A of 2.05 m and weighs 700 kg. Determine the cart you would hire (determined by length) which would be big enough to transport the animal if its total length is 110% of the length (BC) used to determine its mass. Carts for rental are in lengths of 1.5, 2.0, 2.5, 3.0, and 3.5 m. [10 marks]

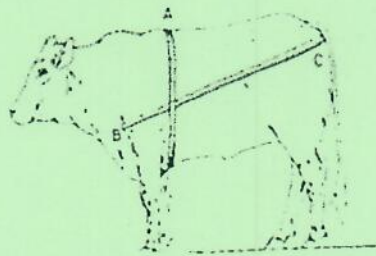


Figure 1 Dimensions of an ox necessary for weight determination.

[Hint: mass of a DAP is given as $Live\ mass\ (kg) = \frac{A^2 \times BC}{10816}$, where A, BC are in centimetres]

- d) Grain is a key agricultural produce that is harvested in the southern African region. What are the major processes conducted during grain harvesting? [6 marks]

SECTION II – ANSWER ANY TWO QUESTIONS

QUESTION 2 [30 MARKS]

- a) The list below shows factors that determine seed germination and emergency.
1. Type of soil;
 2. Planting depth;
 3. Type of drainage;
 4. Moisture content;
 5. Degree of firmness of soil around the seed;
 6. Skill of machine operator
 7. Quality of the seed;
 8. Treatment of the seed to resist soil micro-organisms;
 9. Uniformity of seed size;
 10. Cleanliness and condition of the seedbed;
 11. Uniformity of seed coverage;
 12. Time of planting;
 13. Seed distribution;
 14. Soil temperature.
- i) Name the parameters that are influenced by equipment. [6 marks]
- ii) Describe how any two equipment dependent parameters affect seed germination and seedling emergency. [6 marks]
- b) Check-planting is one of the methods of planting achieved by a precision planter.
- i) What is check-planting? [3 marks]
 - ii) State the benefits of check-planting. [3 marks]
 - iii) Why is check-planting not practised in Eswatini? [4 marks]
- c) Planters enable row crop planting of different crops with different field spacing requirements.
- (i) What possible actions can you undertake on a planter to change the spacing of plants within a row? [4 marks]
 - (ii) What is the common method used on small planters to vary plant spacing within a row. [4 marks]

QUESTION 3

- a)
- (i) What are the functions of brakes on tractors? [6 marks]
 - (ii) What information is contained in the operator's manual of an agricultural tractor? [5 marks]
- b)
- (i) Distinguish between controls and instruments/indicators on agricultural tractors [4 marks]
 - (iii) Give two examples of each category in (i) above. [4 marks]
- c) What external features would help you identify a four wheel drive agricultural tractor? [3 marks]
- d) An ignition switch for a tractor diesel engine is shown in Figure 2. Possible positions for the key are labelled on the diagram. State the conditions under which the key would be held in the labelled positions A, B, C and D. [8 marks]

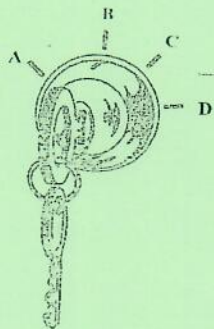


Figure 2 Positions of a key in an ignition switch of a diesel engine

QUESTION 4

- a) List five operational differences between a mould board plough and a disc plough
[10 marks]
- b) Figure 3 shows basic parts of a mouldboard plough. State the functions of the basic parts.
[10 marks]

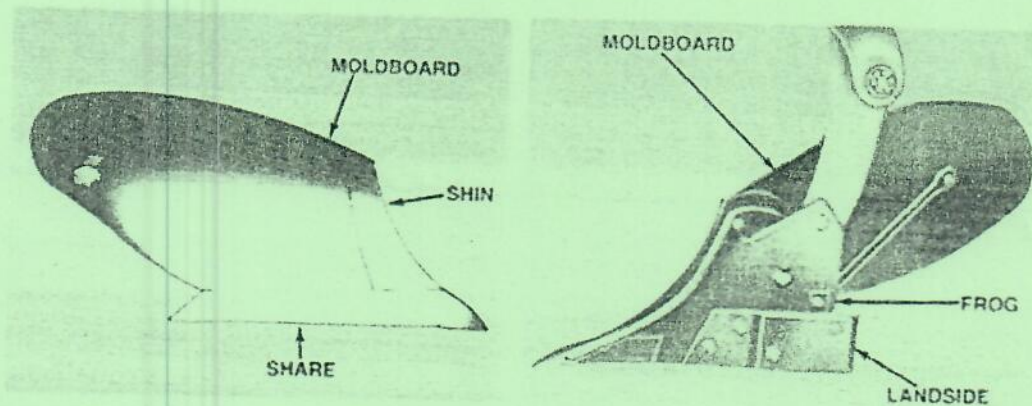


Figure 3 Basic parts of a mouldboard plough.

- c) What tillage processes are practised in conventional tillage?
[10 marks]