



**UNIVERSITY OF SWAZILAND
SUPPLEMENTARY 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) Performance of a machine is determined by its capacity.
- (i) Define machine capacity. [3 marks]
 - (ii) Distinguish between the three methods of measuring machine capacity. [9 marks]
- b) List the time elements considered when computing the time efficiency of the use of a machine, and indicate those factors that are considered in calculating the field efficiency. [13 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) What is the importance of knowing the centre of load of the plough? [5 marks]
 - (ii) Calculate the centre of load from the ploughed furrow [10 marks]

SECTION II – ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Distinguish between implements, equipment and machines as used in farm mechanisation terminology. [9 marks]
- b) Name any six objectives of tillage? [12 marks]
- c) The reaction of soil to the forces applied by tillage tools depends on the following properties: Shear strength of the soil, adhesive properties of the soil, and frictional characteristics of the soil. What are the effects of these factors in tillage? [9 marks]

QUESTION 3

- a) Briefly discuss
- (i) The major objectives of plant protection; [6 marks]
 - (ii) The pros and cons of Ultra Low Volume (ULV) sprayers in Swaziland; [9 marks]
- b) Determine the application rate (in litres per hectare) of a boom sprayer that has a nozzle spacing of 50 cm on an 18 m boom. The sprayer is being driven at 8 km/h and the nozzle discharge is 0.02 ml per second. [15 marks]

QUESTION 4

- a) What is the importance of machinery calibration in agricultural production?
[5 marks]
- b) State the seven key steps of stationary calibration of a maize planter.
[7 marks]
- c) A vertical rotor planter has 35 cells around its disc of 28 cm in diameter. The planter's seed tube 70 cm in vertical length and the seed is released 20 cm above the ground from the end of the tube. If the rotor's speed is 25 m/min, and assuming the forward planter speed to be 4 km/h and no air resistance, calculate
- (i) The seed to seed distance along the row;
[9 marks]
- (ii) The time required to strike the ground after the seed is released from the rotor.
[9 marks]