



**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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GRANTED BY THE CHIEF INVIGILATOR**

SECTION I COMPULSORY

QUESTION 1

- a) Distinguish between pyrolysis and gasification as methods of refining extractable energy from biomass [3 marks]
- b) Wind energy is becoming widely used on agricultural farms around the world.
- i) What are the limitations of using wind energy in Swaziland [4 marks]
- ii) In an effort for a farmer to increase extractable wind energy the diameter of the blades of a windmill are doubled. By what factor does the availability of wind power increase, if the wind conditions remain the same? [8 marks]
- c) Discuss any five factors that discourage small scale farmers from owning and using farm machines in Swaziland. [10 marks]
- d) A prospective farmer purchases 50 ha of land. The land has been used for grazing but the new owner prefers to grow maize on the land. Gravel is seen on the surface and roots are spreading in many areas of the land
- i) Select the processes the farmer will follow before planting the maize seeds. [5 marks]
- ii) Recommend the implements to be used in each of the processes in i) above giving reasons for your recommendation. [10 marks]

SECTION II ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Discuss the advantages and disadvantages of the use of mould board ploughs as opposed to disc ploughs in Southern Africa. [9 marks]
- b) Distinguish between tillage processes and tillage practices. [6 marks]

- c) There are 6 discs on a disc harrow spaced at 30 cm apart on a gang. Measurements of the operations showed that the total time lost in the field for turning and adjustments is 80% of the time the harrow is in the field. Assuming that there is no overlap between passes and the operating speed is 8 kmph, determine:
- i) Field capacity. [10 marks]
 - ii) Field Efficiency. [5 marks]

QUESTION 3

- a) It is important to routinely calibrate farm equipment. What are the benefits of calibrating farm equipment? [5 marks]
- b) Explain the procedure of stationary calibration of a maize planter. [15 marks]
- c) A planter drops seeds at 200 points in a row of 50 m. Calculate the plant population if a row spacing of 90 cm is expected. [10 marks]

QUESTION 4

- a) List any three transmission systems commonly used in transferring power in agricultural equipment. [6 marks]
- b) What are the advantages of using belt drives over chain drives for the transfer of power in farm operations [9 marks]
- c) With the aid of diagrams, explain five types of mechanical forces that act on power transmission equipment. [15 marks]