



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC AGRIC ECON. AGBMGT. II
BSC AGRIC EDUC. II
BSC AGRIC AGRON. II
BSC ANI. SC. II
BSC LWM. II**

COURSE CODE: LUM 205 (NEW PROGRAMME)

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) Using Swaziland as an example, discuss any **two** objectives of agricultural mechanisation. [10 marks]
- b) Machine performance is critical in the management of farm machinery. Field efficiency is one of the major factors used to determine machine performance. Discuss any three ways of improving field efficiency of farm machines. [15 marks]
- c) A 5 m width of cut harvester makes an average stop of 4 minutes every time it unloads its 2 ton grain tank. The gross yield of the field is 2.1 t/ha. Material losses are estimated at 0.1 t/ha. The operating speed is 4.8 kph. The field is 400 m long and 15 s are required for turning at the headlands. Assuming an actual width of cut to be 95% of the theoretical, calculate
- i) Theoretical field capacity;
 - ii) Effective field capacity;
 - iii) Field efficiency;
- [15 marks]

SECTION II – ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Distinguish between the following farm equipment;
- i) Harrows and cultivators [5 marks]
 - ii) Dusters and sprayers [5 marks]
 - iii) Seed drills and planters [5 marks]

- b) During the static calibration of a planter, the following results were obtained;

| Measurement | value |
|----------------------------------|--------------|
| Diameter of wheel | 40 cm |
| Row width | 90 cm |
| Number of wheel turns | 50 |
| Amount of maize collected | 10 kg |

Determine the amount of seed that the farmer must buy plant in a three hectare field.

[15 marks]

QUESTION 3

- a) Discuss the features of a disc plough which determine the implements' penetration, soil disintegration, and the degree of trash burial.

[15 marks]

- b) A three bottom disc plough is to be used at Luyengo for ploughing where the soil resistance is 22 kN/m of cutting width. If each bottom has an effective cutting width of 45cm, determine the draught power required from the tractor if ploughing is conducted at an average speed of 5 kph

[10 marks]

- c) Select a tractor to be used if drawbar power is estimated to be 75% of engine power.

[5 marks]

QUESTION 4

- a) Briefly discuss factors that are used to determine the size of machinery used on a farm.

[20 marks]

- b) Determine plough size that will be appropriate for a 50 hectare field in 30 days given that labour laws permit 10 hours for farm workers. The ploughing speed is 4.5 kph and a field efficiency of 85% is expected.

[10 marks]