



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: DIP AGRIC II & DIP AGRIC ED. II

COURSE CODE: LUM 201

TITLE OF PAPER: FARM POWER

TIME ALLOWED: TWO (2) HOURS

**SPECIAL MATERIAL REQUIRED: TYRE SPECIFICATION
TABLES**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO
OTHER QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

SECTION I
COMPULSORY

QUESTION 1

- a) State reasons why diesel engines are commonly used on Swaziland's agricultural farms.

[7 marks]

- b) The government plans to open up new farming land in an area that is predominantly marshy with a lot of clay soil. Name the type of tractor you would recommend to be used to clear the place. Give reasons for your choice.

[6 marks]

- c) Discuss the concepts of torque and power when considering purchasing a tractor, given the various farm tasks.

[15 marks]

- d) What pre-start checks should a swazi farmer conduct on a tractor before setting out for field operations in the morning?

[12 marks]

SECTION II

CHOOSE ANY TWO QUESTIONS FROM THIS SECTION.

QUESTION 2

- a) Comment on the problems associated with using a tyre that has excessive inflation pressure than recommended for a specific loading.
[15 marks]
- b) The sidewalls of a tyre have the inscription 16.9R34 139 A8
- i) Using the load index and speed symbol tables provided what would you recommend to be the safe load and speed that should be subjected to the tyre when in use? Explain how you arrived at your decision
[8 marks]
- ii) Using table 2 provided from the manufacturer, what should be the allowable maximum speed if a load of 2600 kg is to be carried by the tyre under the same inflation pressure. Explain how you arrived at your decision.
[6 marks]

QUESTION 3

- a) What components constitute the drive train of a tractor?
[3 marks]
- b) Friction has advantages and disadvantages in the functioning of machines. Write short notes on the usefulness and disadvantages of friction in the power train of a tractor transmission system. Give examples of how friction is maintained or minimised in each case.
[12 marks]
- c) What is clutch drag in power transmission? Name the possible causes of clutch drag.
[10 marks]

QUESTION 4

a) Comment on the following statements:

- i) Diesel engine powered tractors do not need a battery since diesel engines are self ignited and starting can be done with the help of “jumpers” from other tractors.

[5 marks]

- ii) Tractors normally operate at low speeds and therefore do not need shock absorbers and springs as suspension elements.

[5 marks]

b) Name three types of electrical ignition systems for internal combustion engines.

[6 marks]

c) Figure 2 represents the circuit for dashboard light. The 12 V battery sends a current through a bulb marked 12V, 2W that is connected in parallel with a variable resistor (R). The variable resistor is used to adjust the intensity of light on the dashboard.

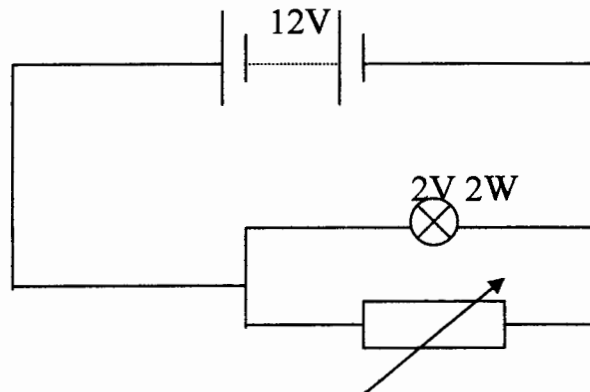


Figure 2 Electric circuit containing a bulb

Calculate

- i) Current rating of the bulb.
ii) The value of the variable resistance (R) when the dashboard is brightest.

[14 marks]