



**UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER**

**PROGRAMME: DIPLOMA IN AGRICULTURE 2
DIPLOMA IN AGRICULTURAL EDUCATION 2**

COURSE CODE: LUM 201

TITLE OF PAPER: FARM POWER

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

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

**DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED
BY THE CHIEF INVIGILATOR**

SECTION I
COMPULSORY

QUESTION 1.

- a) At what time of the day is it preferable to fill up tractors with fuel? Give reasons to support your answer?

[10 Marks]

- b) Distinguish between controls and indicators that are found on agricultural tractors.

[10 Marks]

- c) A tractor engine produces a flywheel torque of 230 Nm when running at 2200 rpm. Calculate the drawbar power the tractor produces to pull the plough if $\frac{2}{3}$ of the engine power can be used as drawbar power.

[8 Marks]

- d) Write short notes on the common causes of the following colours of smoke from the exhaust pipe of an internal combustion engine:

- i) Blue smoke;
- ii) White smoke
- iii) Black smoke.

[12 Marks]

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SECTION II
CHOOSE ANY TWO QUESTIONS

QUESTION 3.

- a) Name engine systems that ensure good operation of an internal combustion engine.

[12 Marks]

- b) What are the functions of a muffler on the exhaust system of an internal combustion engine?

[6 Marks]

- c) A tractor tyre has the markings 18.4/80 – 30 10PR inscribed on its sides. Calculate the forward speed of such a tractor in metres per second if the wheel is running at 10 rpm.

[12 Marks]

QUESTION 2

- a) Name the common types of final drives in the drive train of a tractor transmission.

[6 Marks]

- b) Name any particular advantages of the final drives stated in a) above.

[8 Marks]

- c) Figure 2 shows the arrangement of gears in a gearbox for transmission of power in the first gear. Calculate the speed of the output shaft when the engine is running at 1800 rpm and the gear teeth are as shown on the diagram.

[16 Marks]

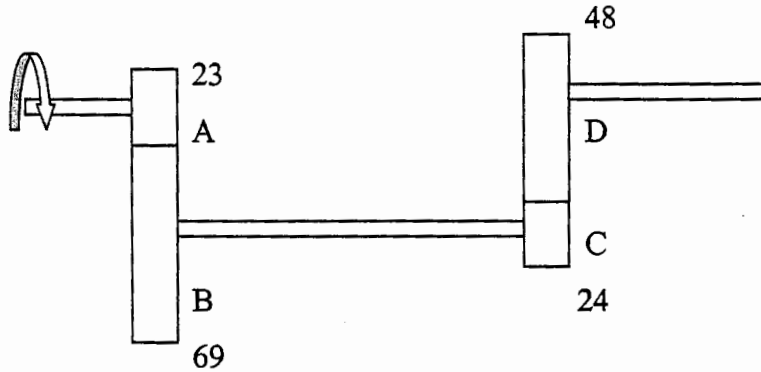


Figure 2: Gear transmission in first gear

QUESTION 4

- a) What constitutes good care of lubrication systems of internal combustion engines?

[10 Marks]

- b) Name five checks a farmer should be capable of conducting on a tractor if its engine is overheating.

[10 Marks]

- c) Why are diesel engines preferred to petrol engines in agricultural tractors?

[10 Marks]