



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMMES:

- B. Sc. AgEc. & AgBMgt. (YEAR 1)**
- B. Sc. Agric. Ed. (YEAR 1)**
- B. Sc. Agron. (YEAR 1)**
- B. Sc. Ani.Sci. (YEAR 1)**
- B. Sc. FSNT (YEAR 1)**
- B. Sc. Home Econ. (YEAR 1)**
- B. Sc. Home Econ. Ed. (YEAR 1)**
- B. Sc. Hort. (YEAR 1)**
- B. Sc. LWM (YEAR 1)**
- B. Sc. TADM (YEAR 1)**

COURSE CODE: LUM 101 (NEW PROGRAMME)

TITLE OF PAPER: PHYSICS

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: DRAWING EQUIPMENT

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

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GRANTED BY THE CHIEF INVIGILATOR**

1st SEM.2006/2007

SECTION ONE: COMPULSORY

QUESTION ONE

- (a) Write the three fundamental equations of linear motion (6 Marks)
- (b) A cyclist starts from rest and travels with uniform acceleration of 2ms^{-2} in a straight line.
- (i) What is the velocity of the cyclist after 5 s?
 - (ii) How far has the cyclist travelled in the 5 s?
 - (iii) After how long will the cyclist be 100 m from starting point? (6 Marks)
- (c) (i) Define angular velocity (3 Marks)
- (ii) A tractor flywheel makes 3000 revolutions per minute. Calculate its angular velocity in radians per second. (5 Marks)
- (d) The following equipment were purchased for connection on a tractor that uses a 12 V battery:
- radio 12V, $50\ \Omega$
 - fuel gauge, 12 V, $250\ \Omega$;
 - coolant temperature gauge 12 V, $120\ \Omega$

Make a sketch of the circuit that would include the three appliances/equipment, and a battery (ignore the switch in the circuit).

Calculate the current flowing through each component/equipment.

(20 Marks)

SECTION II: ANSWER ANY TWO QUESTIONS

QUESTION TWO

- (a)
 - (i) State the principle of moments. (5 Marks)
 - (ii) A horizontal uniform metal bar PQ of weight 5.0 N and length 0.50 m is pivoted at P as shown in Figure 1 below. The bar is held stationary by a string QR which makes an angle of 30° with the metal bar. Calculate the moment about P due to the weight of the metal bar and determine the tension in the string. (5 Marks)

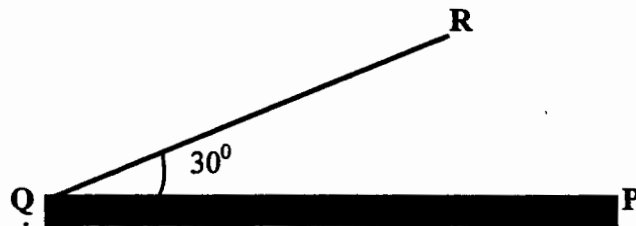


Fig. 1. Horizontal metal bar

- (b) You have been assigned to chase monkeys away from a maize field using a pellet gun. Some stubborn little monkey is seemingly not scared of you and remains seated on top of a rock watching your movements. The rock where the monkey is seated is 10 m away from you and 6 m high.

If your pellet gun can project pellets with a velocity of 18 m/s, calculate the angle that you need to incline your projection to the horizontal so that a pellet just hits the seated monkey. (10 Marks)
[Gravitational acceleration is 9.81 ms^{-2} and air resistance is negligible.]

2nd SEM.2005/2006

QUESTION THREE

- (a) Describe, with the aid of diagrams, the function of the following:
 - i) Magnifying glass
 - ii) Pin hole camera
 - iii) A convex mirror

(9 Marks)

- b) A pair of binoculars is focussed on a group of birds flying 100 m above a maize field. Using the real is positive convention, calculate the image distance from the lens if the focal length of the lens is 50 mm,

(11 marks)

- (c) Distinguish between reflection and refraction

[10 marks]

QUESTION FOUR

- (a) Use energy conversion methods to distinguish between motors and generators.

(6 Marks)

- (b) What are the advantages of circuit breakers in houses?

(6 Marks)

- (c) What properties make liquids very useful for energy transmission in machines? (8 Marks)

- (d) Comment on the statement that when a slide projector is used to show pictures, the slides are put in upside down and the images are magnified laterally (sideways) as well as vertically.

(10 marks)

(c) Define force and give the dimension of force

(2½ Marks)

(d) Figure 2 below shows a force (push) of 200 N exerted on a lawn mower at an angle of 30° to the ground. By so doing, the lawn mower is pushed forward and pressed down to the ground. Calculate;

- (i) The force that pushes the lawn mower forward
- The force that presses the lawn mower to the ground

(2½ Marks)

(2½ Marks)

- (ii) If the lawn mower is pushed for a total distance of 300 m, how much work is done?

(2½ Marks)

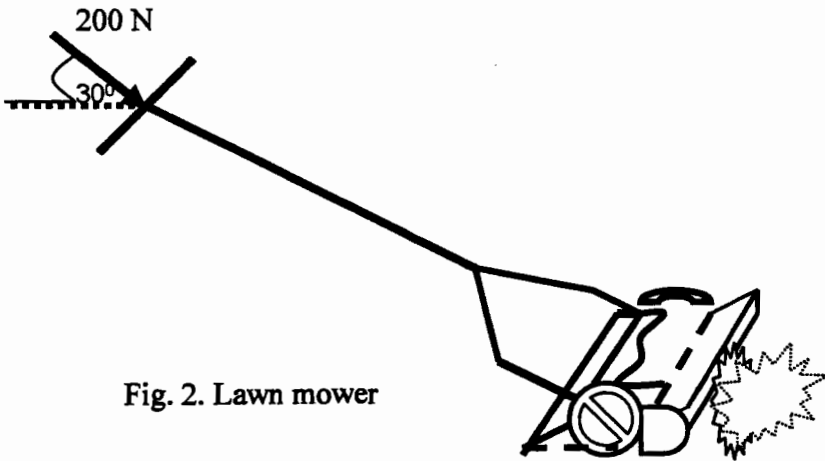


Fig. 2. Lawn mower