



**UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER**

COURSE CODE: LUM 101

TITLE OF PAPER: - *PHYSICS*

BSc. Agric Econ. & AgBMgt 1

BSc. Agric. Ed 1

BSc. Agron. 1

BSc. Ani. Sci. 1

BSc. FSNT 1

BSc. Home Econ. 1

BSc. Home Econ. Ed. 1

BSc. Hort. 1

BSc. LWM 1

BSc. TADM 1

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 ONE: COMPULSORY

QUESTION ONE

(a) Write down dimensions of

- (i) Force
- (ii) Momentum
- (iii) Pressure
- (iv) Energy
- (v) Power

(5 Marks)

(b) The energy of a moving body is a function of mass (m) of the body and the velocity (v) of the body. Using dimensional analysis, establish the equation of the relationship between energy in a moving body (E_m) and mass of the body (m) and velocity of body (v).

(10 Marks)

(c) Car A travelling on a straight track at 80 km/h passes car B going in the same direction at 50 km/h.

- i. Calculate the velocity of car A relative to car B (2 ½ Marks)
- ii. If car B was travelling in the opposite direction, what would be the relative velocity of car A to car B? (2 ½ 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.

(6 Marks)

(e) What properties make liquids very useful for energy transmission in machines?

(6 Marks)

(f) Figure 1 shows a fish at A in an aquarium. Calculate the pressure at A. [8 marks]

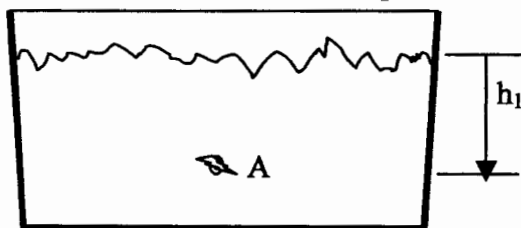


Figure 1 An aquarium

SECTION II: ANSWER ANY TWO QUESTIONS

QUESTION TWO

- (a) What do you understand by vector and scalar quantities? (5 Marks)
- (b) A box shown in figure 2 below weighs 500 N. The box is pushed up an incline AB.
- Calculate the work done in pushing the box from A to B. Frictional force is 50N. (5 Marks)
 - Would the box remain stationary if it were left half-way up the incline? Give facts to your answer. (5 Marks)

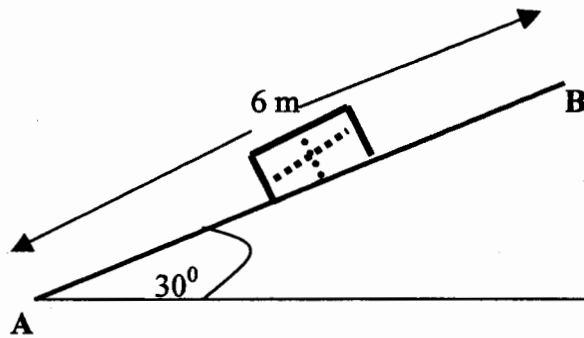


Figure 2. Box on an incline.

- (c) Two trucks travelling in the same straight line collide and remain locked together after impact. Truck A has a mass of 1000 kg and has a velocity of 10 m/s due east. Truck B has a mass of 1500 kg and has a velocity of 6 m/s due west. Determine the magnitude and direction of the velocity of the trucks after impact (15 Marks)

QUESTION THREE

(a) A slide projector uses 75x75 mm slides to produce pictures 1800 mm square on a screen in a lecture hall. Comment on the type of lens used, its focal length and the length of the hall.

[12 marks]

(b) Explain why a high voltage is used to transmit electrical energy commercially from one part of the country to another.

[8 marks]

(c) State the laws of reflection of light.

(5 Marks)

(d) Show how you would measure the density of solid in a school laboratory using the displacement method.

(5 Marks)

QUESTION FOUR

(a) A bar of steel with a mass of 60 kg is balanced by a set of forces as shown in figure 3 below. Compute the resultant force and the point of its application. (10 marks)

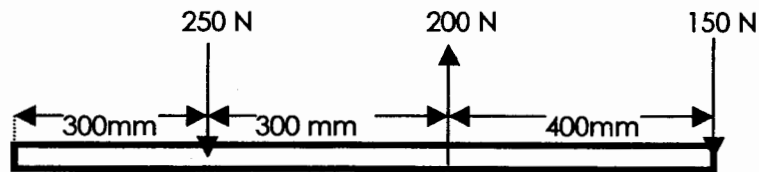


Figure 3. Hanging steel bar

c) A block of steel, whose density is 1860 kg/m^3 , weighs 25 g before being immersed in a beaker of water. What will be the apparent weight of the block when immersed in water?

Give reasons for the difference in the weight readings. (10 Marks)

(d) What do you understand by centre of gravity? Using the concept of centre of gravity, what are the conditions for stability of objects? (10 Marks)