UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER

PROGRAMMES: BSc. Agric. Econ and AgBMgt 1, BSc. Ag.Ed, BSc. Agron 1, BSc. An. Sc 1, BSc. FSNT 1, BSc. Home Econ 1, BSc. Home Econ. Ed 1, BSc. Hort 1, BSc. LWM 1, BSc. TADM 1

COURSE CODE: LUM 101 (NEW PROGRAMME)

TITLE OF PAPER: PHYSICS

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER QUESTIONS

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SECTION 1: COMPULSORY

QUESTION 1

(a) A ball is thrown vertically upwards with an initial velocity of 20 m/s. determine;

    (i) The maximum height reached by the ball.   [10 marks]

    (ii) The time taken to return to the ground.   [10 marks]

(b) A horizontal pipeline increase uniformly in diameter from 75mm to 150mm diameter in the direction of the flow of water. When 85 liters of water is flowing per second through the pipe, a pressure gauge at the 75mm diameter section reads 2 bars. Determine what the reading of a gauge at the 150mm diameter section will be, assuming that there are no losses.   [10 marks]

(c) Justify that power (P) from an engine that drives a tractor pulling a load of force (F) and moving at velocity (v) is given by the equation $P = Fv$.   [10 marks]

SECTION 2: ANSWER ANY TWO QUESTIONS

QUESTION 2

(a) Describe how you would attempt to make;

    (i) a permanent magnet   [5 marks]

    (ii) a temporary magnet   [5 marks]

(b) A lever AB, 3m long, rests on a fulcrum at C, 1m from A. There is a downward force of 80N acting on the lever at A. Calculate;

    (i) the force required at B to maintain equilibrium.   [5 marks]

    (ii) the force exerted by the fulcrum on the lever (neglect the weight of the lever).

        [5 marks]

(c) State the laws of reflection of light. Show that the image of an object in a plane mirror is as far behind the mirror as it is in front.   [10 marks]

QUESTION 3

(a) A bulldozer exerts a drawbar pull (force) of 20KN when pulling a 5m wide scraper over a level road. If the forward speed is 8km/h, calculate;

    (i) the drawbar power developed, and   [7.5 marks]

    (ii) the energy consumption in order to cover 2000m.   [7.5 marks]

(b) Calculate the pressure on the fluid on a cylindrical syringe when a nurse applies a force of 40N to the syringe's piston of a radius of 1cm.   [10 marks]

(c) What are the practical uses of dimensional analysis?   [5 marks]

QUESTION 4

(a) How much heat is required to raise the temperature of 0.2kg of aluminium from 18°C to 63°C, assuming the specific heat capacity of aluminium to be 950J/kg°C.   [10 marks]

(b) Calculate the total resistance of a circuit having three resistances of 3.5, 2.75, and 4 ohms each in series.   [10 marks]

(c) If the resistances in (b) above are placed in parallel, what will be the new value of the total resistance?   [10 marks]