



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMMES: BSc. Agric. Econ and AgBMgt 1, BSc. Ag.Ed 1, 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

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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GRANTED BY THE CHIEF INVIGILATOR**

SECTION 1: COMPULSORY**QUESTION 1**

(a) Define the following terms;

(i) Wavelength [2 marks]

(ii) Specific heat capacity [2 marks]

(b) What are the practical uses of dimensional analysis? [6 marks]

(c) Distinguish between fundamental and derived quantities. [5marks]

(d) A swimmer wants to cross a river whose water is flowing at 6 m/s. She swims at a velocity of 8m/s and starts off directly across the river.

If the stream is 20m wide, calculate:

(i) How far downstream does she lands at the opposite bank? [7.5 marks]

(ii) How much time does she take to cross the river? [7.5 marks]

If she wanted to land exactly opposite her starting point, calculate:

(iii) The angle at which she would have to start swimming from the bank. [5 marks]

(iv) The time it would take her to cross the river. [5 marks]

SECTION 2: ANSWER ANY TWO QUESTIONS**QUESTION 2**

(a) State the Archimedes Principle. [5 marks]

(b) What is the difference in the construction of converging and diverging lenses? [5 marks]

(c) Distinguish between electromotive force and potential difference. [5 marks]

(d) Two capacitors having capacitances of 46 and $64 \mu F$ respectively are connected in series across a 200-V supply. Find;

(i) Potential difference across each capacitor. [7.5 marks]

(ii) Charge on each capacitor. [7.5 marks]

QUESTION 3

(a) A cable car is pulled up a slope by a constant force of 5000N at a uniform velocity of 6m/s. It takes 4 minutes to complete the journey.

(i) How much work is done in getting the car to the top of the slope? [5 marks]

(ii) How much work would be done if the velocity was 12m/s (the force remaining the same)? [5 marks]

(iii) How does the power developed in (i) compare with (ii)? [5 marks]

(b) A concave mirror of radius of 20cm produces a virtual image 3 times the size of the object. Establish the position of the object. How far must the object be moved to produce a real image of the same magnification. [10 marks]

(c) What are the characteristics of images formed in plane mirrors? [5 marks]

QUESTION 4

(a) A gas in a cylinder has a pressure of 280kPa at 7°C. Find the new pressure if the temperature rises to 87°C. [10 marks]

(b) An electric kettle is rated 1250W, 255V. What is the resistance of the heating element when in use? If electricity is charged at 44c per kilowatt-hour and the kettle is used for 20 minutes each day, what does it cost per week? [10 marks]

(c) What do you understand by pixels as specified by digital cameras? [5 marks]

(d) Distinguish between optical zoom and digital zoom of digital cameras. [5 marks]