UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: ALL YEAR 1 PROGRAMMES

COURSE CODE: ABE 101

TITILE OF PAPER: PHYSICS

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS

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PHYSICS

FINAL EXAMINATION

Question 1: Compulsory

(a) Describe four applications of optics in the farm. **[10 marks]**

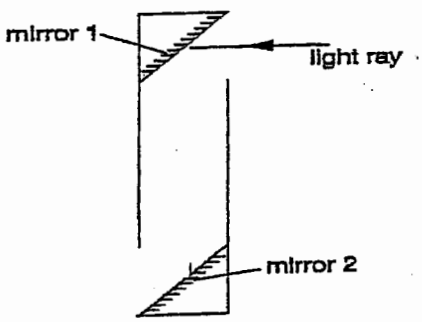
(b) Define the term "Resistance" as used in physics with particular reference to electricity, and the factors that affect it. **[10 marks]**

(c) (i) State the law of energy conservation. **[5 marks]**

(ii) Prove the above law by using the following information; a pilot flies an aircraft at an altitude of 20 km and then comes down by 6 km, where he drops a 100 kg bag of maize to a starving community. Calculate the Potential energy and the Kinetic energy of the bag of maize at the level it was dropped. **[15 marks]**

Question 2

The figure below shows the design of a periscope;



(a) Draw the figure and complete the path of the light after it strikes the mirror. **[5 marks]**

(b) Draw the normal to the surface of the mirror. Mark the angle of incidence and label it i. **[5 marks]**

(c) State the relationship between the angle of incidence and the angle of reflection. **[5 marks]**

(d) Suggest the possible use of a periscope. **[5 marks]**

(e) A 5000 w security light is left to operate for 20 hrs a day. Calculate the cost of electricity it consumes per week if the electricity charge is E 0.90 per kwh. **[10 marks]**

Question 3

(a) Define the following terms as used in physics, and describe one example for each term where it is applicable in practice. i.e. Conduction, Convection and Radiation.

[15 marks]

(b) The main reason for the vacuum in a flask is to reduce heat transfer due to; **[5 marks]**

(i) Conduction only

(ii) Convection only

(iii) Radiation only

(iv) Conduction and Convection

(v) Convection and Radiation

(c) Differentiate between the two terms; speed and velocity. **[5 marks]**

(d) What quantity is calculated by multiplying the magnitude of a force by the distance?

(i) Acceleration
(ii) Power
(iii) Work
(iv) Pressure **[5 marks]**

Question 4

A transformer is connected to the supply mains which is 220 volts, and the output is connected to a lamp rated 1.8 w, 6.0 v.

(a) Name the type of the transformer and the reason. **[5 marks]**

(b) Calculate the ratio of the number of turns on the secondary coil to the number of turns on the primary coil. Show your working. **[5 marks]**

(c) Calculate the normal working current for the lamp. Show your working. **[7.5 marks]**

(d) Calculate the working resistance of the lamp. Show your working. **[7.5 marks]**

(e) Explain why the initial current for the lamp is likely to be higher than normal working current. **[5 marks]**