



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMMES : ALL YEAR ONE PROGRAMES

COURSE CODE : ABE 101

TITLE OF PAPER: PHYSICS

TIME ALLOWED : TWO (2) HOURS

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

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GRANTED BY THE CHIEF INVIGILATOR.**

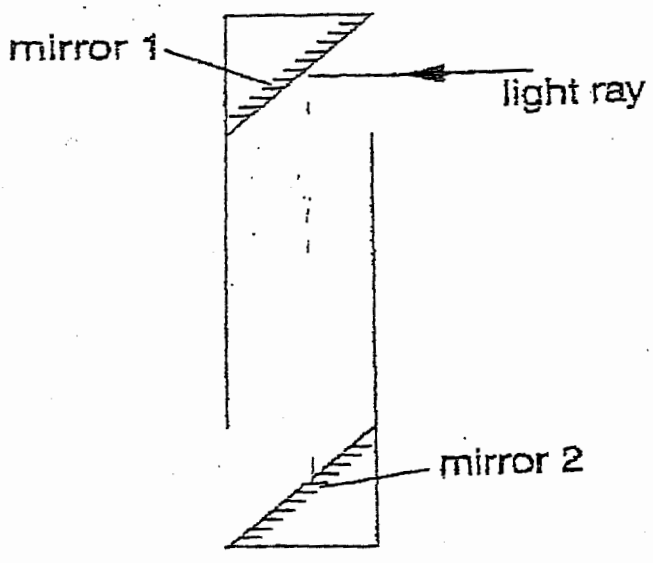
PHYSICS
FINAL EXAMINATION

Question 1 : Compulsory

- (a) A 6000 watts security light operates between 6.00 pm and 6.00 am everyday. The cost of electricity is E 1.20 per kwh. Calculate the amount paid towards electricity every three months when there are four security lights operating simultaneously. [15 marks]
- (b) Concrete roads are laid in sections with pitch between them, explain why this is done. [5 marks]
- (c) Describe four possible uses of reflection in our day to day life. [10 marks]
- (d) You are required to calculate the mass and kinetic energy at half the height of an object which has a potential energy of 1500 joules at 50 metres height. [10 marks]

Question 2

- (a) State the third Newton's Law and explain what it means. [10 marks]
- (b) 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 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) The main reason for the vacuum in a flask is to reduce heat transfer due to;

- (i) Conduction only
- (ii) Convection only
- (iii) Radiation only
- (iv) Conduction and Convection
- (v) Convection and Radiation

[5 marks]

Question 3

(a) You are required to design a transformer for your client who wants to operate a music system which labeled 12 volts, 0.8 amps. The transformer should be connected to 240 volts mains supply. There are 8600 turns on the primary coil of the transformer. Calculate,

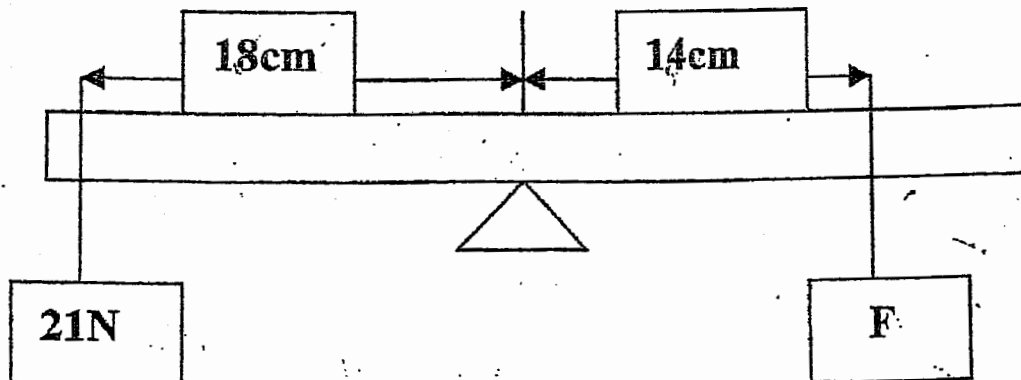
- (i) The number of turns on the secondary coil and current which flows in the primary coil. [10 marks]
- (ii) Power output of the secondary transformer. [5 marks]

(b) With the aid of diagrams describe three laws of reflection [15 marks]

Question 4

(a) Describe the three characteristics of sound, if possible you may add diagrams to assist your description. [15 marks]

(b) The diagram below shows a uniform beam balanced as shown in the diagram. Calculate the force F which must be hung in order for the beam to balance. [7.5 marks]



(c) Define the following terms as used in physics, and give one example for each term where it is applicable, i.e. Conduction, Convection and Radiation. [7.5 marks]