



**UNIVERSITY OF ESWATINI
FINAL EXAMINATION PAPER**

**PROGRAMME: ALL YEAR ONE PROGRAMMES
(AGRICULTURE & CONSUMER SCIENCES)**

COURSE CODE: ABE102

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 I COMPULSORY**QUESTION 1**

- a) Explain the difference between the following, giving examples where applicable:
- (i) Scalar and vector quantities [4 marks]
 - (ii) Mass and weight [4 marks]
 - (iii) Temperature and heat [4 marks]
 - (iv) Accuracy and precision in measurements [4 marks]
 - (v) Deceleration and negative acceleration [4 marks]
- b) An object is mechanically released upward with an initial velocity of 100 m/s. At the same instant, another object is shot vertically downward from the top of a 280 m cliff with an initial velocity of 40 m/s. Neglecting air friction, find:
- (i) The time when the objects pass each other. [10 marks]
 - (ii) The height above the ground at which the objects pass each other. [5 marks]
 - (iii) The time when the velocities of the two objects are the same [5 marks]

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

- a) Explain four (4) possible uses of reflection in our day to day life. [12 marks]
- b) A 6000 watts security light operates between 6 pm and 6 am every day. The cost of electricity is E1.72 per kWh. Calculate the amount paid towards electricity every 3 months where there are four security lights operating simultaneously. [10 marks]
- c) Define the term 'resistance' as used in Physics with particular reference to electricity, and the factors that affect it. [8 marks]

QUESTION 3

- a) A horizontal pipeline increases uniformly in diameter from 75 mm to 150 mm in the direction of water flow. When 85 L/s is flowing through the pipe, a pressure gauge at the 75 mm section reads 2.00 bars. Determine what the reading of a gauge at the 150 mm section will be, assuming no head losses (frictionless fluid).
[15 marks]
- b) Discuss Newton's three (3) laws of motion.
[15 marks]

QUESTION 4

- a) Explain the concept of specific heat capacity
[5 marks]
- b) How much heat is required to raise the temperature of 0.2 kg of aluminium from 18 °C to 65 °C, if the specific heat capacity of aluminium is 950 J/kg· °C?
[5 marks]
- c) State if the following statements are true or false
- (i) In kinematics, displacement is a vector
 - (ii) Instantaneous velocity can be graphically determined by using the tangent on a velocity-time curve
 - (iii) In hydraulics, the larger the inner diameter of the pipe the higher the velocity
 - (iv) When a car slows down towards the west, it is both deceleration and negative acceleration
 - (v) Water has a higher specific heat capacity than dry mineral soil
 - (vi) When resistors are connected in series, the resultant resistance is the sum of the readings from the resistors.
 - (vii) A kilowatt is a unit of energy
 - (viii) Energy is a derived quantity not a basic/fundamental quantity
 - (ix) In heat transfer, conduction requires a solid medium
 - (x) Rate of change of velocity is termed acceleration
- [20 marks]