

RUKORE HIGH SCHOOL
S.5 PHYSICS AOI TERM II 2025

P510/1

Paper one.

Time: 30 minutes

Instructions:

- ❖ Show all the necessary working for the calculations.
- ❖ Use $g = 10\text{ms}^{-2}$ where necessary.

ITEM:

Students at **RUKORE HIGH SCHOOL** organized a bicycle competition on a hill that is 120 m high. One of the participants, mark, has a mass of 60 kg and his bicycle weighs 15 kg.

Mark starts at the bottom and pedals up the hill in 4 minutes along a paved path 300m long. He does not stop and maintains a steady pace.

The mechanical efficiency of marks body during pedaling is 25%, meaning only 25% of the energy he uses goes into lifting him and the bicycle. The cost of energy intake (food) is about Shs 100,000 per 18,000kJ.

Tasks:

- (a) Calculate the total gravitational potential energy (GPE) gained by mark and hi bicycle by the time he reaches the top.
- (b) Determine the useful power output in watts during the climb.
- (c) Find the total energy input required by mark's body considering the 25% efficiency.
- (d) Calculate the cost of food energy required to complete the climb.
- (e) Suggest the two ways to improve efficiency during such physical activities.

END

SUCCESS