

## SECTION B

**Task B4** (45 minutes)

You are going to use a pendulum to determine a value for the acceleration due to gravity,  $g$ .

A pendulum has been set up for you. Pull the mass to one side and release it. The pendulum swings backwards and forwards in an oscillating motion.

- (a) (i) Clearly describe the energy changes when the pendulum is in motion. [2]

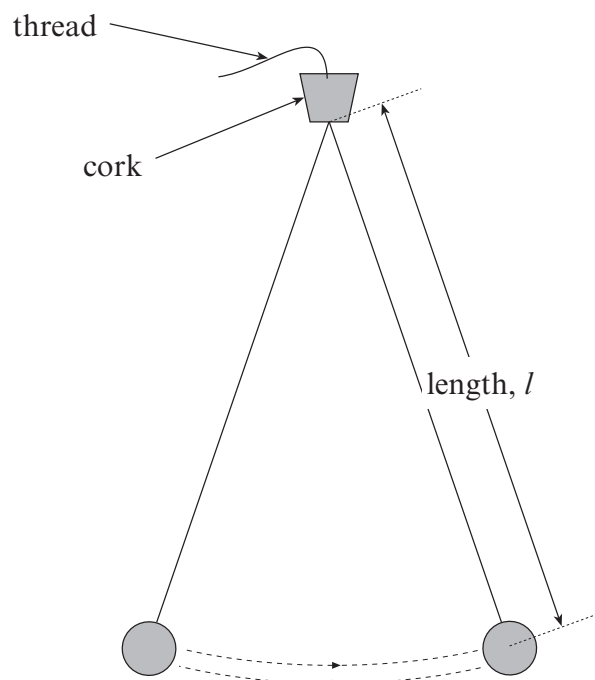
*Potential to kinetic energy (or kinetic to potential energy) (1 mark)*

*This is continuous e.g. potential to kinetic and then potential energy (1 mark)*  
*(can be deduced from a diagram)*

- (ii) Explain why the pendulum eventually comes to rest. [1]

*Energy is lost against air resistance*  
*or equiv by collision with air molecules*  
*or energy lost due to friction at top of the string*  
*(Energy lost due to friction or resistance is not enough)*

- (b) The period  $T$  of the pendulum is the time taken for one oscillation. This is the time taken for the pendulum to swing from one side to the other **and back again** as shown in the following diagram.



The pendulum has been set up for you with a length of 0.200 m.

Take a series of measurements for the time taken for 10 oscillations for 5 different lengths in the range 0.200 m to 1.200 m.

The length can be changed by adjusting the thread through the cork. To set the pendulum in oscillation you should pull the mass to the side a small distance.

Record your results in a table and include and complete a column for the mean value of the time for 10 oscillations. [5]