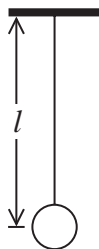


5 A student is using a simple pendulum to determine a value for the acceleration of free fall g .



- (a) She measures the length l of the pendulum four times with a metre rule and records the following values.

l / cm			
l_1	l_2	l_3	l_4
85.5	86.0	87.5	85.5

She calculates the mean length l_m of the pendulum using the following method:

$$l_m = \frac{85.5 + 86.0 + 87.5 + 85.5}{4} = 86.1 \text{ cm}$$

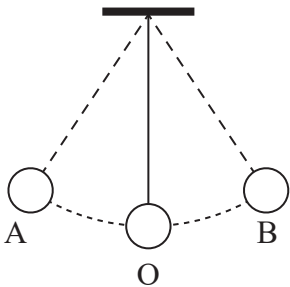
- (i) Calculate a more accurate value for l_m . (2)

$$l_m = \dots\dots\dots$$

- (ii) Determine the time period of the oscillations of this pendulum, using your calculated value for l_m . (2)

$$\text{Time period of oscillations} = \dots\dots\dots$$

- (b) She sets the pendulum into oscillations with small amplitude and uses a stopwatch to determine the time period.



The student releases the pendulum at A and simultaneously starts the stopwatch. She measures the time taken for 5 oscillations and divides the value by 5. She repeats the procedure twice and calculates a mean time period.

Explain two modifications to the student's method that would improve the value obtained for the time period. (4)