Answer **all** the questions in the spaces provided.

For Examiner's Use

1 A simple pendulum may be used to determine a value for the acceleration of free fall g. Measurements are made of the length L of the pendulum and the period T of oscillation.

The values obtained, with their uncertainties, are as shown.

$T = (1.93 \pm 0.03)$ s
$L = (92 \pm 1)$ cm

(a) Calculate the percentage uncertainty in the measurement of

(i) the period T,

uncertainty = ... % [1]

(ii) the length L.

uncertainty = ... % [1]

(b) The relationship between T, L and g is given by

$$g = \frac{4\pi^2 L}{T^2} .$$

Using your answers in **(a)**, calculate the percentage uncertainty in the value of g.

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uncertainty = ... % [1]

(c) The values of L and T are used to calculate a value of g as $9.751\,\text{m}\,\text{s}^{-2}$.

(i) By reference to the measurements of L and T, suggest why it would not be correct to quote the value of g as $9.751\,\text{m}\,\text{s}^{-2}$.

.....

..... [1]

(ii) Use your answer in **(b)** to determine the absolute uncertainty in g.

Hence state the value of g, with its uncertainty, to an appropriate number of significant figures.

g = ... ± ..... $\text{m}\,\text{s}^{-2}$ [2]