Question.

One of the precautions in experiments involving the determination of the period of oscillation of simple pendulum given below is NOT correct

- prevent draught
- read values with the eye placed vertically above scale marks
- start the stop watch simultaneously with the the release of the system to start oscillating
- use small displacements from equilibrium position

Solution.



Fig.1. Motion of simple gravity pendulum.

The period T of a simple pendulum is the time taken for a complete cycle. We can find it by the formula:

$$T = 2\pi \sqrt{\frac{L}{g}} \left(1 + \frac{1}{16}\theta^2 + \cdots \right)$$

L is a length of pendulum;

- g is a local acceleration of gravity;
- heta is maximum angle that the pendulum swings away from vertical.

For small swings $\theta \ll 1$ the period is:

$$T = 2\pi \sqrt{\frac{L}{g}}$$

So, it depends only on the length of pendulum and local gravity for small swings.

Therefore, we must:

- prevent draught (for g = const and consider only the force of gravity)
- start the stop watch simultaneously with the the release of the system to start oscillating (to accurately measure the oscillations)
- use small displacements from equilibrium position (for $\theta \ll 1$)

to determine the period of oscillation of simple pendulum.

But we must not read values with the eye placed vertically above scale marks, because we need know only one value *L*, which can be measured at the beginning and remains constant.

Answer.

It is not correct:

• read values with the eye placed vertically above scale marks

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