PHYSICS

• The period of oscillation of a simple pendulum is $T = 2\pi \sqrt{\frac{l}{g}}$ measured value of L is 20.0 cm known to 1 mm accuracy and time for 100 oscillations of the pendulum is found to be 90 s using a wrist watch of 1s resolution. what is the accuracy in the determination of g ?

Ans)

$T = \frac{1}{n}$

Further, $T = 2\pi \sqrt{\frac{l}{g}}$

$$\Rightarrow g = \frac{(4\pi)^2 l}{T^2} = \frac{(4\pi^2)(l)}{\left(\frac{t}{n}\right)^2}$$

$$= (4\pi^2 n^2) \frac{l}{t^2}$$

% error in the value of 'g' will be

$$\frac{\Delta g}{g} \times 100 = \left(\frac{\Delta l}{l}\right) \times 100 + 2\left(\frac{\Delta t}{t}\right)$$

$$= \frac{0.1}{20} \times 100 + 2\left(\frac{1}{90}\right) \times 100$$

$$= 2.72\%$$

∴ The answer is 3%