Answer on Question #65622, Physics / Astronomy | Astrophysics

The length of second pendulum is decreased by 0.3 cm when it is shifted to chennai from london. If the acceleration due to gravity at London is 981 cm/sec^2, the acceleration due to gravity at chennai is :

Find: g_2 – ?

Given:

$\Delta l=0.003$ m

$g=9.81$ m/s^2

$T=2$ s

Solution:

The period of simple pendulum:

$$T = 2\pi\sqrt{\frac{l}{g}} \ (1)$$

Of (1) $\Rightarrow$ $\sqrt{\frac{l_1}{g_1}} = \frac{T}{2\pi}$ (2)

Of (2) $\Rightarrow$ $\frac{l_1}{g_1} = \frac{T^2}{4\pi^2}$ (3)

Of (3) $\Rightarrow$ $l_1 = \frac{T^2 g_1}{4\pi^2}$ (4)

Of (4) $\Rightarrow$ $l_1=0.981$ m (5)

The length of simple pendulum in Chennai:

$l_2=l_1-\Delta l$ (6)

(5) in (6): $l_2=0.978$ m (7)

Of (1) $\Rightarrow$ $\sqrt{\frac{l_2}{g_2}} = \frac{T}{2\pi}$ (8)

Of (8) $\Rightarrow$ $\frac{l_2}{g_2} = \frac{T^2}{4\pi^2}$ (9)

Of (9) $\Rightarrow$ $g_2 = \frac{4\pi^2 l_2}{T^2}$ (10)

Of (10) $\Rightarrow$ $g_2=9.78$ m/s^2

Answer:

978 cm/s^2