

14. (a) For a total mass of $m + M$, Eq. 16-12 becomes

$$\omega = \sqrt{\frac{k}{m + M}} \implies M = \frac{k}{\omega^2} - m .$$

Eq. 16-5 ($\omega = 2\pi/T$) is used to put this into its final form:

$$M = \frac{k}{(2\pi/T)^2} - m = \left(\frac{k}{4\pi^2} \right) T^2 - m .$$

- (b) With $T = 0.90149$ s, $k = 605.6$ N/m and $M = 0$ in the above expression, we obtain $m = 12.47$ kg.
(c) With the same k and m , we plug $T = 2.08832$ s into the expression and obtain $M = 54.43$ kg.