Mechanics I – Quiz 1 - B

2019-2020

Full Name: KEY

1- Using the fact that the speed of light in space is about 3.00×10^8 m/s, determine how many miles light will travel in 10 hours. (1 mile = 1.6 km)

$$X = V \times t$$

$$= \left(3.10^8 \frac{m}{s} \times \frac{1\,km}{1000\,m} \times \frac{1\,mile}{1.6\,km}\right) \times \left(10\,h \times \frac{3600\,s}{1\,h}\right)$$

$$= 67.5 \times 10^8 \text{ miles}$$

2- The magnitude of the resistive force $\boldsymbol{F}$ acting on a falling object in air is given by $F = bv^2$, where v is the speed of the falling object. What is the dimension of b?

$F = ma$ $\quad v = \frac{L}{T}$

$F = M\frac{L}{T^2}$ $\quad v^2 = \frac{L^2}{T^2}$

$F = bv^2$

$M\frac{L}{T^2} = b\frac{L^2}{T^2}$

$b = \frac{T^2}{L^2} M \frac{L}{T^2}$

$$\boxed{b = \frac{M}{L}}$$