

Chapter 1 Problem 52 †

Given

$$[m] = M$$

$$[s] = L$$

$$[v] = \frac{L}{T}$$

$$[a] = \frac{L}{T^2}$$

$$[t] = T$$

Solution

a) Find the dimension of F .

$$[F] = [ma] = [m][a] = M \frac{L}{T^2} = \frac{M L}{T^2}$$

b) Find the dimensions of K .

$$[K] = [0.5 m v^2] = [m][v^2] = M \left(\frac{L}{T}\right)^2 = \frac{M L^2}{T^2}$$

c) Find the dimensions of p .

$$[p] = [m v] = [m][v] = M \left(\frac{L}{T}\right) = \frac{M L}{T}$$

d) Find the dimensions of W .

$$[W] = [m a s] = [m][a][s] = M \left(\frac{L}{T^2}\right) L = \frac{M L^2}{T^2}$$

e) Find the dimensions of L .

$$[L] = [m v r] = [m][v][r] = M \left(\frac{L}{T}\right) L = \frac{M L^2}{T}$$

†Problem from University Physics by Ling, Sanny and Moebs (OpenStax)