Chapter 4 Forces Notes Answers

Check Your Understanding 1

1. Ans

   (a) since acceleration = 0

   $kx - mg = 0$

   $100x - 1(9.81) = 0 \rightarrow x = 0.098\,\text{m}$

   (b) since accelerating upwards,

   $kx - mg = ma$

   $100(x) - 1(9.81) = 1(1) \rightarrow x = 0.108$ m

2. Tension in bottom spring = weight of 1kg

   $kx_1 = 1(9.81) \rightarrow x_1 = 0.0981$ m

   for middle ball to be in eq,, tension in top spring = weight of 1 kg + tension in bottom spring

   $kx_2 = kx_1 + mg = 2(9.81) \rightarrow x_2 = 0.1962$ m

   total extension = $x_1 + x_2 = 0.294$ m

3. Ans

   (a) at terminal speed, drag = weight = 598 N

   (b) $598 = kv^2 \rightarrow k = \frac{598}{90^2} = 0.074\ \text{N s}^2\ \text{m}^{-2}$

   (c) He will experience a decrease in velocity at a decreasing rate, until a new lower terminal velocity is reached.

   (d)