Errata (Fall 2021)

PHYS 203A: COLLEGE PHYSICS

Department of Physics, Southern Illinois University–Carbondale

Last updated: November 11, 2021

The following is not a complete list. It is being maintained since 2021 Oct 13, and is expected to evolve.

1. 2020 Fall, Homework No. 04B, Problem 1, part (e), in the video for Solutions between 11:45 and 12:30 time stamps:

   Using
   $$ma = F - \mu_k N \tag{1}$$
   we have, using $m = 196/9.8 = 20.\,\mathrm{kg}$,
   $$(20)a = (105) - (78), \tag{2}$$
   which yields $a = 1.4\,\mathrm{m/s^2}$.

2. 2020 Fall, Homework No. 05, Problem 3, part (d), in the video for Solutions between 12:20 and 15:00 time stamps:

   Using
   $$ma = \mu_s mg \tag{3}$$
   and
   $$a = \omega^2 R \tag{4}$$
   together we obtain
   $$\mu_s = \frac{\omega^2 R}{g}, \tag{5}$$
   which yields $\mu_s = 0.37$.

3. 2020 Fall, Homework No. 06, Problem 6, part (b), in the video for Solutions at 1:06:40 time stamp:

   The calculation for x_c yields
   $$x_c = 0.14\,\mathrm{m} = 14\,\mathrm{cm}. \tag{6}$$

4. 2020 Fall, Homework No. 07, Problem 2, in the video for Solutions between 10:15 and 15:40 time stamps:

   The error was in the fourth line under the figure, at 10:15 minute time stamp,
   $$K_i = \frac{1}{2}mv_i^2 = \frac{1}{2}(0.150)(5.00)^2 = 1.88\,\mathrm{J}. \tag{7}$$
   This error, then, led to errors at various other places. Here are the corrections.

(a)

$$\frac{1}{2}(0.150)v_f^2 = \frac{1}{2}(1.88) \tag{8a}$$

$$v_f = 3.54\,\frac{\mathrm{m}}{\mathrm{s}}. \tag{8b}$$

(b)

$$\vec{\mathbf{p}}_f = -\hat{\mathbf{i}}(0.150)(3.54) = -\hat{\mathbf{i}}\,0.531\,\mathrm{kg}\frac{\mathrm{m}}{\mathrm{s}}. \tag{9}$$

$$\vec{\mathbf{F}} = \frac{\vec{\mathbf{p}}_f - \vec{\mathbf{p}}_i}{\Delta t} \tag{10a}$$

$$= \frac{-\hat{\mathbf{i}}(0.531) - \hat{\mathbf{i}}(0.750)}{8.0 \times 10^{-3}} \tag{10b}$$

$$= 160\,\mathrm{N}. \tag{10c}$$

5. 2020 Fall, Homework No. 09A, Problem 2, in the video for Solutions between 6:37 and 17:00 time stamps:

   The question originally had N_1 and N_2 swapped in the figure, and m was not provided in the question. This has been fixed on the question paper. However, I added $350 + 450$ incorrectly in the video. For the force equation it should read

$$N_1 + N_2 - mg - Mg = 0, \tag{11a}$$

$$350 + 450 - 0 - Mg = 0, \tag{11b}$$

$$Mg = 800\,\mathrm{N}. \tag{11c}$$

   For the torque equation (with axis about the point where mg acts) we have

$$-N_1\frac{L}{2}\sin 90 + N_2\frac{L}{2}\sin 90 - Mg\left(x - \frac{L}{2}\right)\sin 90 = 0, \tag{12a}$$

$$-350\left(\frac{2.00}{2}\right)\sin 90 + 450\left(\frac{2.00}{2}\right)\sin 90 - 800\left(x - \frac{2.00}{2}\right)\sin 90 = 0, \tag{12b}$$

   which leads to

$$x = \frac{900}{800} = 1.13\,\mathrm{m}. \tag{13}$$