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PHYS 211X
HW 5, Due Friday, 3/3/2023 23:59; §7 Q: #11 P: #42, 45 §8 P: #13, 22 ,26, 30, 51, 56

Chapter 7

Questions

11.

Because both masses are the same, the reading on the scale is 5 kg.

Problems

42.

a.

$$\begin{aligned} F_{cw,x} &= (1500 * 9.8)\sin(20^\circ) = 5027.7N \\ F_{car,x} &= (2000 * 9.8)\sin(30^\circ) = 9800.0N \\ \text{Find } F_{break} : F_{car,x} - F_{break} &= F_{cw,x} \\ 9800.0 - F_{break} &= 5027.7 \\ F_{break} &= \boxed{4772.3N} \end{aligned}$$

b.

$$\begin{aligned} \text{Find } v_f \text{ of } v_f^2 &= v_0^2 + 2\vec{a}\Delta x \\ v_0 &= 0m/s \\ \vec{a}_{car,x} &= 9.8\sin(30) = 4.9m/s \\ \Delta x &= \frac{200m}{\sin(30^\circ)} = \frac{200m}{0.5} = 400m \\ v_f^2 &= 0^2 + 2(4.9)(400) \Rightarrow \sqrt{3920} = \boxed{62.6m/s} \end{aligned}$$

45.

$$\begin{aligned} F_y &= -(70+10kg)(9.8m/s^2) + -(70+10kg)(0.2m/s^2) \\ &= \boxed{-800.0N} \end{aligned}$$

Chapter 8

Problems

13.

The question is: what velocity must m_1 rotate at such that the radius r does not change?

22.

26.

30.

51.

56.