

PHYSICS 1050: Assignment #7

DUE: Tuesday March 1, 2016

Readings:

- Chapter 2 of Franklin et al.
- Chapter 3 of Franklin et al.
- Chapter 4 of Franklin et al.

Problems:

- include name or PIN;
- staple your assignment;
- show all your work;
- all answers are to have three significant figures unless stated otherwise.

1. **Looking for a new car: Problem 2.2 on page 25**

2. **Visitng the family: Problem 2.3 on page 25**

3. **Birds in Lethbridge: Problem 2.10 on page 25**

4. **Biophysics strikes back**

The Biophysics students are having their usual Saturday night biophysics party performing physics experiments at a classmate's home. This Saturday it is in an apartment building and you notice a managemnt student (MS) passed out in the stairwell. The class immediately thinks of a home experiment and drags the MS to the room. The class ties the MS to an ironing board (IB) with duct tape. Two ropes are tied to either end of the IB and the other ends are tied to the balcony railing. The MS and IB are thrown off the balcony and left to hang there. The MS and IB have a combined weight of 75.0 daN. The left rope makes an angle of 10.0° relative to the vertical and the right rope makes an angle of 20.0° relative to the vertical. What is the tension in both ropes? (The magnitude and direction of the force applied by the rope on the IB.)

5. **Bones and muscles in action.**

A patient travels to the bar for some therapy. The patient has a forearm that weighs 2.05 daN and lifts an 11.2 daN beer stein. The only other significant forces on the forearm come from the biceps muscle, which act perpendicularly to the forearm, and the force at the elbow. If the biceps muscle produces a pull of 232 N when the forearm is raised 43.0° above the horizontal, find the magnitude and direction of the force that the elbow exerts on the forearm.

6. Falling with style.

A parachutist relies on air resistance (mainly on her parachute) to decrease her downward velocity. She and her parachute have a mass of 60.0 kg, and at a particular moment air resistance exerts a total upward force of 650 N on her and her parachute.

- (a) What is the weight of the parachutist?
- (b) Draw a free-body diagram for the parachutist. Use that diagram to calculate the net force on the parachutist.
- (c) What is the acceleration of the parachutist?