

This is the last assignment before mid-term II, which is on the evening of November 19, and Thanksgiving break.

**Reading:**

In this past week we have worked with HRW Chapters 12 ( on statics) and 14 (on fluids)  
New material for this week will be in Chapter 13 (Newtonian gravitation) and 15 (oscillations)  
We'll then move on to discuss waves in Chapters 16 and 17.  
The last part of the semester will be topics in Thermodynamics, Chapters 18-20.

**Problems:**

*Due in class Friday, November 15.*

- (1) HRW Chapter 12 Question 5 (about penguins)
- (2) HRW Chapter 12 Problem 7
- (3) HRW Chapter 12 Problem 22
- (4) HRW Chapter 12 Problem 28
- (5) HRW Chapter 14 Problem 6
- (6) HRW Chapter 14 Problem 24
- (7) HRW Chapter 14 Problem 41
- (8) HRW Chapter 14 Problem 49
- (9) HRW Chapter 14 Problem 62
- (10) About the Deep Springs College Hydro Plant: The headworks are 420 ft  $\simeq$  130 m above the station with the turbine.
  - (a) What do you expect the gauge pressure to be at the station? Usually in the business one speaks of “head”, or the height  $h$ , instead of pressure. Why might this be?
  - (b) If the flow rate is  $f = 790$  gpm, then find the maximum power the station could produce.
  - (c) The station runs continuously. How much power does it produce in a month? Compare this to the average US household electrical consumption, 940 kilowatthours (kWh) per month (2011 data).
  - (d) Can you determine flow rate from the pressure? Hint: This depends on the fixed geometry of the system.
  - (e) Why is head the relevant parameter in calculating power produced? In your answer include a sketch of Power vs. head.