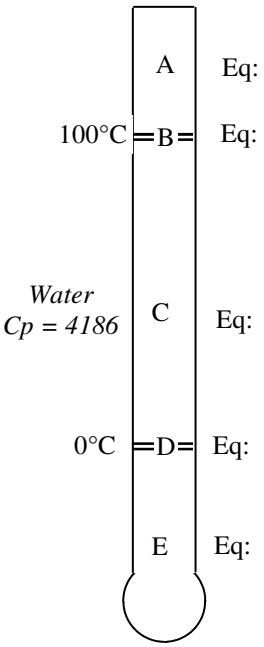
A-Day: Due Thurs., Jan 31 (Assigned: 1/29)
B-Day: Due Fri., Feb 1 (Assigned: 1/30)

2008 Heat 3—Review

Half-test next time. Make sure you can redo all of the problems from the homework.
*If you got help on the homework—redo it yourself until **you** can do it, yourself!*

1) A 15 kg piece of Aluminum (Cp = 899) at 75ºC is placed in 20 kg of 10ºC water (Cp = 4186). Find the final temperature went the two come to thermal equilibrium. (*Use the notes at the end of Heat 2 OR see go to the examples page.)*

Let me see if I can help you understand a total heat problem better.



2) On the thermometer at the left.
(*Mark each answer on the graphic as you answer them.)*
A. At what letter does water turn to steam?
B. What letter shows ice?
C. What letter is steam?
D. What letter shows the temperature at which ice melts?

3) For each letter region, give cp or L. (*They are different for each letter; Write cp = or L = and give the actual number. Letter C is done for you.)*

4) For each letter region, give the correct heat equation, (*To the right of each letter there is an "Eq". Put either Q = mL or Q = mcpΔT for each of those.)*

5) If 5 kg of water starts at –15°C and raises to 35°C
A. In what letter region is Ti (*what letter on the thermometer*)?
(*Write Ti = -15°C on the thermometer in the correct region.*)
B. In what letter region is Tf?
(*Write Tf = 35°C on the thermometer in the correct region.*)
C. Is there a phase change involved? If yes, what letter?
D. How many Q equations will you need to use to calculate the total heat?

E. Calculate the total heat to raise the 5 kg from –15°C to 35°C.

6) A) Convert 345K to Celsius. B) Convert 100ºF to Celsius.

7) Conduction (1), Convection (2), or Radiation (3)?
A) ___ How you could get heat thru a closed window.
B) ___ Cannot occur in a solid.
C) ___ Will be faster when something is wet.

8) Endothermal (N) or Exothermal (X)?
A) ___ Heat is added to a reaction
B) ___ A reaction gets cold.
C) ___ A reaction gets hot.
D) ___ Boiling water?
E) ____ A reaction gives off heat?
F) ____ Heat is absorbed?
G) ____ Heat is given off?
H) ____ Freezing water?

More on back

2008 Heat 3—Review

9) A) When water freezes, does it expand or contract?
   B) Is this normal or exceptional (do a lot of other substance do this or is water special)?
   C) Is ice more dense or less dense than liquid water?
   D) Does ice float or sink?
   E) Which is a better conductor, water or ice?
   F) Which is a better insulator, water or ice?
   G) Does a pond or lake freeze from the top down or from the bottom up?
   H) OK— put ALL of the above together and explain to me why the properties of water allow fish to survive in the winter.

10) A) Which is harder to cool down: water or air?
   B) Why is it that places that are close to oceans don't have a large temperature change throughout the year (compared with inland)?

11) Which will require more heat to raise its temperature?
   A. A 20 kg mass of water or a 10 kg mass of water?
   B. 10 kg of copper or 10 kg of water?
   C. 10 kg of 1ead (Cp = 128) or 10 kg of silver (Cp = 234).
   D. 10 kg of water changing 20ºC or 10 kg of water changing 40ºC?
   E. 10 kg of ice melting ($Lf = 3.33 \times 10^5$) or 10 kg of water boiling to steam ($Lv = 2.2.6 \times 10^6$)?

12) 1.24×10^5 J of heat is added to 80 kg of water originally at 35º. If Cp of water = 4186, what is the final temperature of the water?

13) Which are moving faster:
   A. ____ Cold atoms or hot atoms?
   B. ____ Liquid molecules or solid molecules?
   C. ____ Molecules before or after condensation?
   D. ____ Water at 20ºC or at 50ºC?

14) What is sublimation?

15) Why do ice cubes in the freezer eventually "disappear"?