1) How much energy is required to convert 10 grams of 100° water to 100° steam?

Answer: 22600 J

2) How much energy is required to convert 10 grams of 85° water to 120 degree steam?

Answer: 23633.6 J

3) 5 grams of 100° water is mixed with X grams of 20° water. The final temperature is 30°. How much heat is released by the hot water? How much heat is absorbed by the cold water? What is the value of X?

Answer: 1464.6 J, X = 35 g

4) 5 g of 100° water is mixed with 35 g of 20° water. What is the final temperature? What is the final composition?

Answer: 30°C, all water

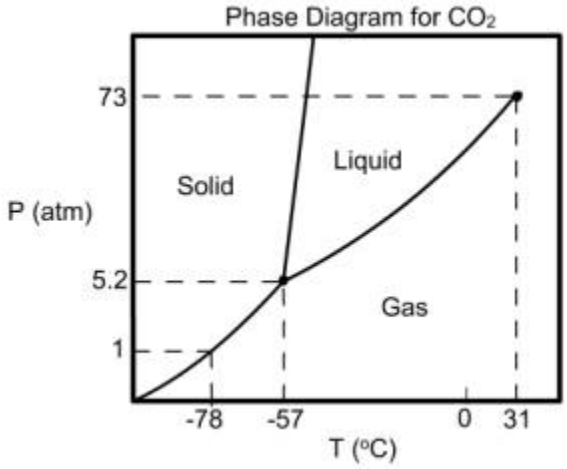
5) 5 g of 100 degree steam is mixed with 35 g of 20 degree water. What is the final temperature? What is the final composition?

Answer: 97.5°C all water

6) 10g of 120 degree steam is mixed with 35 g of 20 degree water. What is the final temperature? What is the final composition?

Answer: 5 grams steam, 40 grams water, 100°C

7) Answer the following questions based on this phase diagram for carbon dioxide.



- What temperature is the critical temperature of carbon dioxide? **31°C**
- What pressure is the critical pressure of carbon dioxide? **73 atm**
- Under what conditions will all three phases of carbon dioxide co-exist at the same time? **5.2 atm and –57°C**
- At atmospheric pressure, carbon dioxide can never be in the ___**liquid**___ phase.
- At 0 °C, carbon dioxide can never be in the _____**solid**_____ phase.
- At atmospheric pressure, -78 °C is the _____**sublimation/deposition**_____point of carbon dioxide.
- Under what conditions will carbon dioxide be a supercritical fluid? **Above 31°C**
- At 73 atm and 0 °C, carbon dioxide is in the ____**liquid**____ phase.
- At 73 atm, the melting/freezing point of carbon dioxide is about ____**-50**___ degrees Celsius.
- What phase change would occur if the pressure of carbon dioxide were decreased from 2 atm to 0.5 atm at a constant temperature of –78° C? **sublimation**
- Starting from 5.2 atm and 0 °C, how can carbon dioxide gas be converted to liquid?
    - increase temperature
    - decrease temperature
    - **increase pressure**
    - decrease pressure