Phase Change Energy

Honors Chemistry

Thermochem #5

For each situation, answer the following questions...
  a) Is energy being absorbed or released?
  b) Are IMFs being broken or made? Are molecules speeding up or slowing down?
  c) What constant are you going to look up to solve the problem? (e.g. heat of fusion, heat of vaporization)
  d) How much energy was lost or gained? (This is the math part. If it’s a phase change, use dimensional analysis. If it’s a temperature change, use \( q = mC\Delta T \). If it’s both, do both and add the answers.)

1. 25 grams of steam condense on someone’s skin, causing a horrible burn.
   a) Energy is being ________________ by the steam.
   b) IMFs are being ________________.
   c) To find the energy, I’ll need to know water’s ____________________________.
   d) 

2. A sample of 47.5 grams of methanol melts.
   a) Energy is being ________________ by the methanol.
   b) IMFs are being ________________.
   c) To find the energy, I’ll need to know methanol’s ____________________________.
   d) 

3. A beaker with 56.8 grams of chloroform is warmed (gently because it’s flammable) from 4.8 °C to 55.6 °C.
   a) Energy is being ________________ by the chloroform.
   b) Molecules are ____________________________.
   c) To find the energy, I’ll need to know chloroform’s ____________________________.
   d)
4. An ice cube with mass 115 grams starts at 0.0 °C, melts, and then warms up to 25.8 °C
   a) Energy is being _____________________ by the ice.
   b) IMFs are being ______________________ and then molecules are ____________________.
   c) To find the energy, I’ll need to know water's ___________________________ and its ____________________.
   d)

5. A puddle of 12389.7 grams of ammonia evaporates.
   a) Energy is being _____________________ by the ammonia.
   b) IMFs are being ______________________.
   c) To find the energy, I’ll need to know ammonia’s ____________________________.
   d)

6. A sauce pan of simmering water goes from having 505 mL in it to having 302 mL in it.
   a) Energy is being _____________________ by the water.
   b) IMFs are being ______________________.
   c) To find the energy, I’ll need to know water’s ____________________________.
   d)

7. On page 523, you can see that water, ethanol, and methanol all have very high heats of vaporization. What IMFs do these three share?

8. Why would hydrogen and oxygen have such small heats of vaporization?

9. Why would oxygen have a higher heat of vaporization than hydrogen?