

- 1) How much heat, in KJ is required to convert 79.8 g water from liquid at 11.3 °C to vapor at 25.0 °C? ($\Delta H_{\text{vap}} \text{H}_2\text{O} = 44.0 \text{ KJ/mol}$) (Ans: 199KJ)

(Hint: convert g to mols and then use the enthalpy to find heat)

$$\Delta H = \Delta H_1 + \Delta H_2$$

$$\Delta H = m s \Delta T$$

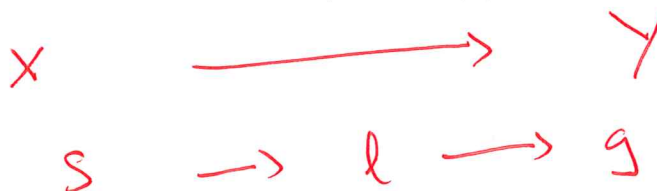
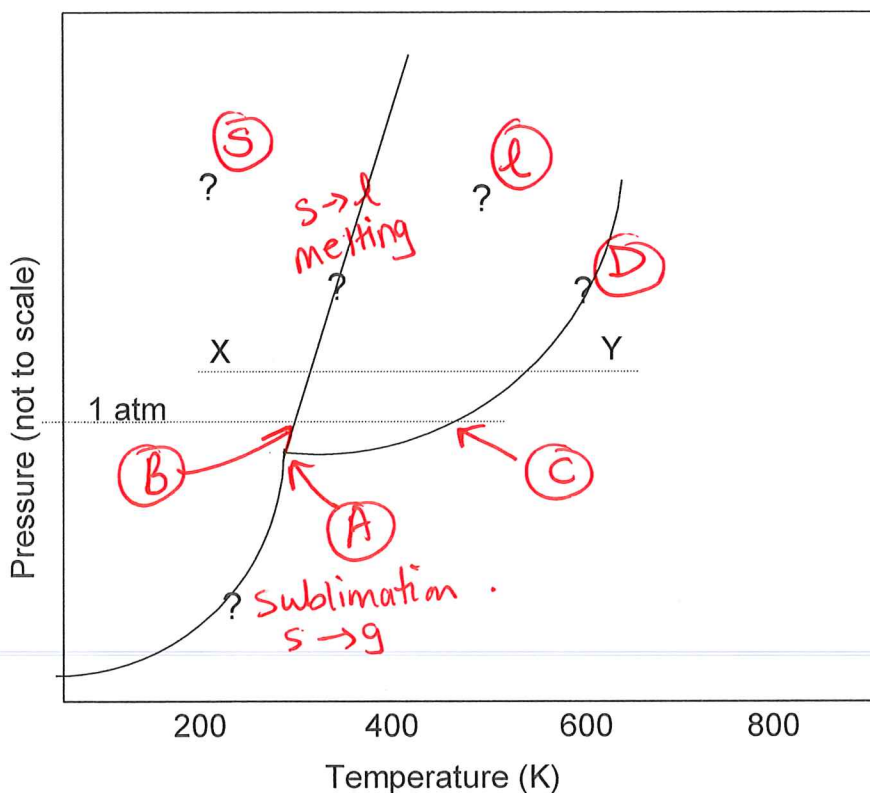
$$11.3^\circ\text{C} \rightarrow 25.0^\circ\text{C}$$

$$\Delta H_1 = 79.8 \text{ g} \times 4.18 \text{ J/g}^\circ\text{C} \times (25 - 11.3) \times \frac{1 \text{ kJ}}{1000 \text{ J}} = 4.57 \text{ kJ}$$

$$\Delta H_2 = 79.8 \text{ g} \times \frac{1 \text{ mol}}{18 \text{ g}} \times \frac{44 \text{ kJ}}{\text{mol}} = 195 \text{ kJ}$$

$$\Delta H = (195 + 4.57) = \boxed{199 \text{ kJ}}$$

- 2) The figure below is a phase diagram for iodine.
 a) indicate the phases present in the portions of the diagrams marked (?);
 b) use the letters A, B, C and D to represent the triple point, the normal melting point, the normal boiling point, and the critical point, respectively;
 c) describe the phase changes that occur as the temperature of a sample is raised, at constant pressure, from point X to point Y.



Use the following intermolecular forces to answer the following questions.

- A) London forces
- B) Dipole-dipole interactions
- C) Hydrogen bonding
- D) Ion-dipole interactions
- E) Ionic forces

3) Circle the compound in the following pairs that has a higher boiling point? Which intermolecular force is responsible for the higher value?

CO ₂ or OCS <i>B</i>	SeO ₂ or SO ₂ <i>A</i>	CH ₃ CH ₃ or H ₂ CO <i>B</i>
CH ₃ CH ₂ OH or CH ₃ OCH ₃ <i>C</i>	NaCl or H ₂ O <i>E</i>	Ne or Kr <i>A</i>

4) Circle the compound in the following pairs that has a higher surface tension?

CO ₂ or OCS	SeO ₂ or SO ₂	CH ₃ CH ₃ or H ₂ CO	CH ₃ CH ₂ OH or CH ₃ OCH ₃
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5) Which of the following molecules in the pairs will have more cohesion (rather than adhesion)?

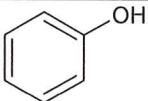
CO ₂ or OCS	SeO ₂ or SO ₂	CH ₃ CH ₃ or H ₂ CO	CH ₃ CH ₂ OH or CH ₃ OCH ₃
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6) For the compounds in the table chose the solvent it will be soluble in the solvents given below. Give the major intermolecular force responsible for the solubility.

Methanol: CH₃OH

Water: H₂O

Hexane: CH₃CH₂CH₂CH₂CH₂CH₃

Substance	Solvent	Intermolecular force
CO ₂	hexane	A London
	methanol	C H-
CH ₃ CH ₂ OCH ₂ CH ₃	hexane	A London

7) Arrange the following in increasing melting point.

H₂O, NH₃, CH₄, LiOH

