

Exam II – Chapters 6, 2B, 7 & 10

- (3 pts) For each group of ionic compounds, circle the one that will have the largest lattice energy.
 - MgO** or CaO
 - NaF** or NaBr
 - K₂S or **CaS**
- (3 pts) For each group of substances, circle the one with the highest boiling point.
 - HCN or **KCN**
 - HF** or HCl
 - CH₂Cl₂** or CCl₄
- (3 pts) Circle the atom or ion in each group that has the larger atomic radius.
 - Sr** or I
 - Cl⁻** or K⁺
 - Ba** or Ba²⁺
- (3 pts) Which atom or ion in each of the following pairs has the larger electron affinity?
 - Na or **Na⁺**
 - C or **O**
 - Mg or **Cl**
- (3 pts) Circle the compound with the lowest vapor pressure.
 - BF₃
 - Br₂
 - HBr**
 - CH₃Br
- (3 pts) Circle the compound with the higher surface tension.
 - CCl₄
 - CH₃Cl
 - H₂O**
 - H₂S
- (3 pts) Which one of the following atoms has the largest ionization energy?
 - Mg
 - S
 - Ar**
- (3 pts) Circle the compound with the lower viscosity.
 - NH₃
 - CH₂Br₂
 - H₂S
 - CCl₄**
- (12 pts) Please name the following compounds (spelling counts!):
 - HClO₃ (aq) **chloric acid**
 - PbS₂ **lead (IV) sulfide**
 - SrSO₄ **strontium sulfate**
 - NO₃ **nitrogen trioxide**
 - HF (aq) **hydrofluoric acid**
 - P₂O₃ **diphosphorous trioxide**
- (12 pts) Please write the correct formula for the following:
 - nitrous acid **HNO₃ (aq)**
 - tin (II) carbonate **SnCO₃**
 - calcium acetate **Ca(C₂H₃O₂)₂ or Ca(CH₃COO)₂**
 - carbon tetrachloride **CCl₄**
 - zinc phosphate **Zn₃(PO₄)₂**
 - hydrobromic acid **HBr (aq)**

11. (36 pts) Please complete all requested information for the following three structures. Start by drawing ALL necessary Lewis structures.

a. SeI_5^-

ABE notation: AB_5E

Molecular Geometry: **square pyramid**

Bond angle(s): $< 90^\circ$

Hybridization on the central atom: sp^3d^2

Total # of σ bonds in molecule: **5**

Total # of π bonds in molecule: **0**

Is this structure polar? **YES** NO (circle one)

b. ClO_4^-

ABE notation: AB_4

Molecular Geometry: **tetrahedral**

Bond angle(s): 109.5°

Hybridization on the central atom: sp^3

Total # of σ bonds in molecule: **4**

Total # of π bonds in molecule: **0**

Is this structure polar? YES **NO** (circle one)

c. SO_3

3 resonance structures

ABE notation: AB_3

Molecular Geometry: **trigonal planar**

Bond angle(s): 120°

Hybridization on the central atom: sp^2

Total # of σ bonds in molecule: **3**

Total # of π bonds in molecule: **1**

Is this structure polar? YES **NO** (circle one)

12. (5 pts) Identify the strongest type of intermolecular force between the molecules of the following substances:

LDF : London Dispersion Forces

DDF : Dipole-Dipole Forces

HBF : Hydrogen-Bonding Forces

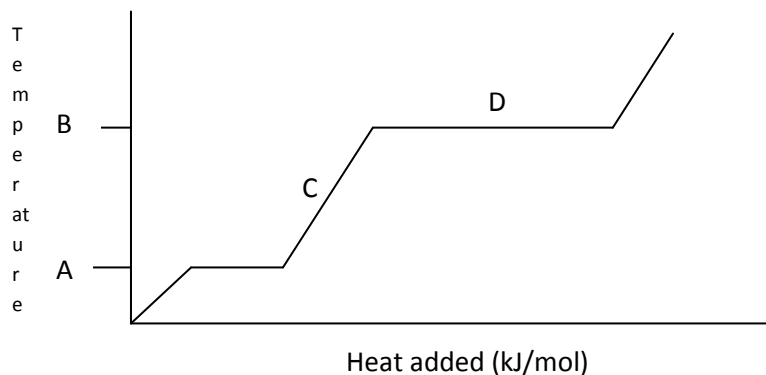
- a. $\text{CH}_3\text{CH}_2\text{Cl}$ **DDF**
- b. $\text{CH}_3\text{CH}_2\text{NH}_2$ **HBF**
- c. SeI_5^- **DDF**
- d. ClO_4^- **LDF**
- e. SO_3 **LDF**

13. (5 pts) Consider the following and chose the correct **letter(s)** for each:

- a. metallic bonds
- b. ionic bonds
- c. nonpolar covalent bonds
- d. polar covalent bonds

- 1. The bond between the atoms in Al_2S_3 . **b** .
- 2. The bond between the atoms in SO_3 . **d** .
- 3. The bond between the atoms in Mg. **a** .
- 4. The bonds between the atoms in N_2 . **c** .
- 5. The bonds between the atoms in MgCO_3 . **b, d** .

14. (6 pts) Identify the following on this heating-cooling curve for a liquid:



- a. The melting point **A** .
- b. The phase change from liquid to gas **D** .
- c. The boiling point **B** .