

CHM151 Quiz 11 INTERMOLECULAR FORCES 25 Pts Name: _____

Multiple Choice Due day of final exam. (Wednesday May 8th)

Identify the letter of the choice that **best completes** the statement or answers the question.

- _____ 1. Which of the following statements concerning intermolecular forces are correct?
1. London dispersion forces exist in all molecular solids.
 2. London dispersion forces increase as the number of electrons increases.
 3. Dipole-dipole attractions occur in nonpolar molecules if they have polar bonds.
 4. Hydrogen bonding only occurs for molecules containing OH bonds.
- a. 1 only
b. 1 and 2
c. 4 only
d. 1, 2, and 4
e. 2 and 3
- _____ 2. Which of the following molecular solids will exhibit dipole-dipole intermolecular forces: NH₃, BF₃, I₂, and H₂S?
- a. NH₃ and H₂S b. NH₃, BF₃, and H₂S c. I₂ only
d. BF₃ and I₂ e. NH₃, BF₃, I₂, and H₂S
- . **Draw Lewis or VSEPR structures of each to support your answer**

- _____ 3. The following molecules are gases at room temperature: Ne, N₂, O₂, Cl₂, and SiH₄. Which one will have the highest boiling point?
- a. Ne b. N₂ c. O₂ d. Cl₂ e. SiH₄

Provide a rationale for your answer.

- _____ 4. Which one of the following molecules will have the lowest boiling point?
- a. NH₃ b. CH₃Cl c. CH₄ d. NH₂Cl e.. CHCl₃

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Provide a rationale for your answer.
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- _____ 5. Which of the following molecules would be expected to form hydrogen bonds in the liquid state or solid state: H₂SO₄, HF, CH₃OH (methanol), and CH₂O (formaldehyde)? (***You will need to draw structures.***)
- a. H₂SO₄, HF, and CH₃OH
b. HF and CH₃OH
c. H₂SO₄, HF, and CH₂O
d. HF, CH₃OH, and CH₂O
e. CH₃OH and CH₂O

6. Arrange H_2O , H_2S , and SiH_4 in order from *lowest to highest* boiling point.
State which intermolecular forces are involved for each

7. Arrange KCl , $\text{CH}_3\text{CH}_2\text{OH}$, C_3H_8 , and He in order of *increasing* boiling point.
State which intermolecular forces are involved for each

- ___ 8. Which of the following properties of water can be attributed to hydrogen bonding?

1. high melting point
 2. high heat of vaporization
 3. low vapor pressure
 4. high surface tension
- a. 1 and 3
 - b. 2 and 3
 - c. 2, 3, and 4
 - d. 1, 3, and 4
 - e. 1, 2, 3, and 4

- ___ 9. In which one of the following pure solids is it necessary to break covalent bonds to make a liquid or gas?
- a. KCl
 - b. Ne
 - c. CO_2
 - d. NH_3
 - e. SiO_2

- ___ 10. Which of the following gases can be liquefied at 25°C ?

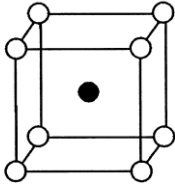
<u>Gas</u>	<u>boiling pt.</u>	<u>critical temp.</u>
N_2	-196°C	-147°C
Cl_2	-34°C	144°C
O_2	-183°C	-119°C

- a. N_2 only
- b. Cl_2 only
- c. O_2 only
- d. Cl_2 and O_2
- e. N_2 and O_2

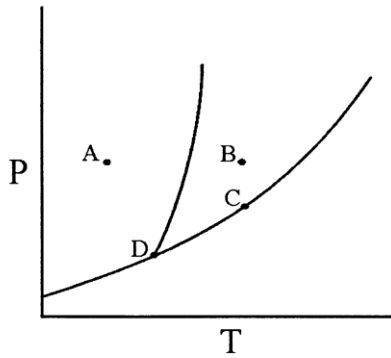
- ___ 11. Which of the following are valid reasons why vegetable oil has a greater viscosity than diethyl ether, CH_3OCH_3 ?

1. Oil molecules are not held together by hydrogen bonds.
 2. Oil molecules have long chains that become entangled.
 3. Intermolecular forces are greater for the larger oil molecules.
- a. 1 only
 - b. 2 only
 - c. 3 only
 - d. 1 and 3
 - e. 2 and 3

- ___ 12. In the unit cell below, element X is within the cell and element Y is at the corners. What is the formula for this compound?



- a. XY
 - b. XY₂
 - c. XY₄
 - d. XY₈
 - e. X₂Y
- ___ 13. Which of the following statements concerning the phase diagram below are correct?



- 1. Moving from point A to B results in a phase transition from solid to liquid.
 - 2. Point D lies at the critical point.
 - 3. At point C, liquid and gas phases coexist at equilibrium.
- a. 1 only
 - b. 2 only
 - c. 3 only
 - d. 1 and 3
 - e. 2 and 3