Questions 1-16. Each question is worth 4 points. Answer the question by circling your choice. You MUST show all work when needed to get full credit.

1. The physical properties of a substance influenced by the strength of intermolecular forces include all of the following **except**:
   A) viscosity    B) melting point.    C) vapor pressure.    D) boiling point.    E) mass.

2. An piece of ice is an example of a(n) __________ solid.
   A) ionic    B) metallic    C) molecular    D) network    E) condensed

3. An attractive force that operates between molecules is called a(n) _____________.
   A) covalent bonding
   B) instantaneous dipole
   C) ionic bonding
   D) intermolecular forces
   E) intramolecular forces

4. Two substances are mixed together and the vessel cools down, the reaction is considered:
   A) Work    B) Evaporation
   C) Endothermic    D) Exothermic
   E) Enthalpy

5. In water, the melting point is unusually high because of
   A) hydrogen bonding between the molecules
   B) ionic bonds in the individual molecules.
   C) dipole-dipole attractions between the molecules.
   D) covalent bonds in the individual molecules.
   E) the heat content of the hydrogen-oxygen bonds.

6. Which of the following describe a change of state or a phase change?
   A) Breaking ice with hammer
   B) The melting of ice at 0°C
   C) The formation of perspiration on skin
   D) Heating water from 55°C to 75°C
   E) Cooling water from 85°C to 45°C
7. Which choice correctly lists the intermolecular forces present in CH₃Br?
   A) London dispersion forces only
   B) dipole-dipole forces and hydrogen bonding
   C) London dispersion forces and dipole-dipole forces
   D) London dispersion forces and hydrogen bonding
   E) London dispersion forces, dipole-dipole forces, and hydrogen bonding

8. Which of the following molecules experience dipole-dipole forces?
   A) CCl₄
   B) NH₃
   C) CO₂
   D) SO₃
   E) all of these choices are correct

9. From the vapor pressure curve of acetone, it can be seen that the normal boiling point of acetone at 1 atm is about ________.
   A) 57°C
   B) 50°C
   C) −50°C
   D) 0°C
   E) 100°C

10. Which of the following statements regarding intermolecular forces is **incorrect**?
    A) London dispersion forces are the result of permanent dipoles in atoms or molecules.
    B) Bonding forces are much stronger than intermolecular forces.
    C) London dispersion forces occur in all atoms and molecules.
    D) An intermolecular force is an attractive force that operates *between* molecules.
    E) Molecules which have hydrogen bonded to F, O, or N can undergo hydrogen-bonding.

11. Which of the following statements is correct?
    A) At the melting point of a substance, the solid, liquid, and gas phases are all in equilibrium.
    B) The freezing point and the melting point of a substance are the same.
    C) There is no fundamental difference in the melting process for covalent substances and ionic substances.
    D) When iodine vapor cools at atmospheric pressure, it condenses to the liquid state.
    E) In order for a substance to go from the liquid phase to the gas phase, it must give off energy to the surroundings.
12. Suppose you wish to raise the temperature of 1.00 g of each substance by 1.0°C. Which of the following metals require the greatest amount of heat?
   A) copper, 0.377 J/(g °C)
   B) iodine, 0.214 J/(g °C)
   C) aluminum, 0.895 J/(g °C)
   D) mercury, 0.140 J/(g °C)
   E) iron, 0.448 J/(g °C)

13. What phase transition is occurring between points D and E on the heating curve?
   A) melting
   B) evaporation
   C) deposition
   D) sublimation
   E) freezing

14. Which of the following compound has the strongest London dispersion force?
   A) CF₄      B) CCl₄    C) CBr₄     D) Cl₂      E) CH₄

15. A 5.20-g piece of metal is heated and placed in a calorimeter that is filled with 120. g of water at 23.5°C. The water reaches a final temperature of 74.3°C. Calculate the heat change for the piece of metal (the specific heat of water is 4.184 J/(g °C)).
   A) -37.3 kJ
   B) -1.11 kJ
   C) -25.5 kJ
   D) +25.5 kJ
   E) +37.3 kJ

16. Consider the reaction, CaCO₃(s) → CaO(s) + CO₂(g)  ΔH= 178.0 kJ
    How much heat would be required to decompose exactly 4 mol CaCO₃(s)?
   A) 1780 kJ      B) 712 kJ    C) 178 kJ    D) 44.5 kJ    E) 89.0 kJ
CSU Dominguez Hills
CHEM 108 - Intro to Chemistry
Instructor: Dr. Kenneth R. Rodriguez, SP2017

Quiz 8

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3. An attractive force that operates between molecules is called a(n) __________.
   A) covalent bonding  B) instantaneous dipole  C) ionic bonding  D) intermolecular forces  E) intramolecular forces

4. Two substances are mixed together and the vessel cools down, the reaction is considered:
   A) Work  C) Endothermic  E) Enthalpy  B) Evaporation  D) Exothermic

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   A) 57°C
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10. Which of the following statements regarding intermolecular forces is incorrect?
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   \[ Q = m \cdot C \cdot \Delta T \]
   \[ H_{H_2O} = 74.3 - 23.5 = 50.8 \]
   \[ 5.20 \cdot 4.184 = 21.8 \]
   A) -37.3 kJ
   B) -1.11 kJ
   C) -25.5 kJ
   D) +25.5 kJ
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16. Consider the reaction, CaCO₃(s) → CaO(s) + CO₂(g)  \( \Delta H = 178.0 \) kJ
    How much heat would be required to decompose exactly 4 mol CaCO₃(s)?
    A) 1780 kJ
    B) 712 kJ
    C) 178 kJ
    D) 44.5 kJ
    E) 89.0 kJ

\[ 4 \text{ mol CaCO}_3 \times \frac{100.09 \text{ g CaCO}_3}{1 \text{ mol CaCO}_3} = 400.36 \text{ g of CaCO}_3 \rightarrow 1000 \text{ kJ} \]
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\[ \text{Total} = 4 \text{ mol} \times \frac{178.0 \text{ kJ}}{1} = 178.0 \text{ kJ} \]