Ch 11-12 MC Review

1. Helium atoms do not combine to form He_2 molecules, yet He atoms do attract one another weakly through
   A. dipole-dipole forces.
   B. ion-dipole forces.
   C. dispersion forces.
   D. dipole-induced dipole forces.
   E. hydrogen bonding.

2. The molecular property related to the ease with which the electron density in a neutral atom or molecule can be distorted is called
   A. a dipole moment.
   B. polarizability.
   C. a dispersion force.
   D. surface tension.
   E. a van der Waals force.

3. Which two properties are more typical of molecular compounds than of ionic compounds?
   I. They are gases or liquids at room temperature.
   II. They have high melting points.
   III. Solids do not conduct electricity, but liquids do.
   IV. Atoms share electrons.
   A. I and IV B. I and III
   C. II and III D. II and IV
   E. III and IV

4. Which of the following substances should have the highest boiling point?
   A. CH_4 B. Cl_2 C. Kr
   D. CH_3Cl E. N_2

5. Which of the following properties indicates the presence of *strong* intermolecular forces in a liquid?
   A. a low heat of vaporization
   B. a low critical temperature
   C. a low vapor pressure
   D. a low boiling point
   E. none of these

6. For which of the following species are the intermolecular interactions entirely due to dispersion forces?
   A. C_2H_6 B. CH_3OCH_3 C. NO_2
   D. H_2S E. $CaNO_3$

7. Each of the following substances is a liquid at –50°C. Place these liquids in order of *increasing* vapor pressure.
   dimethyl ether (CH_3OCH_3), propane (C_3H_8), ethanol (CH_3CH_2OH)
   A. ethanol < propane < dimethyl ether
   B. ethanol < dimethyl ether < propane
   C. propane < dimethyl ether < ethanol
   D. dimethyl ether < ethanol < propane
   E. propane < ethanol < dimethyl ether

8. Given the following liquids and their boiling points, which has the *highest* vapor pressure at its normal boiling point?
   A. ethanol, bp = 78°C
   B. methanol, bp = 65°C
   C. water, bp = 100°C
   D. benzene, bp = 80°C
   E. The vapor pressure of each of the liquids at its normal boiling point would be the same.

9. Krypton has a *higher* melting point than argon because of its
   A. hydrogen bonding.
   B. stronger dispersion forces.
   C. permanent dipole moment.
   D. ionic bonds.
   E. greater ionization energy.

10. Which of the responses includes all of the following that can form hydrogen bonds with water molecules?
    (1) Na^+ (2) CH_3COOH
    (3) C_2H_6 (4) CH_3NH_2
    A. (1) and (2) B. (1) and (3)
    C. (2) and (3) D. (2) and (4)
    E. (3) and (4)

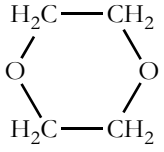
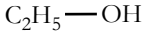
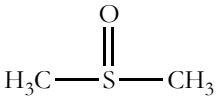
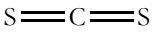
11. Which property of water allows a razor blade to float on it without sinking?
    A. viscosity B. surface tension
    C. density D. specific heat
    E. triple point

12. The structural form of the element Ge closely resembles the structure of
    A. C (diamond). B. N (diatomic).
    C. As (tetrahedral). D. S (S_8 ring).
    E. Kr (monatomic).

13. Which of the following is *not* an endothermic process?
    A. melting of a solid
    B. vaporization
    C. raising the temperature of a gas
    D. condensation of water vapor
    E. sublimation of dry ice

14. Solid iodine has a vapor pressure of 1.0 mmHg at 39°C. How many *moles* of iodine will sublime into a 500. mL flask at this temperature? If the volume of the flask is doubled at constant temperature, what will happen to the *equilibrium* vapor pressure of I_2? (Assume some solid I_2 is always present in the container.)
    A. 2.1×10^{-4} mol; vapor pressure increases
    B. 2.0×10^{-2} mol; vapor pressure increases
    C. 2.6×10^{-5} mol; no change in vapor pressure
    D. 2.1×10^{-4} mol; no change in vapor pressure
    E. 2.6×10^{-5} mol; vapor pressure decreases

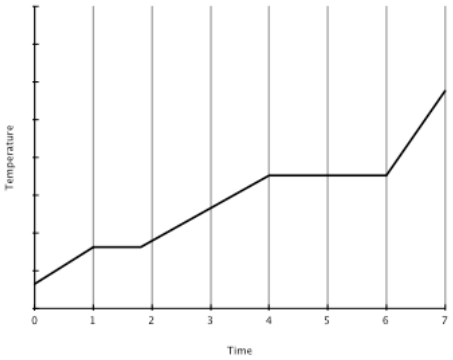
15. The molar heats of sublimation and fusion of iodine are 62.3 kJ/mol and 15.3 kJ/mol, respectively. Calculate the molar heat of vaporization of liquid iodine.
A. 77.6 kJ/mol
B. 47.0 kJ/mol
C. –47.0 kJ/mol
D. –77.6 kJ/mol
E. 4.07 kJ/mol

16. Which one of the following would be immiscible with water?
A. 
B. 
C. 
D. 
E. NH_3

17. The solubility of nitrogen gas at 25°C and a nitrogen pressure of 522 mmHg is 4.7×10^{-4} mol/L. What is the value of the Henry's Law constant in mol/L·atm?
A. 6.8×10^{-4} mol/L·atm
B. 4.7×10^{-4} mol/L·atm
C. 3.2×10^{-4} mol/L·atm
D. 9.0×10^{-7} mol/L·atm
E. 1.5×10^{3} mol/L·atm

18. The solubility of oxygen in lakes high in the Rocky Mountains is affected by the altitude. If the solubility of O_2 from the air is 2.67×10^{-4} M at sea level and 25°C, what is the solubility of O_2 at an elevation of 12,000 ft where the atmospheric pressure is 0.657 atm? Assume the temperature is 25°C, and that the mole fraction of O_2 in air is 0.209 at both 12,000 ft and at sea level.
A. 1.75×10^{-4} M
B. 2.67×10^{-4} M
C. 3.66×10^{-5} M
D. 4.06×10^{-4} M
E. none of these

19. Which of the following correctly describes the conductivity observed by doping Si with the indicated element?
A. Ge; n-type
B. Ge; p-type
C. P; p-type
D. As; n-type
E. Ga; n-type



20. The heating curve above gives the relationship between time and temperature as a sample of an unknown substance goes through phase changes. The sample begins as a solid and is heated at a constant rate. At which point is the sample half liquid and half gas?
A. Time 3
B. Time 4
C. Time 5
D. Time 6
E. Time 7

Answers: 1. C; 2. B; 3. A; 4. D; 5. C; 6. A; 7. B; 8. E; 9. B; 10. D; 11. B; 12. A; 13. D; 14. C; 15. B; 16. D; 17. A; 18. A; 19. D; 20. C.