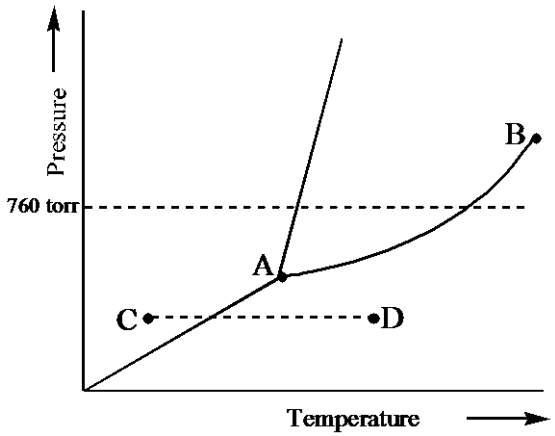
1. Which one of the following quantities is generally not obtainable from a single heating or cooling curve of a substance, measured at atmospheric pressure?
   A. melting point
   B. boiling point
   C. triple point
   D. heat of fusion
   E. heat of vaporization

2. Liquid ammonia (boiling point = -33.4°C) can be used as a refrigerant and heat transfer fluid. How much energy is needed to heat 25.0 g of $NH_3(l)$ from -65.0°C to -12.0°C?

Specific heat capacity, $NH_3(l)$	4.7 J/(g·K)
Specific heat capacity, $NH_3(g)$	2.2 J/(g·K)
Heat of vaporization	23.5 kJ/mol
Molar mass, $\mathcal{M}$	17.0 g/mol

   A. 5.5 kJ
   B. 6.3 kJ
   C. 39 kJ
   D. 340 kJ
   E. 590 kJ

3. Examine the phase diagram for the substance Bogusium (Bo) and select the correct statement.



   A. Bo(*s*) has a lower density than Bo(*l*).
   B. The triple point for Bo is at a higher temperature than the melting point for Bo.
   C. Bo changes from a solid to a liquid as one follows the line from C to D.
   D. Bo changes from a liquid to a gas as one follows the line from C to D.
   E. Point B represents the critical temperature and pressure for Bo.

4. In hydrogen iodide _____ are the most important intermolecular forces.
   A. dipole-dipole forces
   B. London dispersion forces
   C. hydrogen bonding
   D. covalent bonds
   E. polar covalent bonds

5. When the electron cloud of a molecule is easily distorted, the molecule has a high _____.
   A. polarity
   B. polarizability
   C. dipole moment
   D. van der Waals radius
   E. compressibility

6. The strongest intermolecular interactions between pentane (C_5H_{12}) molecules arise from
   A. dipole-dipole forces.
   B. London dispersion forces.
   C. hydrogen bonding.
   D. ion-dipole interactions.
   E. carbon-carbon bonds.

7. The strongest intermolecular interactions between ethyl alcohol (CH_3CH_2OH) molecules arise from
   A. dipole-dipole forces.
   B. London dispersion forces.
   C. hydrogen bonding.
   D. ion-dipole interactions.
   E. carbon-oxygen bonds.

8. Which of the following substances will have hydrogen bonds between molecules?
   A. $(CH_3)_3N$
   B. CH_3-O-CH_3
   C. CH_3CH_2-OH
   D. CH_3CH_2-F
   E. HI

9. Which of the following pairs is arranged with the particle of higher polarizability listed first?
   A. Se^{2-}, S^{2-}
   B. I, I^-
   C. Mg^{2+}, Mg
   D. Br, I
   E. none of these choices is correct

10. Which of the following should have the highest boiling point?
   A. CF_4
   B. CCl_4
   C. CBr_4
   D. CI_4
   E. CH_4

11. Select the pair of substances in which the one with the higher vapor pressure at a given temperature is listed first.
    A. C_7H_{16}, C_5H_{12}
    B. CCl_4, CBr_4
    C. H_2O, H_2S
    D. CH_3CH_2OH, CH_3-O-CH_3
    E. Xe, Kr

12. When the adhesive forces between a liquid and the walls of a capillary tube are greater than the cohesive forces within the liquid
    A. the liquid level in a capillary tube will rise above the surrounding liquid and the surface in the capillary tube will have a convex meniscus.
    B. the liquid level in a capillary tube will rise above the surrounding liquid and the surface in the capillary tube will have a concave meniscus.
    C. the liquid level in a capillary tube will drop below the surrounding liquid and the surface in the capillary tube will have a convex meniscus.
    D. the liquid level in a capillary tube will drop below the surrounding liquid and the surface in the capillary tube will have a concave meniscus.
    E. None of these will occur.

Answers:
1. C
2. C
3. E
4. A
5. B
6. B
7. C
8. C
9. A
10. D
11. B
12. B