DATE: NAME: CLASS:

ANSWER KEY	Chapter 2 Test Answer Key	BLM 2.4.1A

Answers to Multiple-Choice Questions

1. d
2. b
3. c
4. a
5. c
6. a
7. a
8. b
9. c
10. b
11. d
12. c
13. c
14. d
15. a
16. c
17. b
18. d
19. b
20. a

Answers to Written Response Questions

21. The angle between C—H bonds will decrease. In CH_4, there is equal repulsion between the bond pairs and the C—H bonds spread as far apart as possible to the maximum bond angle of 109.5 ^{o}C. In CH_3Cl, the repulsion between the larger Cl atom and the C—H bond pairs is greater than the repulsions between bond pairs in CH_4. The C—H bond pairs will move closer together, decreasing the angle between the C—H bonds.

22. When a liquid boils, the heat energy is used to overcome the intermolecular forces of attraction between molecules and the molecules move farther apart. London dispersion forces between molecules increase with an increase in the number of electrons in the molecule. Since chlorine atoms have fewer electrons than bromine atoms, the1,2-dichloroethene has weaker London dispersion forces. Therefore, less energy is needed to spread the molecules apart and 1,2-dichloroethene will boil at the lower temperature of 47 ^{o}C.

23. The most significant difference between the molecules is the number of OH groups on the carbon chain. Molecules having an OH group will form hydrogen bonds to other molecules. The greater the number of OH groups, the greater the amount of hydrogen bonding that can occur. A greater number of OH groups on a molecule also will create slightly stronger dipole–dipole forces between molecules. Similarly the molecule with more OH groups has more electrons and slightly

larger London dispersion forces between molecules. The intermolecular bonding will increase in the order:

propan-1-ol < propane-1,2-diol < propane-1,2,3-ol

24. In an ionic compound, ions are not bonded in pairs as independent units. Each ion is attracted to all of the surrounding neighbouring ions. Therefore, the chemical formula represents the simplest whole-number ratio of ions. In a molecular compound such as $C_2H_4Cl_2$, all of the atoms are bonded together to form one discrete molecule. The chemical formula must represent all of the atoms present in the molecule.

25. The model of the metallic bond would describe positive copper ions immersed in a sea of free electrons. As one end of the wire is heated, the kinetic energy of the free electrons increases. This energy is passed from electron to electron along the wire. More rapid movement of particles is detected as a rise in temperature. As the electrons in the opposite end of the wire increase in kinetic energy, they move faster and the wire heats up. The wire will not get red-hot at the opposite end because some of the kinetic energy is lost to the air around the wire.

26. a) Metallic bonding can be ruled out because the solid did not conduct electric current. The intermolecular bonding between molecules in a molecular solid are formed by much weaker attractive forces than those found in ionic or metallic bonding and can thus be ruled out because the melting point is very high. Although many ionic compounds are soluble in water, some are not; therefore, ionic bonding cannot be ruled out.

    b) The sample could be melted and tested for electrical conductivity. A molten ionic compound would conduct electric current, while a network solid, other than graphite, would not conduct electric current.