

Name _____

AP Chemistry

HW 10_1: Due 1/19/18 Write the letter of the correct answer on the line in front of the question.

Use the following answers for questions 1- 11.

- (A) A network solid with covalent bonding (B) A molecular solid with zero dipole moment
(C) A molecular solid with hydrogen bonding (D) An ionic solid
(E) A metallic solid

1. C Solid ethyl alcohol, C_2H_5OH
2. A Solid Silicon dioxide, SiO_2
3. D Solid lithium chloride ($LiCl$)
4. C Solid ammonia (NH_3)
5. E Solid gold (Au)
6. B Solid dry ice (CO_2)
7. D Solid magnesium oxide (MgO)
8. B Solid I_2
9. C Solid hydrogen fluoride (HF)
10. E Solid osmium (Os)
11. D Solid cesium iodide (CsI)

Use these answers for questions 12-15

- (A) hydrogen bonding (B) hybridization (C) ionic bonding
(D) resonance (E) van der Waals forces (London dispersion forces)

12. E Is used to explain why iodine molecules are held together in the solid state
13. A Is used to explain why the boiling point of HF is greater than the boiling point of HBr
14. B Is used to explain the fact that the four bonds in methane are equivalent
15. D Is used to explain the fact that the carbon-to-carbon bonds in benzene, C_6H_6 , are identical

Use the following answers for questions 16 - 18.

- (A) Macromolecules held together with strong polar bonds.
(B) Closely packed lattice with delocalized electrons throughout
(C) Lattice of positive and negative ions held together by electrostatic forces.
(D) Strong multiple covalent bonds (including bonds.) with weak intermolecular forces
(E) Strong single covalent bonds with weak intermolecular forces.

16. C Cesium chloride, $CsCl$ (s)
17. B Silver, Ag (s)
18. D Carbon dioxide, CO_2 (s)
19. D A hard, crystalline solid with a high melting point does not conduct electricity in any phase. This solid is most likely:
(A) an ionic solid. (B) a metallic solid. (C) a molecular solid.
(D) a network covalent solid. (E) none of the above

20. B A solid is insoluble in water, does not conduct electricity, and does not melt below 1000 °C. This solid could be
 (A) Pt (B) SiC (C) CsCl (D) C₁₀H₂₂ (E) CH₃CH₂OH
21. C The boiling points of the halogens, F₂, Cl₂, Br₂ and I₂, increase in that order. This is best attributed to differences in:
 (A) covalent bond strengths (B) dipole forces (C) London dispersion forces (D) colligative forces (E) atomic radius
22. E The lowest melting points overall occur for members of which class of solids?
 (A) ionic (B) metallic (C) polar molecular (D) network covalent (E) non-polar molecular
23. B What are the strongest intermolecular force between neighboring carbon tetrachloride, CCl₄, molecules?
 (A) dipole-dipole forces (B) dispersion forces (C) hydrogen bonds (D) covalent bonds (E) ionic bonds
24. A The compounds C₃H₈, CH₃CH₂OH, and CH₃OCH₃ have very similar molar masses. When they are arranged in order of *increasing* strength of their intermolecular forces, what is the correct order?
 (A) C₃H₈, CH₃OCH₃, CH₃CH₂OH (B) CH₃CH₂OH, CH₃OCH₃, C₃H₈ (C) CH₃OCH₃, CH₃CH₂OH, C₃H₈
 (D) CH₃OCH₃, C₃H₈, CH₃CH₂OH (E) CH₃CH₂OH, C₃H₈, CH₃OCH₃
25. D Which property does *not* indicate strong intermolecular forces?
 (A) high enthalpy of vaporization (B) high viscosity (C) high critical temperature
 (D) high vapor pressure (E) high melting point

26. C

Substance	Equilibrium Vapor Pressure at 20°C (torr)
C ₆ H ₆ (l)	75
C ₂ H ₅ OH(l)	44
CH ₃ OH(l)	92
C ₄ H ₉ OH(l)	32
C ₂ H ₆ O ₂ (l)	0.06

Based on the data in the table above, which of the following liquid substances has the weakest intermolecular forces?

- (A) C₆H₆(l) (B) C₂H₅OH(l) (C) CH₃OH(l) (D) C₄H₉OH(l) (E) C₂H₆O₂(l)

27. D In the diagram to the right, which of the labeled arrows identifies hydrogen bonding in water?

- (A) A (B) B (C) C (D) D
 (E) none of these

28. C Which of the following is the best explanation for the difference in the boiling points of liquid Br₂ and I₂, which are 59°C and 184°C, respectively?

- (A) Solid iodine is a network covalent solid, whereas solid bromine is a molecular solid.
 (B) The covalent bonds in I₂ molecules are weaker than those in Br₂ molecules.
 (C) I₂ molecules have electron clouds that are more polarizable than those of Br₂ molecules, thus London dispersion forces are stronger in liquid I₂.
 (D) Bromine has a greater electronegativity than iodine, thus there are stronger dipole-dipole forces in liquid bromine than in liquid iodine.
 (E) The Br₂ molecules are smaller than the I₂ molecules and move more rapidly making it easier to boil.

29. B The figure above shows that in solid hydrogen fluoride, there are two different distances between H atoms and F atoms. Which of the following best accounts for the two different distances?

- (A) Accommodation of the necessary bond angles in the formation of the solid
 (B) Difference in strength between covalent bonds and intermolecular attractions
 (C) Different isotopes of fluorine present in the samples
 (D) Uneven repulsions among nonbonding electron pairs
 (E) Hydrogen bonds are strong and shorter than bonds between molecules

