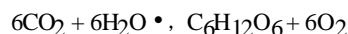


- 19) In which system do molecule-ion attractions exist?
 A) NaCl(aq) C) C₆H₁₂O₆(aq)
 B) C₆H₁₂O₆(s) D) NaCl(s)
- 20) The gram formula mass of NH₄Cl is
 A) 53.5 g/mole C) 22.4 g/mole
 B) 28.0 g/mole D) 95.5 g/mole
- 21) Metallic bonding occurs between atoms of
 A) copper C) sulfur
 B) carbon D) fluorine
- 22) Which formula represents an ionic compound?
 A) H₂O C) NH₃
 B) CH₄ D) KCl
- 23) The region that is the most probable location of an electron in an atom is
 A) an orbital C) the excited state
 B) an ion D) the nucleus
- 24) Which structural formula represents a nonpolar molecule?
 A) H—Cl C) $\begin{array}{c} \text{H} - \text{N} - \text{H} \\ | \\ \text{H} \end{array}$
 B) H—H D) $\begin{array}{c} \text{H} - \text{O} \\ | \\ \text{H} \end{array}$
- 25) Which type of chemical bond is formed between two atoms of bromine?
 A) metallic C) covalent
 B) hydrogen D) ionic
- 26) Given the unbalanced equation:

$$__ \text{Al} + __ \text{CuSO}_4 \rightarrow __ \text{Al}_2(\text{SO}_4)_3 + __ \text{Cu}$$

 When the equation is balanced using the *smallest* whole-number coefficients, what is the coefficient of Al?
 A) 1 B) 2 C) 3 D) 4
- 27) Based on the *Properties of Selected Elements* chemistry reference table, which of the following atoms requires the *least* energy for the removal of the most loosely bound electron?
 A) Sn C) Be
 B) Br D) Sr

- 28) Given the reaction:



- What is the total number of moles of water needed to make 2.5 moles of C₆H₁₂O₆?
 A) 2.5 C) 15
 B) 12 D) 6.0
- 29) Which substance contains a polar covalent bond?
 A) Cl₂ C) H₂
 B) HCl D) KCl
- 30) Which of the following is an empirical formula?
 A) P₂O₅ C) C₃H₆
 B) C₂H₄ D) P₄O₆
- 31) The percent by mass of hydrogen in NH₃ is equal to
 A) $\frac{1}{17} \times 100$ C) $\frac{3}{17} \times 100$
 B) $\frac{17}{1} \times 100$ D) $\frac{17}{3} \times 100$
- 32) The table below shows the normal boiling point of four compounds.

Compound	Normal Boiling Point (°C)
HF(l)	19.4
CH ₃ Cl(l)	-24.2
CH ₃ F(l)	-78.6
HCl(l)	-83.7

- Which compound has the *strongest* intermolecular forces?
 A) CH₃Cl(l) C) HCl(l)
 B) HF(l) D) CH₃F(l)
- 33) Which list of elements is arranged in order of increasing atomic radii?
 A) Sc, Ti, V, Cr C) Sr, Ca, Mg, Be
 B) F, Cl, Br, I D) Li, Be, B, C
- 34) Which of the following solids has the *highest* melting point?
 A) Na₂O(s) C) CO₂(s)
 B) SO₂(s) D) H₂O(s)

35) In the boxes below, draw a correct Lewis electron-dot structure for:

- (a) an atom of hydrogen
- (b) an atom of nitrogen
- (c) a molecule of ammonia (NH₃)

(a) hydrogen	(b) nitrogen	(c) ammonia

36) A chemist performs the same tests on two homogeneous white crystalline solids, *A* and *B*. The results are shown in the table below.

	Solid A	Solid B
Melting Point	High, 801 °C	Low, decomposes at 186 °C
Solubility in H ₂ O (grams per 100.0 g H ₂ O at 0 °C)	35.7	3.2
Electrical Conductivity (in aqueous solution)	Good Conductor	Nonconductor

The results of these tests suggest that

- A) solid *A* contains only ionic bonds and solid *B* contains only covalent bonds
- B) solid *A* contains only covalent bonds and solid *B* contains only ionic bonds
- C) both solids contain only covalent bonds
- D) both solids contain only ionic bonds