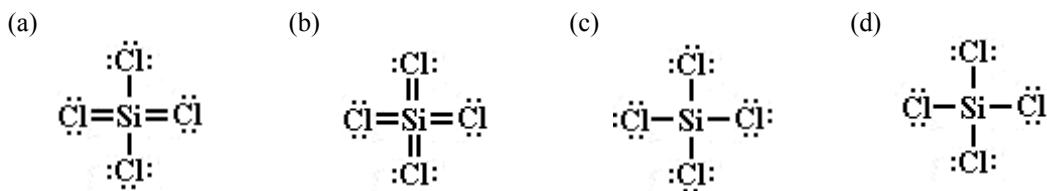


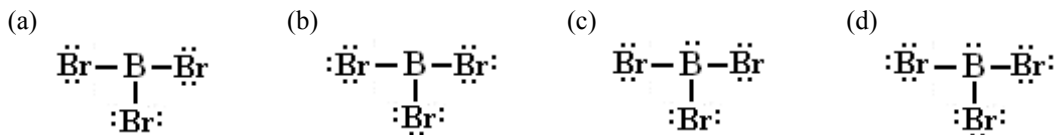
## Chemistry Final Exam Practice Multiple Choice

- (1) Which of the following gives the number 4500000000 in scientific notation?  
 (a)  $4.5 \times 10^9$  (c)  $45 \times 10^{-9}$   
 (b)  $45 \times 10^9$  (d)  $4.5 \times 10^{-9}$
- (2) Which of the following gives the number 0.000043 in scientific notation?  
 (a)  $43 \times 10^5$  (c)  $4.3 \times 10^{-5}$   
 (b)  $4.3 \times 10^5$  (d)  $43 \times 10^{-5}$
- (3) How many meters are equivalent to 55 km?  
 (a) 0.055 m (c) 550 m  
 (b) 0.55 m (d) 55000 m
- (4) A ring weighs 180 g. When the ring is placed in a graduated cylinder containing 25 mL of water, the water level rises to 45 mL. Which of the following is the density of the ring?  
 (a) 7.2 g/mL (c) 4.0 g/mL  
 (b) 9.0 g/mL (d) 0.11 g/mL
- (5) How many neutrons does sodium-23 have?  
 (a) 11 (c) 24  
 (b) 12 (d) 34
- (6) How many electrons does a neutral silicon atom have?  
 (a) 4 (c) 12  
 (b) 6 (d) 14
- (7) How many electrons does a lithium ion ( $\text{Li}^+$ ) ion have?  
 (a) 1 (c) 3  
 (b) 2 (d) 4
- (8) How many valence electrons does a nitrogen atom have?  
 (a) 5 (c) 8  
 (b) 7 (d) 10
- (9) Which of the following gives the orbital notation for the element manganese?  
 (a)  $\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow$   $\uparrow$   
 $\frac{1s}{1s}$   $\frac{2s}{2s}$   $\frac{2p}{2p}$   $\frac{3s}{3s}$   $\frac{3p}{3p}$   $\frac{4s}{4s}$   $\frac{3d}{3d}$   
 (b)  $\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow$   $\uparrow$   $\uparrow$   $\uparrow$   $\uparrow$   
 $\frac{1s}{1s}$   $\frac{2s}{2s}$   $\frac{2p}{2p}$   $\frac{3s}{3s}$   $\frac{3p}{3p}$   $\frac{4s}{4s}$   $\frac{3d}{3d}$   
 (c)  $\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow$   
 $\frac{1s}{1s}$   $\frac{2s}{2s}$   $\frac{2p}{2p}$   $\frac{3s}{3s}$   
 (d)  $\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$   $\uparrow\downarrow\uparrow\downarrow$   $\uparrow$   $\uparrow$   $\uparrow$   
 $\frac{1s}{1s}$   $\frac{2s}{2s}$   $\frac{2p}{2p}$   $\frac{3s}{3s}$   $\frac{3p}{3p}$   $\frac{3d}{3d}$
- (10) Which of the following gives the electron configuration notation for the element arsenic?  
 (a)  $1s^2 2s^2 3s^2 4s^2 2p^6 3p^6 4p^6 3d^7$  (c)  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^3$   
 (b)  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 4p^6 5s^2 3p^5$  (d)  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$
- (11) Which of the following gives the noble gas notation for the element strontium?  
 (a)  $[\text{Kr}] 4s^2$  (b)  $[\text{Kr}] 5s^2$  (c)  $[\text{Ar}] 4s^2$  (d)  $[\text{Ar}] 5s^2$
- (12) Which of the following gives the electron configuration notation for the sulphide ion ( $\text{S}^{2-}$ )?  
 (a)  $1s^2 2s^2 2p^6 3s^2 3p^6$  (b)  $1s^2 2s^2 2p^6 3s^2 3p^4$  (c)  $1s^2 2s^2 2p^6 3s^2 3p^2$  (d)  $1s^2 2s^2 2p^6 3s^2 3p^5$
- (13) Which of the following atoms has the largest atomic radius?  
 (a) Li (b) Na (c) K (d) Rb
- (14) Which of the following atoms has the highest ionization energy?  
 (a) Cl (b) S (c) P (d) Si

(15) Which of the following is the correct Lewis structure for the compound  $\text{SiCl}_4$ ?



(16) Which of the following is the correct Lewis structure for  $\text{BBr}_3$ ?



(17) What is the shape of the molecule  $\text{OBr}_2$ ?

- (a) linear                      (b) bent                      (c) trigonal planar                      (d) trigonal pyramidal

(18) What is the shape of the molecule  $\text{PCl}_3$ ?

- (a) trigonal pyramidal                      (b) trigonal planar                      (c) tetrahedral                      (d) trigonal bipyramidal

(19) Which of the following is the chemical formula for calcium oxide?

- (a)  $\text{CaO}$                       (c)  $\text{Ca}_2\text{O}_2$   
(b)  $\text{Ca}_2\text{O}$                       (d)  $\text{Ca}_2\text{O}_3$

(20) Which of the following is the name of the compound  $\text{K}_2\text{S}$ ?

- (a) potassium sulphate                      (c) potassium sulphide  
(b) potassium sulphur                      (d) potassium (II) sulphide

(21) Which of the following is the chemical formula for copper (II) sulphate?

- (a)  $\text{CuSO}_4$                       (c)  $\text{Cu}_2\text{SO}_3$   
(b)  $\text{Cu}_2\text{SO}_4$                       (d)  $\text{CuSO}_3$

(22) Which of the following is the chemical formula for aluminum nitrate?

- (a)  $\text{AlNO}_3$                       (c)  $\text{Al}(\text{NO}_3)_3$   
(b)  $\text{AlNO}_2$                       (d)  $\text{Al}(\text{NO}_2)_3$

(23) Which of the following is the name of the compound  $\text{N}_2\text{O}$ ?

- (a) nitrogen oxide                      (c) nitrogen monoxide  
(b) dinitrogen oxide                      (d) dinitrogen monoxide

(24) Which of the following is the name of the compound  $\text{HClO}_3$ ?

- (a) hydrochloric acid                      (c) chlorous acid  
(b) chloric acid                      (d) hydrogen chloride trioxide

(25) Which of the following is the molar mass of the compounds citric acid ( $\text{C}_6\text{H}_8\text{O}_7$ )?

- (a) 192.124 g/mol                      (c) 29.018 g/mol  
(b) 304.116 g/mol                      (d) 609.378 g/mol

(26) How many moles are there in  $3.20 \times 10^{23}$  atoms of zinc?

- (a) 0.532 mol                      (c) 1.94 mol  
(b) 0.516 mol                      (d) 1.88 mol

(27) How many moles are there in 45.0 g of  $\text{NO}_2$ ?

- (a) 1.02 mol                      (c) 1.50 mol  
(b) 0.667 mol                      (d) 0.978 mol

(28) What is the mass of  $7.45 \times 10^{23}$  molecules of sodium oxide?

- (a) 59.5 g                      (c) 76.7 g  
(b) 48.3 g                      (d) 1.24 g

- (29) How many molecules are there in 160 g of glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)?  
 (a) 6.79x10<sup>23</sup> molecules (c) 1.08x10<sup>26</sup> molecules  
 (b) 5.35x10<sup>23</sup> molecules (d) 9.63x10<sup>25</sup> molecules
- (30) How many atoms of each element are in 100 molecules of propane (C<sub>3</sub>H<sub>8</sub>)?  
 (a) 100 atoms of carbon and 100 atoms of hydrogen (c) 800 atoms of carbon and 800 atoms of hydrogen  
 (b) 300 atoms of carbon and 300 atoms of hydrogen (d) 300 atoms of carbon and 800 atoms of hydrogen
- (31) What is the percent composition of each element in the compound KMnO<sub>4</sub>?  
 (a) 15.5% K, 56.2% Mn, 28.3% O (c) 35.5% K, 49.9% Mn, 14.5% O  
 (b) 24.7% K, 34.8% Mn, 40.5% O (d) 37.5% K, 40.2% Mn, 23.3% O
- (32) The reactants of a neutralization reaction are always which of the following?  
 (a) carbon dioxide and water (c) a salt and water  
 (b) a hydrocarbon an oxygen (d) an acid and a base
- (33) The products of a combustion reaction are always which of the following?  
 (a) carbon dioxide and water (c) a salt and water  
 (b) a hydrocarbon an oxygen (d) an acid and a base
- (34) The reaction 2NF<sub>3</sub> → N<sub>2</sub> + 3F<sub>2</sub> can be classified as which of the following types?  
 (a) double replacement (c) synthesis  
 (b) decomposition (d) single replacement
- (35) The reaction Mg(NO<sub>3</sub>)<sub>2</sub> + 2Na → Mg + 2NaNO<sub>3</sub> can be classified as which of the following types?  
 (a) double replacement (c) single replacement  
 (b) neutralization (d) combustion
- (36) Which set of coefficients would balance the following reaction?  
 \_\_\_ Al(OH)<sub>3</sub> + \_\_\_ H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> → \_\_\_ Al<sub>2</sub>(C<sub>2</sub>O<sub>4</sub>)<sub>3</sub> + \_\_\_ H<sub>2</sub>O  
 (a) 2, 3, 1, 3 (c) 1, 3, 1, 3  
 (b) 2, 3, 1, 6 (d) 2, 3, 2, 3

Use the following information to answer questions 37 and 38.

Sodium and water react according to the following balanced chemical equation: 2Na + 2H<sub>2</sub>O → 2NaOH + H<sub>2</sub>

- (37) If 2.0 mol of H<sub>2</sub>O are reacted, determine the moles of H<sub>2</sub> produced.  
 (a) 1.0 mol (c) 3.0 mol  
 (b) 2.0 mol (d) 4.0 mol
- (38) If 4.0 mol of NaOH are produced, determine the moles of Na reacting  
 (a) 1.0 mol (c) 3.0 mol  
 (b) 2.0 mol (d) 4.0 mol

Use the following information to answer questions 39 and 40.

Iron (III) oxide reacts with carbon according the following balanced chemical equation: 2Fe<sub>2</sub>O<sub>3</sub> + 3C → 4Fe + 3CO<sub>2</sub>  
 25.0 g of carbon is present in the reaction.

- (39) What mass of iron will be produced?  
 (a) 155 g (c) 88.1 g  
 (b) 77.5 g (d) 122 g
- (40) What mass of carbon dioxide will be produced?  
 (a) 21.1 g (c) 91.6 g  
 (b) 275 g (d) 30.5 g

Answers:

- |       |        |        |        |        |        |        |        |
|-------|--------|--------|--------|--------|--------|--------|--------|
| (1) a | (6) d  | (11) b | (16) b | (21) a | (26) a | (31) b | (36) b |
| (2) c | (7) b  | (12) a | (17) b | (22) c | (27) d | (32) d | (37) a |
| (3) d | (8) a  | (13) d | (18) a | (23) d | (28) c | (33) a | (38) d |
| (4) b | (9) b  | (14) a | (19) a | (24) b | (29) b | (34) b | (39) a |
| (5) b | (10) d | (15) c | (20) c | (25) a | (30) d | (35) c | (40) c |

## Chemistry HP Final Review Problem

Methane ( $\text{CH}_4$ ) reacts with ammonia ( $\text{NH}_3$ ) and oxygen to produce hydrocyanic acid and water.

(a) Write a balanced chemical for this reaction.

(b) Methane has a density of  $0.717 \text{ g/mL}$ , determine the mass of  $50.0 \text{ mL}$  of methane. Calculate the moles of methane present.

(c) Calculate the number of moles of ammonia present in  $1.20 \times 10^{24}$  molecules of ammonia.

(d) The methane and ammonia are reacted in the presence of oxygen. Determine the mass of hydrocyanic acid and water produced. Calculate the number of molecules of hydrocyanic acid produced. Determine the volume of water produced.

(e) Calculate the mass of oxygen required in the reaction. How many molecules of oxygen are required?

(f) What mass of the excess reactant is used in the reaction and what mass of the excess reactant remains after the reaction?

(g) Draw a Lewis Structure for each compound in the reaction. Classify the VSEPR shape of each molecule.