

## CHEMISTRY 11 REVIEW QUESTIONS

The following problems are based on material that you learned in Chemistry 11 and that you must know thoroughly in order to be able to do well in Chemistry 12!!!

- Provide answers to the following, using the correct number of sig. figs.
  - $0.00376 + 12.48 =$
  - $0.00376 \times 12.48 =$
- What is the difference between fluorine and fluoride? What is the charge on each?
- Write names for the following compounds:
  - $\text{CdCl}_2$
  - $\text{Ca}(\text{NO}_2)_2$
  - $\text{KMnO}_4$
  - $\text{AsCl}_3$
  - $(\text{NH}_4)_2\text{CO}_3$
  - $\text{ICl}_5$
  - $\text{CuF}_2$
  - $\text{PbS}$
- Write chemical formulas for the following compounds:
  - magnesium chloride
  - calcium chlorite
  - nickel II chloride
  - diphosphorus hexoxide
  - sodium bicarbonate (baking soda)
  - ammonium oxalate
  - potassium hydrogen phosphate
  - xenon tetrachloride
- Write balanced chemical equations for the following reactions:
  - copper + sulfur  $\rightarrow$  copper II sulfide
  - nitrogen gas + hydrogen gas  $\rightarrow$  ammonia
  - methane + oxygen  $\rightarrow$  carbon dioxide + water
- Label the following compounds as covalent or ionic:
  - $\text{CH}_4$
  - $\text{PbS}$
  - $\text{NO}_2$
  - $\text{AlCl}_3$
- Calculate the mass in grams of the following:
  - one atom of fluorine
  - five atoms of sodium
- Calculate the molar mass of the following:
  - $\text{BaCO}_3$
  - $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$
- For each of the compounds in Problem 8, calculate the number of moles present in a sample having a mass of  $5.00 \times 10^2$  g.

10. Calculate the mass of the following:
- a) 5.00 mole of HCl
  - b) 0.288 mole of  $\text{NaClO}_4$
  - c)  $1.20 \times 10^{-3}$  mole of  $\text{CH}_4$
11. Calculate the molar mass of the following compounds from the information given:
- a) 11.00 mol weighs 598 g
  - b)  $2.30 \times 10^{-2}$  mol weighs 1.98 g
12. Express the following concentrations in g/liter
- a) 0.348 g dissolved in 75.0 mL
  - b) 10.23 g dissolved in 0.250 L
13. Express the following in terms of molarity:
- a) 0.226 mol in 0.875 L
  - b)  $1.44 \times 10^{-3}$  mol in 16.8 mL
14. How many moles of solute in the following?
- a) 2.66 L of 0.0200 M solution
  - b) 0.125 L of 0.260 M solution
15. What volume of a solution with a concentration of 0.475 M would contain:
- a) 1.00 mol
  - b) 0.250 mol
16. Calculate the molarity of the following:
- a)  $\text{KNO}_3$ , 100 g/liter
  - b)  $\text{SnSO}_4$ , 5.11 g in 150 mL of solution
17. Express the following concentrations in g liter<sup>-1</sup> (g/L):
- a) HBr, 1.50 M
  - b)  $\text{C}_2\text{H}_5\text{OH}$ ,  $3.6 \times 10^{-4}$  mol in 1.00 mL sol'n
18. Calculate molar mass for the solutes in the following:
- a) a 0.500 M solution contains 85.6 g/liter
  - b) a 0.012 M solution contains 1.5 g in 125 mL
  - c) a 0.481 M solution contains 2.81 g in 25.0 mL
19. Zinc metal will react with either hydrochloric acid or sulfuric acid to produce hydrogen gas. If 50.0 grams of zinc is to be used in the reaction, how much of each acid would be needed to completely react with the zinc? How much hydrogen gas (in grams) would be produced in each case?
20. Calcium oxide can be prepared by heating calcium in oxygen. How much oxygen would be needed to make 15.0 grams of calcium oxide in this way?
21. Phosphine,  $\text{PH}_3$ , is formed when calcium phosphide is added to water. How many grams of phosphine can be obtained from 200.0 grams of calcium phosphide? How many grams of the other product are formed?

(a) HCl (b) C<sub>3</sub>H<sub>8</sub> (c) SO<sub>2</sub> (d) NH<sub>4</sub>Cl (e) KOH (f) H<sub>2</sub>SO<sub>4</sub> (g) H<sub>2</sub>O (h) AgNO<sub>3</sub>  
(i) PbSO<sub>4</sub> (j) H<sub>3</sub>PO<sub>4</sub> (k) Ca(OH)<sub>2</sub> (l) Al(OH)<sub>3</sub> (m) P<sub>2</sub>O<sub>5</sub> (n) Ba(OH)<sub>2</sub> (o) CH<sub>3</sub>COOH (p) CH<sub>3</sub>CH<sub>2</sub>OH

22. Classify the above chemical formulae as ionic or covalent by making two lists. Describe the difference between an ionic and covalent compound.
23. Classify the above as acids, bases, salts or covalent by making four lists.
24. Describe how you can identify each of the four categories by the formula of the compound.
25. Describe how each of the four categories would react with litmus paper and conduct electricity when dissolved in solution.
26. For each compound that conducts electricity, write a dissociation equation to describe how it ionizes in water.

## Answers to the Review of Chemistry 11

- a) 12.48                                      b) 0.0469
- Fluorine is a molecule (therefore having no charge) while fluoride is an ion with a -1 charge.
- |                           |                         |
|---------------------------|-------------------------|
| a) cadmium chloride       | e) ammonium carbonate   |
| b) calcium nitrite        | f) iodine pentachloride |
| c) potassium permanganate | g) copper (II) fluoride |
| d) arsenic trichloride    | h) lead (II) sulfide    |
- |                                |  |
|--------------------------------|--|
| a) $\text{MgCl}_2$             | e) $\text{NaHCO}_3$                      |
| b) $\text{Ca}(\text{ClO}_2)_2$ | f) $(\text{NH}_4)_2\text{C}_2\text{O}_4$ |
| c) $\text{NiCl}_2$             | g) $\text{K}_2\text{HPO}_4$              |
| d) $\text{P}_2\text{O}_6$      | h) $\text{XeCl}_4$                       |
- a)  $\text{Cu} + \text{S} \rightarrow \text{CuS}$   
b)  $\text{N}_2 + 3 \text{H}_2 \rightarrow 2 \text{NH}_3$   
c)  $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$
- a) covalent  
b) ionic  
c) covalent  
d) ionic
- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| a) $3.16 \times 10^{-23} \text{ g}$ | b) $1.91 \times 10^{-22} \text{ g}$ |
|-------------------------------------|-------------------------------------|
- |                |                |
|----------------|----------------|
| a) 197.3 g/mol | b) 170.5 g/mol |
|----------------|----------------|
- |             |             |
|-------------|-------------|
| a) 2.53 mol | b) 2.93 mol |
|-------------|-------------|

10. a) 183 g                                    b) 35.3 g                                    c) 0.0192 g
11. a) 54.4 g/mol                                b) 86.1 g/mol
12. a) 4.64 g/liter                                b) 40.9 g/liter
13. a) 0.258 M                                    b)  $8.57 \times 10^{-2}$  M
14. a)  $5.32 \times 10^{-2}$  mol                                b)  $3.25 \times 10^{-2}$  mol
15. a) 2.11 L                                      b) 0.526 L (526 mL)
16. a) 1 M                                         b) 0.158 M
17. a) 121 g/L                                    b) 16.6 g/L
18. a) 171 g/mol                                c) 234 g/mol  
    b)  $1.0 \times 10^3$  g/mol
19. 55.8 g of HCl; 75 g of H<sub>2</sub>SO<sub>4</sub>; 1.53 g of H<sub>2</sub>
20. 4.28 g of O<sub>2</sub>
21. 74.6 g of PH<sub>3</sub>; 185 g of CaO