

Chemistry 11 Review

Do not forget Significant digits and units

Name: Key

1. Differentiate between atomic mass and the molecular mass

atomic - mass of an atom of an element

molecular - mass of a molecule of a compound

2. How many significant figures are in each of the following:

a 85.0 3

b 0.03506 4

c 5400 2

d 3.20×10^8 3

e 1.004 4

f 10.030 5

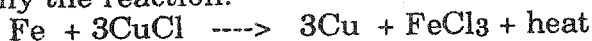
g 100 1

h 1000. 4

3. Calculate the number of carbon atoms in 12.0 g of carbon?

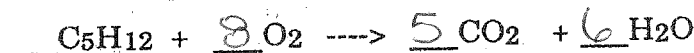
$$12.0 \text{ g} \left(\frac{1 \text{ mol}}{12.0 \text{ g}} \right) \left(\frac{6.02 \times 10^{23} \text{ atoms}}{\text{mol}} \right) = \underline{6.02 \times 10^{23} \text{ atoms}}$$

4. Classify the reaction:



exothermic single replacement

5. Balance the following equation resulting from the combustion of pentane:



6. The following data were obtained from a chemical analysis:

Carbon 38.7% Hydrogen 9.7% Oxygen 51.6%

The empirical formula for the compound is...

a. CHO

b. CH₂O

c. CH₃O

d. CH₄O

e. CH₅O

see attached for work below

7. A piece of copper wire is left overnight in a 0.25M solution of silver nitrate. The solution turns blue in colour [from the copper (II) ion], and silver metal is deposited in the flask. Calculate the minimum amount of copper wire needed to produce 27 g of silver in the flask?



$$27 \text{ g Ag} \left(\frac{1 \text{ mol}}{107.9 \text{ g}} \right) = 0.25 \text{ mol Ag} \left(\frac{1 \text{ mol Cu}}{2 \text{ mol Ag}} \right) = 0.125 \text{ mol Cu} \left(\frac{63.5 \text{ g}}{\text{mol}} \right) = \underline{7.9 \text{ g}} \text{ or } \underline{0.13 \text{ mol Cu}}$$

8. Calculate the number of moles of a gas that will occupy a 5.00 L flask at 150. kPa and 20.0 °C is (R = 8.31 L kPa/K mol)?

$$n = \frac{PV}{RT} = \frac{150. \text{ kPa} (5.00 \text{ L})}{8.31 (293 \text{ K})}$$

0.308 mol

9. Calculate the number of grams of KNO₃ required to make 1.00 L of a 0.400 M KNO₃ solution?

$$\text{mol} = M \times L$$

$$= 0.400 \text{ M} (1.00 \text{ L})$$

$$= 0.400 \text{ mol}$$

$$0.400 \text{ mol} \left(\frac{101.1 \text{ g}}{\text{mol}} \right) =$$

40.4 g

10. 2.00 L of 12.0 M HCl is diluted to 6.00 L. What is the new HCl solution concentration?

$$M_B V_B = M_A V_A \quad M_A = \frac{12.0M(2.00L)}{6.00L}$$

4.00 M

11. Of the following elements, the most reactive would be...
 a. Li b. Na c. Cs d. Be e. Ra

bottom left

12. You have 120 mL of a 0.40 M MgSO₄ solution. What is the amount of water that must be added to make this a 0.10 M MgSO₄ solution?

$$V_A = \frac{0.120L(0.40M)}{0.10M} = 0.48L$$

$$.48 - .12 = 0.36$$

0.36 L of H₂O

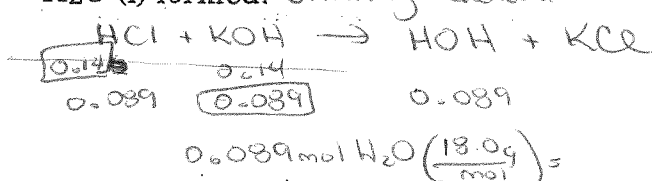
13. The correct formula for the compound diphosphorous tetroxide is...
 a. PO₂ b. PO₄ c. P(O₄)₂ d. P₂O₄ e. 2PO



This equation represents the reaction of aqueous silver nitrate and aqueous calcium chloride to produce silver chloride which is insoluble in water (calcium nitrate is soluble in water). What is the net ionic equation for this precipitation reaction?

- a. $2Ag^+(aq) + 2NO_3^-(aq) + Ca^{2+}(aq) + 2Cl^-(aq) \rightarrow 2AgCl(s) + Ca(NO_3)_2(aq)$
- b. $Ca^{2+}(aq) + 2NO_3^-(aq) \rightarrow Ca(NO_3)_2(aq)$
- c. $2Ag^+(aq) + 2Cl^-(aq) \rightarrow 2AgCl(s)$
- d. $2Ag^+(aq) + 2NO_3^-(aq) \rightarrow AgNO_3(s)$
- e. $Ca^{2+}(aq) + 2Cl^-(aq) \rightarrow CaCl_2(s)$

15. 5.0 g of HCl (aq) are reacted with 5.0 g of KOH (aq), calculate the mass of H₂O (l) formed? limiting reactant.



$$5g \left(\frac{\text{mol}}{36.5g} \right) = 0.13699 \text{ mol HCl}$$

$$5g \left(\frac{\text{mol}}{56.1g} \right) = 0.08913 \text{ mol KOH}$$

1.6g H₂O

16. If 42.26 mL of a 0.362 M NaOH solution are need to neutralize 50.00 mL of a HCl solution in an acid-base titration, what is the molarity of the acid?

$$\begin{aligned} NaOH \rightarrow \text{mol} &= M \times L \\ &= 0.362M(0.04226) \\ &= 0.015298 \text{ mol NaOH} \end{aligned}$$



0.306 M HCl

$$M = \frac{\text{mol}}{L} = \frac{0.015298 \text{ mol}}{0.05L} = 0.30596$$

Chem II Review

	g	mole	$\div 3.225$	Rounded
b) C	38.7	3.225	1.000	1
H	9.7	9.7	3.00	3
O	51.6	3.225	1.000	1

