

Chemistry Midterm

Name _____ (1pt.)

$Q = mC\Delta T$ Heat capacity of water = 4.184 Joules/ (gram* Celsius)

1. What is the molar mass of $Mg(ClO_4)_2$? (10 pts.)

223.21 grams per mole

2. What is the percent by mass of carbon in carbon dioxide? (10 pts.)

27.29%

3. A sample of water releases 4.50×10^3 J of heat energy and its temperature drops from $80.0^\circ C$ to $68.0^\circ C$. What is the mass of the water? (10 pts.)

89.63 grams

4. Which of the following contains the greatest number of atoms? Circle the correct one. (10 pts.)

- A. 1.0g of lithium *****
- B. 1.0g of sodium
- C. 1.0g of aluminum
- D. 1.0g of silver

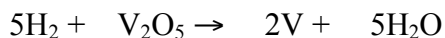
5. How many molecules are present in 59.0 grams of HBr? (10 pts.)

4.39×10^{23} Molecules

6. (10 pts.) Balance all terms in this equation: $Cr_2S_3 + HCl \rightarrow CrCl_3 + H_2S$



7. (10 pts.) Balance all terms in this equation: $H_2 + V_2O_5 \rightarrow V + H_2O$



8. An isotope of sodium has the atomic number 11 and the mass number 23. An atom of this isotope contains: (circle the best answer) (5 pts.)

- A. 11 neutrons
- B. 12 protons
- C. 12 neutrons *****
- D. 23 electrons

For each of the following questions, determine the compound name. Use roman numerals where appropriate. Assume acids are in water and use the acid name. (10 pts. each)

9) FePO_4 _____ Iron (III) Phosphate _____

10) CCl_4 _____ Carbon Tetrachloride _____

11) HNO_2 _____ Nitrous Acid _____

For each of the following questions, write the appropriate formula for it. (10 pts. each)

12) Magnesium nitride _____ Mg_3N_2 _____

13) Calcium acetate _____ $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$ _____

14) Chromium (III) oxide _____ Cr_2O_3 _____

Balance the equations below. (10 pts. each)

15. $\text{Co}(\text{NO}_3)_2(aq) + \text{Na}_2\text{CO}_3(aq) \rightarrow$

$\text{Co}(\text{NO}_3)_2(aq) + \text{Na}_2\text{CO}_3(aq) \rightarrow \text{CoCO}_3 + 2\text{NaNO}_3$

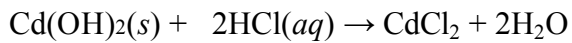
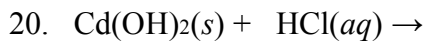
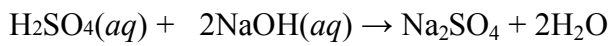
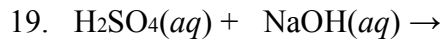
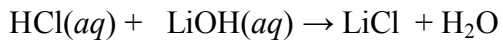
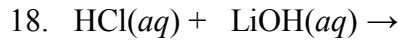
16. $\text{K}_2\text{CO}_3(aq) + \text{PbO}(aq) \rightarrow$

$\text{K}_2\text{CO}_3(aq) + \text{PbO}(aq) \rightarrow \text{K}_2\text{O} + \text{PbCO}_3$

17. $\text{CuSO}_4(aq) + \text{Ba}(\text{NO}_3)_2(aq) \rightarrow$

$\text{CuSO}_4(aq) + \text{Ba}(\text{NO}_3)_2(aq) \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{BaSO}_4$

Write the complete equation for the neutralization reactions that take place when the following solutions are mixed. (If an acid has more than one acidic hydrogen, assume that there is enough base to remove all of them. Assume that there is enough acid to neutralize all of the basic hydroxide ions.)(10 pts. each)



21. A chemical called BD (or BDO) is used in the synthesis of Spandex. BD is composed of 53.31% Carbon, 11.18% Hydrogen, and 35.51% Oxygen. It has a molecular mass of 90.122 grams per mole. Find: (1) the empirical formula (20 points), (2) the empirical mass (15 points) and the molecular formula (20 points) . (55 points total) Show work!!! If the empirical formula is wrong: you will be given 10 points maximum for the correct calculation set up of empirical mass. If the mass or formula calculations are wrong previously, you can receive 10 points maximum for the correct formula set up for molecular formula.

Empirical Formula C_2H_5O

Empirical Mass 45.061

Molecular Formula $C_4H_{10}O_2$