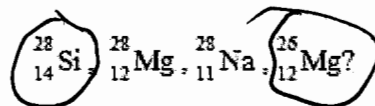
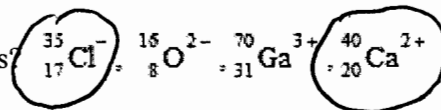


SHOW ALL WORK TO RECEIVE CREDIT

1. (4 Pts) Which two of the atoms below have the same number of neutrons?



2. (4 Pts) Which two of the ions below have the same number of electrons?



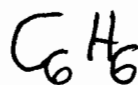
each have  $18e^{-}$ 's

3. (3 Pts) How many protons, neutrons, and electrons are in a carbon-13 atom?

Protons 6 neutrons 7 electrons 6

4. (5 Pts) The empirical formula of a hydrocarbon with a molar mass of 78.11 g/mol is CH. What is the molecular formula? (Atomic masses: C 12.01 H 1.01)

$$\frac{78.11}{\left(\begin{array}{r} 12.01 \\ + 1.01 \\ \hline 13.02 \end{array}\right)} = 6$$

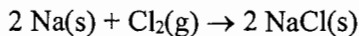


$78.11 \div 13.02 = 6$  so 6 x empirical formula

5 (4 Pts) What is the molar mass of nitroglycerine,  $\text{C}_3\text{H}_5(\text{ONO}_2)_3$ ? (Atomic masses: C 12.01; H 1.01; O 16.00, N 14.01)

6	x 16.00	
3	x 14.01	
3	x 16.00	
5	x 1.01	
3	x 12.01	
		227.11

6. (5 Pts) How many moles of sodium chloride can be produced from the reaction of 3.35 moles of sodium with 2.13 moles of chlorine gas?



3.35 moles Na, 2.13 moles  $\text{Cl}_2$

Based on Na:  $\frac{3.35 \text{ mole Na}}{2 \text{ mol Na}} \times 2 \text{ moles NaCl} = 3.35 \text{ moles NaCl}$

Based on  $\text{Cl}_2$ :  $\frac{2.13 \text{ mol Cl}_2}{1 \text{ mol Cl}_2} \times 2 \text{ moles NaCl} = 4.26 \text{ moles NaCl}$

SHOW ALL WORK TO RECEIVE CREDIT

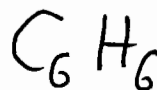
1. (4 Pts) Which two of the ions below have the same number of electrons?  $\overset{35}{17}\text{Cl}^-$   $\overset{16}{8}\text{O}^{2-}$   $\overset{70}{31}\text{Ga}^{3+}$   $\overset{40}{20}\text{Ca}^{2+}$

2. (4 Pts) Which two of the atoms below have the same number of neutrons?  $\overset{28}{14}\text{Si}$   $\overset{28}{12}\text{Mg}$   $\overset{28}{11}\text{Na}$   $\overset{26}{12}\text{Mg}?$

3. (3 Pts) How many protons, neutrons, and electrons are in a nitrogen-15 atom?

Protons 7 neutrons 8 electrons 7

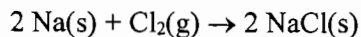
4. (5 Pts) The empirical formula of a hydrocarbon with a molar mass of 78.11 g/mol is CH. What is the molecular formula? (Atomic masses: C 12.01 H 1.01)



5. (4 Pts) What is the molar mass of nitroglycerine,  $\text{C}_3\text{H}_5(\text{ONO}_2)_3$ ? (Atomic masses: C 12.01; H 1.01; O 16.00, N 14.01)

227.09

6. (5 Pts) How many moles of sodium chloride can be produced from the reaction of 4.35 moles of sodium with 3.13 moles of chlorine gas?



4.35 moles Na, 3.13 moles  $\text{Cl}_2$

Based on Na:  $\frac{4.35 \text{ moles Na} \times 2 \text{ moles NaCl}}{2 \text{ moles Na}} = 4.35 \text{ mole NaCl}$

Based on  $\text{Cl}_2$ :  $\frac{3.13 \text{ moles Cl}_2 \times 2 \text{ moles NaCl}}{1 \text{ mole Cl}_2} = 6.26 \text{ moles NaCl}$