

Short Answer Questions

1. Using your knowledge of qualitative analysis, what ion do you have if you see a red flame during your flame test and you observe no reaction with potassium chloride?

Red Flame = Li, Ca, Sr

**ACTIVITY SERIES**

Li + KCl → Reaction

Ca + KCl → No Reaction

Sr + KCl → No Reaction

2. What aqueous compound do you have if you see a bluish-green flame test and will turn litmus paper blue?

Bluish-green = Cu Litmus paper blue → Base → (OH)

∴ Cu(OH)

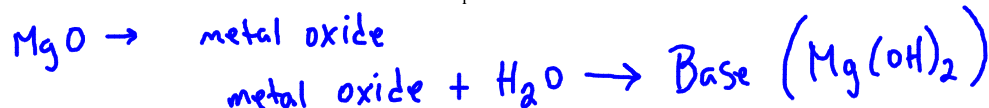
3. What metal do you have if you see a violet flame and reacts with barium compounds but not lithium compounds?

potassium

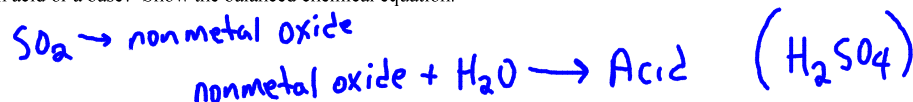
4. You have a soluble compound mixed in with insoluble sand. How can you extract the compound from the sand and then recover the metal ion?

1. → mix with water to dissolve compound
2. Filter out sand
3. Boil away water to leave mystery compound

5. Magnesium burns in oxygen to synthesize magnesium oxide powder. If you mixed this powder with water, would it react to form an acid or a base? Show the balanced chemical equation.



6. Sulfur burns in oxygen to synthesize sulfur dioxide powder. If you mixed this powder with water, would it react to form an acid or a base? Show the balanced chemical equation.



7. During a camp fire, you notice that the smoke keeps following you around and getting into your eyes. You hate that. Why does the fire produce smoke? What could you do to help reduce the amount of smoke?

Smoke = incomplete combustion

- 1) Add more O<sub>2</sub> to get complete combustion
- 2) use a fuel that is more pure to get complete combustion

8. Hydrocarbons are compounds of carbon and hydrogen. Can you derive an equation to help you remember the amount of hydrogens that go with each straight-chain alkane? (Hint: let C be number of carbons and let H be number of hydrogens → H = mC + b)

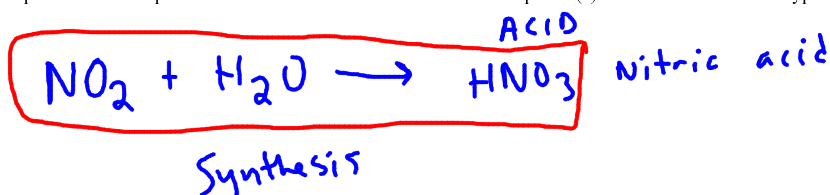
C	H
0	2
1	4
2	6
3	8

} 2

H = mC + b

H = 2C + 2

9. Nitrogen dioxide is a chemical that comes out in car exhaust. What do you suppose would happen when this chemical gets up into the atmosphere? What would it react with? What compound(s) would it make? What type of reaction is this?



## REACTIONS

Write the word equations below as chemical equations and balance. Use the activity series to see if the reaction takes place (for single displacement) and use the solubility chart to determine descriptive subscripts:

1. Magnesium hydroxide and hydrogen sulfate react to form magnesium sulfate and water.



2. Hydrogen carbonate forms water and carbon dioxide



3. Boron and hydrogen chloride react to form boron chloride and hydrogen gas.



4. Iron (III) chloride and fluorine gas react to form iron (III) fluoride and elemental chlorine.



5. Barium oxide reacts with water to form barium hydroxide



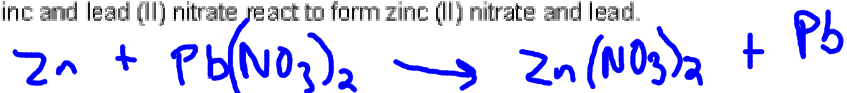
6. Copper and hydrogen sulfate react to form copper (II) sulfate and water and sulfur dioxide



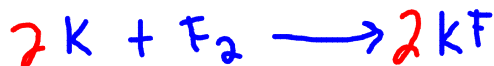
7. Copper (II) nitride breaks down to form copper metal and nitrogen gas.



8. Zinc and lead (II) nitrate react to form zinc (II) nitrate and lead.



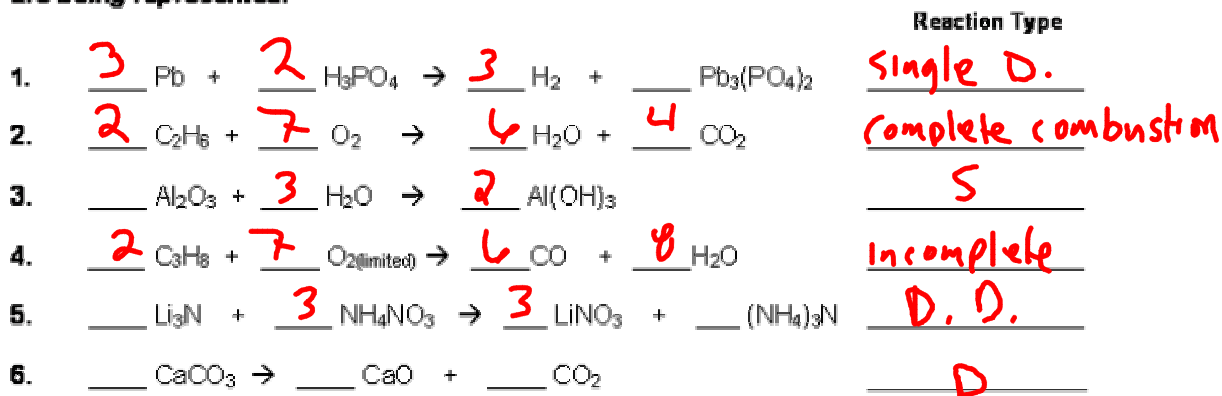
9. Potassium metal and fluorine gas combine to form potassium bromide.



10. Silver and hydrogen carbonate react to form silver carbonate and hydrogen gas.

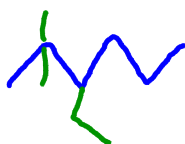


**B. Balance the following reactions and indicate which of the six types of chemical reaction are being represented:**

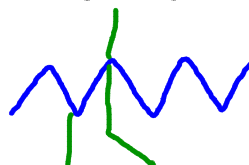


**C. Draw the following molecules as indicated:**

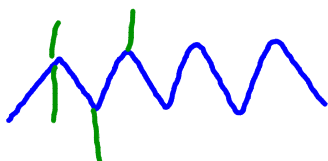
1. 3-ethyl-2,2-dimethylhexane



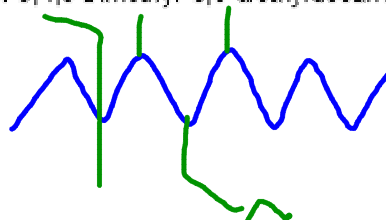
2. 3,4-dimethyl-4-ethyloctane



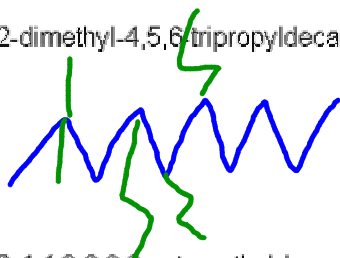
3. 2,2,3,4-tetramethylnonane



4. 3,4,6-trimethyl-3,5-diethyldecane



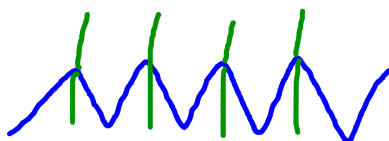
5. 2,2-dimethyl-4,5,6-tripropyldecane



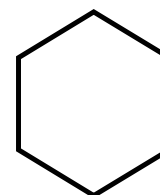
6. 4,4-dibutylnonane



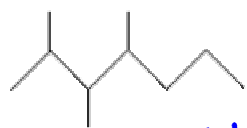
7. 2,2,4,4,6,6,8,8-octamethyldecane



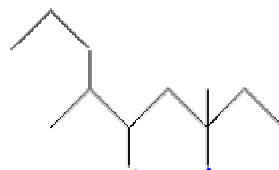
8. cyclohexane



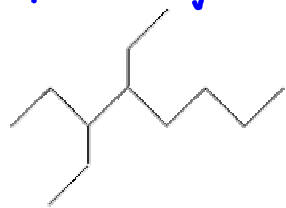
D. Name the following hydrocarbons:



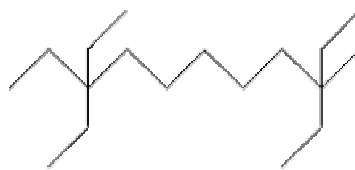
2,3,4-trimethylheptane



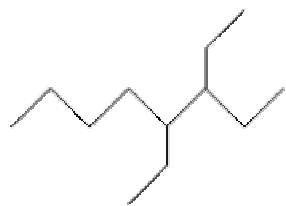
3,3,5,6-tetramethylnonane



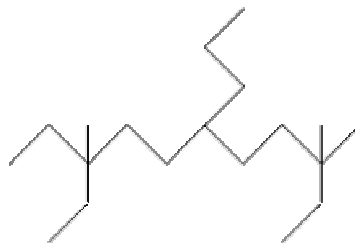
3,4-diethyloctane



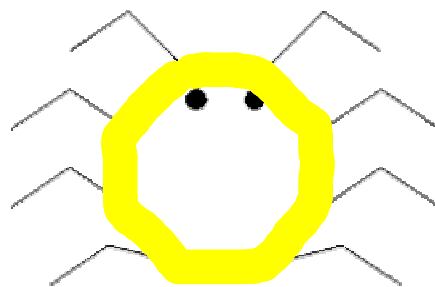
3-methyl-3,9,9-triethylundecane



3,4-diethyloctane



3,3,9-trimethyl-9-ethyl-6-propylundecane



1,2,3,4,5,6,7,8-octaethylcyclooctane