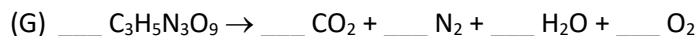
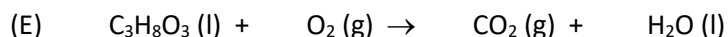
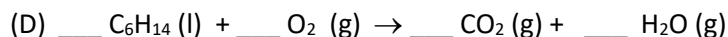
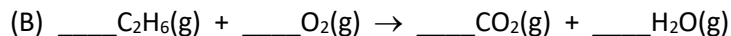
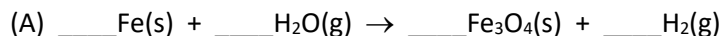


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1. Balance the following Chemical Equations:



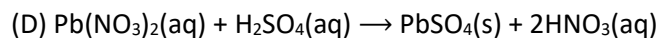
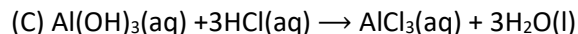
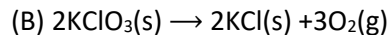
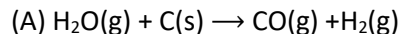
2. Write and Balance the equations:

(A) Aqueous calcium hydroxide reacts with aqueous sodium carbonate to produce solid calcium carbonate and aqueous sodium hydroxide.

(B) Solid iron reacts with Oxygen gas to form solid Iron (II) oxide

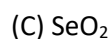
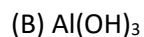
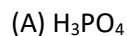
(C) Copper(II) sulfide is oxidized by molecular oxygen to produce gaseous sulfur trioxide and solid copper(II) oxide. The gaseous product then reacts with liquid water to produce liquid hydrogen sulfate as the only product. Write the two equations which represent these reactions.

3. Indicate what type, or types, of reaction each of the following represents: (precipitation, acid-base, and oxidation-reduction.)

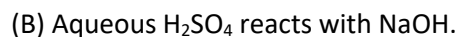
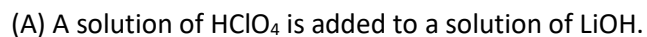


4. Silver can be separated from gold because silver dissolves in nitric acid while gold does not. Is the dissolution of silver in nitric acid an acid-base reaction or an oxidation-reduction reaction? Explain your answer.

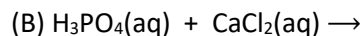
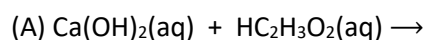
5. Determine the oxidation states of the elements in the compounds listed. None of the oxygen-containing compounds are peroxides or superoxides.



6. Complete and balance the following acid-base equations:



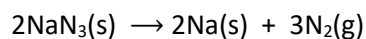
7. Write the molecular, total ionic, and net ionic equations for the following reactions:



8. Write the balanced equation, then calculate the number of moles and the mass of Mg required to react with 5.00 g of HCl and produce MgCl_2 and H_2 .

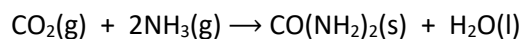
9. H_2 is produced by the reaction of 118.5 mL of a 0.8775-M solution of H_3PO_4 according to the following equation: $2\text{Cr} + 2\text{H}_3\text{PO}_4 \rightarrow 3\text{H}_2 + 2\text{CrPO}_4$. How many grams of H_2 are produced?

10. Automotive air bags inflate when a sample of sodium azide, NaN_3 , is very rapidly decomposed.



What mass of sodium azide is required to produce 2.6 ft^3 (73.6 L) of nitrogen gas with a density of 1.25 g/L ?

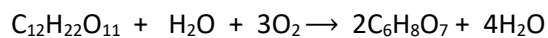
11. Urea, $\text{CO}(\text{NH}_2)_2$, is manufactured on a large scale for use in producing urea-formaldehyde plastics and as a fertilizer. What is the maximum mass of urea that can be manufactured from the CO_2 produced by combustion of 1.00×10^4 grams of CO_2 ?



12. What volume of 0.750 M hydrochloric acid solution can be prepared from the HCl produced by the reaction of 25.0 g of NaCl with excess sulfuric acid? $\text{NaCl(s)} + \text{H}_2\text{SO}_4(\text{l}) \rightarrow \text{HCl(g)} + \text{NaHSO}_4(\text{s})$

13. A sample of 0.53 g of carbon dioxide was obtained by heating 1.31 g of calcium carbonate. What is the percent yield for this reaction? $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO(s)} + \text{CO}_2(\text{s})$

14. Citric acid, $\text{C}_6\text{H}_8\text{O}_7$, a component of jams, jellies, and fruity soft drinks, is prepared industrially via fermentation of sucrose by the mold *Aspergillus niger*. The equation representing this reaction is



What mass of citric acid is produced from the reaction of 150. grams of sucrose if the yield is 92.30%?

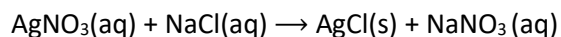
15. The phosphorus pentoxide used to produce phosphoric acid for cola soft drinks is prepared by burning phosphorus in oxygen.

(A) What is the limiting reactant when 0.200 mol of P_4 and 0.200 mol of O_2 react according to $P_4 + 5O_2 \rightarrow P_4O_{10}$?

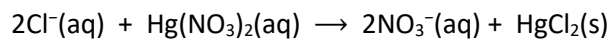
(B) Calculate the percent yield if 10.0 g of P_4O_{10} is isolated from the reaction.

16. What is the limiting reactant when 1.50 g of lithium and 1.50 g of nitrogen combine to form lithium nitride, a component of advanced batteries, according to the following unbalanced equation? $Li + N_2 \rightarrow Li_3N$

17. What is the concentration of NaCl in a solution if titration of 15.00 mL of the solution with 0.2503 M $AgNO_3$ requires 20.22 mL of the $AgNO_3$ solution to reach the end point?



18. In a common medical laboratory determination of the concentration of free chloride ion in blood serum, a serum sample is titrated with a $\text{Hg}(\text{NO}_3)_2$ solution.



What is the Cl^- concentration in a 0.25-mL sample of normal serum that requires 1.46 mL of .000825 *M* $\text{Hg}(\text{NO}_3)_2(\text{aq})$ to reach the end point?