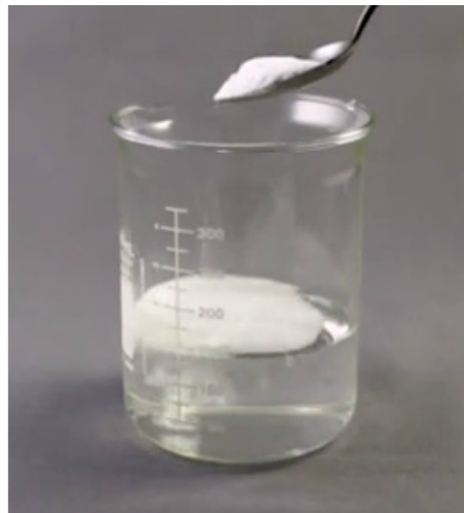


Baking soda is sodium bicarbonate,  $\text{NaHCO}_3$ , and vinegar is primarily acetic acid,  $\text{HC}_2\text{H}_3\text{O}_2$ .

At room temperature, the addition of baking soda to vinegar results in a reaction that produces a tremendous amount of gas, as shown in the video.



Complete the following equation for the reaction of  $\text{NaHCO}_3(s)$  with  $\text{HC}_2\text{H}_3\text{O}_2(aq)$ . Include phase symbols.

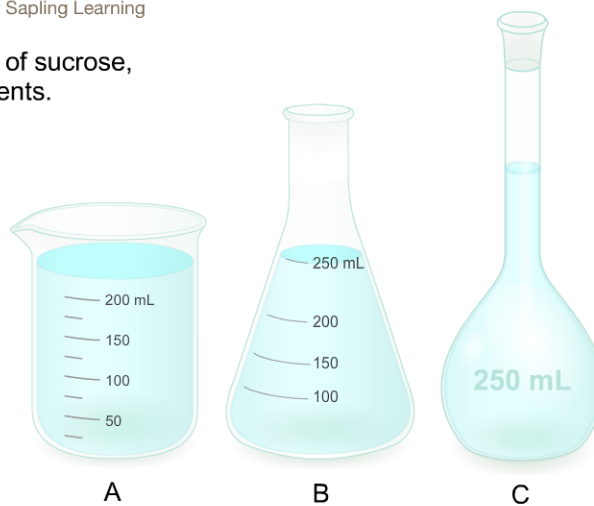



## Question 2 of 20

You need to prepare 250. mL of a 0.500 M aqueous solution of sucrose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}(aq)$ , which is used frequently in biological experiments.

Which type of glassware should you use to make this solution (assuming that the accuracy of the concentration is important)?

- A  
 B  
 C



How should the correct amount of solute be obtained?

- Measure out  $x$  mol of solid sucrose on a molemeter.  
 Measure out  $x$  g of solid sucrose on a balance.  
 Measure out  $x$  cm of sucrose with a ruler.

Now that you have selected the correct unit above, what is the value of  $x$ ?

$x =$

How should the solute and solvent be mixed in the container?

- Mix a small amount of water with the solute to dissolve it, then fill with water to the 250-mL mark.  
 Add the solute, then fill the container to the 250-mL mark with water.  
 Fill the container with water to the 250-mL mark, then add the solute.

## Question 3 of 20

Classify these compounds as strong electrolytes, weak electrolytes, or nonelectrolytes.

Strong electrolyte	Weak electrolyte	Nonelectrolyte

## Question 4 of 20

The flask shown here contains 10.0 mL of HCl and a few drops of phenolphthalein indicator. The buret contains 0.200 M NaOH.

What volume of NaOH is needed to reach the end point of the titration?

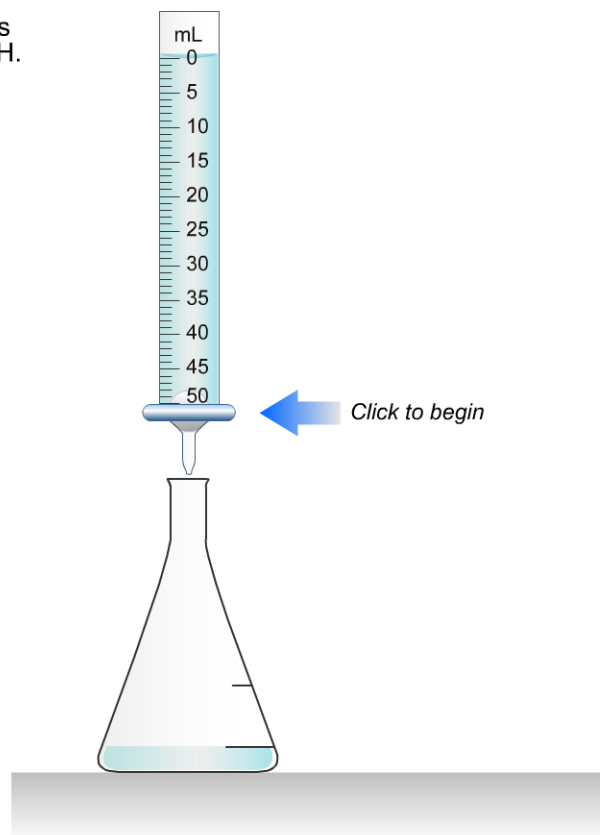
Number

**mL NaOH**

What was the initial concentration of HCl?

Number

**M HCl**



## Question 5 of 20

Write the balanced neutralization reaction between H<sub>2</sub>SO<sub>4</sub> and KOH in aqueous solution. Phases are optional.

0.250 L of 0.490 M  $\text{H}_2\text{SO}_4$  is mixed with 0.200 L of 0.200 M KOH. What concentration of sulfuric acid remains after neutralization?

Number

  
 M  $\text{H}_2\text{SO}_4$ 

Question 6 of 20



53.0 mL of a 1.20 M solution is diluted to a total volume of 228 mL. A 114-mL portion of that solution is diluted by adding 111 mL of water. What is the final concentration? Assume the volumes are additive.

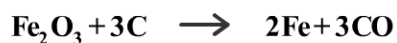
Number

  
 M

Question 7 of 20



Combining 0.358 mol of  $\text{Fe}_2\text{O}_3$  with excess carbon produced 19.6 g of Fe.



What is the actual yield of iron in moles?

Number

  
 mol

What was the theoretical yield of iron in moles?

Number

  
 mol

What was the percent yield?

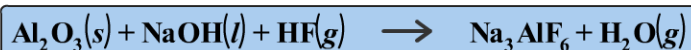
Number

  
 %

Question 8 of 20

Cryolite,  $\text{Na}_3\text{AlF}_6(\text{s})$ , an ore used in the production of aluminum, can be synthesized using aluminum oxide.

Balance the equation.



Tip: If you need to clear your work and reset the equation, click the button that looks like two red arrows.

If 13.7 kilograms of  $\text{Al}_2\text{O}_3(\text{s})$ , 52.4 kilograms of  $\text{NaOH}(\text{l})$ , and 52.4 kilograms of  $\text{HF}(\text{g})$  react completely, how many kilograms of cryolite will be produced?

Number

  
**kg  $\text{Na}_3\text{AlF}_6$** 

Which reactants will be in excess?

$\text{Al}_2\text{O}_3$   
  $\text{NaOH}$   
  $\text{HF}$

What is the total mass of the excess reactants left over after the reaction is complete?

Number

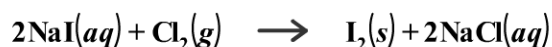
  
**kg**

Question 9 of 20

General Chemistry 4th Edition  
McQuarrie • Rock • Gallogly

University Science Books  
presented by Sapling Learning

Iodine is prepared both in the laboratory and commercially by adding  $\text{Cl}_2(\text{g})$  to an aqueous solution containing sodium iodide:



How many grams of sodium iodide,  $\text{NaI}$ , must be used to produce 96.3 g of iodine,  $\text{I}_2$ ?

Number

  
**g  $\text{NaI}$** 

Question 10 of 20

Sapling Learning  
macmillan learning

Write the balanced equation for the reaction of aqueous  $\text{Pb}(\text{ClO}_3)_2$  with aqueous  $\text{NaI}$ . Include phases.

What mass of precipitate will form if 1.50 L of highly concentrated  $\text{Pb}(\text{ClO}_3)_2$  is mixed with 0.450 L of 0.290 M  $\text{NaI}$ ? Assume the reaction goes to completion.

Number

  
**g**

Table salt,  $\text{NaCl}(s)$ , and sugar,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}(s)$ , are accidentally mixed. A 5.50-g sample is burned, and 2.40 g of  $\text{CO}_2(g)$  is produced. What was the mass percentage of the table salt in the mixture?

Number  % NaCl

Question 12 of 20

Write and balance the equation for the decomposition of aluminum chloride into its elements. Phase symbols are optional.

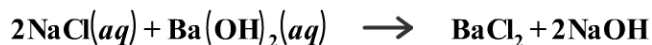
Question 13 of 20

Write the net ionic equation (including phases) that corresponds to

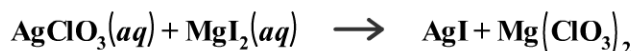



Question 14 of 20

For each reaction, identify the precipitate or lack thereof.



- $\text{BaCl}_2$   
  $\text{NaOH}$   
 no precipitate



- $\text{AgI}$   
  $\text{Mg}(\text{ClO}_3)_2$   
 no precipitate

Question 15 of 20

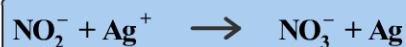
In a particular redox reaction, NO is oxidized to  $\text{NO}_3^-$  and  $\text{Fe}^{3+}$  is reduced to  $\text{Fe}^{2+}$ . Complete and balance the equation for this reaction in acidic solution. Phases are optional.



Question 16 of 20



For a particular redox reaction  $\text{NO}_2^-$  is oxidized to  $\text{NO}_3^-$  and  $\text{Ag}^+$  is reduced to Ag. Complete and balance the equation for this reaction in basic solution. Phases are optional.



Question 17 of 20



Classify each of these reactions.



- combination
- decomposition
- single replacement
- double replacement



- combination
- decomposition
- single replacement
- double replacement



- combination
- decomposition
- single replacement
- double replacement

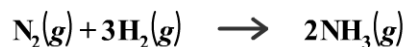


- combination
- decomposition
- single replacement
- double replacement

Question 18 of 20



Nitrogen and hydrogen combine at high temperature, in the presence of a catalyst, to produce ammonia.



Assume 0.120 mol of  $\text{N}_2$  and 0.386 mol of  $\text{H}_2$  are present initially.

After complete reaction, how many moles of ammonia are produced?

Number  
 mol

How many moles of H<sub>2</sub> remain?

Number  
 mol

How many moles of N<sub>2</sub> remain?

Number  
 mol

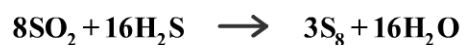
What is the limiting reactant?

hydrogen  
 nitrogen

Question 19 of 20



What is the maximum mass of S<sub>8</sub> that can be produced by combining 91.0 g of each reactant?



Number  
 g S<sub>8</sub>

Question 20 of 20



The balanced equation for the reaction of aqueous Pb(ClO<sub>3</sub>)<sub>2</sub> with aqueous NaI is shown below.



What mass of precipitate will form if 1.50 L of concentrated Pb(ClO<sub>3</sub>)<sub>2</sub> is mixed with 0.600 L of 0.190 M NaI? Assume the reaction goes to completion.

Number  
 g