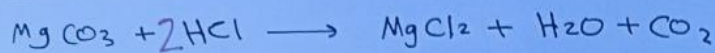
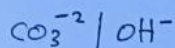


1. Write balanced equation for the reaction of the active ingredients in Gaviscon Extra strength with excess acid. (Hint: Refer to table 2.1, p. 15)



2. Identify the two most common anions present in antacids.



yellow - blue
(3 - 4.6)

3. a. In your text find the color range of the pH change for bromophenol blue.

What is its color in an acidic solution? yellow

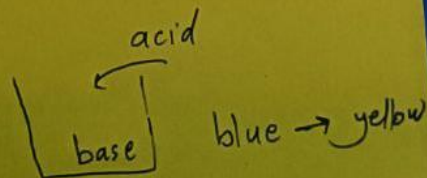
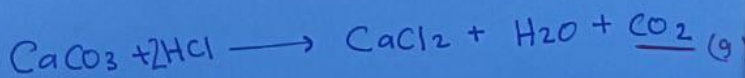
What is its color in a basic solution? blue

b. Describe the color change that occurs at the endpoint in this experiment.

Bromophenol blue changes color in response to pH changes, so the color change occurs between pH=3 (yellow) and pH=4.6 (blue)

4. Why do some antacids cause gas to accumulate in the stomach? What is the gas? CO_2

Most antacids are composed of CaCO_3 or NaHCO_3 that is used to neutralize excess acid in the stomach. Some antacids cause gas to accumulate as the neutralization reaction between HCl and CaCO_3 or NaHCO_3 that produces CO_2



5. A 25-mL volume of 0.0984 M HCl is added to a sample of an unknown base. The HCl not neutralized (the excess HCl) by the base is titrated to a bromophenol blue endpoint with 5.85 mL of 0.0911 M NaOH . How many moles of unknown base (antacid) are present in the original sample?

* moles of HCl added = $MV = 0.0984 \times 0.025 = 0.00246\text{ mol}$

* moles of NaOH added = $MV = 0.0911 \times 0.00585 = 0.000533\text{ mol}$

* moles of antacid = $n_{\text{HCl}} - n_{\text{NaOH}} = 0.00246 - 0.000533 = 0.001927\text{ mol}$

6. How much time should be allowed for the titrant to drain from the buret wall before a reading is made?

(10-15) seconds



7. What criterion is followed in reading and recording the volume of titrant of a buret?

get your eye level with the bottom of the meniscus.



8. A 0.187 g sample of a CO_3^{2-} antacid is dissolved with 50 mL of 0.100 M HCl . The hydrochloric acid is not neutralized by the antacid is titrated to bromophenol blue end point with 7.25 mL of 0.100 M NaOH .

a. Assuming the active ingredient in the antacid sample is CaCO_3 calculate the mass of CaCO_3 in the sample. $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$

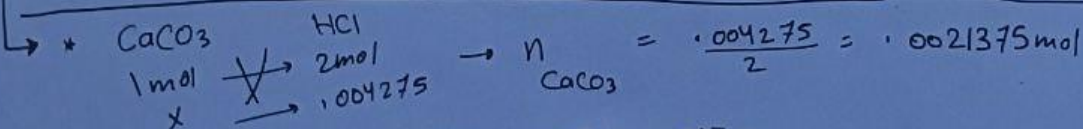
* moles of $\text{HCl} = MV = 0.05 \times 0.100 = 0.005\text{ mol}$

* moles of $\text{NaOH} = MV = 0.100 \times 0.00725 = 0.000725\text{ mol}$

* moles of $\text{HCl}_{\text{ur}} = n_{\text{HCl}_T} - n_{\text{HCl}_r} = 0.005 - 0.000725 = 0.004275\text{ mol}$
 $\downarrow = n_{\text{NaOH}}$

b. What is the percent active ingredient in the antacid sample?

$\frac{0.215}{0.187} \times 100\% =$ / $\frac{0.187}{0.215} \times 100\% = 87\%$



* $m_{\text{CaCO}_3} = n \text{MR} = 0.0021375 \times 100.08 = 0.215\text{ g}$