



*Al-Rasheed University College*  
*Department of Medical Laboratory*  
*Technique*

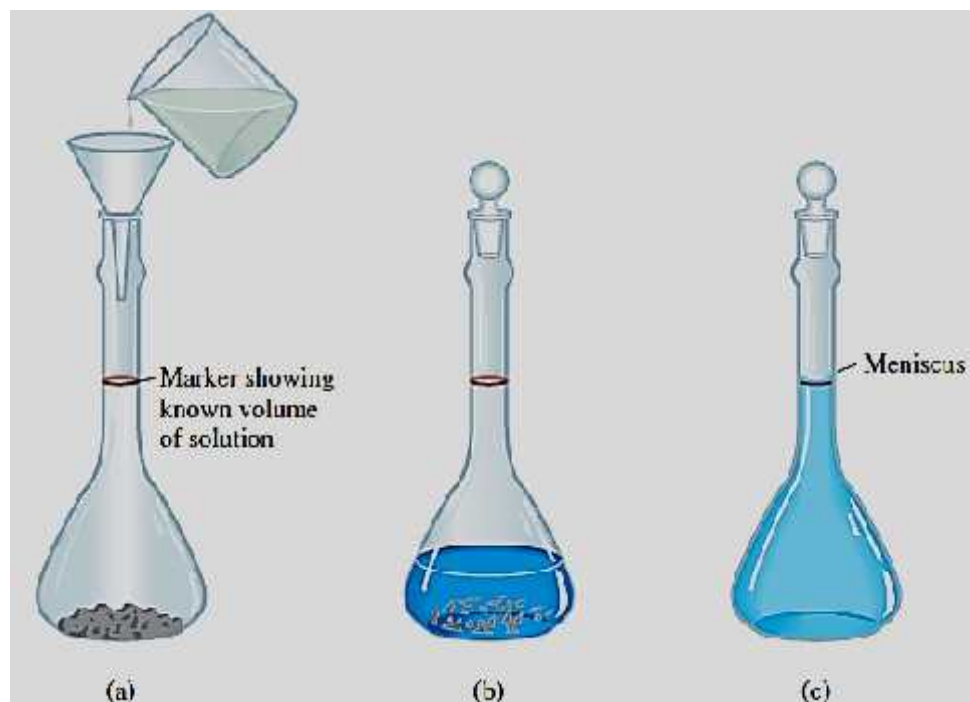
**Clinical Chemistry**  
**Lab 2**

*by*  
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## Preparation of solution from the solid reagents

- First, the solute is accurately weighed and transferred to a volumetric flask through a funnel.
- Next, water is added to the flask, which is carefully swirled to dissolve the solid.
- After all the solid has dissolved, more water is added slowly to bring the level of solution exactly to the volume mark.



## **EXPERIMENT 1 Prepare 50 mL of 0.1 M NaOH from the solid reagent.**

### **PROCEDURE**

- Determine the number of grams of solute to be dissolved and diluted to 50 mL.
- Weigh a 50-mL beaker on an electronic balance.
- Depress the tare button to set the balance to zero. Then add NaOH until the balance reads about ..... g.
- Dissolve the sodium hydroxide in the beaker using about 20 mL of distilled water. Stir gently to avoid loss.
- Quantitatively transfer the solution to a 50-mL volumetric flask fitted with a small funnel. Add more water to the beaker, stir, and repeat the procedure. Rinse the funnel and remove it.
- Dilute the solution in the flask until the bottom of the meniscus is even with the graduation mark. Stopper, invert, and shake the flask. Return it to the upright position, and allow the air bubble to return all the way to the top of the neck.
- Repeat until the solution is completely homogeneous; about 10 inversions and shakings are required.

## Preparation of solution from the liquid reagents

The concentration of many fairly concentrated commercial acids and bases are usually given in terms of percent by weight. It is frequently necessary to prepare solutions of a given approximate molarity from these substances. In order to do so, we must know the density in order to calculate the molarity. Some times substances list specific gravity rather than density.

**EXPERIMENT 2** Prepare 50 mL of 0.5 M HCl from the concentrated commercial reagent.

### PROCEDURE

- Calculate the molarity of the concentrated reagent. Then calculate the volume of concentrated acid required.
- Pipet ..... mL of the concentrated HCl into a 50-mL volumetric flask and diluted to the mark with distilled water.
- Mix the solution by repeatedly inverting and shaking the flask.

2.5 L

9535-03

# Hydrochloric Acid, 36.5-38.0%

Acide Hydrochlorique

'BAKER ANALYZED'® A.C.S. Reagent

HCl  
LOT

FW 36.46

Meets A.C.S. Specifications

Meets Reagent Specifications for testing USP/NF monographs

Appearance	Passes Test
Assay (as HCl) (by acid-base titm)	36.5 - 38.0 %
Color (APHA)	10 max.
Extractable Organic Substances	5 ppm max.
Free Chlorine (as Cl)	1 ppm max.
Residue after Ignition	3 ppm max.
Specific Gravity at 60°/60°F	1.185 - 1.192
Bromide (Br)	0.005 % max.
Trace Impurities (in ppm)	
Phosphate (PO <sub>4</sub> )	1 max
Sulfate (SO <sub>4</sub> )	0.5 max
Sulfite (SO <sub>3</sub> )	0.8 max
Ammonium (NH <sub>4</sub> )	3 max
Trace Impurities (in ppb)	
Aluminum (Al)	100 max
Arsenic and Antimony (as As)	5 max
Boron (B)	50 max.
Calcium (Ca)	200 max
Chromium (Cr)	100 max.
Copper (Cu)	100 max.
Gold (Au)	100 max.
Heavy Metals (as Pb)	100 max.
Iron (Fe)	100 max
Lead (Pb)	50 max.
Magnesium (Mg)	300 max
Manganese (Mn)	300 max.
Mercury (Hg)	5 max.
Nickel (Ni)	100 max.
Potassium (K)	300 max
Sodium (Na)	300 max
Tin (Sn)	300 max
Titanium (Ti)	300 max
Zinc (Zn)	100 max.

Water	CAS No: 7732-18-5
Hydrogen Chloride	CAS No: 7647-01-0

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HEALTH  <b>3</b> SEVERE	FLAMMABILITY <b>0</b> NONE	REACTIVITY <b>2</b> MODERATE	CONTACT  <b>3</b> SEVERE
LABORATORY PROTECTIVE EQUIPMENT			
 <b>GOGGLES &amp; SHIELD</b>	 <b>LAB COAT &amp; APRON</b>	 <b>VENT HOOD</b>	 <b>PROPER GLOVES</b>
STORAGE COLOR: WHITE			

DOT Name: HYDROCHLORIC ACID  
UN1789

CAS NO: 7647-01-0

J. T. Baker NEUTRASORB® or TEAM® 'Low Na+' acid neutralizers are recommended for spills of this product.

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## Problems

1. Describe the preparation of 50 mL of 0.1 M NaOH from the solid reagent.
2. Describe the preparation of 50 mL of 0.5 M HCl from the commercial reagent that has a specific gravity of 1.18 and is 37% (w/w) HCl (36.5 g/mol).