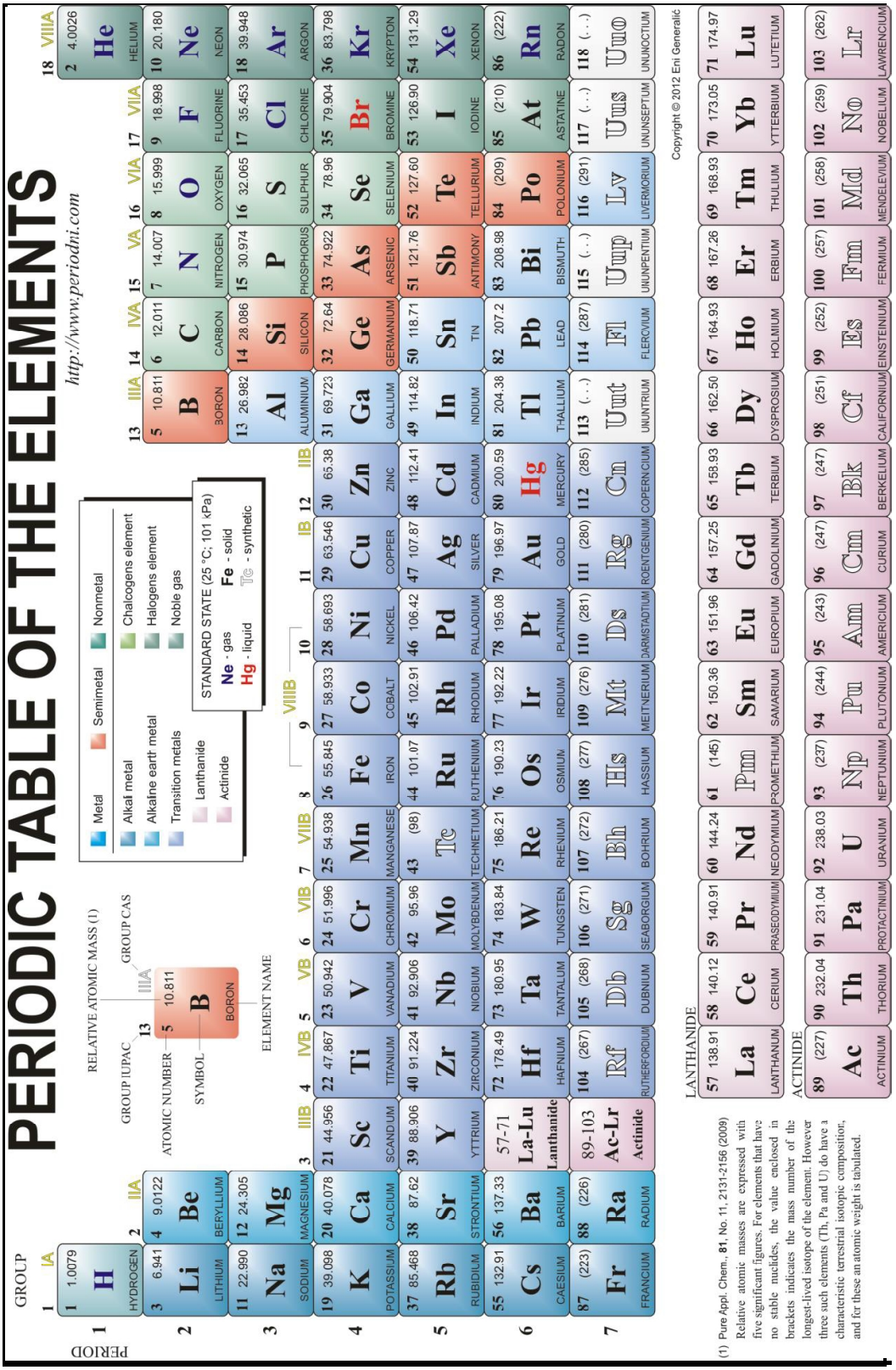
Periodic Table



General instructions

ان منهج السلامة في المختبر يتضمن رغبة الشخص العامل لانجاز عمله بطريقة صحيحة, وهناك بعض الارشادات العامة للعاملين في المختبرات ومنها الالمام بطريقة العمل في الحالات الاضطرارية او الفجائية مثل اجهزة اخماد الحريق وصندوق الاسعافات الاولية , ويمنع العمل الفردي في الاعمال المحذورة , ويمنع التعامل مع مواد او اجهزة لم يتم الاطلاع على كيفية عملها, يجب ارتداء صدرية المختبر و النظارات الزجاجية بصورة دائمية مع توفير منشفة و اسفنجة و صابونة, ويمنع التدخين و الاكل و الشرب داخل المختبر . يجب ان يتجنب العامل في المختبر اضافة الماء الى الحامض او القاعدة لان ذلك يؤدي الى حدوث حرائق ولاكن يمكن اضافة الحامض او القاعدة الى الماء

ان تسجيلا كاملا ودقيقا لنتائج العمل المختبري مهم جدا لكل طالب في المختبر ويجب ان يحتفظ الطالب بسجل لعمله في المختبر يحتوي على وصف كامل و دقيق لكل تجربة قام بها. ان التفصيل في الكتابة يجب ان يكون كافيا حتى يتمكن باحث اخر من اعادة العمل و معرفة نتيجة التجربة بصورة مضبوطة. في ادناه مقترحات تنظيمية لسجل مختبري لتسجيل اية تجربة:

1. ابدأ بتسجيل كل تجربة على صفحة جديدة مدونا في السطر الاول تاريخ وعنوان ورقم التجربة المراد القيام بها.
2. اكتب المعادلة الكيميائية الموزونة للتفاعل و المصدر المتبع في التجربة
3. يمكنك كتابة كميات المواد الكيميائية المستعملة في جدول او ادراجها في وصف التجربة ويجب ذكر اوزان المواد الكيميائية و عدد المولات و حجوم المذيبات المستعملة.
4. يجب ان تحتوي الطريقة العملية على:

أ- وصف لكل جهاز غريب و جديد, واذا كانت هناك طريق تبريد معينة او خاصة فيجب وصفها او ذكرها.

ب- التسلسل في اضافة الكواشف واوقات الاضافة و مدد التفاعل.

ت- درجات الحرارة وخروج الغازات وتغيرات الالوان

ث- طريقة العمل وبضمنها المذيبات المستعملة.

ج-وزن منتوج المادة الخام و كذلك المادة النقية ودرجات انصهار المواد الصلبة.

<u>ينظم تقرير كل تجربة حسب الترتيب التالي</u>

اسماء الطلبة المشاركين: The names of participating students

اسم التجربة : Name of experimental

تاريخ اجراء التجربة: Data of experimental

الغرض من التجربة: Purpose of experimental

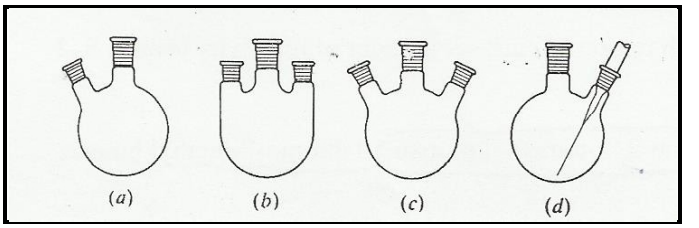
الادوات و المواد المستخدمة: Chemical and apparatus

المناقشة (متضمنة المعادلات ان وجدت او التركيب): Discussion

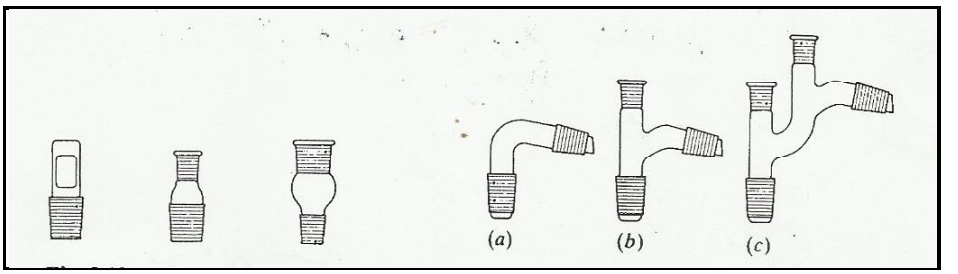
الحسابات و النتائج (متضمنا القوانين وجداول الكشوفات):

Results and calculations

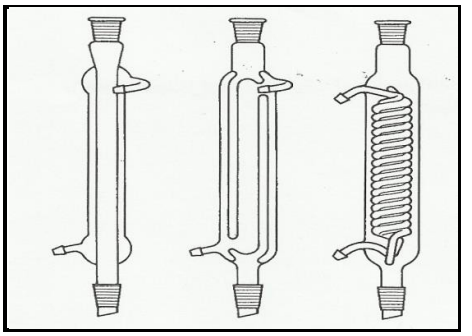
Classes and Apparatus

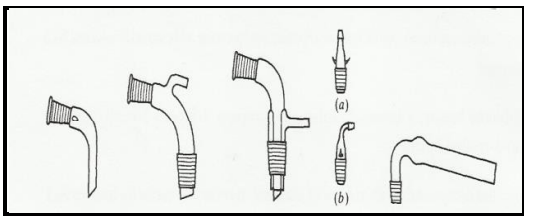


Round – bottomed flasks



Joint **adapters distillation heads**



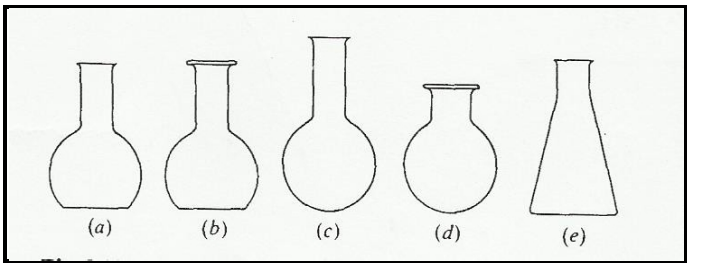


Condenser **(1)** **(2)** **(3)**

(1): receiver adapters or connectors ;

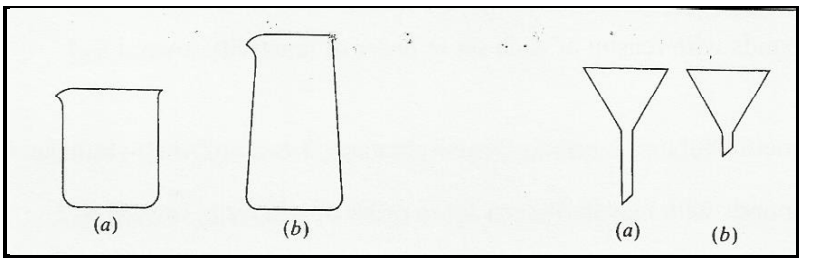
(2): a,b, rubber tubing adapters ;

(3) calcium chloride guard – tube

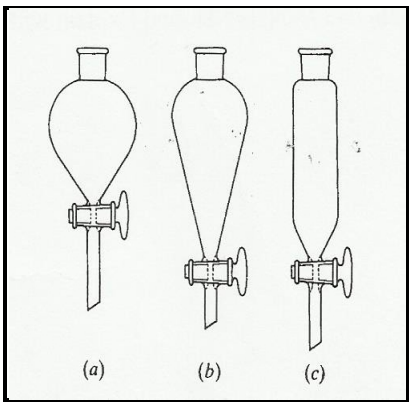


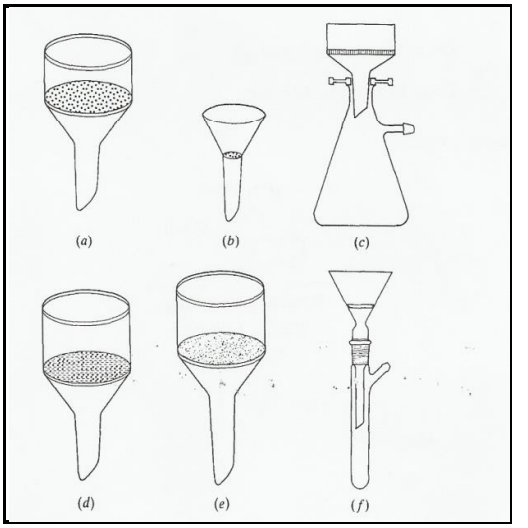
a,b : flat bottomed flasks ; c, d: round bottomed flasks

e: short – necked boiling flask



a : beaker ; b : conical beaker / a: long funnel ; b: short funnel





Separatory funnels

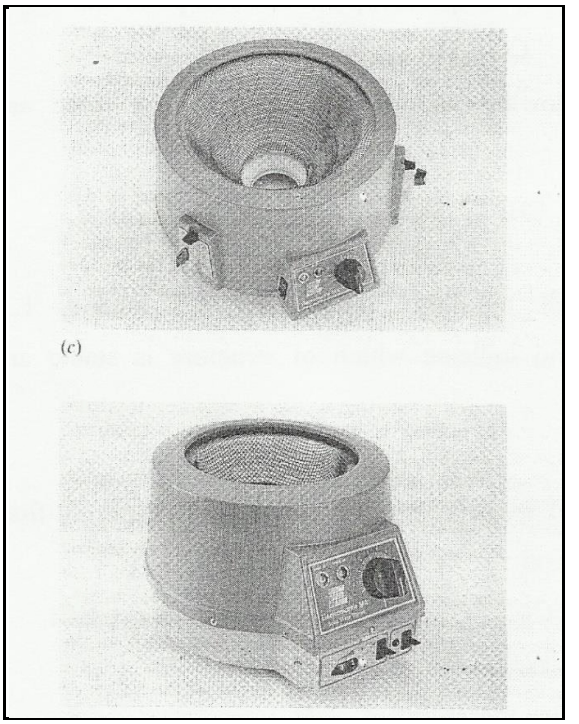
a: Buchner funnel; b : Hirsch funnel;

c: Buchner funnel and flask

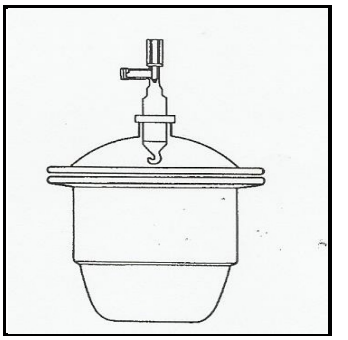
d: slit sieve funnel;

e : sintered glass funnel ;

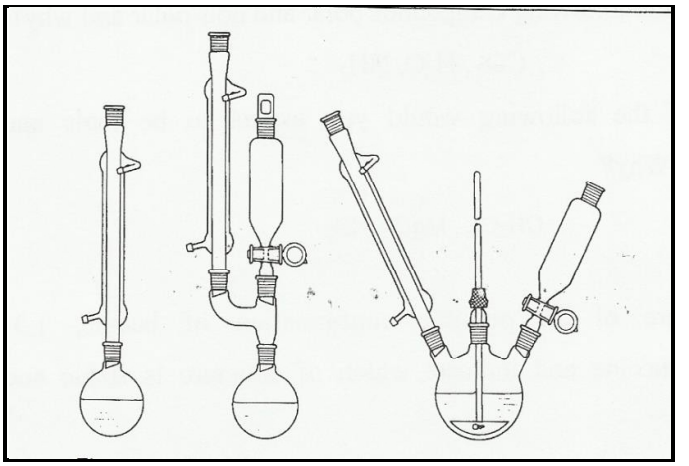
f: Buchner funnel or Hirsch funnel with glass joints



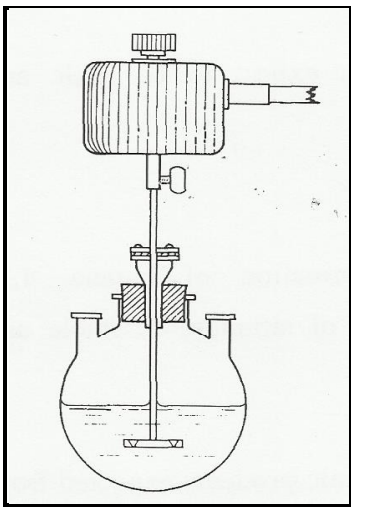
Heating mental



Desiccators



(a) **(b)** **(c)**

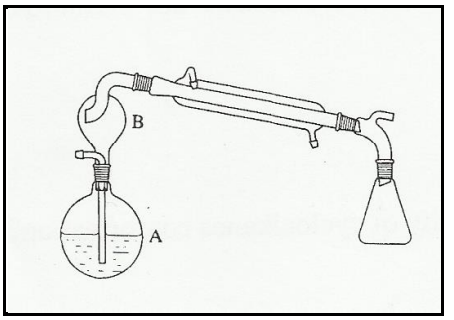


Mechanical shaking

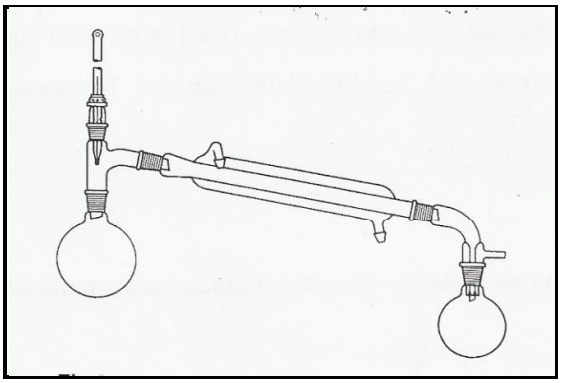
a : Heating a reaction mixture under reflux with addition of liquid

b: Heating a reaction mixture under reflux with addition of liquid

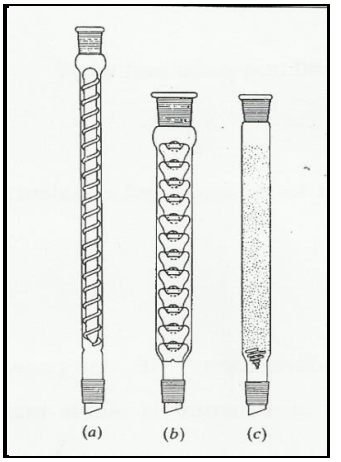
c: Heating a reaction mixture under reflux with addition of liquid and with stirring



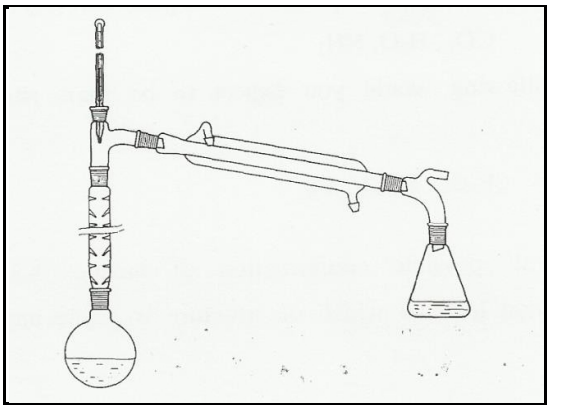
Steam distillation



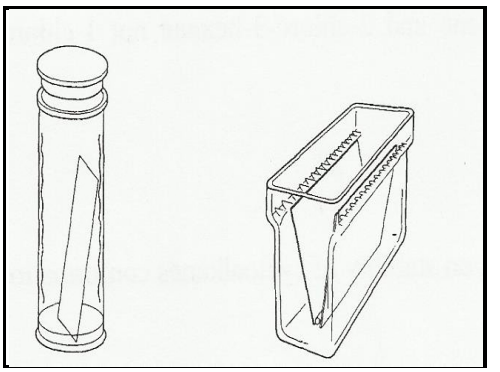
simple distillation at atmosphere pressure



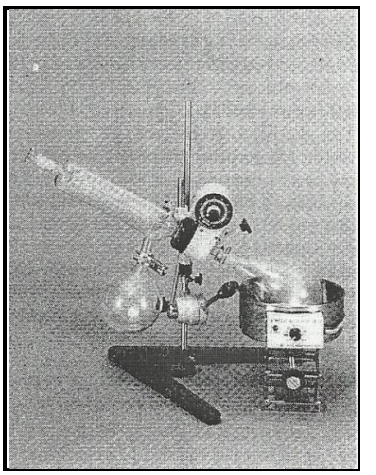
Fractional columns



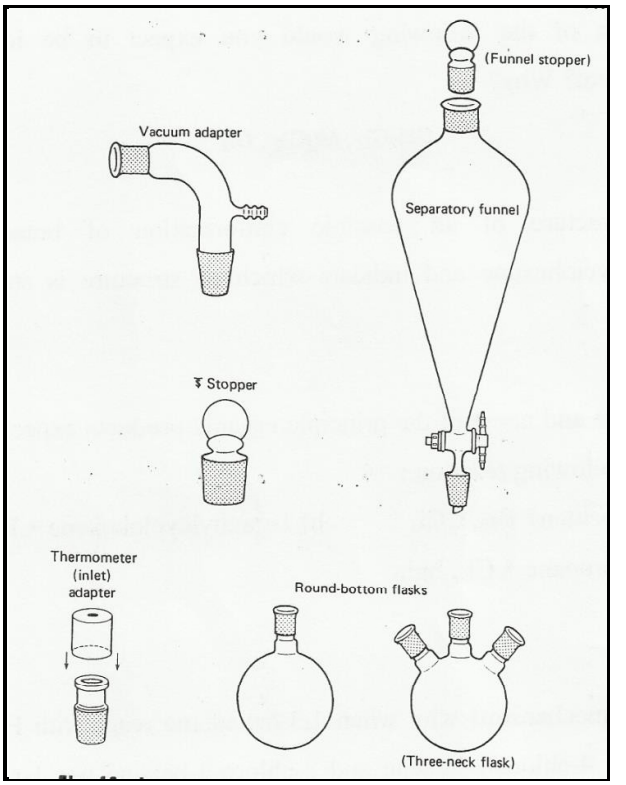
fractional distillation at atmospheric pressure

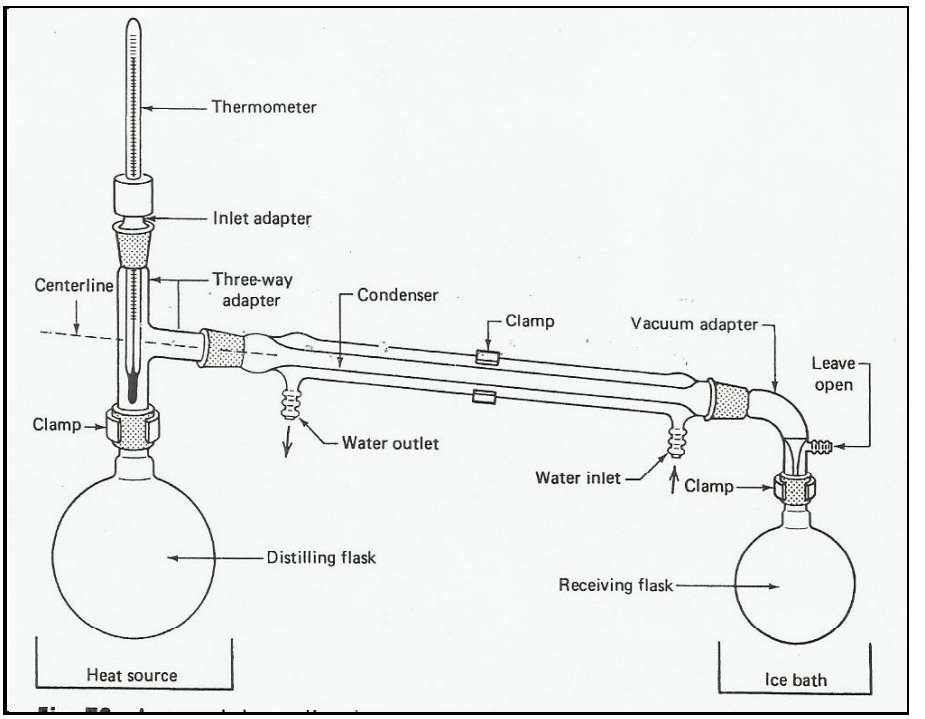


Cylindrical glass jar

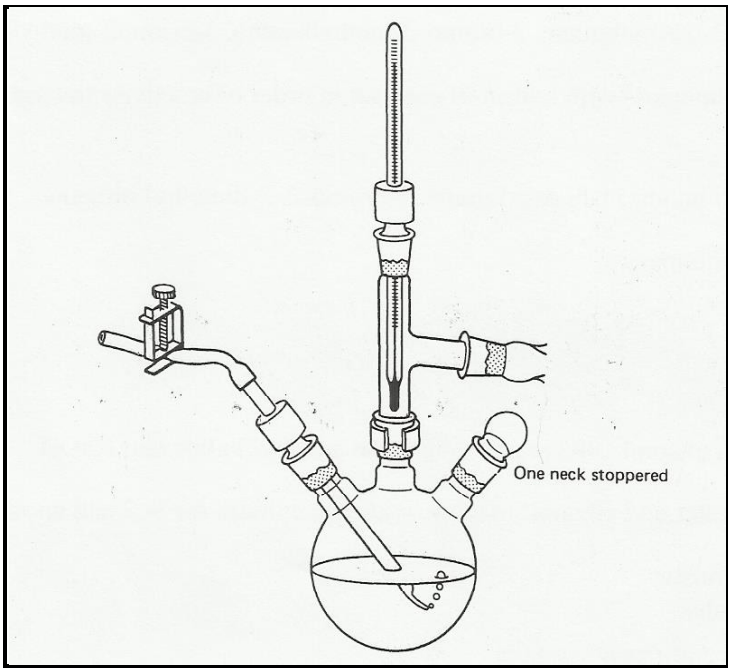


Vaccum distillation

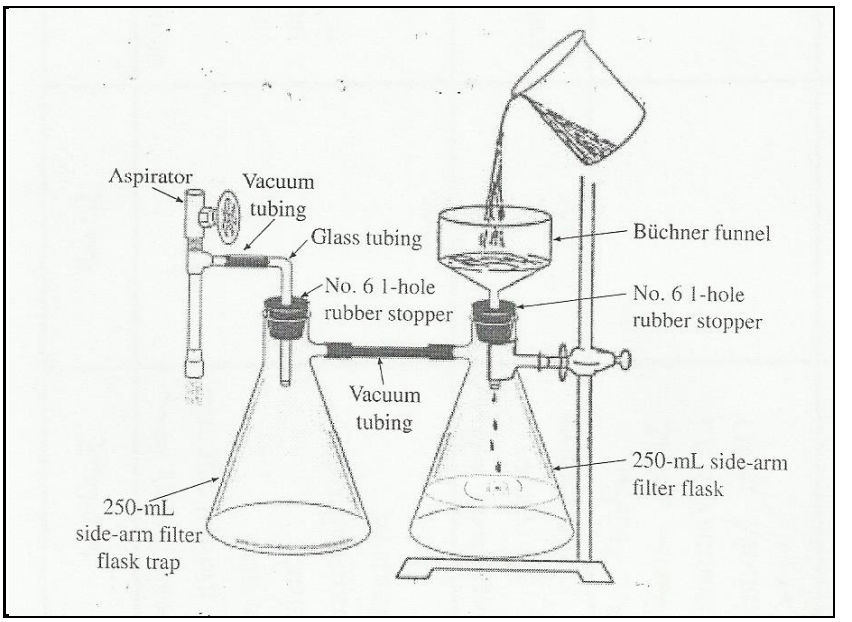




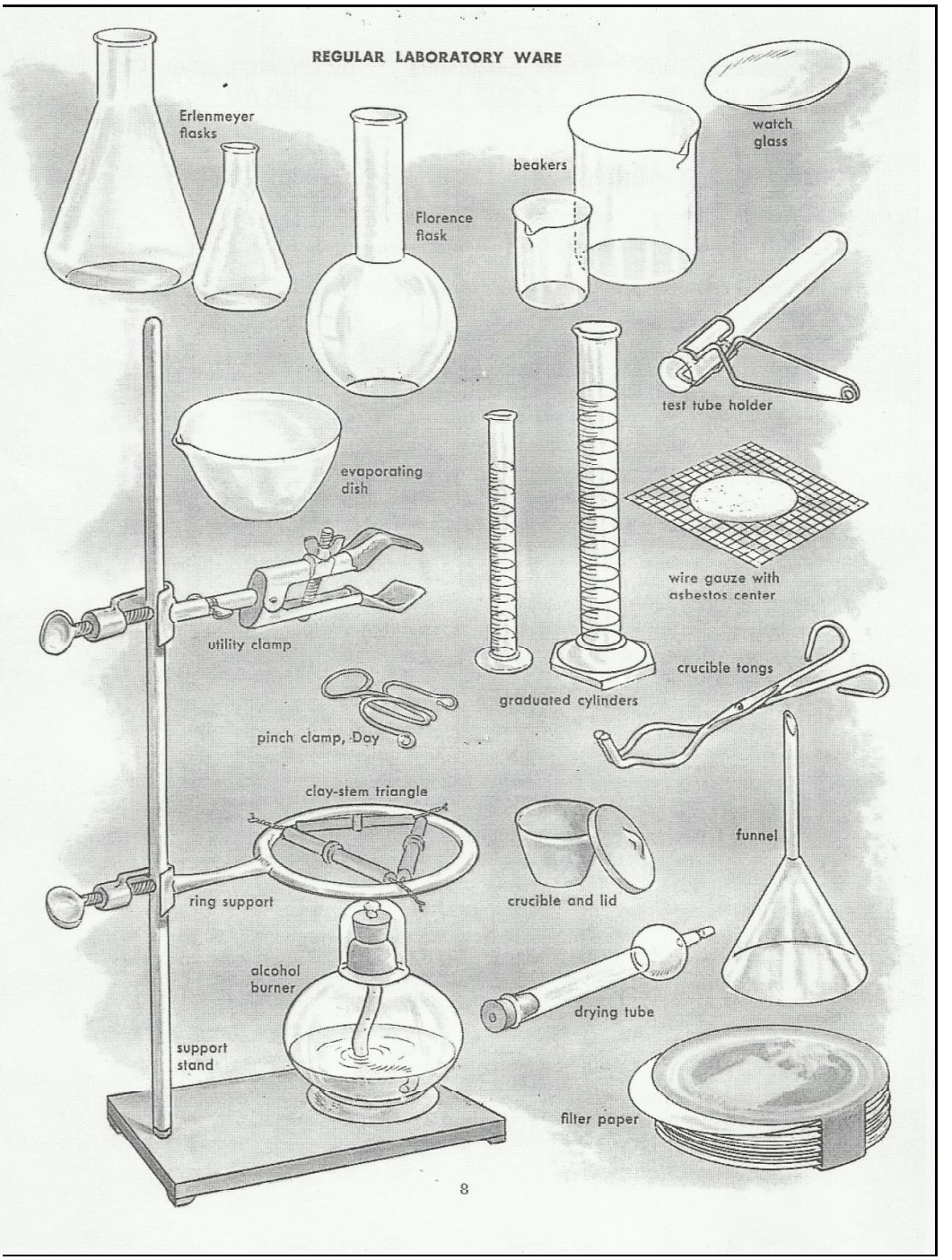
Simple distillation at atmosphere pressure

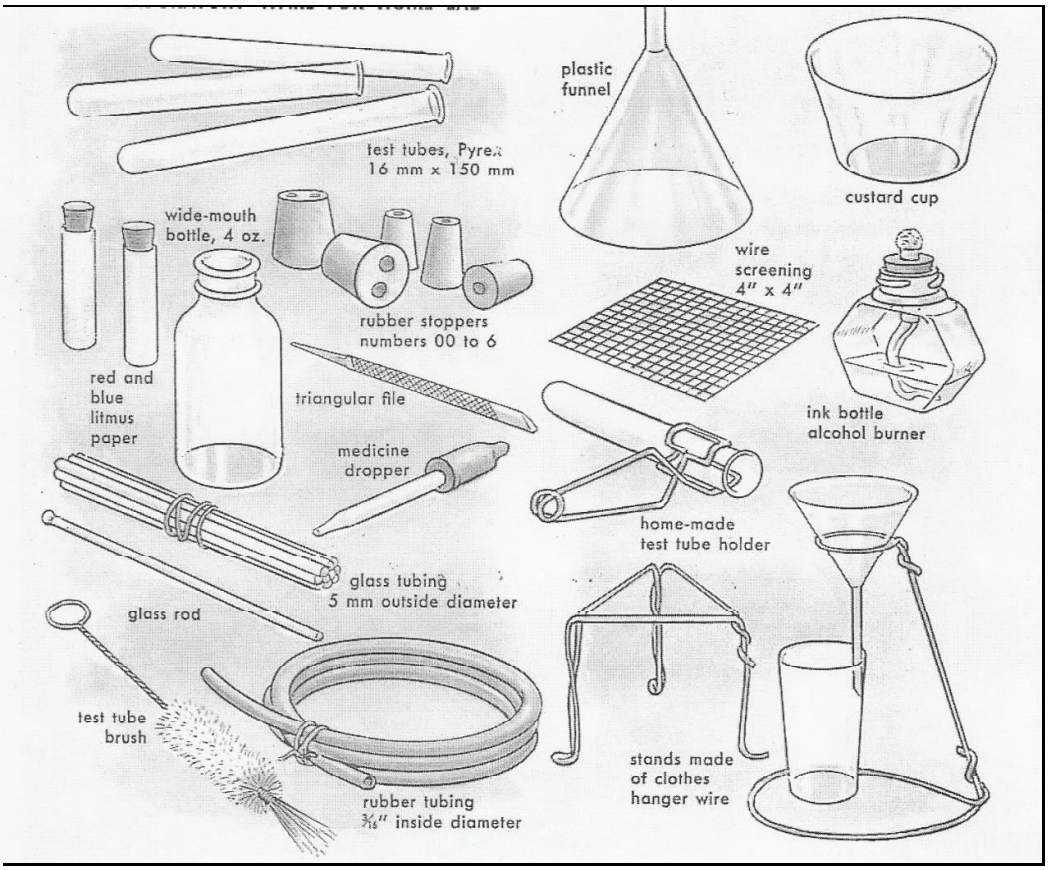


Steam distillation



Vacuum filtration setup using the Buchner funnel


REGULAR LABORATORY WARE
Erlenmeyer flasks
Florence flask
beakers
watch glass
test tube holder
evaporating dish
graduated cylinders
wire gauze with asbestos center
utility clamp
crucible tongs
pinch clamp, Day
clay-stem triangle
funnel
ring support
crucible and lid
alcohol burner
drying tube
support stand
filter paper
8


test tubes, Pyrex
16 mm x 150 mm
plastic
funnel
custard cup
wide-mouth
bottle, 4 oz.
rubber stoppers
numbers 00 to 6
wire
screening
4" x 4"
red and
blue
litmus
paper
triangular file
ink bottle
alcohol burner
medicine
dropper
home-made
test tube holder
glass tubing
5 mm outside diameter
glass rod
test tube
brush
stands made
of clothes
hanger wire
rubber tubing
⅜" inside diameter

Melting Point

Purpose of experimental

1) To determine melting point of unknown compounds.
2) To identify a solid unknown.
3) To determine the purity of organic compound.

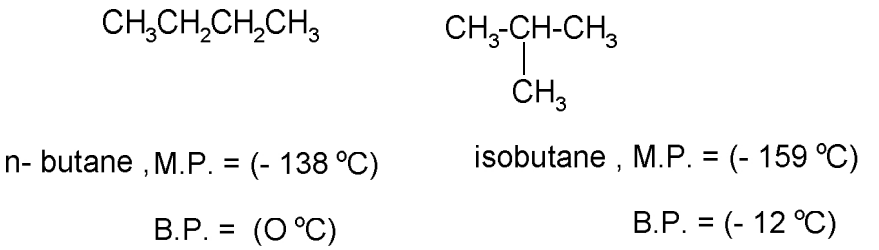
Theory part of experimental

The melting point of a compound is the temperature at which the solid phase is in equilibrium with the liquid phase. A solid compound changes to a liquid when the molecules acquire enough energy to overcome the forces holding them together in an orderly crystalline lattice. For most organic compounds, these intermolecular forces are relatively weak. **The melting point range** is defined as the span of temperature from the point at which the crystals first begin to liquefy to the point at which the entire sample is liquid. Most pure organic compounds melt over a narrow temperature range of 1-2 °C. The presence of a soluble impurity almost always causes a decrease in the melting point expected for the pure compound and a broadening of the melting point range.

Melting points can also be used to assess compound purity. Purification of the compound causes the melting point range to narrow and the melting point to increase.

The branched chain compounds have lower melting points than the corresponding straight chain isomers. For example, n- butane has a melting points of (- 138 ºC) and isobutene (- 159 ºC), This is due to the fact that branching of the chain makes the molecule more compact and

thereby decreases the surface area. Therefore, the intermolecular attractive forces which depend upon the surface area, also become small in magnitude on account of branching. Consequently, *the boiling points of the branched chain alkanes are less than the straight chain isomers.*



Properties of oil bath:

1) Oil must have a high temperature (> 300 °C)
2) Oil vapor is not toxic
3) Oil must be transparent

Factors affecting the melting point

1) The nature of the organic compound (aliphatic or aromatic or salt)
2) Molecular weight organic compound
3) Geometric shape of the organic compound (branched chain or straight chain)
4) Composite purity

Chemical and Apparatus

Capillary tubes (about 1 mm bore, about 8 cm length), thermometer (-10 - 110° C), rubber band, glass rod, stand and clamp, burner, 250 cm^3 beaker, food oil or paraffin oil , chemical compound (powder).

Experimental No. (1) Melting Point

Procedure of Experimental

1) Obtain a sample from your instructor. Record sample ID.
2) Put the sample into a capillary tube (about 1-2 mm in height).
3) Measure the melting point using the apparatus as shown in Figure 4. Attach the capillary tube to a thermometer with sewing thread. Place 25-30 mL of paraffin oil or glycerol in a 50 mL beaker.
4) Turn on the hotplate and observe the melting point. Use a clean glass rod to stir the oil to ensure a uniform heat distribution.
5) Record the melting point range (for example 70-73°C)

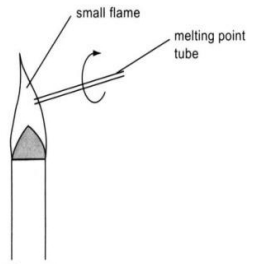


Figure 1

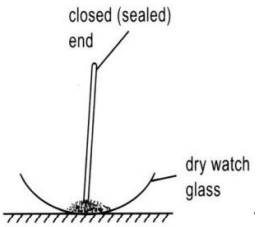


Figure 2

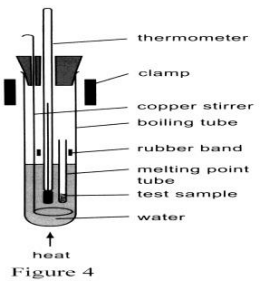


Figure 4

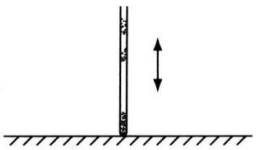


Figure 3

Question for discussion

1. What is the melting point range of pure compound?
2. Is the melting point sharp?
3. How is the melting point of a solid defined?
4. How is the melting point of a solid used to identify the solid?
5. How is the melting point of a solid used to assess the purity of the solid?