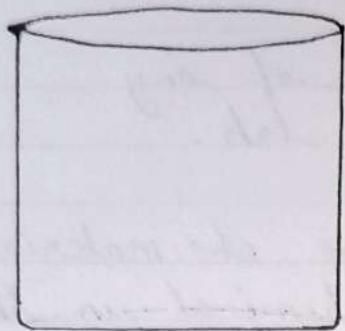


Safety Rules:-

- (i) Conduct yourself in a responsible manner.
- (ii) Follow all detail and further instruction.
- (iii) Ask your teacher before proceeding with the activity.
- (iv) Never work alone in the laboratory.
- (v) Do not touch any equipment, chemicals or other materials in the laboratory area until you are instructed to do so.
- (vi) Unauthorised experiment are not followed.
- (vii) Do not eat food, drink or chewing gum in the laboratory.
- (viii) Read all procedures thoroughly before entering the laboratory.
- (ix) Work area should be kept clean.
- (x) Be alert and proceed with caution at all times in the laboratory.

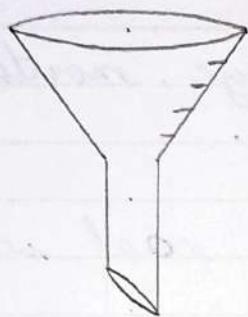
- (xi) Inform the teacher immediately of any mishappening condition in the lab.
- (xii) Dispose of all chemical, waste ch^o material in dustbin and never mix chemical in the sink.
- (xiii) Labels and Equipment instruction must be read carefully before use.
- (xiv) Keep hands away from face, eye, mouth and body while using chemicals.
- (xv) All student should be wear lab coat when entering the laboratory.



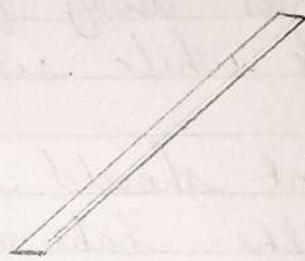
(i) Beaker



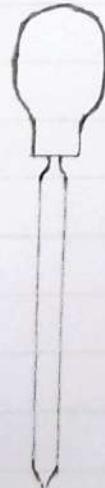
(ii) Conical flask



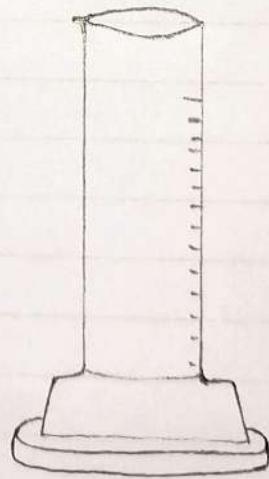
(iii) Funnel



(iv) Stirring Rod.



(v) Pipette



(vi) Measuring cylinder

Aim :-

To study the glassware used in pharmaceutical chemistry lab.

Reference :

A Practical book of Pharmaceutical chemistry.

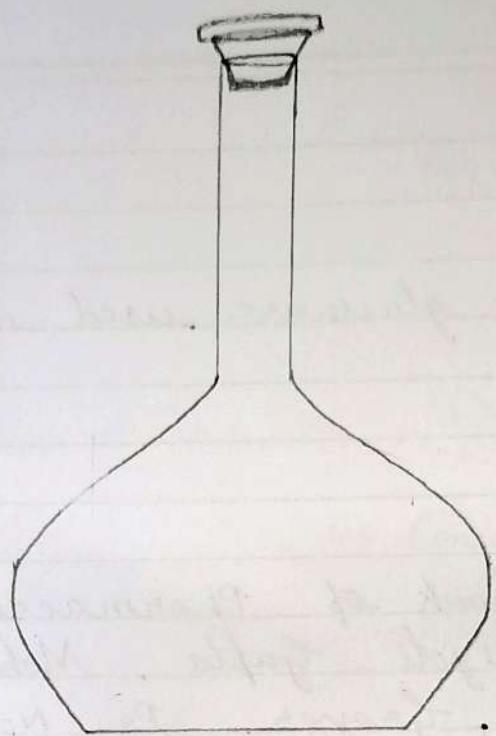
Author - Dr. Iyoti Gupta, Mohit Sandysa,
Ms. Madhuri Grover, Pg. No - 1 to 7.

Requirement :

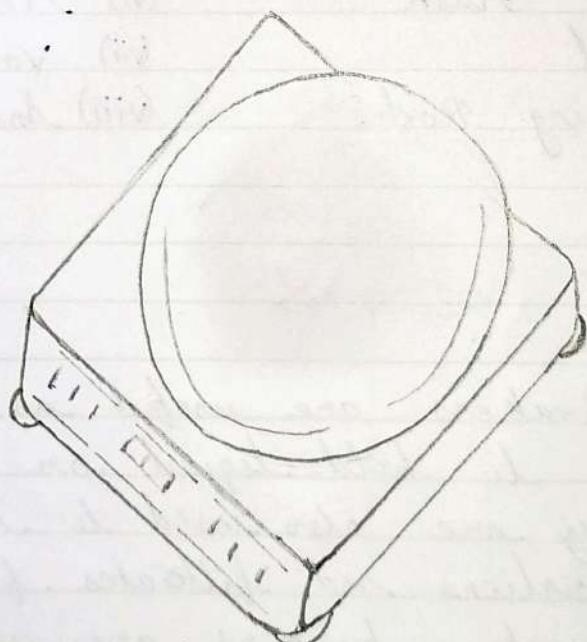
- | | |
|--------------------|---------------------------------|
| (i) Beaker | (v) Pipette |
| (ii) Conical Flask | (vi) Measuring Cylinder |
| (iii) Funnel | (vii) Volumetric cylinder flask |
| (iv) Stirring Rod. | (viii) Analytical wt. machine. |

Theory :-

- (i) Beaker :> Beakers are useful as a reaction container or to hold liquid or solid samples. They are also used to catch liquids from filtrations and filtrates from filtering operations. Laboratory burners are used to heat the beaker.

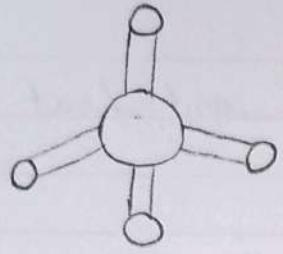


(vii) Volumetric Flask

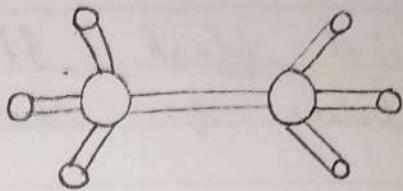


(viii) Analytical weight machine.

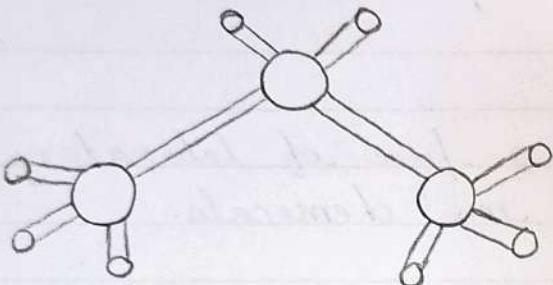
- (ii) Conical flask :- It is used to mix and heat the solution for short term period.
- (iii) Funnel :- A funnel is a tube or pipe that is wide at top and narrow at the bottom, used for guiding liquid or powder into a small opening.
- (iv) Stirring Rod :- A glass rod is a piece of laboratory equipment used to mix chemicals.
- (v) Pipette :- It is used for measuring an exact but smaller volume of liquid and placing it into another container.
- (vi) Measuring Cylinder :- It is a measuring tool for determining the volume of a liquid. There are several markings up and down the length of the container.
- (vii) Volumetric flask :- It is used for accurate dilutions and preparations of solutions.
- (viii) Analytical weight machine :- It is used to weigh chemical compound.
- Result :- The given glassware was studied successfully.



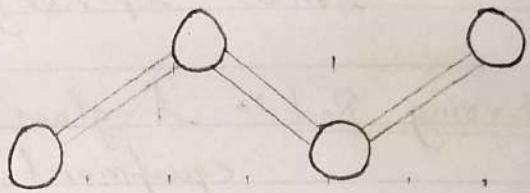
(a) Methane (CH_4)



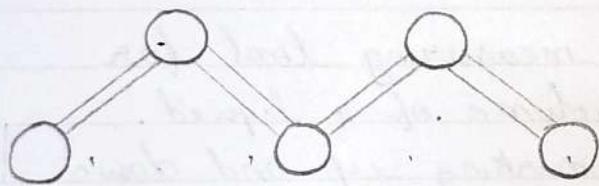
(b) Ethane (C_2H_6)



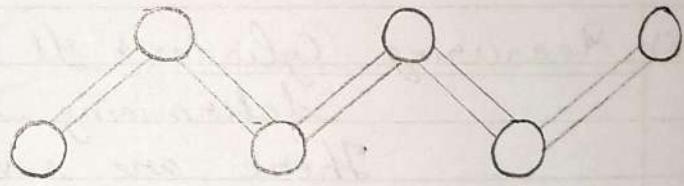
(c) Propane (C_3H_8)



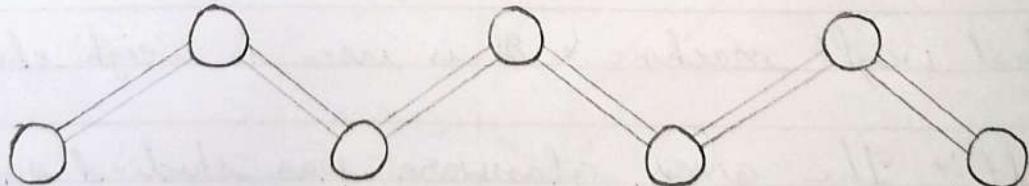
(d) Butane (C_4H_{10})



(e) Pentane (C_5H_{12})



(f) Hexane (C_6H_{14})



(g) Heptane (C_7H_{16})

Aim :-

To construct different molecular models with the help of model set.

Reference :-Requirement :- Model Set :-Theory :-

Colour code and valency (holes) for commonly used elements.

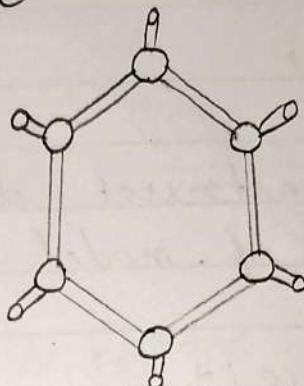
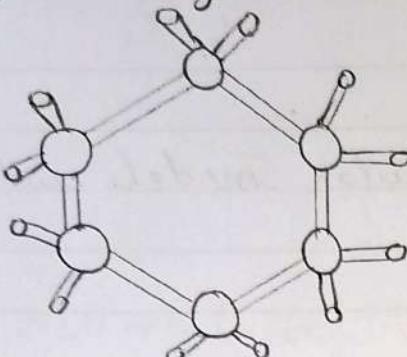
Atom Name	Colour of ball	No. of holes (valency)
Hydrogen	White	1
Oxygen	Red	2
Nitrogen	Blue	3
Carbon	Black	4
Sulfur	Yellow	2
Chlorine	Green	1

Alkane is the category name for a set of compound which contain carbon and hydrogen and only single bonds. An alkane has the general formula of C_nH_{2n+2} .

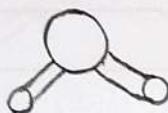
Teacher's Signature _____

Molecules with Functional Group

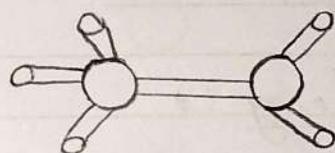
(1). Construct cyclohexane and benzene



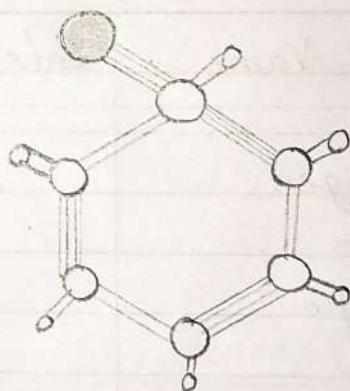
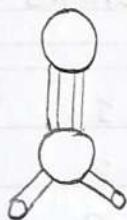
(2) Construct a water molecule



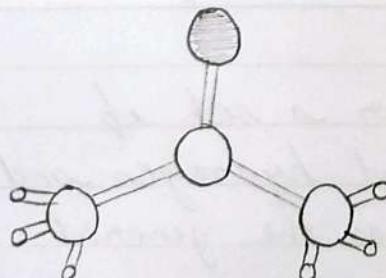
(3) Construct ammonia and methylamine



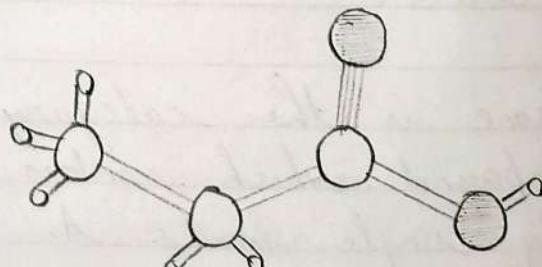
(4) Construct Formaldehyde and benzaldehyde



(5) Construct Acetone



(6) Construct Propionic acid



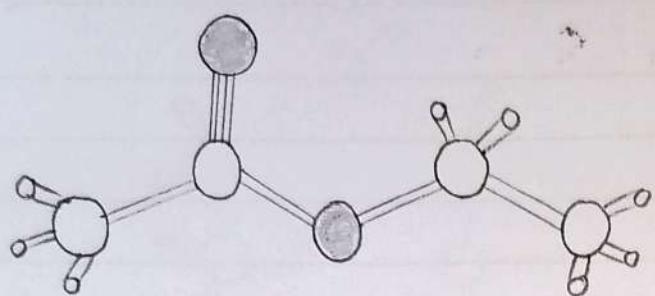
Date _____

Expt. No. 2

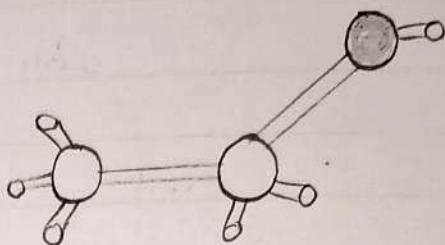
Page No. 6

Teacher's Signature _____

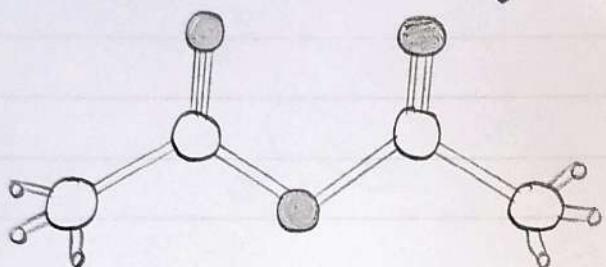
(7) Construct Ethyl acetate



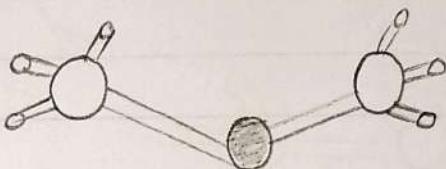
(8) Construct Ethanol



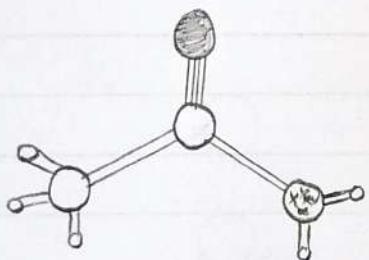
(9) Construct acetic anhydride



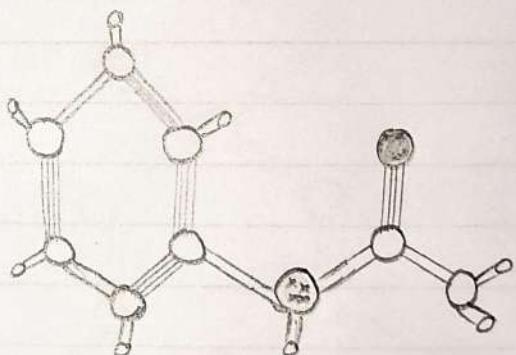
(10) Construct diethyl ether



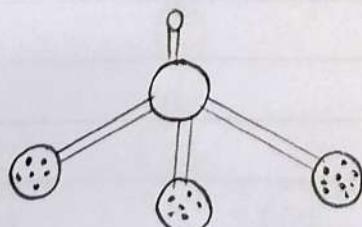
(11.) Construct acetamide



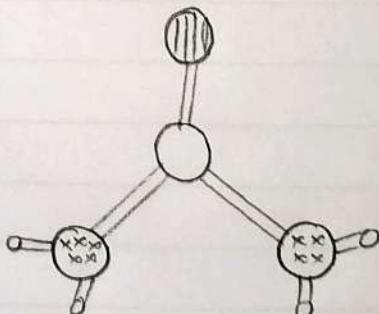
(12) Construct acetanilide



(13) Construct chloroform



(14) Construct thiourea



≡ → Double bond & = → Single bond

○ → Carbon

● → Oxygen

○○ → Nitrogen

○○○ → Chlorine

○○○○ → Sulphur

○ → Hydrogen

Result : →

Construction of different molecular models with the help of model set was successfully performed.

Aim :→

To detect the presence of extra element nitrogen in the given sample. (urea).

Reference :→

Dr. Jain K.S. Dr Miniyal, P.B "A Practical book of pharmaceutical organic chemistry, Nirali Pub.

Requirement :→

- Glassware :→ Beaker, test tube holder, Glass rod.
- Chemical :→ Urea, water.

Theory :→

The behaviour of the compound towards various solvent like water. Dilute caustic soda, dilute HCl and conc. H_2SO_4 also reveals its nature. Take 0.1g or 0.2 ml (2-5) drop of the substance and dry to dissolve in 3 ml of the solvent and its solubility.

Observation Table.

S.No.	Experiment	Observation
1.	Physical state	Solid
2.	Colour	white
3.	Odour	odourless
4.	Solubility test	

1.	Sample + Cold water	Partially dissolved
2.	" + Hot "	easily "
3.	" + Conc. H_2SO_4	Partially "
4.	" + hot conc. H_2SO_4	easily "

Observation	Inference
→ Soluble in hot water and solution is acidic to litmus.	Salt of aromatic bases lower aliphatic acid hydroxy acid or Poly hydrogen Phenol.
→ Soluble in cold water and solution is neutral.	Carbohydrates or alk alcohol.
→ Soluble in ^{hot} cold dilute NaHCO_3 with effervescence	Starch ,
→ Solute in hot water and solution is neutral.	Starch ,
→ Soluble in cold dilute NaHCO_3 with effervescence	Carboxylic acid , (strongly acidic)
→ Soluble in cold dilute NaOH	Carboxylic acid or Phenol.
→ Soluble in cold conc. H_2SO_4	Aromatic hydrocarbons or Phenol
→ Soluble in hot conc. H_2SO_4 and charring occurs.	Carbohydrates accident ketone or phenol. hydroxy acid.

Procedure :-

- i) Take a clean and dried test tube and beaker.
- ii) After that ~~a~~ 1 gm urea put in each test tube accurately.
- (iii) Now heat water in beaker with the help of a heating mantle.
- iv) After that we put 3 ml hot water with pipette in one test tube and mark up test tube as it is with hot water.
- v) After observing first reaction we done 2nd with 3 ml cold water in one gram of urea and mark that as cold one and observe it.

Result:-

The given sample of urea was observed in different sample successfully.

Aim :-

To detect the presence of extra element Dextrose in the given sample (Dextrose & Anhydrous Purified)

Reference :-

Dr. Jain K.S "A Practical Book of Pharmaceutical organic chemistry by Nirali Publication.

Requirement :-

- Glassware :- Beaker, Glassrod, test tube, Pipette, Measuring cylinder.
- Chemical :- Dextrose, Distilled water, conc. H_2SO_4 .

Theory :-

Dextrose is the name of the simple sugar that is made from corn and is chemically identical to glucose or blood sugar.

Dextrose is often used in baking product as a sweetener and commonly found in item such as processed food and corn syrup dextrose also has medical purpose it is dissolved in a solution that are given intravenously when can be combined with other drugs or used to increase a person's blood sugar.

Observation :-

S. No.	Experiment	Observation
1.	5 ml of water + Dextrose anhydrous	Turn red litmus to blue

Dextrose anhydrous is a form of glucose made from starch of corn just like sugar. It is sweet in nature but contains around 20% less sweetness as compared to sugar made from sugarcane.

Dextrose anhydrous does not contain any water, produced in crystalline or powder form.

Dextrose like fructose and glucose is a monosaccharide also known as simple sugar. Simple sugar can be combined to produce complex sugar such as sucrose. Human body metabolizes each unit of simple sugar whereas complex sugar are not easily metabolized by body. Dextrose anhydrous is widely used as a nutrition supplement and a sweetener in food production.

Procedure :-

- (i) First of all, clean all the glasswares properly before used as dry it well.
- (ii) Take sample of dextrose by weighing 1 gm of each.
- (iii) Now take water and heat it for few minutes.

S.No.	Experiment.	Observation
1.	Physical state	Solid
2.	Colour	White
3.	Odour	Odourless
4.	Solubility test	

1.	Sample + cold water	Partially dissolve
2.	Sample + Hot water	Easily dissolve
3.	Sample + hot conc. H_2SO_4	Burn the sample

- (iv) Now add hot water and cold water each of 3 ml to a different test tube.
- (v) Now take 3 ml of conc. H_2SO_4 and heat it well.
- (vi) Add hot conc. H_2SO_4 in another test tube.
- (vii) Now add sample of dextrosein each of test tube.
- (viii) Note the observation.

Result :-

The given sample of dextrose anhydrous in three test tube, one was hot & water and found sample was easily dissolved, 2nd was cold water and found sample were partially dissolved and lastly was hot conc. H_2SO_4 and found that sample were been burn and studied successfully.

Aim :-

To determine the acid value of HCl.

Reference :-

Dr. Miniyar P.B., Dr. Jain, K.B. A practical Book of Pharmaceutical Organic Chemistry. "Nirali Publication"

Requirement :-

S.No.	Chemicals	(Qty/ml)	Apparatus	Qty
1.	Fixed oil (eg. Castor oil)	10.9	Iodine flask (250ml)	01
2.	Potassium hydroxide	2.9	Reflux condenser	01
3.	Cone. HCl	3.9	Burette (50ml)	01
4.	Methyl red (as indicator)	0.5	Beaker (250ml)	01
5.	Sodium carbonate	0.59	Pipette (10ml) graduated	01
6.	Phenolphthalein Sol ⁿ	2ml		

Teacher's Signature _____

Theory :-

Acid is a substance that is sour in taste. It turns blue litmus to red. Its PH is less than 7. It is a molecule or ion capable of either donating a proton, known as a Brønsted-Lowry acid, or capable of forming a covalent bond with an electron known as Lewis acid.

The first category of acids are the Proton donor or Brønsted-Lowry acids. Its aqueous solution releases H^+ ions.

Ex. - HCl, Sulphuric acid.

Hydrochloric acid :- (HCl) → It is also known as muriatic acid is an aqueous solution of hydrogen chloride (chemical formula - HCl). It is a colourless solution with a distinctive pungent smell. It is classified as a strong acid. HCl is an important laboratory reagent and industrial chemical. Hydrochloric acid has many uses. It is used in the production of chloride fertilizers and dyes in electroplating and in the photographic, textile and rubber industries. It is corrosive to eyes, skin and mucous membrane.

HCl is commonly known used for the neutralization of alkaline agents as a bleaching agent in food, textile, metal and rubber industries.

Procedure :-

- (i) Weigh about 10 g of the substance being examined in an iodine flask.
- (ii) Prepare 50 ml mixture of equal volume of ethanol (95%) and ether and 0.5 ml phenolphthalein solⁿ and titrate it against 0.1 N aqueous potassium hydroxide (KOH) solⁿ to neutralise it.
- (iii) Dissolve weighed quantity of the substance in above neutralised solⁿ if the sample does not dissolve in the cold solvent, connect the flask with condenser and warm slowly with frequent shaking until the sample dissolve.
- (iv) Add 1 ml of phenolphthalein solution and titrate with 0.1 N aqueous potassium hydroxide (KOH) solution until the solution remains faintly pink after shaking for 30 seconds.
- (v) Calculate the acid value from the following equation.

$$\text{Acid value} = \frac{5.61 \times n}{w}$$

where n = the no. of ml of 0.1 N potassium hydroxide solⁿ

w = weight of the substance in gm.

Aim :-

To introduce the laboratory technique of Aspirin from Salicylic acid.

Reference :-

Dr. Jain K.S., "Dr. Minjor P.B., "A Practical Book of Pharmaceutical organic chemistry". Nirali Publication, Page no-

Requirement :-

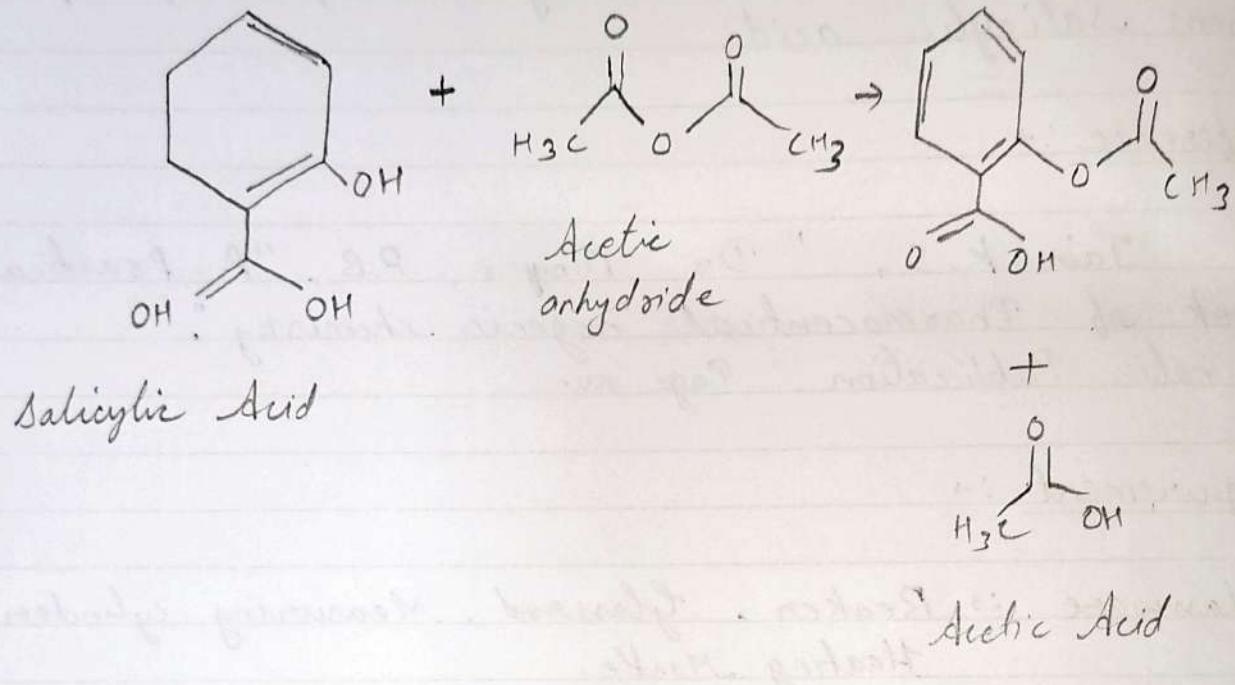
- Glassware :- Beaker, Glassrod, Measuring cylinder, Heating Mantle.
- Chemical :- Aspirin, Salicylic Acid, water.

Theory :-

Aspirin → It is also known as meta salicylic acid. It is used in medication of reduce form pain, fever and inflammation. It is given shortly after a heart attack to decrease the risk of death.

It is also used long term to help prevent further heart attacks and blood clot in people, high risk, for pain and fever. effect typically began within 30 min. It also suppresses the normal functioning of platelets.

Structure of Aspirin.



Aspirin (2-Acetoxybenzoic Acid)

Aspirin can also help treat pain and swelling associated with the following chronic health condition.

- Rheumatic condition including rheumatoid arthritis, osteoarthritis with the following chronic health condition. and other inflammatory joint condition.
- Systemic lupus erythematosus.
- Inflammation around the heart known as Pericarditis

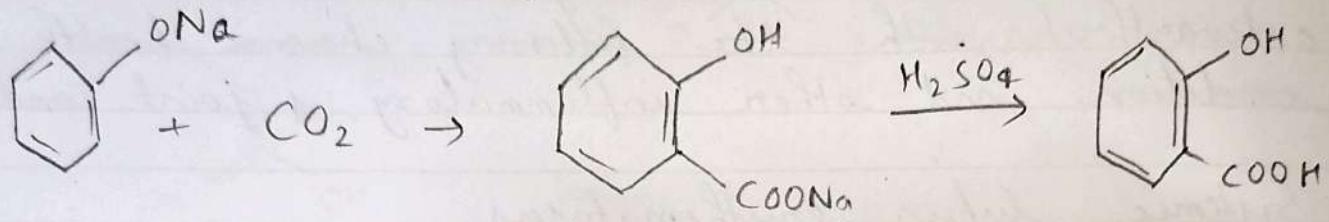
Precaution

- Bleeding disorder, such as hemophilia.
- Uncontrolled high blood Pressure.
- Asthma.
- Peptic or stomach ulcers.
- Liver or kidney disease.

Salicylic Acid :-

It is an organic acid compound it is used to treat mild to moderate ache. It may be used in combination with other acne treatment.

Structure of Salicylic Acid.



Sodium
Phenoxide
(Sodium Phenolate)

Sodium
Salicylate

Salicylic
Acid.

When it is called to the skin. Salicylic acid belongs to a class of drug known as salicylates. When applied to the skin salicylic acid may work by helping the skin to shed dead cells from the top layer and by decreasing redness. This also decrease the number of pimples that poor speed healing. Salicylic acid toxicity but it can occur from topical application of salicylic acid. To reduce

To reduce that risk follow these :-

- Do not apply salicylic acid is consider safe overall it. and product to large areas of your body.
- Do not use for long period of time.
- Do not use under air-light dressing. such as plastic wrap.

Side effects :-

Although salicylic acid is consider safe overall it may cause skin irritation, dryness. Some other side effect are :- Skin tingling or stinging, itching, etc.

Aim :-

To introduce the laboratory technique of Anthraquinone from Anthracene.

Reference :-

Requirement :-

- (a) Glassware - Beaker, Glass rod, Measuring cylinder, Heating mantle.
- (b) Chemical - Water, Anthraquinone Anthracene.

Theory :-

Anthraquinone :- It is an aromatic organic compounds with formula $C_{10}H_8SO_2$. It is building block of many dyes and used in bleaching pulp for papermaking. It is yellow, highly crystalline solid poorly soluble. It is almost completely insoluble in ethanol near room temp. but 2.25g will dissolve in 100 g of boiling ethanol. It is found in nature as are mineral hodeite over composition consumption of anthraquinones cause

abdominal cramps, gastrointestinal discomfort vomiting, dormant nausea, blood diarrhea and dizziness, moreover biological active anthraquinones derived from reactive blue 2 have been utilized as valuable tool compound for biochemical and pharmacological studies they may serve as lead structure for development of future drug.

Precaution :> Lowest effective dosage should be employed prolonged indiscriminate use to be avoided. Abdominal surgery pregnancy children below 6 yrs.

Anthracene :> It is tricyclic aromatic hydrocarbon found in coal tar and used for as starting material for manufacture of dyestuff. crude anthracene crystallize form a high boiling coal tar fraction.

It is purified crystallisation and sublimation Pure anthracene crystallize in colourless monoclinic plate which show a blue fluorescence under ultraviolet radiation. It is used in dyestuff insecticides and wood preservative and coating material.

Anthracene is commonly used as or tracer in conformal coating applied printed wiring boards. It is also used as smokescreen counter crystal and inorganic semiconductor research.

Side effect:-

- Anthracene can effect you when breathed in.
- Skin contact can cause irritation itching and burning which is greatly aggravated by sunlight repeated contact can cause thickening of skin and pigment change.
- Eye contact can cause irritation and burning.
- Breathing anthracene can irritate the nose, throat causing coughing wheezing.
- It may cause skin allergy which itching and skin rashes.

Aim :-

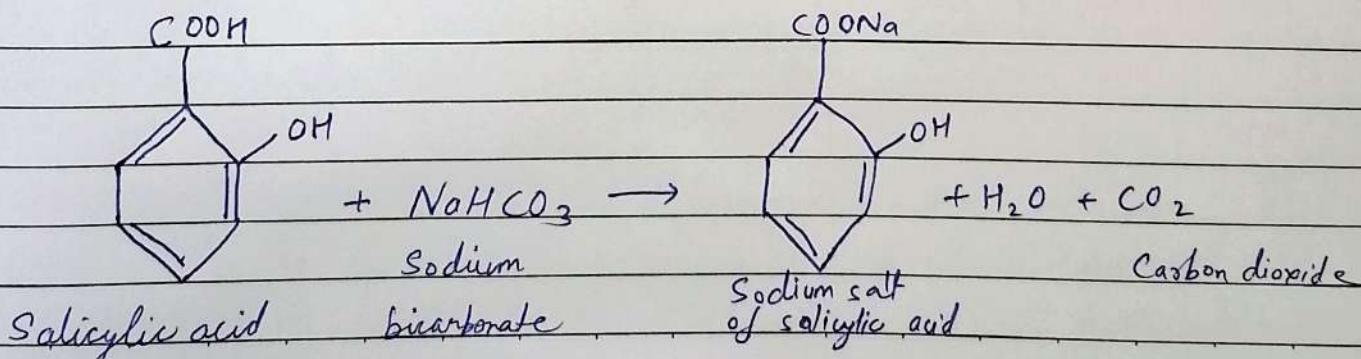
To identify the extra element and the functional group present in the given sample (salicylic acid).

Reference :-Requirement :-

Ignition tube, Pair of tongs, test tube holder, China dish, tripod stand, wire gauze, funnel and filter paper.

Theory :-Sodium bicarbonate test :

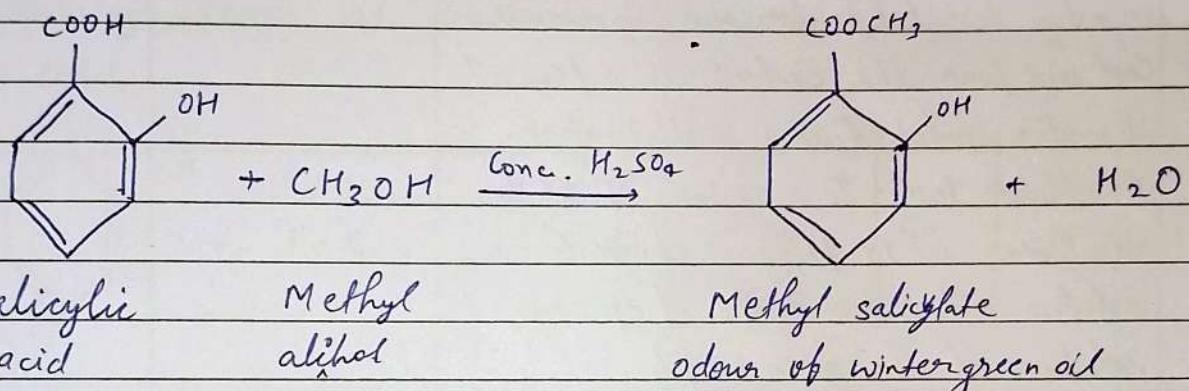
Place a little of the substance in a test tube and add 2 ml of 5% aqueous sodium bicarbonate solution. The acids form their corresponding sodium salts with the liberation of carbon dioxide.



Teacher's Signature _____

Ester test :-

Heat about 0.5 g of the sample with 1 ml of methyl
alcohol and a few drops of concentrated H_2SO_4 in a
dry test tube for about a minute. Cool and pour the
contents to a few ml of water contained in a small beaker.
Salicylic acid can be identified by the colour of
wintergreen oil.



Concentrated H_2SO_4 checks the reversibility of the reaction and acts as a dehydrating agent.

Acriflavine test:

Appearance of yellow or brown-yellow precipitate confirms the presence of COOH group.

Ferric chloride test:

This test is carried out in a containing neutral solution. Put about 0.5g of the substance in a boiling test tube and add dilute ammonia solution until the contents are just alkaline.

26

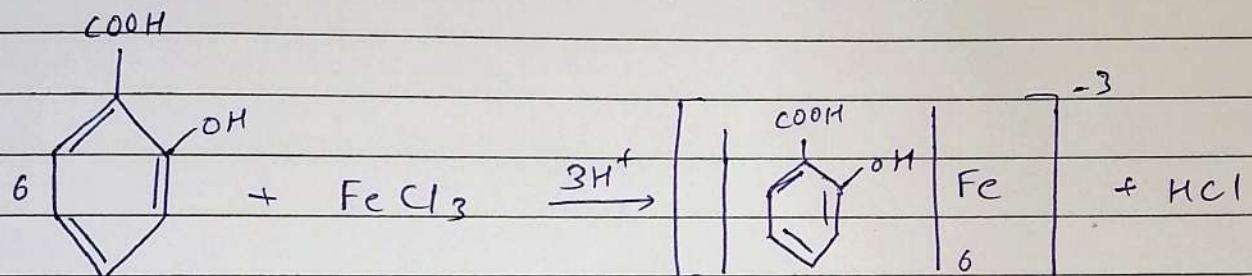
Tests for Carboxylic Acids

S.No	Experiment	Observation	Inference
1.	Sodium bicarbonate test - Place a little of the substance in a test tube and add 2 ml of 5% aqueous sodium bicarbonate soln.		
2.	Ester formation - Heat about 0.5g of the sample with 1ml of methyl alcohol and add a few drops of conc. H_2SO_4 in a dry test tube for about a minute. Cool and pour the contents to a few ml of water contained in a small beaker.		
3.	Acriflavine test. - To a mixture of 0.2% acriflavine and 1% potassium chromate solution add a few drops of aqueous solution of the given sample.		
4.	Ferric Chloride Test - Put about 0.5g of the substance in a boiling test tube and add dilute ammonia solution until the contents are just alkaline to litmus paper. Boil the solution gently until the odour of ammonia is not there. To cold solution add few drops of ferric chloride solution.		
5.	Benzylthiourea test - Dissolve about 0.5g of the sample in minimum volume of water. Add 5% sodium hydroxide soln until the solution is just alkaline to methyl orange. Add a drop of dilute HCl. In another test tube dissolve 0.8g of benzylthiourea chloride in 2ml of water. Mix the 2 solutions. Cool in ice bath.		

to litmus paper. Boil the solution gently until the odour of ammonia is ~~not~~ not there. To the cold solution add few drops of ferric chloride solution. A violet colour indicates the presence of salicylic acid.

Benzylthiouronium Test

Benzylthiouronium salt of the acid separates out.
(Chemistry same as previous experiment).



Salicylic acid Ferric chloride violet coloured complex Hydrochloric acid.

Result:-

The given organic compound has been studied successfully in the laboratory.