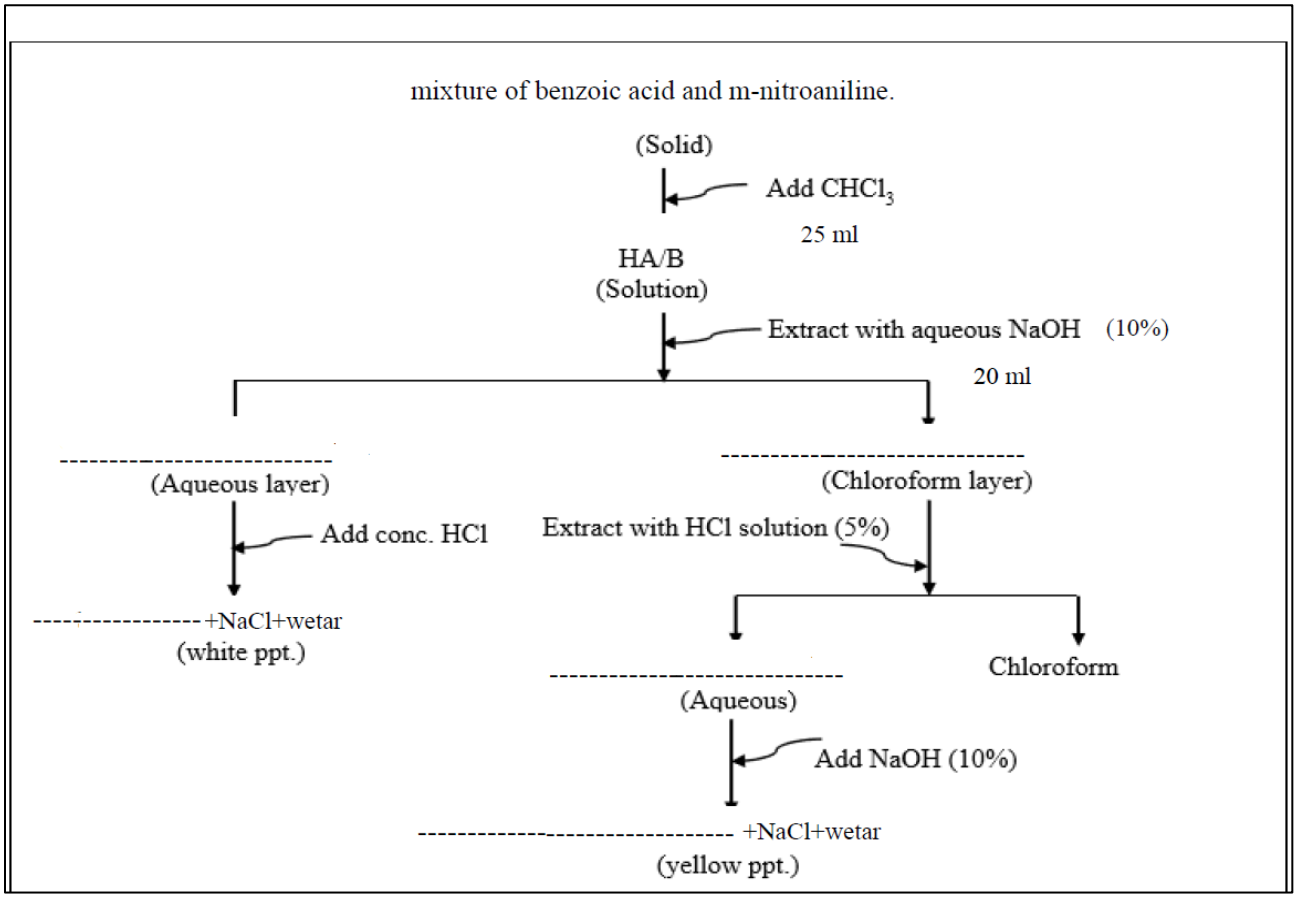
# Solubility

| Tube no. | Test | Observation | Conclusion |
|---|---|---|---|
| 1 | Place 1 mL of distilled water in the test tube, add 0.5 ml hexane and shake. | | |
| 2 | Place 1 mL of distilled water in the test tube, add 0.5 mL of ethanol and shake. | | |
| 3 | Place 1 mL of distilled water in the test tube, add 5 drops of 1-hexanol and shake. | | |
| 4 | 1) Place 1 mL of distilled water in the test tube, add 1 mL of ether and shake.<br>2) Add one drop of red dye (in water) to the ether/water mixture.<br>3) Add ethanol to the ether-water mixture | | |
| 5 | Place 1 mL of distilled water in the test tube, add 1 mL of chloroform and shake. | | |
| 6 | 1) Place 1 mL of chloroform in the test tube, add 1 mL of azo-dye solution (in water) and shake.<br>2) Shake vigorously<br>3) Add 3 drops of 5% NaOH solution to the dye/water/ether mixture. | | |

# Extraction

## 1) Complete the following diagram.




## 2) Predict the outcome of the following extractions?

**1) Benzoic acid dissolved in ether.**

a) Extract with aqueous HCl ……

b) Extract with H2O …….

c) Extract with aqueous NaOH …….

**2) Aniline dissolved in ether.**

a) Extract with aqueous HCl ……

b) Extract with H2O …….

c) Extract with aqueous NaOH …….

## Aliphatic Hydrocarbon (Alkanes and Alkenes)

| Tube no. | Test | Observation | Conclusion |
|---|---|---|---|
| 1 | a) Addition of bromine to cyclohexane<br>b) In sunlight<br>c) Test for the presence of HBr by $NH_4OH$ | | |
| 2 | a) Addition of bromine to cyclohexene<br>b) Test for the presence of HBr by $NH_4OH$ | | |
| 3 | a) Oxidation of alkene (cyclohexene) by dil. $KMnO_4$ | | |

1) Write the chemical equations for the addition of bromine to a) cyclohexene & b) cyclohexane in the presence sunlight.

2) Write the chemical equation for the oxidation of cyclohexene by $KMnO_4$.

3) Write the chemical equation for the addition of bromine to 2-pentene.

4) Write the equation for the oxidation of propene.

## Aromatic Hydrocarbons

| Tube no. | Test | Observation | Conclusion |
|---|---|---|---|
| 1 | Addition of bromine to benzene<br>a) without Fe powder<br>b) With Fe powder | | |
| 2 | Oxidation test<br>a) benzene with $KMnO_4$ | | |
| 3 | Oxidation test<br>b) p-Methoxy-toluene with $KMnO_4$ | | |
| 4 | Oxidation test<br>c) Methoxy-toluene with $KMnO_4$ | | |
| 5 | Nitration of benzene | | |

1) How can you test for the formed hydrogen bromide from the reaction of benzene with bromine? Explain by equation.

2) Can HBr be produced from the reaction of bromine with alkene?

## Hydroxy Compounds (Alcohols and Phenols)

| Tube no. | Test | Observation | Conclusion |
|---|---|---|---|
| 1 | Preparation of Alkyl Halide from Alcohol.<br>a) t-butanol + HCl | | |
| 2 | Oxidation of alcohol with $KMnO_4$ or $H_2CrO_4$.<br>a) Primary alcohol (ethanol) | | |
| 3 | b) Secondary alcohol (isopropanol). | | |
| 4 | c) Tertiary alcohol (t-butanol) | | |
| 5 | Acidity of phenol<br>a) bromothymol blue | | |
| 6 | b) bromophenol blue. | | |
| 7 | Electrophilic substitution in phenol<br>a) phenol with bromine water | | |
| 8 | Reaction with $FeCl_3$ | | |
| 9 | Alkylation of aromatic ring<br>a) 1,4dimethoxybenzene with t-butanol | | |

**Question**

1) Write the chemical equation for phenol with ferric chloride.

2) Write the chemical equation for preparation of toluene from benzene.

# Preparation of Aspirin

**Observation**

……

……

……

**Weight of Aspirin obtained =** …….. g.

**Meting point of Aspirin =** …….. □C.

**Questions**

**What is the structure of Aspirin?**

# Aldehydes and Ketones

| Tube no. | Test | Observation | Conclusion |
|---|---|---|---|
| 1 | Carbonyl Compounds with Amines<br>a) Benzaldehyde with p-methoxy aniline. | | |
| 2 | 2,4-Dinitrophenylhydrazone Formation.<br>a) Aldehyde or ketone with 2,4-dinitrophenylhydrazone | | |
| 3 | Reduction of<br>a) Aldehyde or ketone By $NaBH_4$ | | |
| 4 | Oxidation of<br>a) Aldehyde or ketone by chromic acid | | |
| 5 | **Distinguishing Test**<br>a) Oxidation by weak oxidizing agent (Tollen's reagent) | | |

**Questions:**

1) **Write the equation represents the reduction of benzaldehyde.**

2) **Write the equation represents the oxidation of p-methoxy benzaldehyde.**

## Carbohydrates:

| Physical properties: | | | |
|---|---|---|---|
| Color | | | |
| Shape | | | |
| Solubilities | | | |
| **Test** | | **observations** | **Results** |
| 1 | Effect of heat | | |
| 2 | Molisch's Test | | |
| 3 | Conc. $H_2SO_4$ Test | | |
| 4 | Barfoed's Test | | |
| 5 | (Tollen's Test)<br>Ammoniacal Silver Nitrate | | |
| 6 | Fehling's Test | | |
| 7 | Osazone formation | | |
| 8 | Rapid Furfural Test | | |
| 9 | Ketose Test | | |
| 10 | Iodine test | | |
| 11 | Water Solubility Test | | |

## Q 1) Predict the observations of the following tests.

| Test | Glucose | Lactose | Sucrose | Starch |
|---|---|---|---|---|
| Molisch's test | | | | |
| Solubility | | | | |
| Tollen's test | | | | |
| Fehling's test | | | | |
| Barfoed's test | | | | |
| Iodine's test | | | | |

## Carboxylic acids & their derivative

| Tube no. | Test | Observation | Conclusion |
|---|---|---|---|
| 1 | Reaction of Acetic Acid and Bicarbonate. | | |
| 2 | Esterification<br>a) salicylic acid with alcohol. | | |
| 3 | Ester Hydrolysis | | |

## Amino Compounds

| | | | |
|---|---|---|---|
| 1 | Solubility test | | |
| 2 | Basicity of amine aniline tested by<br>a) phenolphthalein<br>b) p-nitrophenol | | |
| 3 | Azo dye test | | |

Q 1) Write the chemical equation of the reaction for esterification reaction and hydrolysis of ester.

**Questions:**

1) Write the chemical equation for the bromination of aniline.

## De-Amination of Amino Acids

**Weight of o-hydroxybenzoic acid (salicylic acid) = ……. g.**

**m.p. of salicylic acid = ……. $^{o}$C.**

**Questions**

**What will happen if you add sodium nitrate to aniline solution dissolved in sulfuric acid and why?**

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**Diazonium salts can be produced from the reaction of secondary and tertiary aromatic amines with nitrous acid, if NO, explain the expected products by chemical equation.**

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