10/10

Excellent

MELTING POINTS

Name	لين بكر أبوزر	Section	3

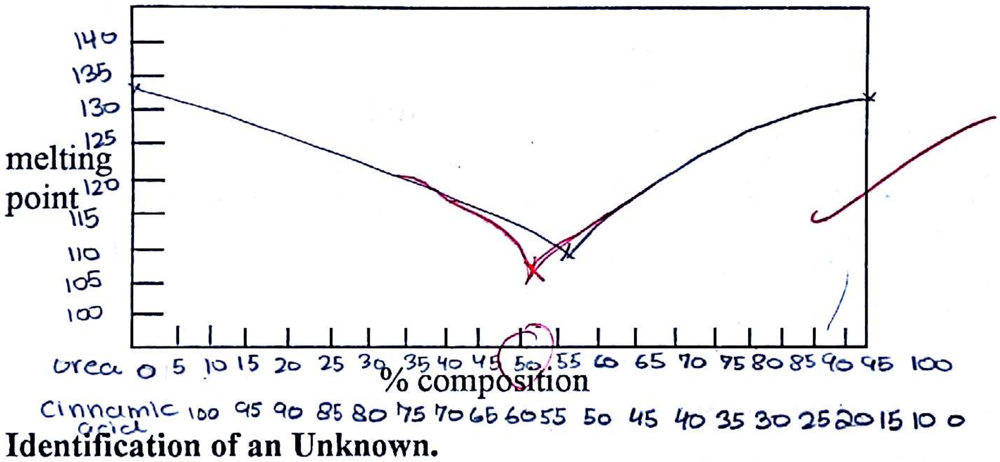
(1-5) الاثنين

Determination of Melting Points.

T_1 T_2

Compound	Start	End	m.p Range	Midpoint
Pure Compounds:				
1. urea	130°c	132°c	2	131°c
2. cinnamic acid	132°c	133°c	1	132.5°c
Mixtures: 50 : 50 1:1 20 : 80 80 : 20	98°c	122°c	24	110°c

Plot the midpoints of the melting points of the two pure compounds and their mixtures.



Identification of an Unknown.

Unknown number: 43

Melting point of unknown: 130°c

Possible Compounds:

Compound	Melting Point
1. urea	132°c
2. cinnamic acid	133°c
3.	

10/10

Excellent

MELTING POINTS

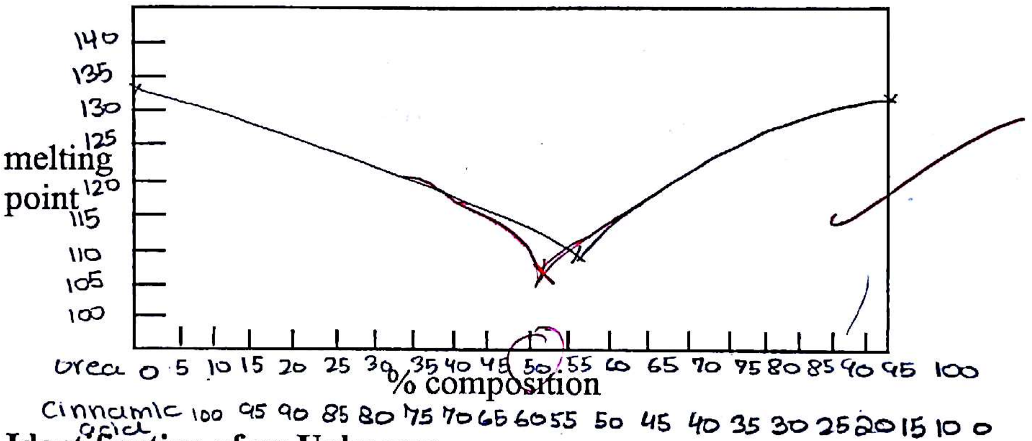
Name	لين بكر أبوزر	Section	3

(1-5) الاثنين

Determination of Melting Points.

Compound	T_1 Start	T_2 End	m.p Range	Midpoint
Pure Compounds:				
1. urea	130 °c	132 °	2	131 °c
2. cinnamic acid	132 °c	133 °c	1	132.5 °c
Mixtures:				
50 : 50 1:1	98 °c	122 °c	24	110 °c
20 : 80				
80 : 20				

Plot the midpoints of the melting points of the two pure compounds and their mixtures.



Identification of an Unknown.

Unknown number: 43

Melting point of unknown: 130 °c

Possible Compounds:

Compound	Melting Point
1. urea	132 °c
2. cinnamic acid	133 °c
3.	

9/10

BOILING POINTS AND DISTILLATION

Name	Leen Abuzir لين أبوزر	Section	3

Simple Distillation of Pure Acetone.

Boiling point of pure acetone found: 52°c reported: 56°c

Account for any difference (if any) between the reported boiling point and the value obtained: external pressure differs from the atmosphere at sea level which is 760 ~~mL~~ mmHg ??!

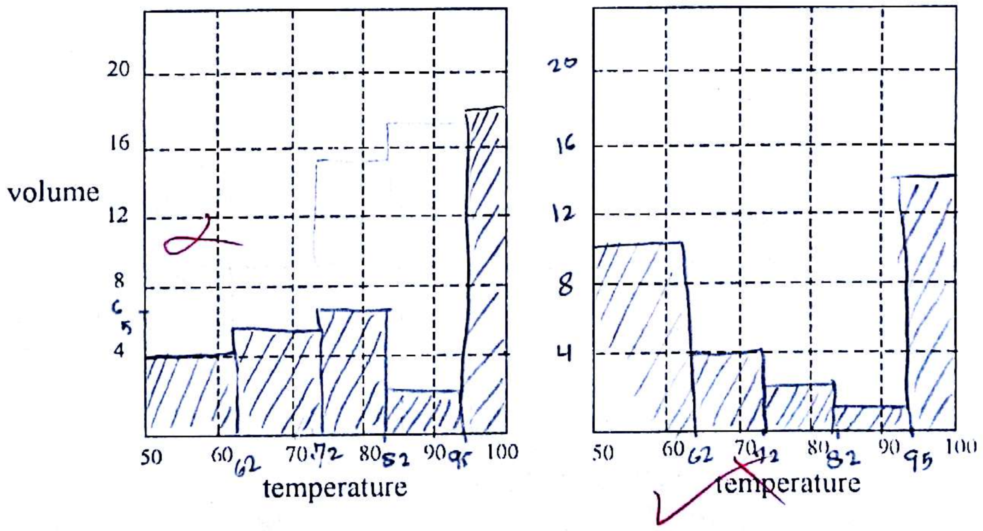
but in atab less than 7

Separation of a Mixture of Acetone and Water.

1.

Fraction	Boiling Range	Volume of Distillate Simple	Volume of Distillate Fractional	Composition of distillate
I	50 - 62	4 mL	10 mL	acetone
II	62 - 72	5 mL	4 mL	mixture
III	72 - 82	6 mL	2 mL	mixture
IV	82 - 95	2 mL	1 mL	mixture
V	residue	18 mL	14 mL	water

2. Plot the boiling point versus the volume of distillate for the acetone-water mixtures using simple and fractional distillation.



Which procedure was more efficient in separating the mixture into its components? Fractional distilation

QUESTIONS

1) A pure liquid has a constant boiling point, but a liquid with a constant boiling point is not necessarily pure. Explain.

Because a liquid mixture of components of the same boiling point will have constant boiling point ; not necessarily pure

2) What is the effect of each of the following on the observed bp?

a) The thermometer is not kept moist with condensate.

B.P increases (super heating)

b) The presence of a non-volatile impurity.

B.P increases if it was soluble
if not soluble b.p doesn't change

3) What effect does a reduction of the external pressure have on the boiling point?

B.P decreases

4) Why is it important that cooling water enters at the lower end and exits at the upper end of the condenser jacket, and not *vice versa*?

to ensure that condensed jacket is always Full of water ; because if it entered From the upper end ; the water is so cold the vapor will be cold Fast and condenses quickly

5) During a distillation why should the distilling flask be filled to two thirds of its capacity only?

To prevent bumping when heated

To allow enough space for boiling.

$\frac{9.5}{10}$

RECRYSTALLIZATION

Name		Section	

soluble +
insolu −

Selection of Recrystallizing Solvent

Compound	Solubility						Suitable Solvent
	water		alcohol		ligroin		
	cold	hot	cold	hot	cold	hot	
salicylic acid	−	+	+	+	−	−	water
anthracene	−	+	−	+	−	+	ligroin
sodium benzoate	+	+	−	+	−	-	alcohol

← 0.5

Recrystallization of an Unknown

Unknown No.: 37

ordinary polar

Solvent	water		alcohol		ligroin	
	cold	hot	cold	hot	cold	hot
Solubility	−	+				

Ⓐ

~~0.3.037~~
0.337
1.22

hot + قوية

Suitable recrystallizing solvent:

وزن مادة قبل التنقية

Mass of crude unknown : 1.00 g

Mass of the purified unknown : ~~1.07~~ 0.883

% yield : $\frac{\text{Actual}}{\text{strating}} \times 100\%$ = ~~$\frac{1.07}{1.00} \times 100\% = 107$~~ $\frac{0.883}{1} \times 100\% =$ 88.3%

Melting point of crude unknown :

Melting point of pure unknown :

QUESTIONS

✗ 1) Why is it preferable to allow the hot solution to cool gradually instead of chilling immediately in an ice-bath?

medium size, not powde

Because immediately cooling decrease the amount of crysta remain the ~~sue~~ to get good & suitable, size of cryste

2) Mention three properties a solvent should have to be suitable for recrystallizing a particular organic compound?

2) Mention three properties a solvent should have to be suitable for recrystallizing a particular organic compound?

[1] Not react with the substance
[2] Dissolve a large amount of the solid to be purfified at high temperature

[3] Evaporate readily from the crystals

3) For what purpose is charcoal used in recrystallization?

remove the colored impurities

الإجابة:

4) How are insoluble impurities removed during recrystallization?

Gravity filtration of hot solution

Filtration of the host solution is necessary to remove insoluble impurities. A fluted filter paper and a short-stem funnel allow rapid filtration and avoid premature crystallization in side

ok

5) Why must the flask and funnel be heated before the hot solution is filtered?

avoid premature crystallization inside the steam and on the filter paper and stem of funnel

6) Why is it important to minimize evaporation during the filtration of the hot solution?

A slight excess of the solvent is usually added to compensate for any losses during hot filtration

to minimize Loss of substance through crystalization on filter paper

EXTRACTION

Name		Section	3

mass of beaker :- 93.811g

mass of beaker + caffeine :- 93.931g

10/10

Isolation of Caffeine from Tea Leaves

Mass of tea leaves: 15g

Mass of extracted caffeine: 0.12g

Percentage of caffeine in tea leaves: $\frac{0.12}{15} \times 100 = 0.8\%$

Separation of a Two-Component Mixture

Mass of recovered benzoic acid:

Mass of recovered *p*-dichlorobenzene:

QUESTIONS

1) Why should the stopper be removed from the separatory funnel before liquid can be withdrawn through the stopcock?

In order for the pressure in the separatory funnel to be the same everywhere.

2) What are the properties of a suitable solvent for the extraction of an organic solute from an aqueous solution?

A- immiscible with H_2O

B- low b.p

C- non-Flammable

D- readily dissolves your substance more than in an aqueous layer.

3) What is the role of sodium carbonate in the extraction of caffeine from tea leaves? It is used to remove acidic tannins by converting them to water-soluble salts

4) What effect does partial miscibility of the two solvents have on the efficiency of the extraction?

That will reduce the efficiency of the extraction because Some of the desired solvent will be dissolved in the other Solvent and as a result the amount of the desired solvent will be less

5) The distribution coefficient, K_D (C_{ether}/C_{water}), for an organic substance X at room temperature is 10. What relative volumes of ether to water should be used for the extraction of 90 percent of X from a water solution in a single extraction?

$$K_D = 10 = \frac{C_{ether}}{C_{water}}$$

$$10 = \frac{\frac{0.9}{V.org} \rightsquigarrow \text{From } \frac{90}{100}}{\frac{0.1}{V.H_2O} \rightsquigarrow \frac{10}{100}}$$

$$\frac{V\ org}{V\ H_2O} = 0.9$$

STEAM DISTILIATION

10

١٠

Name		Section	

Steam Distillation of Bromobenzene.

Fraction Number	Boiling Range	Volume of Water	Volume of Bromobenzene
1	93	5.4	4.2
2	93	5.9	4.9
3	93	5.5	4.5

Isolation of Essential Oils.

Name of spice used: قرنفل

Mass of ground spice: 10 g

Mass of essential oil: 0.32 g

Percentage of essential oil in the spice : 3.2%

QUESTIONS

1) Discuss the results of part 1, concerning the boiling point, and composition of the distillate. Compare these results with those obtained from the water-acetone mixture in the distillation experiment (p. 30).

simple distilation

① water & acetone have boiling point close to other → variable

② composition different variable

③ $X_A \mp X_B = 1$

steam distilation

① constant boiling point

② composition is constant

③ $X_A + X_B = 1$

*2) What are the advantages and disadvantages of steam distillation as a method of purification?

disadvantage

① steam-volatile

② Inert toward steam and stable under the conditions

③ Immiscible with water

Advantages ⇒ Purification of high-boiling compounds by low-temperature distillation and so replaces vacuum distillation

3) Suggest another possible method that might be used to obtain essential oils from the spices.

- Solid-liquid extraction
- Vacuum distillation

4) At 95.5 °C, the vapor pressure of water is 641 mm, and that of bromobenzene is 119 mm. Calculate the molar ratio and the weight ratio of bromobenzene to water when a mixture of the two is distilled at 760 mm. Compare the answers with your experimental results. (density of bromobenzene = 1.5 g/mL).

① $$\frac{n_{Bro}}{n_{H_2O}} = \frac{P^{o}_{Bro}}{P^{o}_{H_2O}} = \frac{119}{641} = 0.186$$

ⓑ $$\frac{m_{Bro}}{m_{H_2O}} = \frac{P^{o}_{Bro}\, M_{w\,Bro}}{P^{o}_{H_2O}\, M_{w\,H_2O}} = \frac{119 * 157}{641 * 18} = 1.62$$

ExP $$\frac{wt_B}{w_{H_2O}} = \frac{(\text{Density} * \text{vol})_B}{(\text{Density} * \text{vol})_{H_2O}} = \frac{(1.5)(4.2)_B}{(1)(5.4)_{H_2O}} = 1.166$$

$$\%\ \text{error} = \frac{1.166 - 1.621}{1.62} * 100\% = |-28\%|$$

× 100%

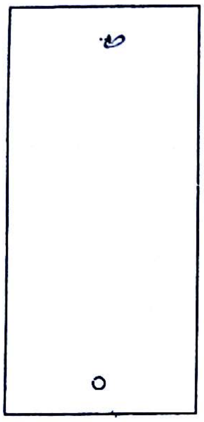
$$= 28\%$$

CHROMATOGRAPHY

Name		Section	

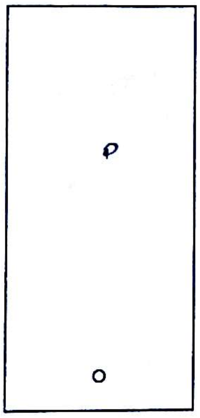
10/10

TLC Examination of Isomeric Nitroanilines.



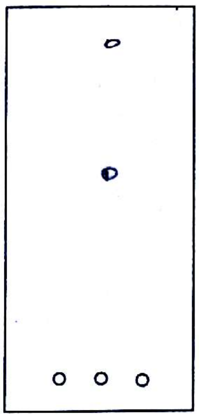
ortho-isomer

$R_f = \frac{4.6}{5.4} = 0.85$



para-isomer

$R_f = \frac{3.1}{5.4} = 0.57$



mixture

$R_f = \frac{4.6}{5.4}$ (ortho)

$R_f = \frac{3.1}{5.4}$ (para)

Analysis of Analgesic Drugs.

Name of the analgesic drug :

The components of the analgesic drug are:

1)

2)

3)

Paper Chromatographic Analysis of a Dye.

R_f-value for the yellow dye: $\frac{1.2}{2} = 0.6$

R_f-value for the blue dye: $\frac{1.6}{2} = 0.8$

QUESTIONS

1) How will the following affect the *TLC* separation?

a) too much sample applied.

too much sample large spot which intering and over laping of close spot of (RF) will not clear & not accurate

b) Stationary phase is too active.

R_F will decrease because the molucule of the component will be bounded to the adsorbent and it will move ashort distance

c) Forgetting to remove the plate when the solvent has reached the top of the plate.

the slower moving spots will catch up with the Faster moving spots at the top of the Plate & we cant Find (R_F)

d) Having too much solvent in the developing chamber so that its surface extends above the origin.

the spots will dissolve in the solvent so we cant show the differ between the spot

e) Polarity of the solvent being too high.

R_F ↑ → poore seperation.

The mix will be Eluided to Fast

2) Which dye is more soluble in *n*-propyl alcohol, the blue or the yellow? How can you tell?

Blue it travelled more than yellow

3) Which compound is more strongly adsorbed on silica, *ortho*- or *para*-nitroaniline? Correlate the R_f values with the structures.

Para -nitroaniline

R_F-para is less than R_F-ortho

$\frac{9.5}{10}$

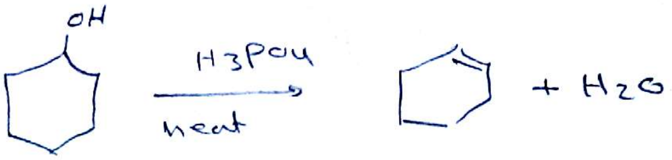
Excellent

DEHYDRATION OF ALCOHOLS

Name		Section	

I (or II). Preparation of Alkenes

Write a balanced equation for the preparation of the alkene.



37.66

Alcohol		Alkene	
molecular weight	100	molecular weight	82
grams used	9.6 g	moles expected	0.1
moles used	0.1	grams expected (theoretical yield)	8.2
		grams obtained (actual yield)	1.6
percentage yield = $\frac{\text{actuall yield}}{\text{theoretical yield}}$ × 100			$\frac{1.6}{8.2}$ × 100%

= 19.5%

low

III. Tests for Unsaturation

a) Bromine test: (equations and observations)

Alkene:

$-\overset{|}{C}=\overset{|}{C}- + Br_2 \xrightarrow[CH_2Cl_2]{} -\underset{Br}{\overset{|}{C}}-\underset{Br}{\overset{|}{C}}-$ (colorless)

Alkane: (red-brown)

$-\underset{|}{\overset{|}{C}}-\underset{|}{\overset{|}{C}}- + Br$ (red-brown) → not react (red-brown

b) Baeyer test: (equations and observations)

Alkene:

$-\overset{|}{C}=\overset{|}{C}- + 2KMnO_4 + 4H_2O \rightarrow -\underset{OH}{\overset{|}{C}}-\underset{OH}{\overset{|}{C}}- + 2MnO_2 + 2KOH$

purple

brown

brown

Alkane:

$-\underset{|}{\overset{|}{C}}-\underset{|}{\overset{|}{C}}- + 2KMnO_4 + 4H_2O \rightarrow$ not react

purple

Purple

QUESTIONS:

1) Dehydration reactions are acid-catalyzed. What is the function of the acid in such reactions? alcohole having, β-Hydrogen can be converted in to alkenes by dehydration (elmination of amolucels of water convert OH-bad leaving group to OH_2^+ good leaving group.

2) Could hydrochloric acid be an acceptable substitute for the acid used in this experiment? Explain. NO — will convert alcohols to alkyl halides instead of to alkenes

3) Why was it necessary to wash the crude alkene with a solution of aqueous base ? Na_2CO_3 to remove tracts of acid in crude alkene to prevent the hydration of Alkenes back to alchole

mass of beaker = 35.374 g

beaker + alkyl = 37.757 g

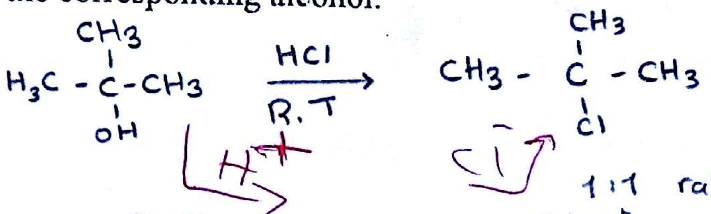
NUCLEOPHILIC SUBSTITUTION

10

Name		Section	

I (or II). Preparation of Alkyl Halide

Write an overall equation for the preparation of the alkyl halide from the corresponding alcohol.



$H_3C-\underset{OH}{\overset{CH_3}{C}}-CH_3 \xrightarrow[R.T]{HCl} CH_3-\underset{Cl}{\overset{CH_3}{C}}-CH_3$

1:1 ratio

mass

Theoretical yield of alkyl halide: = moles of alkyl halide * molar mass of alkyl halide

0.075 * 92.5 = 6.9375 g

Actual yield: 2.38 g

Percentage yield: $\frac{2.38 g}{6.9375 g}$ × 100% = ~~34.34 %~~

III. Relative Reactivities of Alkyl Halides

Alkyl Halide	Reaction Time AgNO$_3$	NaI
1-chlorobutane	slow ppt	
2-chlorobutane	intermediate ppt	
2-chloro-2-methylpropane	Fast ppt	
allyl chloride (x)		
chlorobenzene.	no rxn	

↳ Inert (SN1 nor SN2)

Order of reactivity towards AgNO$_3$: ↳ NaI

↳ AgNO$_3$

2-chloro-2-methyl propane > 2-chlorobutane > 1-chlorobutane

3° > 2° > 1°

Order of reactivity towards NaI:

1-chlorobutane > 2-chlorobutane > 2-chloro-2-methyl propane

1° > 2° > 3°

QUESTIONS

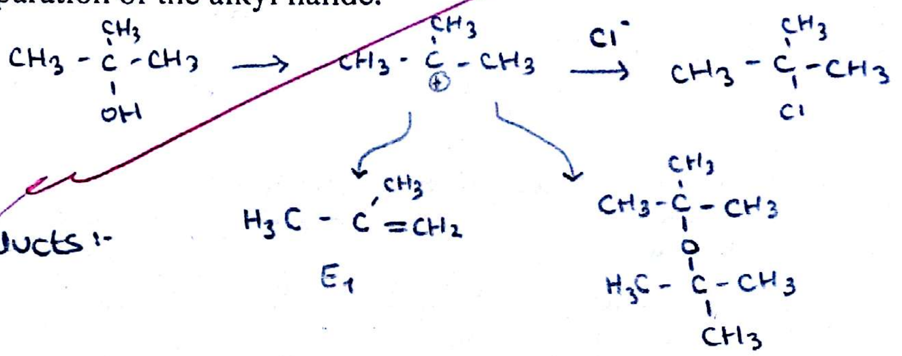
1) Write all the steps in the purification of the alkyl halide mentioning the purpose of each.

1- After seperating the aqueous layer from the organic layer ⇒ wash with cold water to get rid of excess unreacted alcohol and to avoid evaporation

2- Seperate once again and pour the organic layer in a Flask containing anhydrous calcium chloride

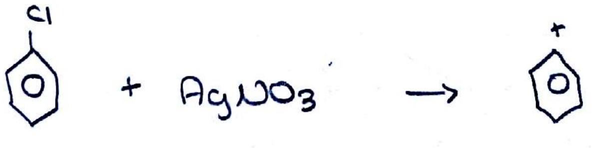
3- decant into a beaker and weigh the beaker with contents

2) Write the structure of all possible by-products that may form during the preparation of the alkyl halide.



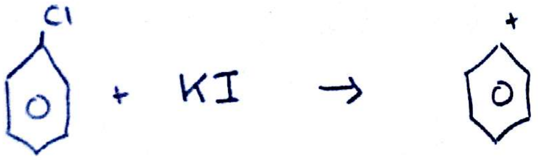
By products :-

3) Account for the low reactivity of chlorobenzene towards silver
SN1 SN2
nitrate and sodium iodide.



will not Form (unstable)

∴ due to the unstability of the carbocation it doesn't undergo SN1 nor SN2



unstable

(1) mass of Filter paper = 0.308 g

(3) mass with product = 4.324 g

ELECTROPHILIC AROMATIC SUBSTITUTION

Name		Section	3

10/10

I. Bromination of Acetanilide

Write an equation for the preparation of *p*-bromoacetanilide

Theoretical yield of *p*-bromoacetanilide:

Actual yield:

Percentage yield:

QUESTIONS

1) Write an equation for the formation of the bromonium ion in this experiment

2) How can you remove excess bromine?

II. Nitration of Phenol

Write an equation for the preparation of *o*- and *p*-nitrophenol.

	o-Nitrophenol	*p*-Nitrophenol
Theoretical yield		
Actual yield		
Percentage yield		

QUESTIONS

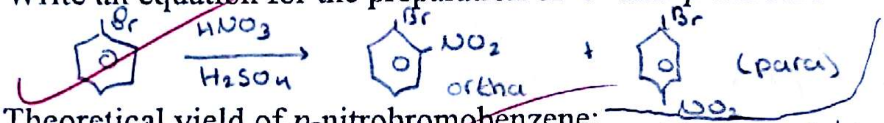
1) Write equations that show the mechanism for the nitration of phenol.

2) Why should the temperature be kept between 45-50 during the experiment?

3) What makes it possible to separate *o*-nitrophenol from the *p*-isomer by steam distillation?

III. Nitration of Bromobenzene

Write an equation for the preparation of *o*- and *p*-nitrobromobenzene.



Theoretical yield of *p*-nitrobromobenzene: 0.02 mol bromo × $\frac{1 \text{ mol P}}{1 \text{ mol B}}$ × 202 = 4.04g

Actual yield: 4.016 g

Percentage yield: $\frac{4.016}{4.04} \times 100\% =$ 99.4 %

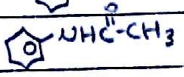
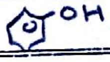
QUESTIONS

1) What has happened to the *o*-nitrobromobenzene that was formed in this experiment? How can it be recovered? It is dissolved in the ethanol solvent and is recovered through evaporation of ethanol

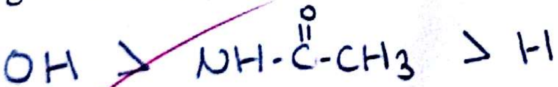
2) Why should the temperature be kept between 45-50 during the experiment? Because if it exceeds that temperature range it will lead to dinitration of bromobenzene

IV. Relative Bromination Rates.

seen

compound	Structure	Reaction time
benzene		no reaction
acetanilide	 NHC(=O)-CH3	medium
phenol	 OH	fastest

From your results, arrange the groups: NH-CO-CH3, H and OH in decreasing order of ring activation towards bromination.



$$OH > NH-\overset{O}{\overset{\|}{C}}-CH_3 > H$$

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8/10

ALCOHOLS AND PHENOLS

Name		Section	3

I. ALCOHOLS

1. Solubility of Alcohols in Water

seek?

Alcohol	Structure	Solubility
1-butanol	$CH_3CH_2CH_2CH_2OH$	−
2-methyl-2-propanol	$H_3C-\overset{OH}{\underset{CH_3}{C}}-CH_3$	+
cyclohexanol		−
ethylene glycol	$\underset{OH}{CH_2}-\underset{OH}{CH_2}$	+

What general conclusions can you draw concerning the solubility of alcohols in water? Alcohols of low moleculer weight are water soluble due to their obility to form hydrogen ponds with H_2O, solubility in water decrease with increasing (Mw) but increase with branching & with the number of (OH) group

2. Acid Properties of Alcohols

Alcohol	Reaction Equation	Observations
① 1-butanol	$CH_3CH_2CH_2OH + 2Na \rightarrow$ $2CH_3CH_2CH_2ONa$	V. fast
② 2-butanol	$CH_3CH_2\underset{OH}{CH_2}CH_3 + 2Na \rightarrow$ $\overset{ONa}{2CH_3CH_2CH_2CH_3}$	fast
③ 2-methyl-2-propanol	$CH_3\overset{OH}{\underset{CH_3}{C}}-CH_3 + 2Na \rightarrow CH_3-\overset{ONa}{\underset{CH_3}{C}}-CH_3$	NO rxN

Arrange the three alcohols according to their rates of reaction with sodium: 1° > 2° > 3°

1-butanol > 2-butanol > 2-methyl-2-propan

? Account for the color change observed upon addition of phenolphthalein to the solution of 1-butanol:

The color becomes pink due to the basic medium result From the Formation of the sodium salt of alcohols

3. Oxidation of Alcohols with Chromic Acid

Alcohol	Reaction Equation	Observations
1-butanol	$CH_3CH_2CH_2CH_2OH + K_2Cr_2O_7 \rightarrow$ $CH_3CH_2CH_2\overset{O}{\overset{\|}{C}}-H + Cr^{+3}$	green ✓
2-butanol	$CH_3CH_2\overset{OH}{\overset{\|}{CH}}CH_3 + K_2Cr_2O_7$	slow Green
2-methyl-2-propanol	$CH_3CH_2\underset{O}{CH}CH_3 + Cr^{+3}$ → No Rxn	~~Fast~~ No Rxn

ok

4. Lucas Test

Alcohol	Structure of Product	Observations
① 1-butanol	$CH_3CH_2CH_2CH_2OH$	No ryn
② 2-butanol	$CH_3\underset{Cl}{CH}CH_2CH_3$	slow
③ 2-methyl-2-propanol	$CH_3-\overset{CH_3}{\underset{Cl}{C}}-CH_3$	Fast (turbidity)

ok

Arrange the three alcohols according to their rates of reaction with the Lucas reagent:

3° > 2° > 1°

2-methyl-2-propanol > 2-butanol > 1-butanol

5. Iodoform Test

Alcohol	Structure of Product	Observations
1-butanol		
2-butanol		
2-methyl-2-propanol		

II. PHENOLS

1. Acidity of Phenols

seen

Compound	Structure	Solubility	
		Water	NaOH
cyclohexanol		✗	✗
phenol		✗	✓
p-cresol		✗	✓

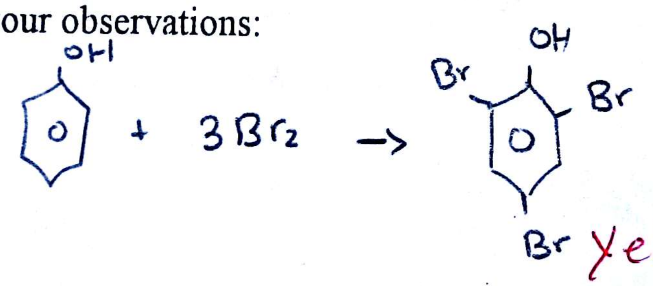
Write your conclusion about the solubility of alcohols and phenols in water and NaOH solutions:

only phenol and p-cresol are soluble in NaOH only, because phenol is stronger acid.
in H_2O they aren't
and cyclohexanol isn't soluble in any.

2. Reaction of Phenols with Bromine Water

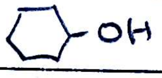
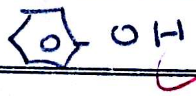
Write an equation for the reaction of phenol with bromine water giving your observations:

seen



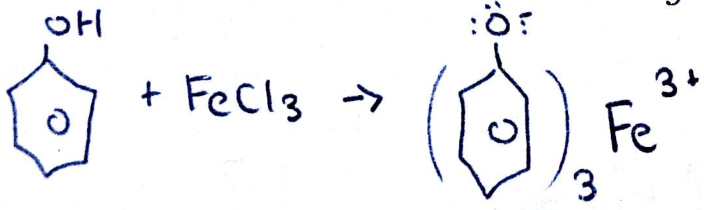
yellow ppt

3. Ferric Chloride Test

Alcohol	Structure	Observations
cyclohexanol		no reaction
phenol		reacts → violet.

} ok

Write an equation for the reaction of phenol with $FeCl_3$:



violet

ALDEHYDES AND KETONES

9.5

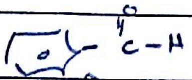
Name		Section	

1. 2,4-Dinitrophenylhydrazine Test

Compound	Structure	Observations and Results
acetone	$CH_3\overset{O}{\overset{\|}{C}}CH_3$	+ve orange ppt
benzaldehyde		+ve " "

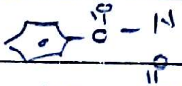
-0.5

2. Tollens' Test

Compound	Structure	Observations and Results
formaldehyde	$H-\overset{O}{\overset{\|}{C}}-H$	+ve fast to form mirror
benzaldehyde		+ve mirror form after heating
acetone	$CH_3\overset{O}{\overset{\|}{C}}CH_3$	-ve no rxn

seen

3. Fehling's or Benedict's Tests

Compound	Structure	Observations and Results
formaldehyde	$H-\overset{O}{\overset{\|}{C}}-H$	red +ve
benzaldehyde		red +ve
acetone	$CH_3-\overset{O}{\overset{\|}{C}}-CH_3$	no rxn -ve

4. Iodoform Test

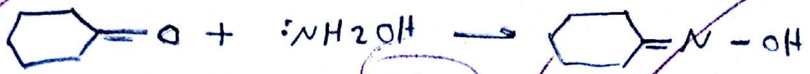
Compound	Structure	Observations and Results
acetone	$CH_3\overset{O}{\overset{\|}{C}}CH_3$	yellow ppt
2-propanol	$C-\overset{OH}{\overset{\|}{C}}-C$	yellow ppt
2-pentanone	$C-\overset{OH}{\overset{\|}{C}}-C-C-C$	yellow ppt
3-pentanone	$C-C-\overset{OH}{\overset{\|}{C}}-C-C$	no rxn

ok

5. Cyclohexanone Oxime

seen

Chemical equation:



Observed melting point: white

X

6. Cyclohexanone Phenylhydrazone

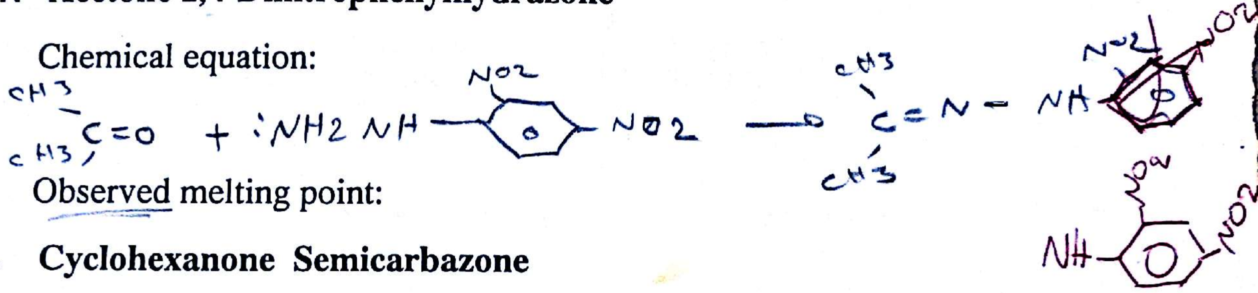
Chemical equation

Observed melting point:

seen

7. Acetone 2,4-Dinitrophenylhydrazone

Chemical equation:

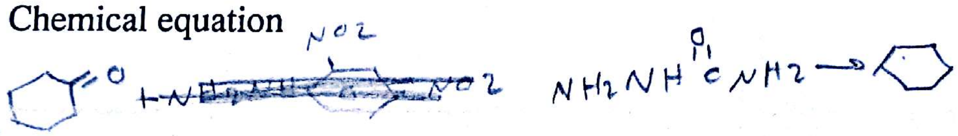


Observed melting point:

X

8. Cyclohexanone Semicarbazone

Chemical equation



Observed melting point:

X

9. Identification of Unknown

Unknown No.:

Tollen's Test:

Iodoform Test :

Derivatives Prepared: 1)... mp:.............

2) .... mp:.............

3)... mp:.............

Unknown is:

PREPARATION OF CARBOXYLIC ACIDS

0116978

Name	Leen Abuzir	Section	3

I. Benzoic Acid by Hydrolysis of Benzonitrile

Give the equation for the preparation of benzoic acid from benzonitrile.

Theoretical yield of benzoic acid:

Actual yield:

Percentage yield:

Melting point of benzoic acid:

QUESTIONS

1) Explain with the help of equations the function of the base in the hydrolysis of benzonitrile.

2) What impurity might be found in the benzoic acid prepared from benzonitrile? How does this impurity arise?

3) Would it be possible to use the nitrile method to achieve the following conversions? Illustrate with equations.

a) $\text{Ph-Br} \longrightarrow \text{Ph-COOH}$

b) $\text{Ph-CH}_2\text{Br} \longrightarrow \text{Ph-CH}_2\text{COOH}$

c) $\text{t-Bu-Br} \longrightarrow \text{t-Bu-COOH}$

II. Benzoic Acid by the Haloform Reaction

Write an equation for the preparation of benzoic acid from acetophenone:

Theoretical yield of benzoic acid:

Actual yield:

Percentage yield:

Melting point of benzoic acid:

QUESTIONS

1) Which of the following compounds will give the haloform reaction?

   a) CH_3COOH
   b) $C_6H_5CH_2\text{-CO-}CH_3$
   c) $C_6H_5CH(OH)\ CH_3$
   d) $C_6H_5CH_2\text{-CO-O}CH_3$
   e) $C_6H_5\text{-CO-}CBr_3$
   f) $C_6H_5CH(OH)CH_2CH_3$

ESTERIFICATION OF ALCOHOLS AND PHENOLS

0116978

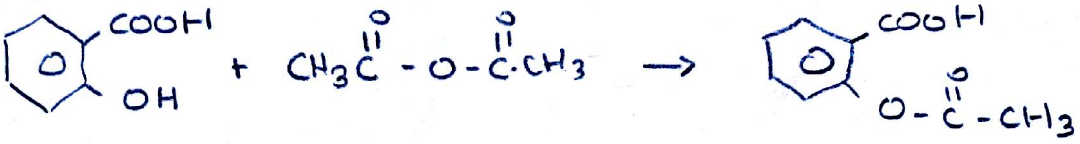
Name	Leen Abuzir	Section	3

mass 1 = 5.531 g

Filter paper = 3.10 g

I. Preparation of Aspirin

Write an equation for the preparation of aspirin:



Theoretical yield of aspirin: 2.56 g

Actual yield: 2.431 g

Percentage yield: $\frac{2.431}{2.56} \times 100 = 94.96\%$

<u>Ferric Chloride Test</u>

Color with Salicylic acid: Violet

Color with Aspirin: Violet

II. Preparation of Methyl Benzoate

Write the overall equation for the preparation of methyl benzoate.

Theoretical yield of methyl benzoate:

Actual yield:

Percentage yield:

QUESTIONS

1) What is the function of the acid in the preparation of methyl benzoate? (give equations).

2) What experimental means may be used to drive an esterification towards completion?

3) Tell how a mixture of benzoic acid and methyl benzoate may be separated?

4) What impurities are most likely to be present in the aspirin you have prepared? Show (by equations) how they are formed.