

In crystallization experiment:

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

so that crystals will form in the funnel  
not in the ~~stem~~ Funnel - stem or Filter paper

(1P)  
60

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

~~to keep moisture content~~  
decrease the loss of substance through crystallization

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

1) non react with the substance to be purified

2) dissolve impurities at low temp and not at all at high temp "Low temp agent"

In extraction experiment:

1) Why should the stopper be removed from the separatory funnel before liquid can be withdrawn through the stopcock?

so that pressure become equal in all the parts of the separatory funnel

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

- non flammable, non toxic, cheap

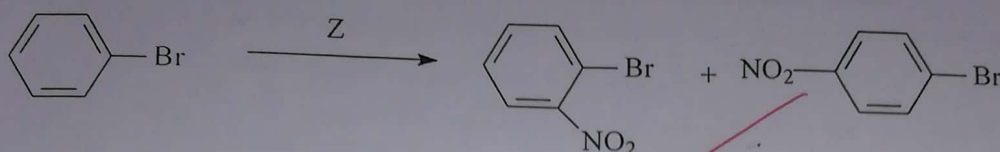
- Evaporate readily from crystal, volatile

~~insoluble in water~~ - immiscible with the liquid in which the substance exist

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

reduce the efficiency of the extraction  
efficiency will be less

I For the following reaction:



The reagent Z is  $\text{HNO}_3 + \text{H}_2\text{SO}_4$

1) Why should the temperature being kept between 45-50 during the experiment

~~control the temperature~~

maybe if the temperature ~~decreases~~

2) Which is more soluble *o*-nitrobromobenzene or *p*-nitrobromobenzene?

*o*-nitro bromobenzene

3) Which has higher melting point *o*-nitrobromobenzene or *p*-nitrobromobenzene?

*p*-nitro bromobenzene

II. Which compound react fastest with bromine / acetic acid

(acetanilide, ~~benzene~~, ~~phenol~~)

~~benzene~~

Phenol

LiAlH<sub>4</sub>

1) For what two purposes are melting points routinely used?

- 1- determine the materials or component of the solution
- 2- to separate solutions to identify if the unknown is the same material we have or not

15  
20

2) What two effects do impurities have on the melting point of an organic compound?

- soluble impurities
- 1- Lowering melting point
  - 2- Broaden the m.p range

insoluble no effect

3) What effects of the presence of pieces of glass in the sample on the measured melting point

there's no effects - glass is insoluble impurities and doesn't affect m.p

4) Why is it important that the cooling water in the distillation apparatus enter the condenser jacket at the lower end and exit at the upper end, and not vice versa?

to make sure that the condenser will always be fully of water - and make a good cooling

if vice versa it won't be fully with water and won't cool well

5) Why should the distillation flask be filled not more than two-thirds of its capacity?

because it will affect the measurements

6) Explain the role of the boiling stones in distillation

they prevent bumping of the liquid

7) What effect does reducing of external vapor pressure on boiling point?

when the  $V_p \downarrow$   $b.p \uparrow$



1) How will the following affect the TLC separation?

a) too much sample applied.

Large spots  $\rightarrow$  over lapping  $\rightarrow$  Rf value won't be accurate

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

the slower spots will reach the faster spots and we won't be able to determine Rf value

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

the spots will dissolve in the solvent

Give two properties a substance should have in order to be steam distilled?

a)..... Steam Volatile.....

b)..... Immiscible with water.....

Inert with glass and stable with the liquid

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

Vacuum distillation - Solid liquid extraction

3) At 95.5 °C, the vapor pressure of water is 600 mm, and that of bromobenzene is 150 mm. Calculate the molar ratio and the weight ratio of bromobenzene to water when a mixture of the two is distilled at 750 mm. (density of bromobenzene = 1.5 g/mL).

$$P_{H_2O}^{\circ} = 60$$

$$P_{Br}^{\circ} = 150$$

$$(a) \frac{n_{Br}}{n_{H_2O}} = \frac{P_{Br}^{\circ}}{P_{H_2O}^{\circ}} = 0.25$$

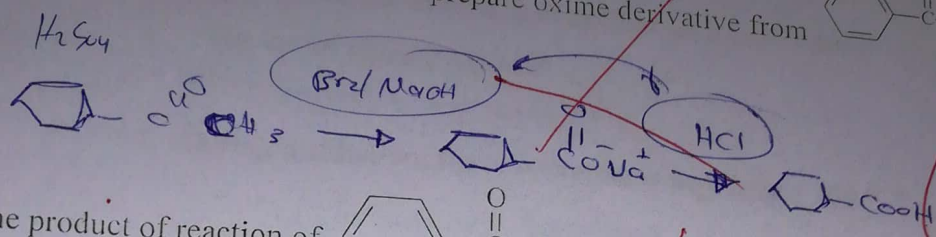
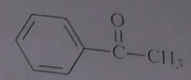
$$\frac{n_{H_2O}}{n_{Br}} = \frac{60}{150} = 0.4$$

$$(b) \frac{mass_{Br}}{mass_{H_2O}} = \frac{P_{Br}^{\circ} \times M_{Br}}{P_{H_2O}^{\circ} \times M_{H_2O}} = 0.375$$

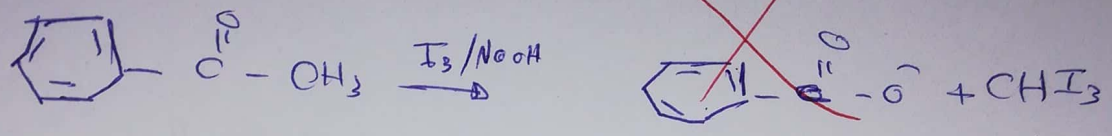
$$\frac{mass_{Br}}{mass_{H_2O}} = \frac{P_{Br}^{\circ} \times M_{Br}}{P_{H_2O}^{\circ} \times M_{H_2O}}$$

Complete the following reactions

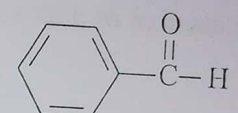
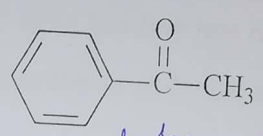
1) Draw the structure and reagent used to prepare oxime derivative from



2) Draw the product of reaction of CC(=O)c1ccccc1 and  $I_2/NaOH$



3) How could you distinguish between



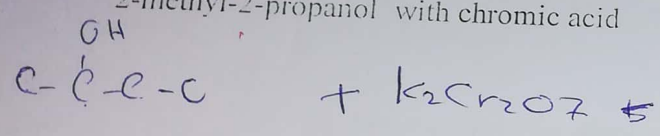
- Oxidizing agent
- Tollens
- Fehling

ketone

aldehyde

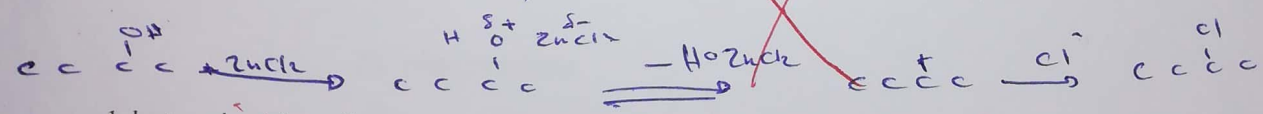
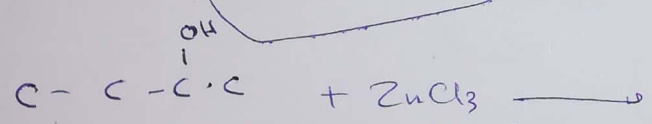
4) Draw the product of the following reactions

2-methyl-2-propanol with chromic acid

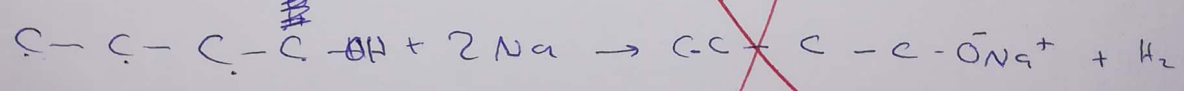


non reactive!

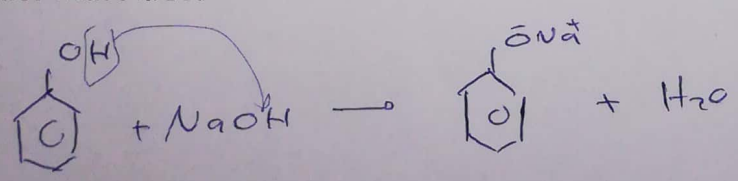
2-butanol with Lucas reagent



1-butanol with sodium



Phenol with NaOH



Na 1<sup>o</sup> 2<sup>o</sup> 3<sup>o</sup>  
Lucas test 5 min  
3<sup>o</sup> 12-14<sup>o</sup>

Phenol's  
SN2X SN2X

0154344

I. Explain each of the following in cyclohexene experiment:

1. The use of phosphoric acid

hydrating agent

2. During distillation, the temperature is kept below 100 °C?

Avoid super heating and evaporation

II. Give two reagents that give positive test tube reaction to indicate the presence of an alkene. Write an equation in each reagent

Br<sub>2</sub>  
KMnO<sub>4</sub>

III. How could you distinguish between t-butyl chloride and n-butyl chloride

1) Give the reagent

AgNO<sub>3</sub>

2) observations

Form precipitate



## Quiz II

Uni. No. 0116978

Name:

Q1. Answer each of the following concerning experiments that you did in the lab:

( T ) Crystals on the Buchner funnel should be washed only with cold suitable solvent (not a hot one) in the recrystallization exp. (cold. filtration)

( T ) Salting-out phenomenon may decrease the solubility of an organic substance in the saturated aqueous phase in the extraction exp.

( F ) Soluble impurities were removed first then insoluble impurities in the recrystallization exp.

( T ) In the extraction exp, dividing the total volume of extracting solvent is more efficient than to use the whole volume in a single extraction.

( T ) The mass of the crude sample is 1.0 g and 0.8 g of the purified one, the yield is 80%.

Q2. Complete the following:

- Anhydrous sodium sulfate may be used in the extraction exp. to adsorb the water in the organic phase.....

- Avoid vigorous shaking during the caffeine extraction since it will cause emulsions.....

- Caffeine substance should not be heated for a longer time since it decomposes readily.....

✓ In the recrystallization exp, the flask should be removed from the heat source before adding the charcoal to it, to avoid bumping of the solution.....

- The solvent-pair may be used in the recrystallization exp if the solute is largely soluble in one.....

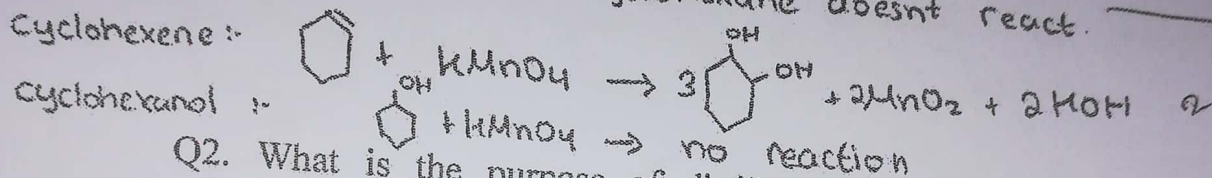
solvent and insoluble in the other  $\Rightarrow$  Therefore, a mixture of both solvents can be used.

Name: \_\_\_\_\_

Uni. No. 0116448

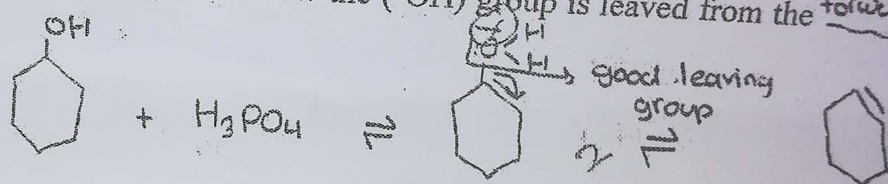
Q1. How can you distinguish between cyclohexene and cyclohexane using Baeyer test?

Cyclohexene reacts with  $\text{KMnO}_4$  to form a brown ppt and glycol  $\text{MnO}_2$  whereas cyclohexane doesn't react.



Q2. What is the purpose of distillation during the preparation of cyclohexene? To separate the cyclohexene from the cyclohexanol to increase the yield of cyclohexene and since the reaction is reversible cyclohexene must be removed to push the

Q3. Show by chemical equation how the (-OH) group is leaved from the alcohol? Forward rxn.



Q4. The excess phosphoric acid was removed during the experiment by...adding.....Sodium...carbonate... $\text{Na}_2\text{CO}_3$ ... (base)

1.5

Q5. Calculate the percentage yield of cyclohexene knowing that the actual yield is 0.25 g and molar mass of cyclohexene 82 g/mol, cyclohexanol 100 g/mol, density of cyclohexene 0.81 g/ml and the mass of cyclohexanol is 10 g?

ratio 1:1

cyclohexanol : cyclohexene

$$10 \text{ g cyclohexanol} \times \frac{1 \text{ mol cyclohexanol}}{100 \text{ g cyclohexanol}} \times \frac{1 \text{ mol cyclohexene}}{1 \text{ mol cyclohexanol}} \times \frac{82 \text{ g cyclohexene}}{1 \text{ mol cyclohexene}} = 8.2 \text{ g cyclohexene}$$

$$\% \text{ yield} = \frac{0.25}{8.2} \times 100 = 3.05 \%$$