

Time: 60 minutes

Chemistry 210
Final Exam

June 18, 2000
Mrs. R. Jaber

Family Name: _____

First Name: _____

Instructor's Name: _____

Student Number: _____ Section: _____

Question I _____ out of 22

II _____ out of 16

III _____ out of 14

IV _____ out of 14

V _____ out of 14

VI _____ out of 20

Total _____ out of 100%

GOOD LUCK

1 (22 pts) Complete each of the following sentences:

a- During distillation cold water is circulated in the condenser from _____.

b- When collecting a solid by suction filtration, suction should be broken before turning off the water pump to _____.

c- Sodium Chloride is commonly used in extraction for 2 purposes

a-

b-

d- Two methods for locating colorless spots on TLC are

a-

b-

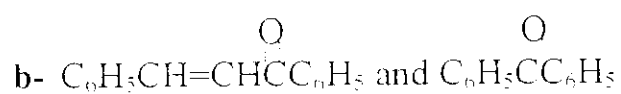
e- In the separation of a mixture of isopentyl alcohol, ethyl propanoate, ethyl propyl ether on an alumina column chromatography _____ will be eluted 1st and _____ will be eluted last using 10% ethyl acetate in hexane.

f- Ethylenediamine is _____ soluble in water than 1,2-dibromoethane, and is _____ soluble in ether than tetramethylethylenediamine.

g- The acid catalyzed dehydration of 2,2-dimethylcyclohexanol yields _____ as the major product.

11(16pts) Describe simple chemical tests to distinguish between each of the following pairs of compounds. Include equations & color changes where applicable.

a- 4-methylphenol and Benzoic acid



c- 2-butanone and butanal

d- n-butyl chloride and tert-butyl chloride

III (14pts)

a- Outline using chemical equations all the steps involved in the preparation of p-nitroaniline from aniline. Explain briefly the purpose of each step.

b- Suggest 2 methods for checking the purity of the product.

IV(14pts) n-Butyl bromide is prepared by refluxing n-butyl alcohol with sodium bromide and sulfuric acid.

a- Give the structure of 2 possible side products of the above reaction.

b- Compare the rate of the above reaction with each of the following. Explain briefly.

1- using 2-methyl-2-propanol instead of n-butyl alcohol

2- using HCl instead of HBr.

- c- Explain the following observation that treating 3-methyl-2-butanol with HBr yields 2-bromo-2-methylbutane as the sole product.

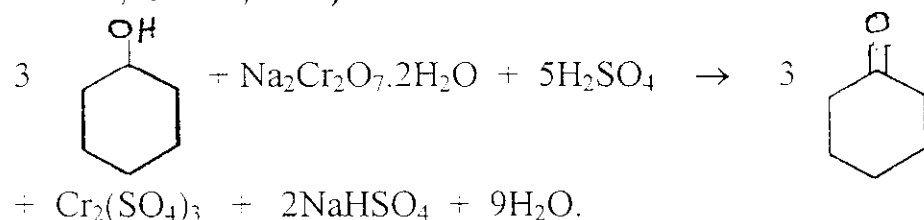
V (14pts)

- a- Write a detailed step by step mechanism for the preparation of benzylacetate (peach flavor) from the corresponding acid and alcohol.

- b- Outline all the steps for the isolation & purification of benzylacetate in the above reaction.

- c- What effect will the use of sodium hydroxide in the purification process have in the yield of ester. Why?

VI (20%) Cyclohexanone can be prepared from cyclohexanol according to the following reaction (atomic weights: C=12, O=16, Na=23, Cr=52, H=1)



- a) Calculate the % yield of cyclohexanone if 20g of Cyclohexanol are reacted with 21g of sodium dichromate dihydrate to produce 15g of cyclohexanone.

- b) Is the above method suitable for the preparation of Benzaldehyde starting from Benzyl alcohol?

Explain your answer.

If the answer is No, suggest another method.

c) Write the equation for the formation of the Semicarbazone derivative of benzaldehyde.

d) What factor(s) account for the fact that only one nitrogen of semicarbazide acts as a nucleophile and that the other 2 nitrogen atoms are non-nucleophilic.