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Organic Chemistry Laboratory I Final Exam May 14, 2015

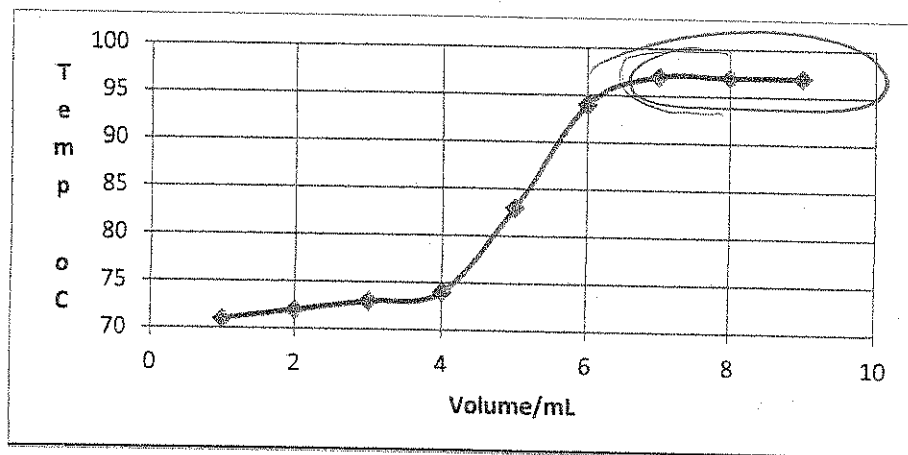
Your Name _____

1. What product is produced if the grignard reagent, phenylmagnesiumbromide, is exposed to water? 10 pts

Benzene

2. A student distilled a mixture of methanol (boiling point 65°C) and propanol (boiling point 97°C). He monitored the boiling point of the distillate and graphed his data (see below). 15 pts

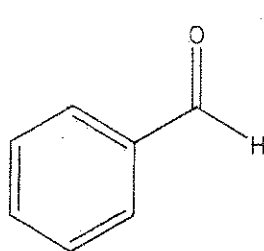
- a. Circle the region of the graph in which the most pure material was distilling over. Explain why you believe this region represents the purest distillate.
- b. Was the student conducting simple distillation or fractional distillation? Justify your answer.



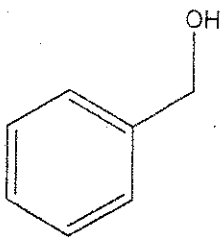
a. Circled region shows steady, level bpt (horizontal line)
AND level area corresponds to correct bpt for propanol

b. fractional - we have a 32°C bpt difference but we observe 2 horizontal areas with a sharp jump/tradition in btwn them

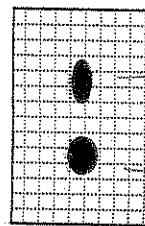
3. A student spotted a mixture of benzaldehyde and benzyl alcohol on a TLC plate. She then developed the TLC plate in ethyl acetate and obtained the following result: 15 pts



benzaldehyde



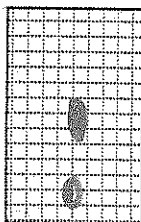
benzyl alcohol



aldehyde
alcohol

TLC Plate after ethyl acetate

- Label the spots on the plate **above** to indicate which is benzaldehyde and which is benzyl alcohol.
- Fill in **below** what the developed plate would have looked like if the student had run the plate in **hexane** instead of ethyl acetate and label your spot(s) to indicate which compound each represents.

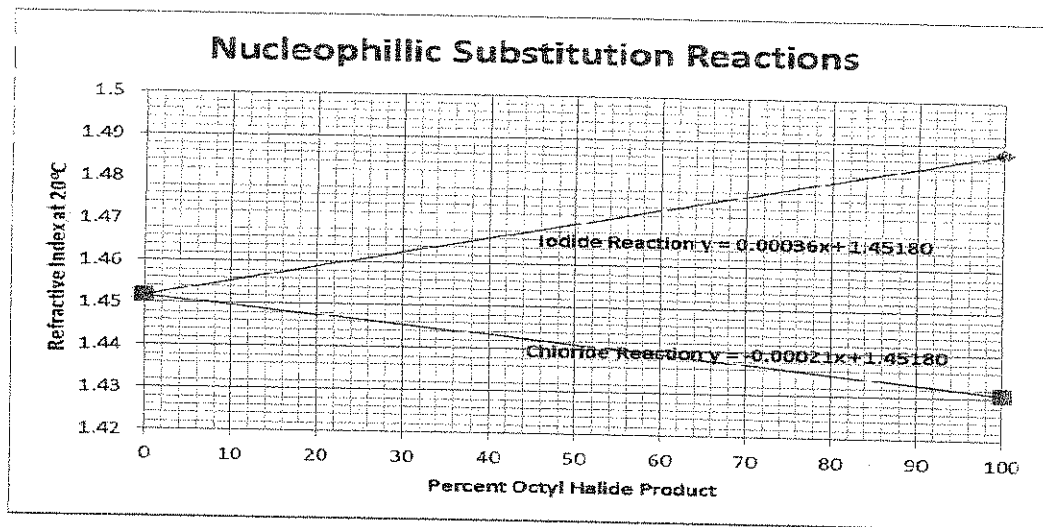


aldehyde
alcohol

4. When dissolving your solute during recrystallization, why is it important that the recrystallization solvent be boiling hot? 10 pts

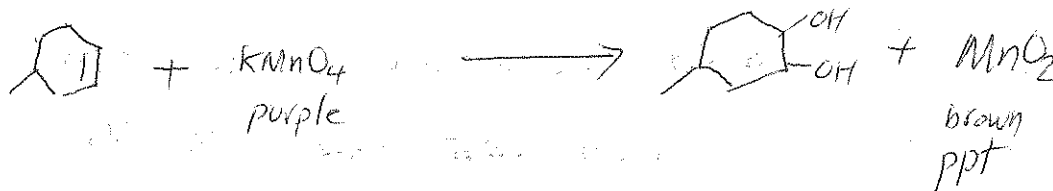
using a cooler temperature solvent will require more solvent to dissolve solute & as a result less solute will be ~~removed~~ recovered upon cooling in ice

5. Two students reacted bromooctane with chloride ion. Both students used the exact same quantities and concentrations of chemicals and exact same reaction temperatures. However, the first student ran her reaction for one hour while the second student ran her reaction for two hours. Both students measured the refractive indexes of their product mixtures. Which student would obtain a higher refractive index? Explain. 15 pts



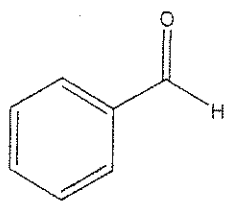
Student 1 will obtain less octyl chlorides + more ~~oct~~ octyl bromides. She will obtain a higher refractive index (graph has a negative slope)

6. What color change took place when KMnO_4 was added to your 4-methylcyclohexene product? What chemical reaction was responsible for this color change? 10 pts

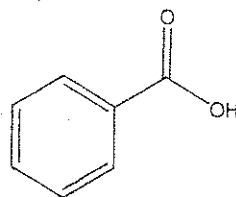


purple color disappears
brown ppt forms

7. A student is given a mixture of benzaldehyde and benzoic acid and is assigned to use extraction to separate these compounds. However, he discovers that both compounds are highly soluble in diethyl ether. What should he do to separate the compounds? Explain. 15 pts



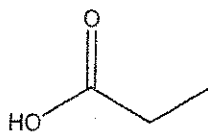
benzaldehyde



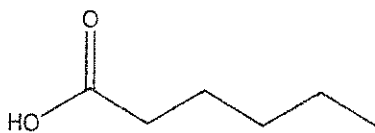
benzoic acid

dissolve both compounds in ROR
extract benzoic acid with aqueous NaOH

8. Which of the following two compounds would you expect to be more soluble in hexane? Explain and be sure to include a discussion of intermolecular forces in your explanation. 10 pts



A



B

B will be more soluble in hexane
B has more extensive London dispersion forces
attracting it to hexane
(A is more strongly attracted to itself via H bonding)