

Department of Chemistry
University of Missouri-St. Louis

Name _____
April 2000

Exam II
Chem. 263

1 (15pts) A. Describe the advantages of using vacuum distillation to distill a high boiling liquid.

B. If a liquid boils at 100 °C at 760 mm, what would be the approximate boiling point at 47.5 mm?

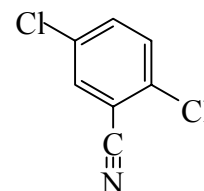
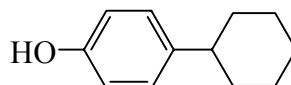
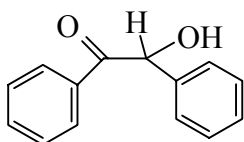
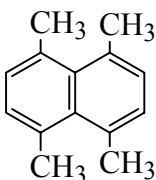
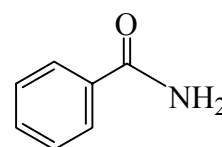
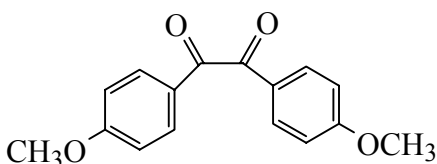
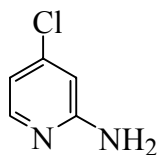
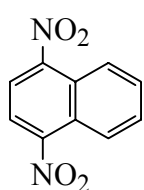
2. (15pts) A. Describe the advantages of using steam distillation to distill an organic liquid from a mixture of relatively non-volatile products.

B. Can a liquid that is miscible in water be steam distilled? Explain your answer.

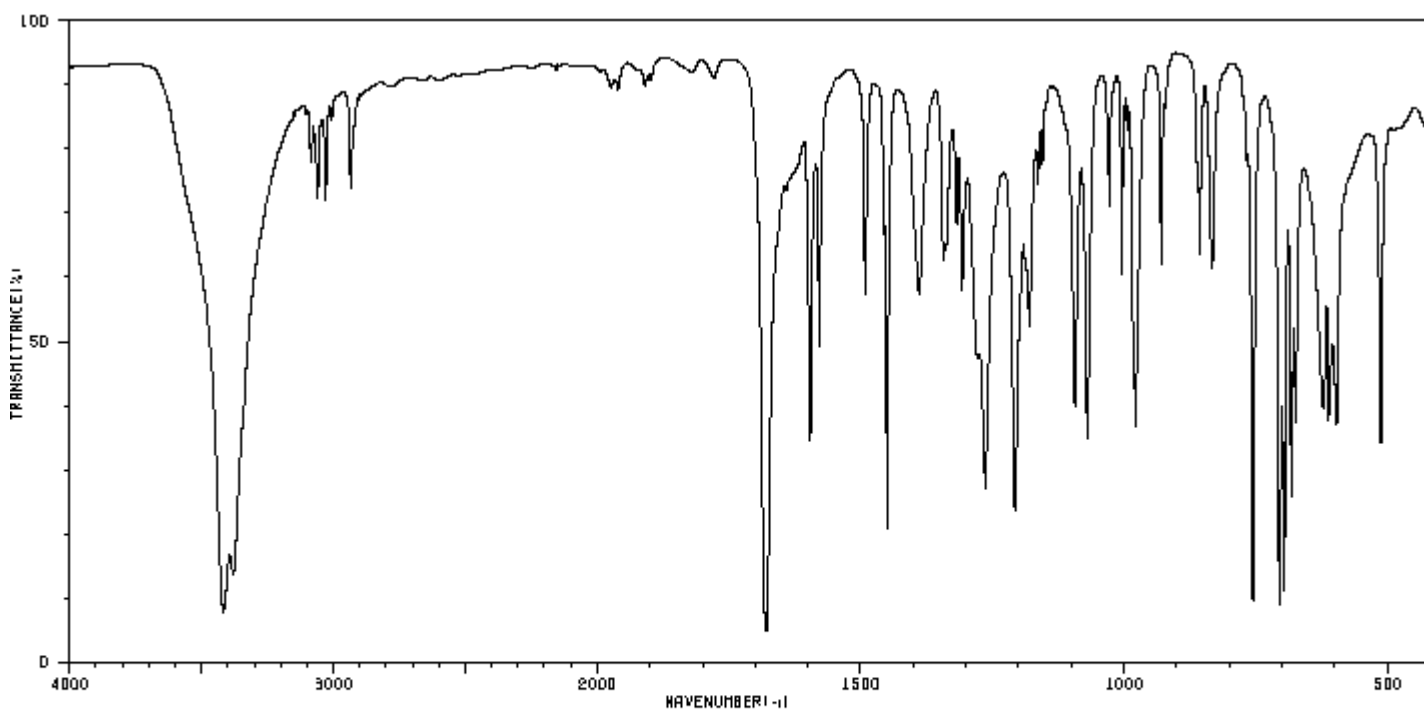
3. (10pts). In the reaction of methanol with sulfuric acid and 2-hydroxybenzoic acid, why is it necessary to make sure that all the reagents and reaction flask are dry before beginning the reaction?

4. (12pts) A student received an unknown that had a melting point of approximately 130 °C. After looking up all the possible compounds that could be found with a similar melting point, the list of possibilities was narrowed down to the following compounds:

1,4-dinitronaphthalene; 2-amino-4-chloropyridine; 4,4'-dimethoxybenzil; benzamide; 1,4,5,8-tetramethylnaphthalene; benzoin; 4-cyclohexylphenol; 2,5-dichlorobenzonitrile;



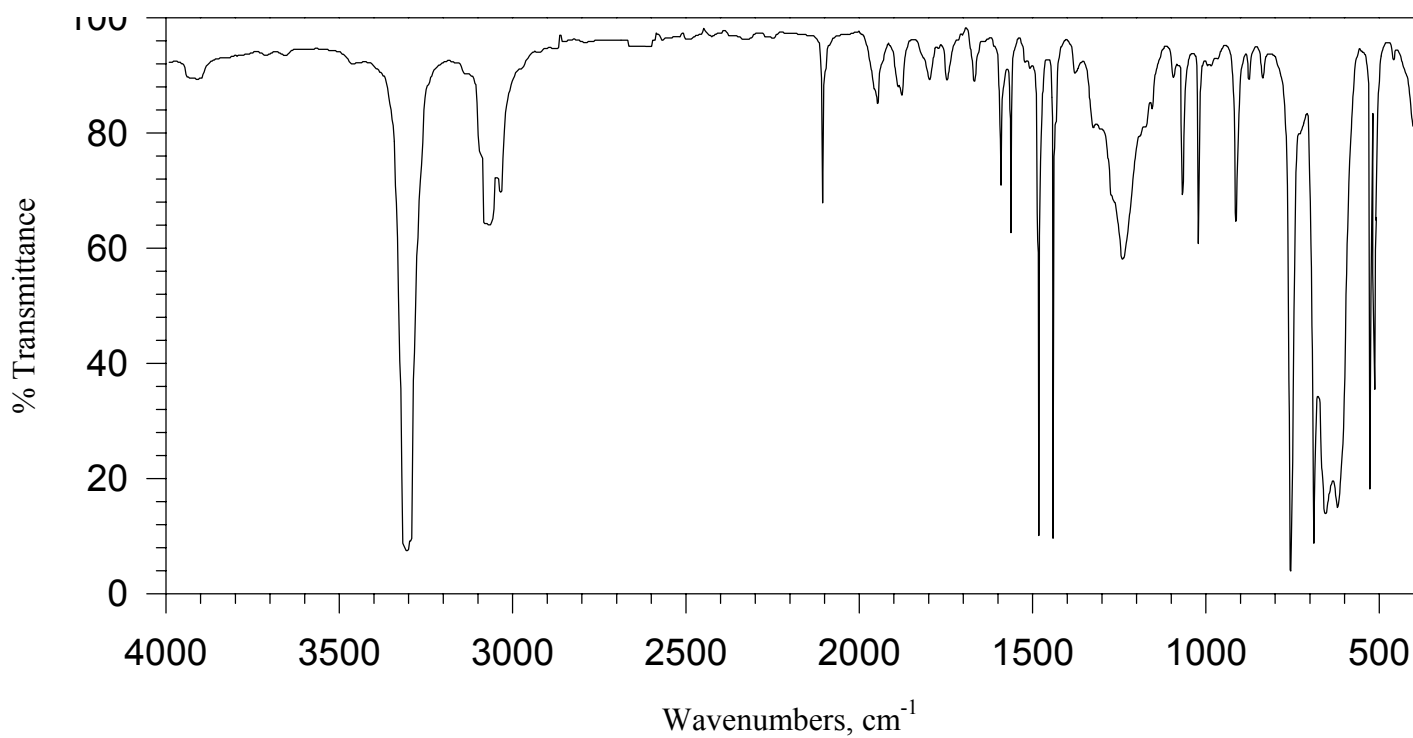
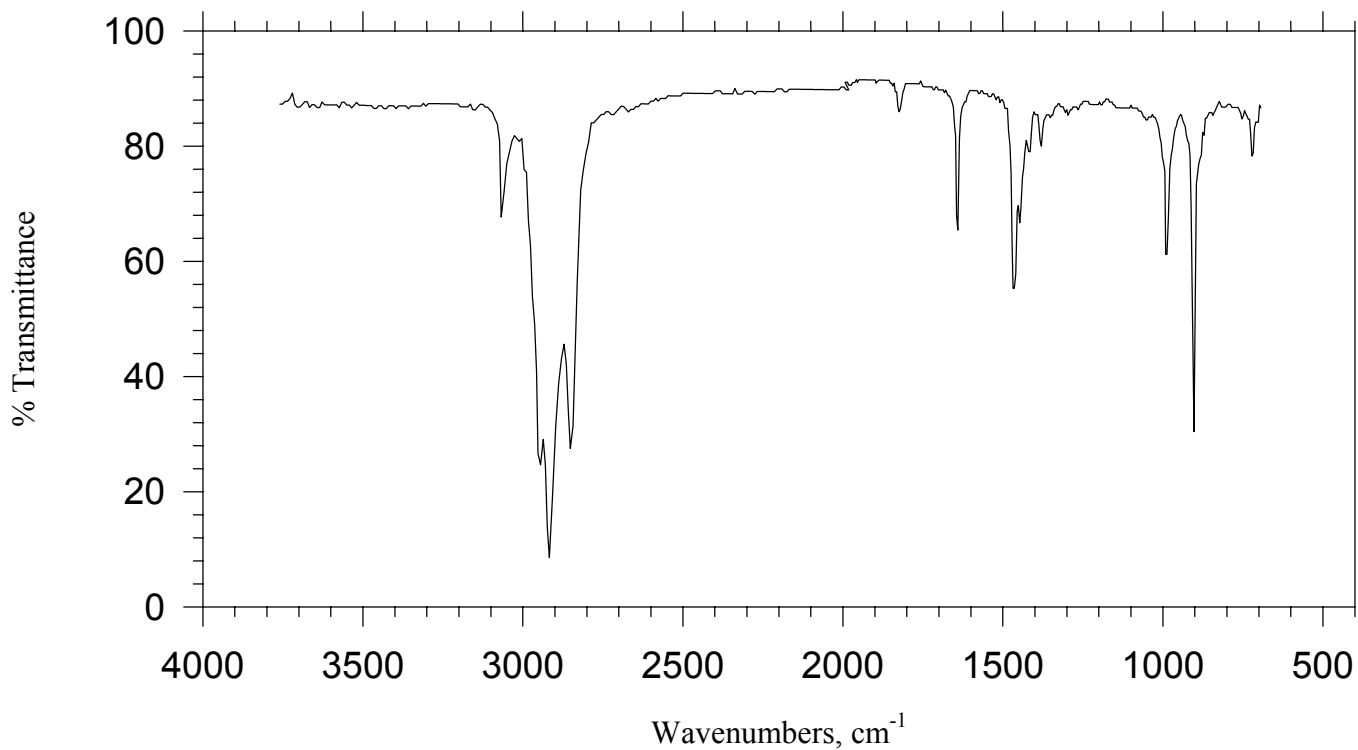
The following tests were performed: the compound was not soluble in dilute acid or base; it gave a positive 2,4-dinitrophenylhydrazone test and it had the following infrared spectrum run as a KBr pellet. What is the most likely structure of the unknown? Show your reasoning.

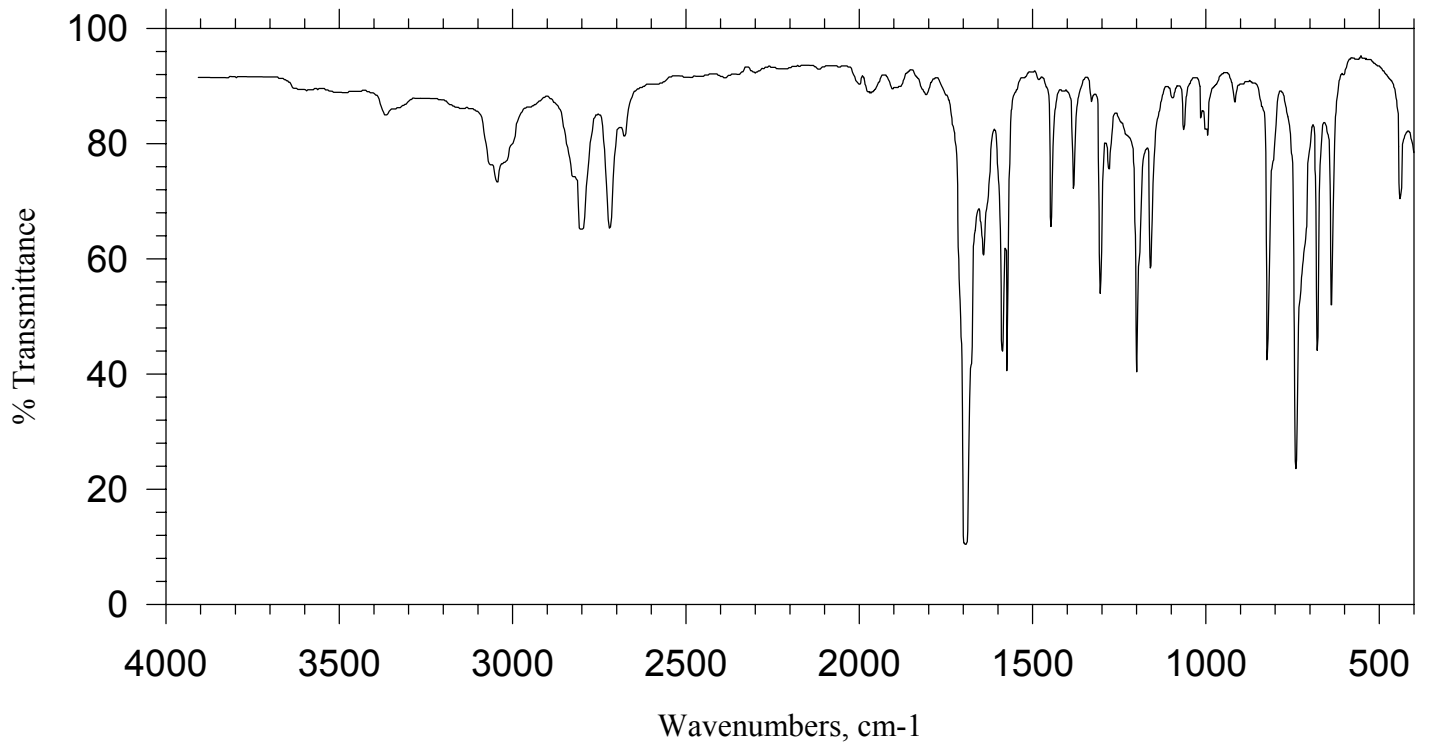
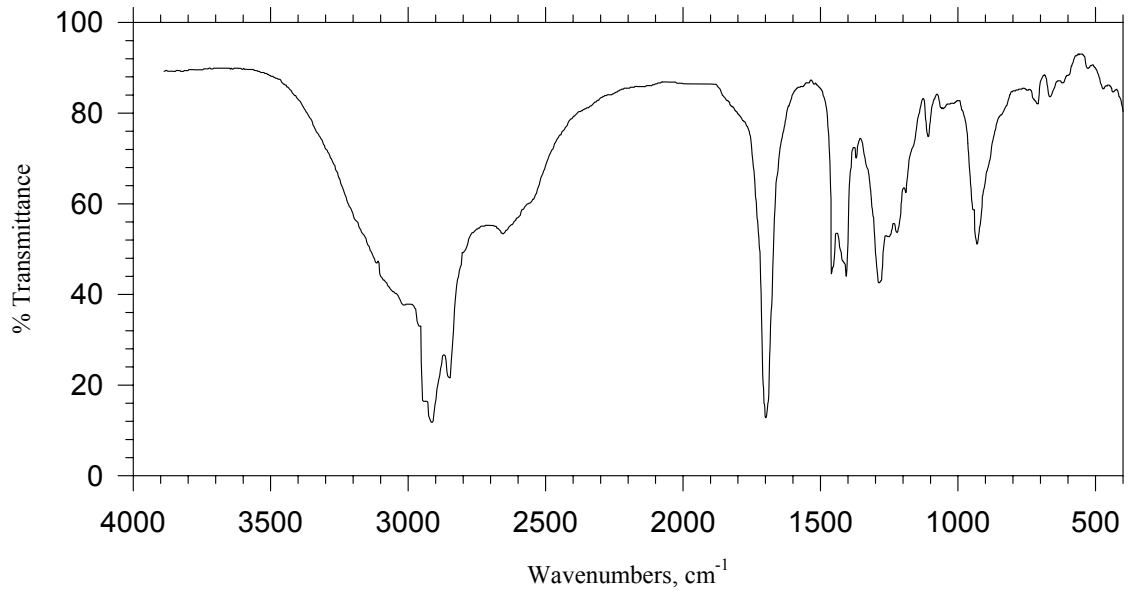


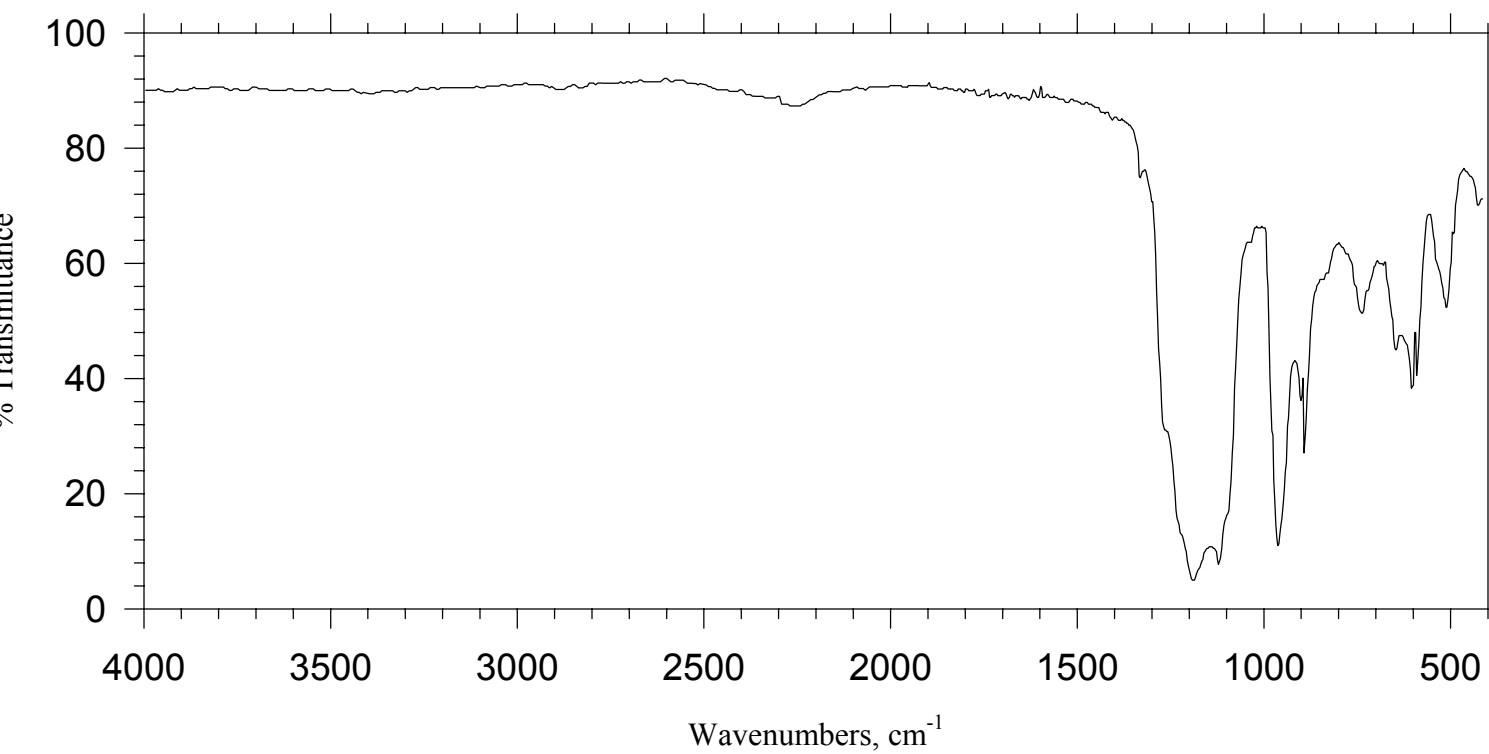
3418	7	1456	64	1263	26	983	47	696	10
3380	13	1450	20	1208	23	978	35	683	25
3061	70	1390	55	1180	50	929	60	675	36
1679	4	1343	60	1093	38	866	62	622	38
1596	33	1318	66	1070	34	833	58	613	36
1579	47	1308	55	1028	88	756	9	597	35
1492	65	1278	46	1006	68	706	8	613	33

5. (25pts) Match the following compounds with their infrared spectra. Please write the structure on top of each spectrum. Ask if you don't know the structure of any of these compounds.

1. 1-heptene 2. phenylacetylene 3. benzaldehyde
4. decanoic acid 5. polyfluorinated hydrocarbon oil







6.(15pts) A. A student had an unknown carboxylic acid that required 10 mL of a 0.1 M NaOH solution to neutralize to a phenolphthalein endpoint. If the student used 120.0 mg of unknown acid, what is the equivalent weight of the acid?

B. Which of these two acids is the unknown more likely to be: butanedioic acid or benzoic acid? Why?

7. (12pts) Describe the difference between simple and fractional distillation.