CHEM 114 Experiment: Identification of Organic Functional Groups

Name: _____ **Date:** _____ **Section:** _____

Part 1: Data and results. Complete the given tables. **Unknown Number:** ____

Tollens Test

1. Write the balanced equation for the Tollens reaction with benzaldehyde.

	Functional Class	Organic Compound	Initial Appearance	Final Appearance	Conclusion (presence/absence of aldehyde)
1	Aldehyde	Benzaldehyde	clear colorless	mirror black, silver	
2	Ketone	Acetone	clear Colorless	no mirror	
3	[redacted]	Unknown			NA

pH Test for Carboxylic acids

2. Write the balanced equation for the chemical reaction of acetic acid with water.

	Functional Class	Organic Compound	Color of pHydrion Paper	pH	Conclusion (presence/ absence of carboxylic acid)
4	Carboxylic acid	Acetic acid	orange	3	

pH Test for Amines

3. Write the balanced equation for the chemical reaction of dibutyl amine with water.

	Functional Class	Organic Compound	Color of pHydrion Paper	pH	Conclusion (presence/ absence of amine)
5	Amine	Dibutyl amine	dark blue	12	

pH Test on Unknown

	Organic Compound	Color of pHydrion Paper	pH	pH Classification (acidic, basic, or neutral?)	Conclusion (presence/absence of carboxylic acid or amine)
6	Unknown				NA

Complete the next page as well.

Unsaturation Test

4. Write the balanced equation for the chemical reaction of cyclohexene with iodine.

	Hydrocarbon Family	Chemical	# of drops	Color of Solution	Conclusion (presence/absence of unsaturation)
7	[redacted]	5% Iodine in Hexanes Solution	[redacted]		[redacted]
8	Alkane	Hexane	1 drop	purple	
9	Alkene	Cyclohexene	1 drop	light orange	
10	[redacted]	Unknown			

Part 2: Exploratory Questions. Write complete sentences.

1. Based on your conclusions, identify the organic functional groups that are present in your unknown: alkene, aldehyde, carboxylic acid, and/or amine.

did not do

NA

2. Briefly and thoroughly explain your reasoning behind the organic functional group identification of your unknown. Mention the observation from each test reaction (Unsaturation, Tollens, and pH Tests) and the corresponding conclusion. Use the individual conclusions to draw your overall conclusion about the identity of your unknown.

did not do

NA

3. Which organic functional group is verified by the addition of silver(I) nitrate, aqueous sodium hydroxide, and concentrated ammonia?

4. Which reagent is needed to test for unsaturation?

5. Draw the chemical structures for the given organic compounds.

   a. hexane

   b. cyclohexene