Name: _____ **Lab TA:** _____

Lab Day

Mon	Tue(am)	Tue(pm)	Wed	Thu(am)	Thu(pm)	Fri
○	○	○	○	○	○	○

Grade

	>95	>90	>85	>80	>70	<70
Report:						

	Yes	No
Report Submitted on Time (Check Box)		

Data Collection:

For this experiment, use a some rough work paper to record the data asked for in the procedure. Make sure you label what it is correctly or you may find yourself having to go back and redo the experiment.

As an aside I made this mistake when I did it ☹.

You will be using this data to answer the following questions and calculations.

Questions:

1. How **many grams** of **solid sodium hydroxide** did you use to make the solution? _____

2. How many **moles** of **NaOH** are there in a **20.0mL** sample of an **0.101M** solution? _____

3. How many **grams** of **benzoic acid** would be required to **react with the NaOH sample mention in Question 2**? _____

4. What **color** does the **indicator turn** at the **end point** of the titrations? _____

5. Why is standardization of any sodium hydroxide solution made from solid sodium hydroxide necessary?
Fill in the blank words.

   Solid sodium hydroxide is _____ and is therefore difficult to weigh _____.

6. Phenolphthalein was used as the indicator in this experiment.
   a) What is the **chemical formula** for **phenolphthalein**? _____
   b) What is **its melting point** in **°C**? _____
   c) While soluble in water **is it soluble in benzene**? _____
   Yes or No

Calculations:

For full credit you must show work for all questions.

1. **Experiment 2a**, **Part 1**, **Step 4**, asked you to calculate the **expected concentration** (**Molarity**) of the **sodium hydroxide** solution (MM of NaOH = 39.997g/mol). Show your calculation here.

_____ **M**

2. **Experiment 2a**, **Part 1**, **Step 5**, asked you to calculate the **mass of benzoic acid** (MM = 122.12 g/mol) required to react with **20.00 mL** of a **0.100 M sodium hydroxide solution**. Show your calculation here.

_____ **g**

3. **In Experiment 2a**, **Part 3**, you performed 2 fine titrations on the **sodium hydroxide** solution you made **Part 1**.
   a) Using the **data from one** of your **fine titrations**, show how you calculated the Molarity of the sodium hydroxide solution.

_____ **M**

   b) What was the **average Molarity** of the **sodium hydroxide** solution obtained from **your two fine titrations**? _____ **M**

   c) **Briefly** comment on how it **compares** to **that calculated in Question 1**. Also include in your comment some reference to the purity of the solid sodium hydroxide used to make your solution.

4a. **In Experiment 2b, Part 2**. You used your **standardized sodium hydroxide** solution to **determine the molarity** of an **unknown sample of acetic acid**. In doing so **you performed two fine titrations**.

   a) What molarity did you obtain for the acetic acid solution in **fine titration 1**? _____

   b) What molarity did you obtain for the acetic acid solution in **fine titration 2**? _____

4b. **For fine titration 2**, show how you calculated the molarity you recorded in **4a, part b**?

_____ **M**

Post Lab Question:

For full credit you must show work for all questions.

1. Suppose a student made a **different sodium hydroxide** solution **using 0.401g of solid sodium hydroxide** and **200mL of water**. The **student then standardized this solution** using benzoic acid in a similar manner to that depicted in the simulation. From the **following additional data recorded by the student**:
   a) Mass of benzoic acid: **0.158g**
   b) Volumer of the benzoic acid solution: **100.0mL**
   c) Volume of sodium hydroxide need to neutralize the solution: **27.84mL**

   Determine the molarity of the sodium hydroxide solution.

_____ **M**