**Formal Report of Group II**

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| **Scoring Rubrics for Formal Reports** | Points | Score |
| The question to be answered during the laboratory is stated |  |  |
| The hypothesis clearly shows it is based on research |  |  |
| Research references to prepare the lab are listed  |  |  |
| Results of procedure are clearly stated |  |  |
| Summarize the essential laboratory data |  |  |
| State how the essential data answers the lab questions |  |  |
| Report is neatly printed with ink, with no visible corrections |  |  |
| The lab report is written in such a way that others could accurately duplicate the experiment |  |  |
| **TOTAL** |  |  |



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| --- | --- |
| ph and indicators |   |

1. **Objectives** :
* To prepare a series of acidic and basic solutions by the process of serial dilution; to determine the color changes that inductors undergo when they are in solutions of different degrees of acidity; and to determine the pH of some unknown solution.
1. **Theoretical Background**:
* A **serial dilution** is the stepwise [dilution](http://en.wiktionary.org/wiki/dilution) of a [substance](http://en.wikipedia.org/wiki/Chemical_substance) in [solution](http://en.wikipedia.org/wiki/Solution). Usually the dilution factor at each step is constant, resulting in a [geometric progression](http://en.wikipedia.org/wiki/Geometric_progression) of the [concentration](http://en.wikipedia.org/wiki/Concentration_%28chemistry%29) in a [logarithmic](http://en.wikipedia.org/wiki/Logarithm) fashion. A ten-fold serial dilution could be 1 [M](http://en.wikipedia.org/wiki/Molar_%28concentration%29), 0.1 M, 0.01 M, 0.001 M... Serial dilutions are used to accurately create highly diluted solutions as well as solutions for [experiments](http://en.wikipedia.org/wiki/Experiment) resulting in [concentration curves](http://en.wikipedia.org/w/index.php?title=Concentration_curve&action=edit&redlink=1) with a [logarithmic scale](http://en.wikipedia.org/wiki/Logarithmic_scale). A tenfold dilution for each step is called a logarithmic dilution or log-dilution, a 3.16-fold (100.5-fold) dilution is called a half-logarithmic dilution or half-log dilution, and a 1.78-fold (100.25-fold) dilution is called a quarter-logarithmic dilution or quarter-log dilution. Serial dilutions are widely used in experimental sciences, including [biochemistry](http://en.wikipedia.org/wiki/Biochemistry), [pharmacology](http://en.wikipedia.org/wiki/Pharmacology), [microbiology](http://en.wikipedia.org/wiki/Microbiology), and [physics](http://en.wikipedia.org/wiki/Physics).
1. **Schematic Procedure:**



Put 10 drops of 0.10 mol/L HCI (which has a pH of 1) in well #1 in the first row. Put 10 drops of 0.010 mol/L NaOH which has a pH of 12) in well #12. Put 9 drops of distilled water in wells #2 through #11. You are now ready to begin the serial dilution

Arrange a micro-plate so that there at least 12 columns across the top. Choose four different rows for the different indicators to be tested.



Pull some of the acid solution from well #1 into a dry Beral pipet. Transfer one drop of the acid from well #1 to well #2, and put the rest of the acid back in well #1. Mix well #2 thoroughly by drawing up the entire contents of the well into the pipet and then returning the liquid to the well.



Add one drop of indicator to each well in your first row. Put a drop of phenolphthalein in each well in the second row.



Prepare the indicators



Repeat for the other two unknown solutions.



Put 5 drops of the unknown solution in each of 4 wells in a new micro-plate



For the three unknown solutions, describe the color changes in each indicator.

**IV. Results and Discussions:**

**Microplate**

1. Do you think that the Universal indicator could contain one of the other indicators used in your experiment? Explain.
* Yes, because the term universal means it can be used almost in all materials.
1. Explain how the pH values from 1 to 12 were obtained from the dilution process.
* The pH values were obtained using different indicators. By the help of colors, the pH values were obtained
1. Explain how you arrived at the pH values of the unknown solutions.
* We determine the pH values of the unknown solutions using the 4 indicators we use, by means of color we can tell whether it is basic or acidic.
1. **Conclusion**
* Using different indicators, we can determine the pH values of the solutions.
1. **References:**
* Group 1 formal Report (2011)
* http://en.wikipedia.org/wiki/PH\_indicator

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