UNIVERSITY of SAN CARLOS SCIENTIA • VIRTUS • DEVOTIO	**Department of Chemical Engineering**	

Experiment Plan

(Form CHEL-1)

Laboratory Course	:	CHE 2204L
Experiment Title	:	Spectrophotometric Analysis of Binary Mixtures
Group Code	:	CHE2204LW01
Students' Name & Signature	:	Jae Michelle Cabo
		Erwin Sumarago
		Rhoel Talandron
Scheduled Date	:	March 11, 2020
Submission Number	:	1
Teacher	:	Engr. May V. Tampus
Term & Academic Year	:	2nd Semester 2019 - 2020

Teacher's Approval

This is to attest that the students have passed the pre-lab interview and are deemed prepared to conduct the experiment.

Assessed and Evaluated By: Engr. May V. Tampus

(Signature over printed name)

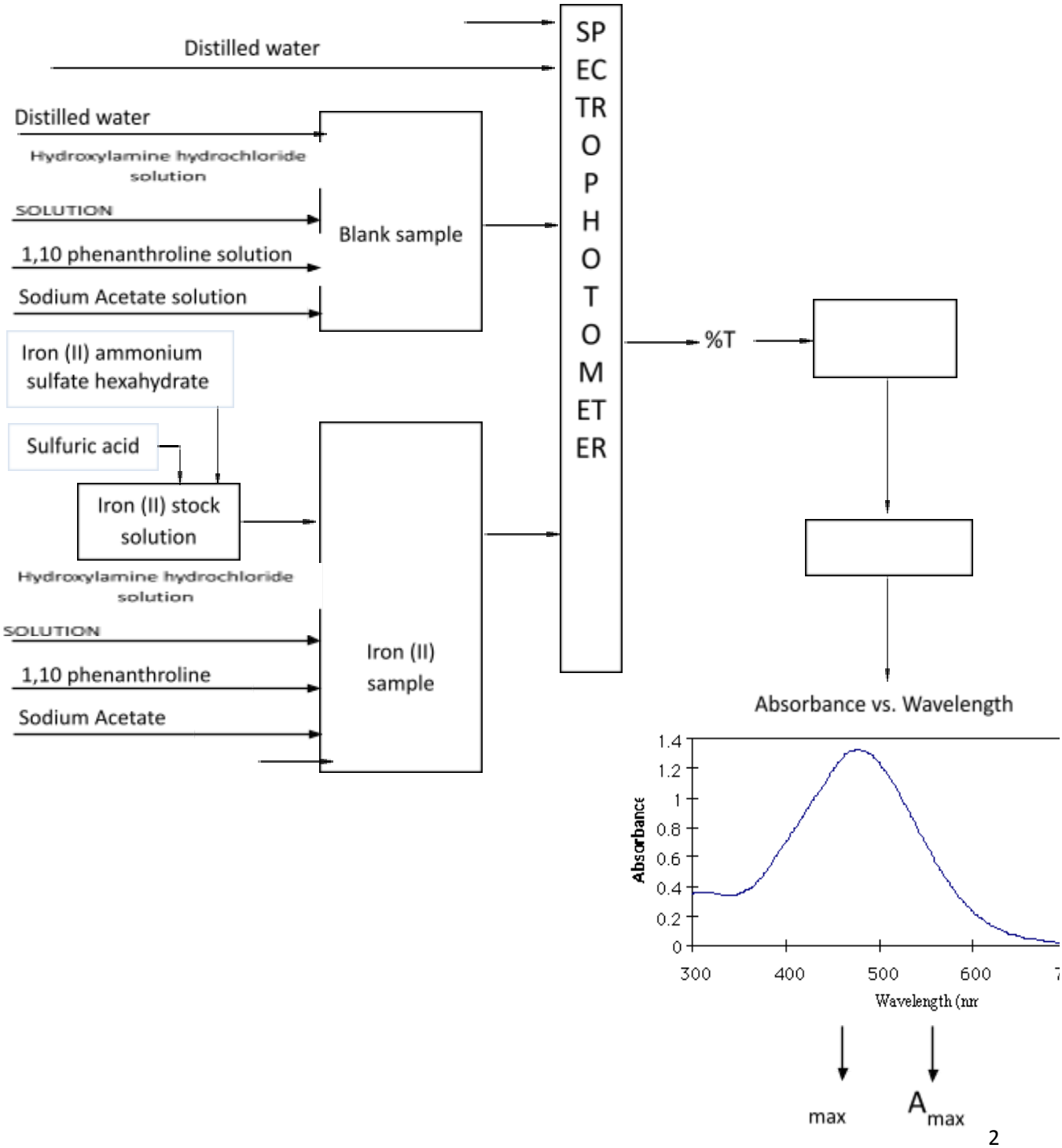
Date and Time

Objectives of the Experiment

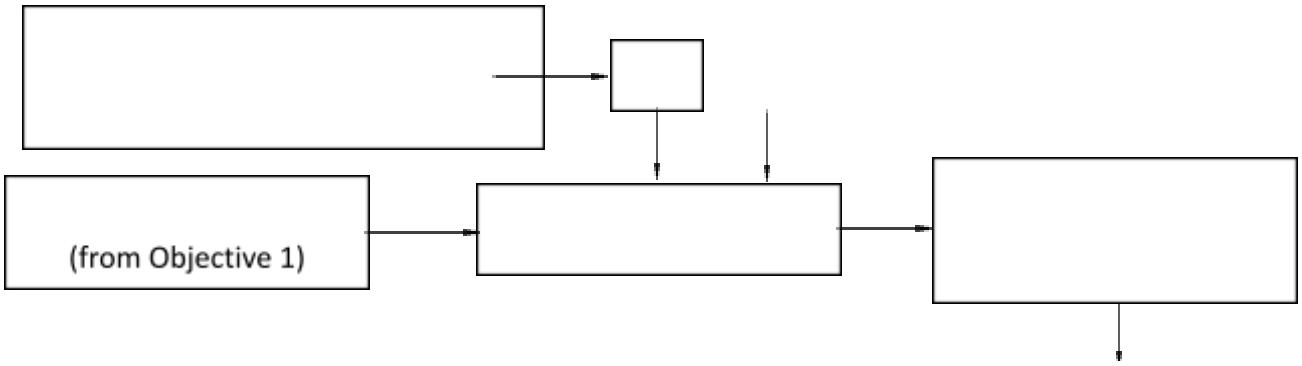
1. To determine the wavelength which gives the maximum absorbance using a spectrophotometer
2. To calculate the maximum molar absorption coefficient of a binary mixture from the absorbance data

Information Flow Diagram

Objective 1:



Objective 2:



Where:

%T = % transmittance

T = transmittance

A = Absorbance

λ = wavelength (nm)

λ_{max}= wavelength which gives maximum absorbance (nm)

A_{max} = maximum absorbance

ε_{max} = maximum molar absorption coefficient $\left(\frac{L}{mol \bullet cm}\right)$

[J] = molar concentration of J

l = length of the sample

Work Plan

Time	Task	Person Responsible
8:30 – 9:00	Log-in and Questioning	Cabo
		Sumarago
		Talandron
9:00 – 9:30	Borrow, clean and prepare the materials to be used in the experiment	Cabo
		Sumarago
	Turn on the spectrophotometer and let it warm for 30 minutes.	Talandron
9:30 – 9:45	Prepare standard solution of iron (II) by weighing accurately 0.01 g of standard iron (II) ammonium sulphate hexahydrate	Cabo
	Dissolve the salt in distilled water, add 2-3 mL of concentrated sulfuric acid and dilute to 1000 mL with distilled water	Sumarago
	Prepare 1,10 – phenanthroline solution	Talandron
	Prepare hydroxylamine solution	Cabo
	Prepare sodium acetate solution	Sumarago
9:45 – 9:55	Pipette 50 mL of stock standard iron (II) solution into 100 mL flask and 50 mL of distilled water into another flask.	Talandron
9:55 – 10:10	Adding 2 mL of hydroxylamine hydrochloride solution, 10 mL of 1,10 – phenanthroline solution and 8 mL of sodium acetate solution to each flask, diluting it to the mark and letting it stand for 10-15 minutes	Cabo
		Sumarago
		Talandron
10:10 – 10:50	Make a duplicate set of samples for second trial.	Cabo
		Sumarago
		Talandron
10:50 – 11:00	Wash the cuvettes twice with the sample to be tested and wipe off any liquid drops or smudges.	Cabo
11:00 – 11:15	Fill the cuvette with the blank and the other cuvettes with the samples.	Sumarago
	Measure %T using spectrophotometer.	Talandron
	Record data at each measurement and measure temperature.	Cabo
11:15 – 11:30	Housekeeping	Cabo
		Sumarago
		Talandron

Raw Data Tables

Table 1. Transmittance and Absorbance of the Blank

λ (wavelength)	Trial 1		Trial 2	
	%T	ABSORBANCE	%T	ABSORBANCE

Temperature:				

λ (nm)	Trial 1		Trial 2	
	%T	ABSORBANCE	%T	ABSORBANCE

Temperature:				

Table 2. Transmittance and Absorbance of Sample

Observations:

Prelab Calculations

- **Calculations for Concentrations of Solutions used:**

$$M_{\text{iron (II)ammonium sulfate hexahydrate}} = \frac{0.07g\ \text{iron (II)ammonium sulfate hexahydrate}\left(\frac{1\ mol}{392.13\ g}\right)}{1\ L\ \text{iron (II)ammonium sulfate hexahydrate}}$$

$$= \ 1.7851x10^{-4}\ \frac{\text{mol iron (II)ammonium sulfate hexahydrate}}{L\ Solution}$$

$$M_{C_{12}H_8N_2 \bullet H_2O} = \frac{0.1\ g\ C_{12}H_8N_2 \bullet H_2O\left(\frac{1\ mol\ C_{12}H_8N_2 \bullet H_2O}{198.22\ g\ C_{12}H_8N_2 \bullet H_2O}\right)\left(\frac{1\ mol\ C_{12}H_8N_2}{1\ mol\ C_{12}H_8N_2 \bullet H_2O}\right)}{100\ mL\ solution\left(\frac{1\ L}{1000mL}\right)}$$

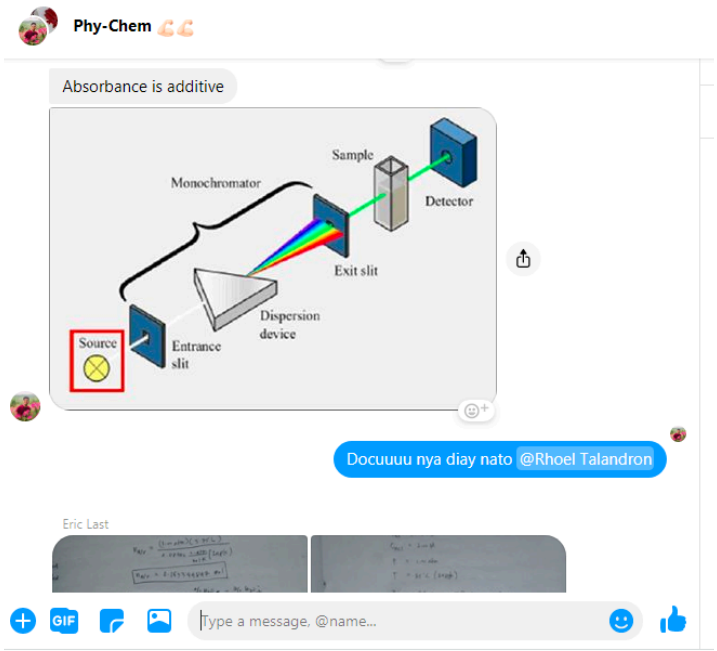
$$= \frac{5.045\ x10^{-3} mol\ C_{12}H_8N_2}{L\ solution}$$

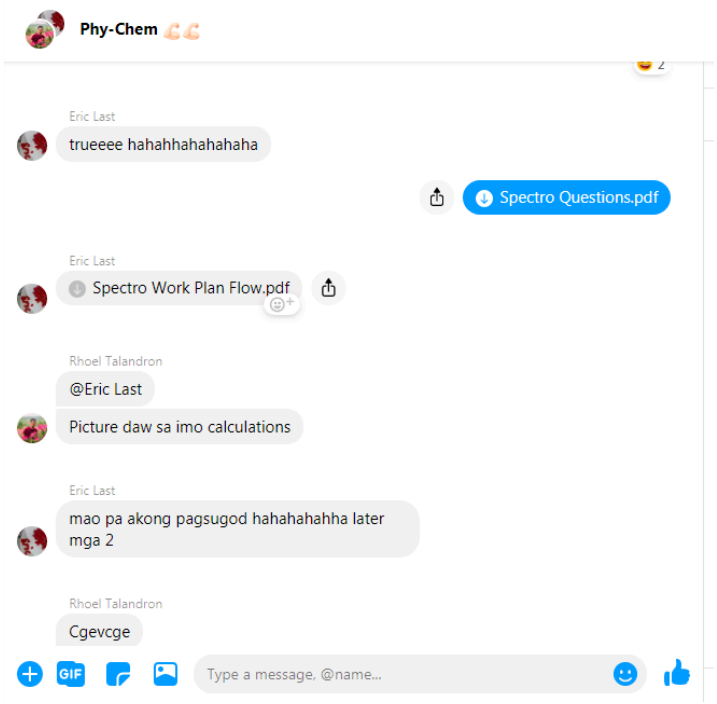
$$M_{[NH_4OH]^+Cl^-} = \frac{10\ g\ [NH_4OH]^+Cl^-\left(\frac{1\ mol\ [NH_4OH]^+Cl^-}{69.49\ g\ [NH_4OH]^+Cl^-}\right)}{100\ mL\ solution\left(\frac{1\ L}{1000mL}\right)} = \frac{1.439\ mol\ [NH_4OH]^+Cl^-}{L\ solution}$$

$$M_{C_2H_3NaO_2 \cdot 3H_2O} = \frac{10\ g\ C_2H_3NaO_2 \cdot 3H_2O\left(\frac{1\ mol\ C_2H_3NaO_2 \cdot 3H_2O}{136.08\ g\ C_2H_3NaO_2 \cdot 3H_2O}\right)\left(\frac{1\ mol\ C_2H_3NaO_2 \cdot 3H_2O}{1\ mol\ C_2H_3NaO_2 \cdot 3H_2O}\right)}{100\ mL\ solution\left(\frac{1\ L}{1000mL}\right)}$$

$$= \frac{0.735\ mol\ C_2H_3NaO_2}{L\ solution}$$

Brainstorming

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