

Experiment 3

Ultraviolet-Visible Spectroscopy – Quantitative Analysis

Section number: _____

Group number: _____

Objective:

(The purpose of the experiment)

Method:

- The maximum wavelength (λ_{max}) measured for paracetamol is -----
- The blank/reference used in this experiment is -----
- The molecular weight for paracetamol is -----
- Calculate the following and show your detailed calculation:
 - a. The concentration in (**mg/ml**) of paracetamol **stock solution 1** is -----
Show your calculation:
 - b. The **molar** concentration (**M or mol/L**) of paracetamol **stock solution 1** is -----
Show your calculation:
 - c. The concentration in (**mg/ml**) of paracetamol **stock solution 2** is -----
Show your calculation:
 - d. The **molar** concentration (**M or mol/L**) of paracetamol **stock solution 2** is -----
Show your calculation:

Results:

Data Table (1)

Label	Concentration (mg/ml)	Concentration (M) or (mol/L)	Absorbance
Standard solution 4			
Standard solution 3			
Standard solution 2			
Standard solution 1			

Unknown data:

Unknown ID number:	Unknown Absorbance:
--------------------------	---------------------------

- Show an example of your calculation of the concentration for one of the above standard solutions in data table (1) in **mg/ml** and in **M**.

Graph Plotting (concentration vs. Absorbance):

You are required to attach TWO plots to this report in external graph papers showing full graph information (graph label, axis label, R^2 , and the linear equation) regarding the following:

1. Calibration curve 1:

A plot of the observed values in the **data table (1)** above. Setting the **X-axis** for the concentration in (mg/ml) and the **Y-axis** for the absorbance. Displaying the **linear equation** and R^2 on the graph (**Attach the graph paper to the report sheet**)

2. Calibration curve 2:

A plot of the observed values in the **data table (1)** above. Setting the **X-axis** for the concentration in (M) and the **Y-axis** for the absorbance. Displaying the **linear equation** and R^2 on the graph (**Attach the graph paper to the report sheet**)

Discussion

Answer the following questions: (show your detailed calculation & use the correct unit)

➤ **Part 1:**

1. Calculate the concentration of your unknown using the equation of calibration curve 1.
2. Calculate the paracetamol molar absorptivity (ϵ) using the equation of calibration curve 2.
3. Calculate the concentration of your unknown using **Beer's law**.

➤ **Part 2:**

Assume that we did the paracetamol tablet assay procedure as describe in the recorded video and the following results was obtained:

- If solution C Absorbance: 0.751
- Weight of 20 tablet: 13.35 g
- Weight of the powder taken: 0.200 g

Answer the following questions:

1. Explain by using calculation how did we find the required weight of powder "0.200 g" ?
2. Calculate the percentage of stated content? "Using Beer's law **OR** calibration curve 1 equation."

Experiment Report Workload Distribution Table (2 marks)

Coordinator for Current Experiment ¹ :		
Section ²	Student Name ³	Percentage of the Performed workload ⁴

¹Mention the name of the student/ group member who did arrange the work related to the current experiment group report/work management.

²Section or part of the group report

³Mention the name of student/the group member who took responsibility of the specified group report section.

⁴Relative to the whole workload used to prepare the current group report.