Lab sheet #9

Beer's Lambert Law and Standard Curves

Objectives:

- To understand the concept of Beer-Lambert law and its applications.
- Getting familiar with the standard curve.
- Determination of an unknown concentration for a solution.

Method:

You are provided with:

- Standard solution of **0.1 M Copper Sulfate** (Stock solution).
- Solutions **"A" and "B"** with **Unknown concentrations**

1. Set up 8 test tubes, as following table:

Tube	0.1M Copper Sulfate Standard Solution (ml)	H_2O (ml)	Solutions with unknown concentration (ml)
Blank	-	5 ml	-
A	1ml	4 ml	-
B	2 ml	3 ml	-
C	3 ml	2 ml	-
D	4 ml	1 ml	-
E	5 ml		-
Solution "A"	-	-	2 ml
Solution "B"	-	-	2 ml

2. Cover the tube and mix the contents using the vortex.

3. Measure the absorbance of each tube at 600 nm against the blank.

Results:

Tube	Absorbance at 600nm	Concentration (M)
A		
B		
C		
D		
E		
Solution "A"		From the curve=
Solution "B"		From the curve=

1. Calculate the concentrations of standard solutions (Tube A-E).
2. Plot the standard curve (Absorbance vs. Concentration).
3. Determine the concentration of unknown solutions "A" and "B" from the standard curve.
4. Calculate the concentration of Solution "A" and "B", from the law using (0.942 $M^{-1}cm^{-1}$).
5. Calculate the extinction coefficient of your Copper Sulfate solution (using one of the known tubes).

In the Discussion

- Discuss the shape of the standard curve you obtained.
- Discuss the relationship between absorbance, colour, and concentration.
- Compare the calculated concentration values (A and B) with those obtained from the standard curve. (explain which one is more accurate and why)
- Compare the calculated extinction coefficient of Copper Sulfate with the known value (0.942 $M^{-1}cm^{-1}$).