More Calibration Practice (Because you asked)....

1. A 0.2690 g sample was dissolved in 200.0 mL of solution to create "Solution A". A stock solution with 16.93 ppm Co^{2+} was used to make a calibration curve with the following results

Vol cobalt std (mL)	Total volume (mL)	Absorbance
1.00	50.00	0.127
2.00	50.00	0.296
4.00	50.00	0.432
6.00	50.00	0.620
10.00	50.00	1.137

If 10.00 mL of solution A was diluted to 50.00 mL and its absorbance measured with a result of 0.511. What is the concentration of cobalt in the original (solid) sample (with error!)?

2. A 10.02 mg sample containing cadmium was dissolved to make 100.0 mL of solution. 10.00 mL of this solution was diluted to make 50.00 mL of a second solution called "solution B." The following solutions were made and the absorbance of each measured, as shown in the table below. What is the concentration of cadmium in the original (solid) sample?

volume solution B (mL)	volume 9.58 ppm Cd^{2+} solution (mL)	total volume (mL)	absorbance
5.00	0.00	100.0	0.424
5.00	1.00	100.0	0.522
5.00	3.00	100.0	0.686
5.00	5.00	100.0	0.986
5.00	10.00	100.0	1.096

3. A 0.440 mg sample was dissolved in 100.0 mL of solution. The potential of the solution was measured with a nitrate ion selective electrode and found to be 0.402 V versus the silver/silver chloride electrode. Based on the calibration data below, what is the percent of nitrate in the solid?

$[NO_3^-]$ (M)	E v. Ag/AgCl (V)
0.0187	0.166
2.50×10^{-3}	0.226
3.21×10^{-4}	0.308
9.90×10^{-5}	0.385
9.51×10^{-6}	0.416

4. A mixture containing phenol was separated using HPLC. It resulted in 5 peaks with the following data

peak #	retention time (min)	area under peak
1	0.53	731438
2	0.96	657199
3	1.85	550681
4	2.91	44871
5	4.51	4224381

A 5.00 mL sample original solution was mixed with 5.00 mL of 6.85% phenol solution. The resulting mixture was separated using HPLC. The results are shown below.

peak #	retention time (min)	area under peak
1	0.54	728265
2	0.95	1901456
3	1.85	554280
4	2.92	44251
5	4.49	4229641

What is the %phenol in the original sample?

5. A spectroscopic analysis has a calibration curve of

$$A = (1.363 \pm 0.067)c + 0.084 \pm 0.076$$

when run at a wavelength of 243 nm and using ppm as the concentration units.

a. Assuming a pathlength of 1.00 cm, what is the absorptivity of the analyte?

b. If a 0.416 g sample dissolved in 250.0 mL solution had a %T = 57.5% at 243 nm what is the %analyte in the sample?

c. What region of the spectra is used to conduct this experiment?