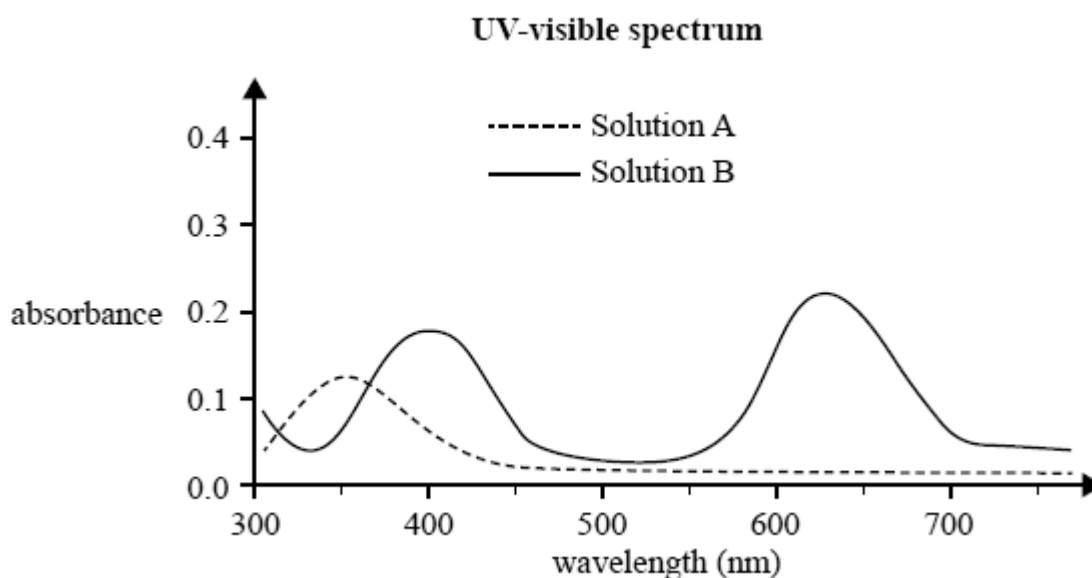


Video worksheet - Colorimetry and UV-Visible spectroscopy

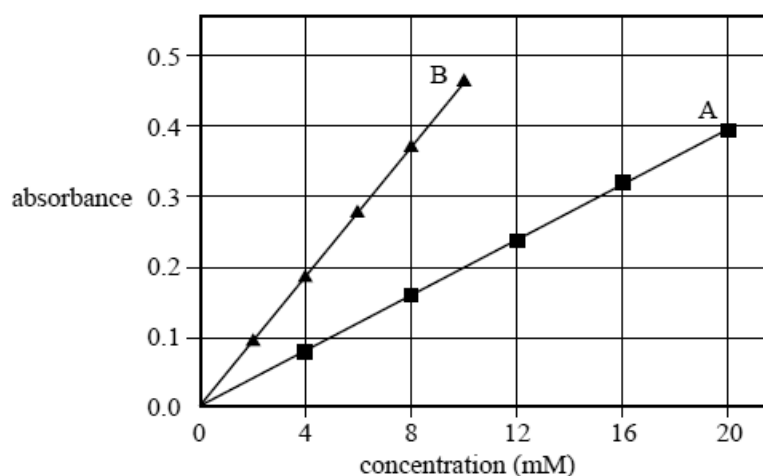
UV-visible spectroscopy was used to measure the spectra of two solutions, A and B. Solution A was a pink colour, while Solution B was a green colour.

The analyst recorded the absorbance of each solution over a range of wavelengths on the same axes. The resultant absorbance spectrum is shown below.



a) If 10.00 mL of Solution A was mixed with 10.00 mL of Solution B, which wavelength should be used to measure the absorbance of Solution B in this mixture? Justify your answer.

b) The analyst used two sets of standard solutions and blanks to determine the calibration curves for the two solutions. The absorbances were plotted on the same axes. The graph is shown below.



The analyst found that, when it was measured at the appropriate wavelength, Solution A had an absorbance of 0.2. If Solution A was cobalt(II) nitrate, $\text{Co}(\text{NO}_3)_2$, determine its concentration in mg L^{-1} .

$$M(\text{Co}(\text{NO}_3)_2) = 182.9 \text{ g mol}^{-1} \quad 1 \text{ mM} = 10^{-3} \text{ M}$$

c) In another mixture, the pink compound in Solution A and the green compound in Solution B each have a concentration of approximately $1.5 \times 10^{-2} \text{ M}$.

Could the analyst reliably use both of the calibration curves to determine the concentrations for Solution A and Solution B by UV-visible spectroscopy? Justify your answer.
