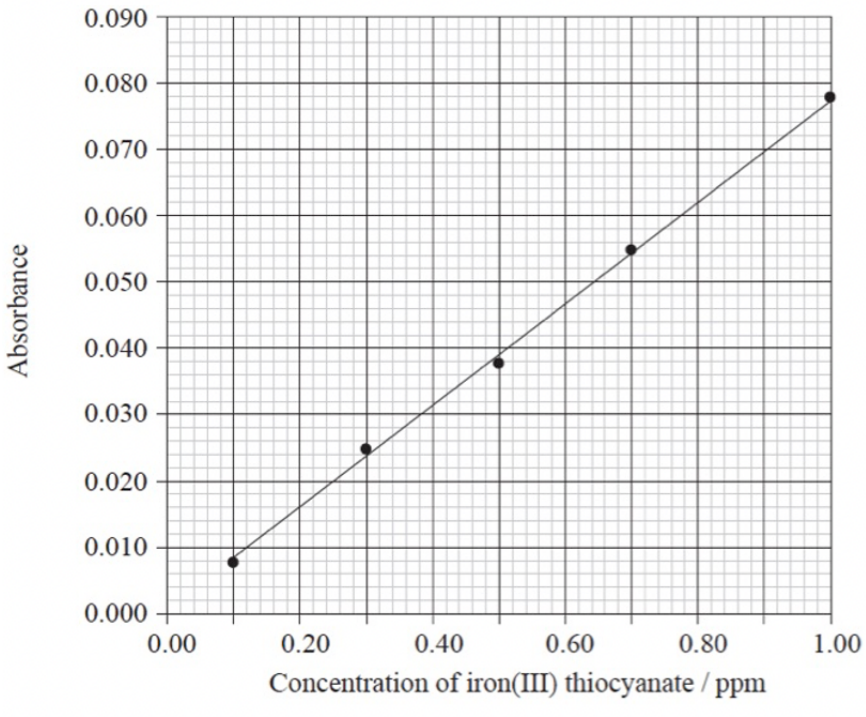
# SL & HL Questions on Graphical techniques

**1.** Sketch three separate graphs to show how the concentration of reactant A varies with time for :
(a) a zero order reaction with respect to [A].
(b) a first order reaction with respect to [A].
(c) a second order reaction with respect to [A].

**2.** The ideal gas equation is $PV = nRT$.
(a) Sketch a graph to show how pressure changes with volume for a fixed mass of gas at a constant temperature.
(b) Show how the variables can be manipulated to produce a straight- line graph.

**3.** The absorbance of a solution containing an unknown concentration of iron(III) thiocyanate was measured with a visible spectrometer and found to be 0.032. Use the calibration curve below, which was obtained using known concentrations of iron(III) thiocyanate under the same conditions, to determine the concentration of iron(III) thiocyanate (in ppm) in the sample.




**4.** A student wanted to determine the value for the temperature at absolute zero by experiment. She took 100 $cm^3$ of methane measured at 1.00 x $10^5$ Pa and 20 °C. She then successively increased the temperature by 10 °C and measured the new volume at 30 °C, 40 °C, 50 °C, 60 °C, 70 °C and 80 °C whilst keeping the pressure constant. Explain how she could use her results graphically to determine the value for absolute zero.