Question 35 (8 marks)
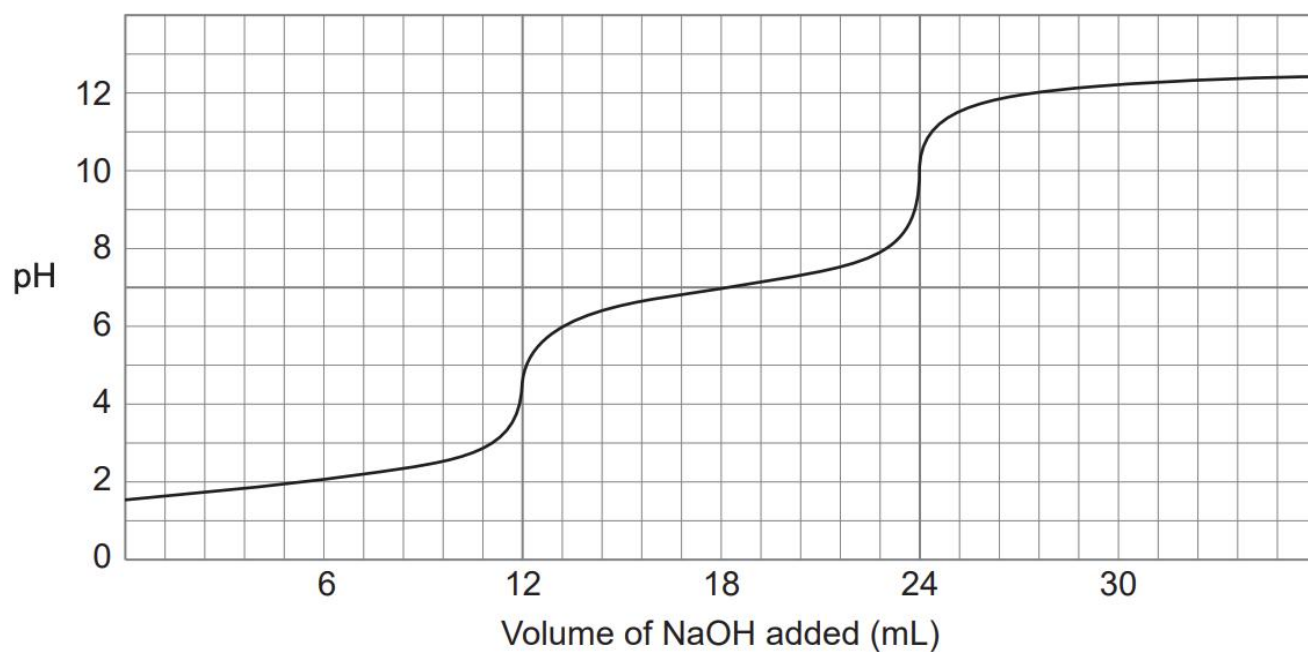
Consider the following acid-base titration curve that is produced by the addition of 0.166 mol L^{-1} sodium hydroxide solution to 20.00 mL of an approximately 0.1 mol L^{-1} diprotic acid.

(a)   (i)   Indicate whether the diprotic acid is most likely to be sulfuric acid, H_2SO_4(aq) or sulfurous acid, H_2SO_3(aq), by **circling** your choice below. (1 mark)

Sulfuric acid   Sulfurous acid

(ii)   Making reference to the titration curve shown above, give **two** reasons for your answer. (2 marks)

One: _____

_____

_____

Two: _____

_____

_____

(b) Predict the effect (increase, decrease or no change) on the calculated concentration of the acid for the following two systematic errors that can occur in a titration and justify your choice. (4 marks)

	Systematic Error	Effect on calculated concentration of acid (circle)	Justification
I	Only rinsing the pipette with distilled water before use	increase decrease no change	
II	Using an indicator with an end point of pH = 4.5	increase decrease no change	

(c) State **one** reason why these errors are classified as systematic errors rather than random errors. (1 mark)

_____

_____