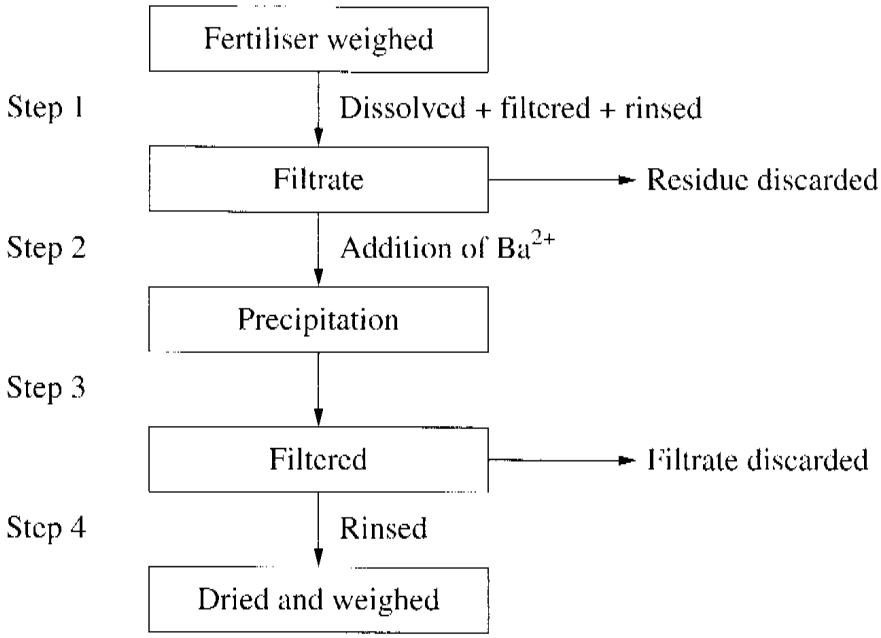
Question 29 (6 marks)

The flowchart shown outlines the process used to determine the amount of sulfate present in a sample of lawn fertiliser.



(a) What assumptions were made and how do these affect the validity of this process? **3**

That there were no sulfate ~~precipitated~~ in the discarded filtrate (slight solubility of $BaSO_4$) ~~residue~~ and that the $BaSO_4$ was dried to completion (i.e. no water / constant mass). The first would result in lost SO_4^{2-} and the second in an overestimation of $BaSO_4$. Both of these would reduce the validity of the result.

(b) It was found that 4.25 g had a sulfate content of 35%. **3**

What is the mass of the dried precipitate at Step 4? Include a chemical equation in your answer.

initially $SO_4 = 4.25 \times 35\%$

$= 1.488$ g

$BaSO_4 = 233.37$

$SO_4 = 96.07$

$\therefore SO_4 = 41.2\%$ of $BaSO_4$

So $1.488 = 41.2\%$ of final ppt

so mass of ppt in Step 4 = 3.6 g