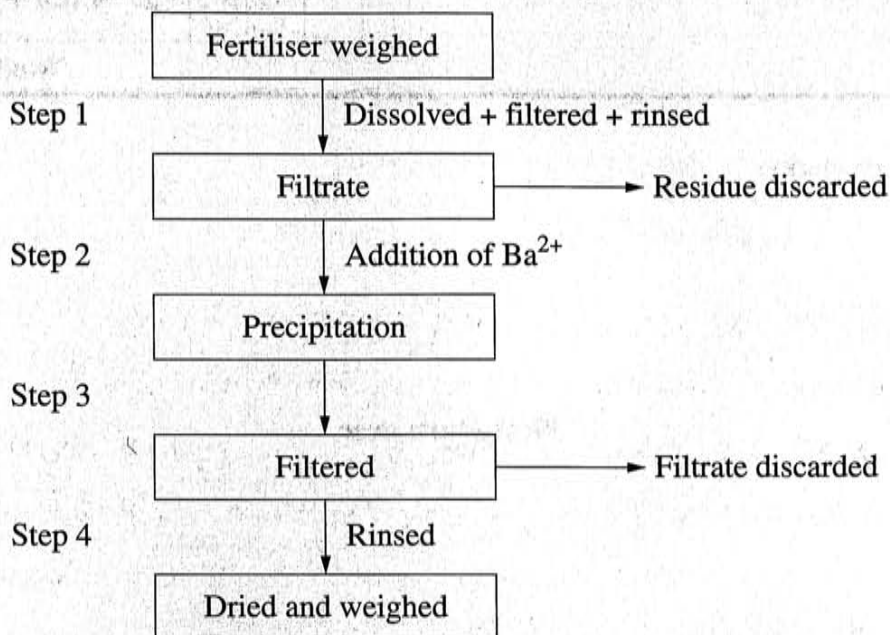


Question 29 (6 marks)

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

The initial assumption is that all fertiliser is dissolved, this will reduce the % of sulfate result as there will be less sulfate to test.
 The next one is that all the sulfate precipitates with the Ba^{2+} , decreasing the ^{weighable} sulfate, decreasing the %.
 Finally, it is assumed that all barium sulfate is captured by the filter paper while a lot will not be; decreasing the ~~weighable~~ barium sulfate ~~and~~ hence decreasing the %.

- (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.

$4.25 \text{ g} \times 0.35 = 1.4875 \text{ g}$ of sulfate
 $n = \frac{m}{M} \therefore n = \frac{1.4875}{32.07 + 16 \times 4} = 0.01548$ moles
 since Barium sulfate is BaSO_4 , there will be 0.01548 moles of BaSO_4 .

$\therefore m = nM = 0.01548 \times (137.3 + 32.07 + 16 \times 4)$
 $= 3.613$ grams of BaSO_4 .