Question 29 (6 marks)

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

Step 1  Fertiliser weighed  
Dissolved + filtered + rinsed

Step 2  Filtrate  
Addition of $\text{Ba}^{2+}$  
Precipitation  
Residue discarded

Step 3  Filtered  
Filtered discarded

Step 4  Rinsed  
Dried and weighed

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

The assumptions made were that the addition of $\text{Ba}^{2+}$ would react with other objects in the fertiliser resulting in sulfate not being reacted or altered. This affects the validity of this process as it may result in some sulfate reaching and altering the end result of sulfate collected.

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

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

\[ \text{mass of solid} = \text{mass of solution} \times \text{percentage of sulfate} \]

\[ \text{mass of solid} = 4.25 \text{ g} \times 0.35 \]

\[ \text{mass of solid} = 1.52 \text{ g} \]