Virtual Lab – Titration

In this virtual lab, you will use a solution of NaOH (known concentration) to determine the unknown concentration of a solution of an acid. A titration is a method of carefully mixing two solutions so that you can end up with a final solution that is fully neutralized.

The titration videos are two parts:
https://www.youtube.com/watch?v=sFpFCPTDv2w
https://www.youtube.com/watch?v=2z4mlE6MK0U

List three pieces of personal protective equipment used by the chemist in the video. (3 marks)

1. **Safety Goggles (used to protect the eyes)**
2. **Gloves (to prevent any damage if chemicals are accidentally spilt)**
3. **Lab coat/apron**

What is the concentration of your NaOH solution?

The concentration of the NaOH solution was given to us as 0.1002 M -> (mol/L)

What is the acid you are titrating?

H_2SO_4 (Sulfuric Acid)

What volume of your acid solution are you using for the titration?

The volume used is 10 ml as also stated in the video. We will use this to calculate the molarity (concentration).

Write a balanced chemical equation for the reaction that will occur during your titration. (2 marks)

$H_2SO_4 (aq) + 2\ NaOH (aq) \longrightarrow 2\ H_2O (aq) + Na_2SO_4 (aq)$

Three titrations were done and the volume of titrant (NaOH) was recorded as follows. Determine the volume of NaOH added for each titration. (3 marks)

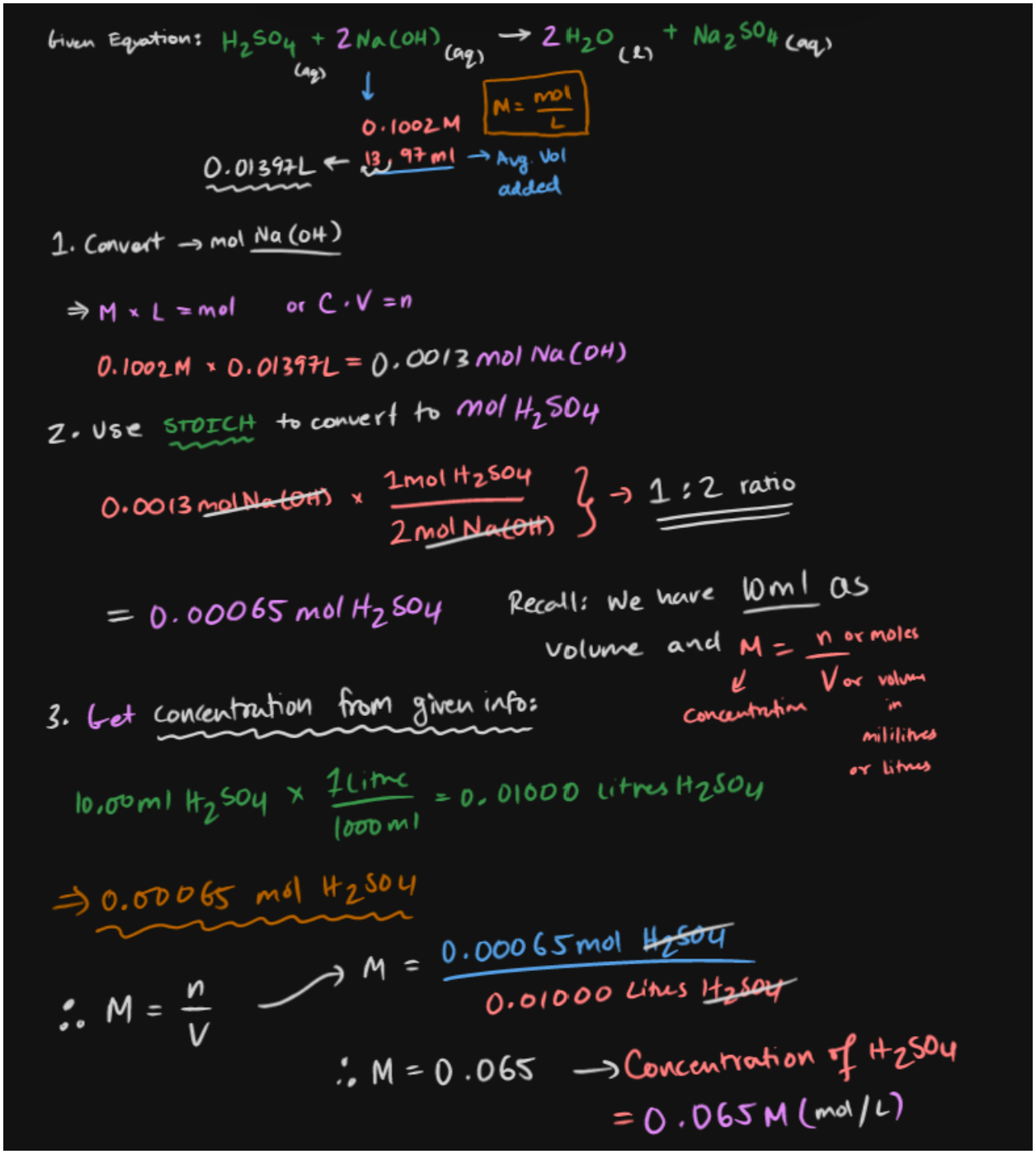
	Titration 1	Titration 2	Titration 3
Initial volume reading	6.53 ml	5.72 ml	8.57 ml
Final volume reading	20.44 ml	19.68 ml	22.61 ml
Volume added	13.91 ml	13.96	14.04

Calculate the average volume of NaOH added. (2 marks)

Average volume of NaOH added = (13.91 + 13.96 + 14.04) / 3

Average volume of NaOH added = 13.97 ml

Determine the unknown concentration of your acid solution. Use the average volume of NaOH that you calculated in the previous question. (6 marks)



At the equivalence point (when the base has fully neutralized the acid), what would be the pH of the solution? (2 marks)

At the equivalence point, the moles of acid are equivalent to the moles of the base (right at the moment where the ph indicator shows even the slightest change in colour). It is at the point where the acid has been completely neutralized by the base. Therefore the ph would be 7, which is neutral. At that point, the reaction has been completed and we are left with water and a salt which is Na2SO4 (Sodium Sulfate). This is why acid-base reactions are called neutralization reactions.