1. You are provided with the following;

BA1, which is a solution made by dissolving 6.0g of a mixture of sodium chloride and sodium hydroxide in 1dm^3 of water.

BA2, which is a 0.05M solution of sulphuric acid.

You are required to determine the concentration of sodium hydroxide in gdm^{-3} and hence its percentage composition in BA1.

Procedure:

Pipette 20.0 or 25.0 cm^3 of BA1 into a clean conical flask, add 2-3 drops of phenolphthalein indicator and titrate the contents in the flask with BA2 from the burette until the end point. Repeat the titration 2-3 times until you obtain consistent results.

Record your results in the table below.

Table of results:

Volume of pipette used_____cm^3

Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of BA2 used (cm^3)			

Titre values used for calculating the average volume of BA2 used.....

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∴Average volume of BA2 used.....cm^3

Questions:

(a) Calculate the

(i) Number of moles of sulphuric acid in BA2 that reacted.

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(ii) Number of moles of sodium hydroxide in BA1 that reacted

(iii) Molarity of sodium hydroxide in BA1

(b) Determine the:

(i) Concentration of sodium hydroxide in BA1 in gdm-3
(Na = 23, 0 =16, H=1)

(ii) Percentage composition of sodium hydroxide in the mixture.

2. You are provided with substance R which contains two cations and one anion. You are required to identify the cations and anion in R. Carry out the following tests on R and record your observations and deductions in the table below. Where a gas(es) is evolved, it must be identified.

TEST	OBSERVATIONS	DEDUCTIONS
(a) Heat two spatula endfuls of R in a hard glass test tube, first gently and then strongly until there is no further change		
(b) To two spatula endfuls of R in a boiling tube, add about 3cm^3 of water and shake vigorously to dissolve.		
(c) To the resultant solution in (b), add dilute ammonia solution dropwise until is excess. Shake and Filter. Keep both the filtrate and the residue.		
(d) To the filtrate from (c), add dilute nitric acid dropwise until the solution is just acidic. Divide the acidic		

filtrate into four portions. (i) To the first portion of the acidified filtrate , add sodium hydroxide solution dropwise until in excess.		
(ii) To the second portion of the acidified filtrate, add dilute ammonia solution dropwise until in excess.		
(iii) To the third portion of the acidified filtrate add 4-5 drops of lead(II) nitrate solution and heat gently.		
(iv) Use the fourth portion to carry out a test of your own choice to confirm the anion in R. Record Test and observations. (v) Test:		
(e) Wash the residue and dissolve it in dilute sulphuric acid. Divide the acidic solution into three parts.		
(i) To the first part of the acidic solution, add sodium hydroxide		

solution dropwise until in excess.		
(ii) To the second part of the acidic solution, add 3-4 drops of potassium iodide solution.		
(iii) To the third part of the acidic solution, add dilute ammonia solution dropwise until in excess		

(f) Identity the:

(i) cations in R……and……

(ii) anion in R……

 End