FORM FOUR CLUSTERKCSE MODEL 4

CHEMISTRY PAPER 3 QUESTIONS

1.i) 0.5g of a metal carbonate X2CO3 labelled E.

ii)Sulphuric (VI) acid labelled as solution N.

iii)Solution R prepared by dissolving 40g of sodium hydroxide in 400cm3 of distilled and made up to 1 litre. You are required to determine the value of X in the metal carbonate.

Procedure I

Fill the burette with sulphuric (VI) acid solution up to the mark. Pipette 25.0cm3 of solution R into a conical flask. Add 2 -3 drops of phenolphthalein indicator. Titrate solution R against solution N.

Repeat the experiment two more times and record your results as in table I below.

Titration number	1	2	3
Final burette reading (cm³)			
Initial burette reading (cm³)			
Volume of solution K used (cm³)			

Calculate:- i) The average volume of solution N used.

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ii)   The number of moles of solution R used.

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iii)   The number of moles of solution N used.

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iv) The number of moles of sulphuric (VI) in 100cm3 of solution N.

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2.Procedure 2

Using a measuring cylinder, measure 100cm3 of solution N into a 250cm3 beaker. Add all of the 0.5g of solid E into the beaker and swirl the beaker. When the solution is complete, label this solution as solution K. Rinse the burette and fill it with solution K. Pipette 25.0cm3 of solution R into

a conical flask. Add 2 – 3 drops of phenolphthalein indicator. Titrate solution R against K. Record your results as in table 2 below.

Titration number	1	2	3
Final burette reading (cm³)			
Initial burette reading (cm³)			
Volume of solution K used (cm³)			

Calculate:-

i) The average volume of solution K used.

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ii) The number of moles of solution K used.

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iii) The number of moles of sulphuric (VI) acid in 100cm3. (1mark)

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iv) The number of moles of sulphuric (VI) acid that reacted with 0.5g of the metal carbonate.

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v) Determine the relative formula mass of the metal carbonate X2CO3

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vi) Work out the value of X in X2CO3. (C=12.0, O=16.0)

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3.a) You are provided with solid T. Carry out the experiments in the table below and record your observations and inferences in the spaces provided. Put all of solid T in a boiling tube. Add 40cm3 of distilled water. Shake and filter. Divide the filtrate into three portions. Retain the residue

i) To the first portion add a few drops of 2M sodium hydroxide and then excess.

Observations	Inferences
(1mark)	(1mark)

ii) To the second portion add a few drops of ammonia solution and then excess.

Observations	Inferences
(1mark)	(1mark)

iii) To the third portion add a few drops of barium chloride followed by dilute hydrochloric acid

Observations	Inferences
(1mark)	(1mark)

b) Dissolve the residue in 2cm3 hydrochloric acid in a test tube. Ensure some residue remains. Decant. Divide the solution into two portions.

i) To the first portion, add a little sodium hydroxide solution until in excess.

Observations	Inferences
(1mark)	(1mark)

ii) To the second portion add a little ammonia solution in excess.

Observations	Inferences
(1mark)	(1mark)