FORM FOUR CLUSTER KCSE MODEL 4

CHEMISTRY PAPER 3 ANSWERS

1.

Table 1

Titration Number	1	2	3
Final burette Reading (cm^3)	12.5	25.0	37.5
Initial burette Reading (cm^3)	0.0	12.5	25.0
Volume of N used (cm^3)	12.5	12.5	12.5

a) Complete table 1 mark

B]Incomplete table with 2 titrations done ½ mark

c)i) Accuracy 1 mark

value is within +2 .0 of teacher's award ½

Primuth of averaging 1 Values to be averaged should be those within+ 2 .0 of each other.

Final answer

Calculations

ii) $\left(\frac{25.0\times1}{1000}\right)$ √½

=0.025moles√½

iii) Mole ratio of $NaOH : H_2SO_4$

2 : 1

Number of moles of solution N= $\frac{0.025}{2}$ √½

=0.0125moles√½

iv) $\frac{100\times0.0125}{average titre}$ √½

Answer √½

v) $\frac{1000\times answer\ in(iv)}{100}$ √½

Answer = √½

2. Conditions to apply as in table 1

Calculations

ii) No of moles of NaOH used $= \frac{25.0 \times 1}{1000}$ √½

$= 0.025$ moles √½

Mole ratio NaOH : H_2SO_4

2 : 1 √½

No of moles of solution K used $= \frac{0.025}{2}$ √½

$= 0.0125$ √½

iii) Moles of H_2SO_4 in $100cm^3$ of solution

$= \frac{100 \times 0.0125}{average\ titre}$ √½

Answer= √½

iv) No. of moles of H_2SO_4 = *Answer in a(iv) – Answer in b(iii)* of reacted X_2CO_3

= Answer √½

v) Mole ratio $X_2CO_3 : H_2SO_4$

1 : 1√½

Moles of X_2CO_3 in 0.5 g = answer (iv) above.

0.5 g of X_2CO_3 = *answer (iv) above* × *1 mole*

Relative formula mass $= \frac{1 \times 0.5}{Answer\ in\ (iv)}$ √½

= Answer = √½

vi) 1 mole of X_2CO_3 = Answer in (v) above)

$\therefore X = \frac{Answer\ in\ (v) - 60}{2}$ √½

=Answer √½

.a)i) A white precipitate is formed√½ soluble in excess sodium hydroxide to form a colourless solution.√½

Inference

Possibly $Zu^{2+}, Pb^{2+} or Al^{3+} ions\ present$ √1 for all the three. ½ for any two.

ii) **Observation**

-A white precipitate is formed.√½

-It dissolves in excess ammonia to form a colourless solution.√½

Inference

$Zn^{2+} ions\ present$ √1 or $Al^{3+}, Pb^{2+} ion\ absebt$

iii) **Observation**

-A white precipitate is formed.√½

-The white precipitate is insoluble in an acid.√½

Inference

SO_4^{2-} ions present√1

b)i) **Observation**

-A pale blue precipitate is formed.√½

-The precipitate is insoluble in sodium hydroxide.√½

Inference

Cu^{2+} ions present.√1

ii) **Observation**

-A pale blue precipitate is formed.√½

-The precipitate dissolves in excess ammonia to form a deep blue solution.√½

Inference

Cu^{2+} ions present