2020

CHEMISTRY — HONOURS — PRACTICAL

Paper : DSE-B-1P

(Inorganic Materials of Industrial Importance)

Full Marks : 30

The figures in the margin indicate full marks.

1. For the estimation of the quantity of $CaCO_3$ and $MgCO_3$ present separately in a given dolomite sample in *g* :

(a) Write down the principle of dissolution and estimation mentioning all the equations involved and derive the working formula. 15

(b) Using the following data calculate the strength of ~(M/50) EDTA solution :

(i) 1.1451 *g* of Zn-acetate dihydrate has been accurately weighed, transferred to a 250 mL volumetric flask and volume is made up with distilled water in presence of NH_4Cl.

(ii) Standardization of ~(M/50) EDTA by standard Zn-acetate 2½+2½

No. of titrations	Volume of standard Zn-acetate taken (mL)	Burette reading of EDTA solution (mL)			
		Initial	Final	Difference	Most frequent reading
1	25	0	26.3	26.3	26.3
2	25	0	26.4	26.4	
3	25	0	26.3	26.3	

(c) 0.7678 *g* of the Dolomite sample has been weighed accurately and after dissolution step, the volume is made up to 250 mL in a volumetric flask.

Using the above data, calculate separately the amount of $CaCO_3$ and $MgCO_3$ present in the given Dolomite sample in *g* by using the following specimen results. 5+5

(i) Table for estimation of Ca^{II} and Mg^{II} :

No. of titrations	Volume of stock solution taken (mL)	Burette reading of EDTA solution (mL)			
		Initial	Final	Difference	Most frequent reading
1	25	0	35.5	35.5	35.5
2	25	0	35.5	35.5	
3	25	0	35.6	35.6	

(ii) Table for estimation of Ca^{II} :

No. of titrations	Volume of stock solution taken (mL)	Burette reading of EDTA solution (mL)			
		Initial	Final	Difference	Most frequent reading
1	25	0	18.7	18.7	18.7
2	25	0	18.6	18.6	
3	25	0	18.7	18.7	

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CHEMISTRY — HONOURS — PRACTICAL

Paper : DSE-B-2P

(Novel Inorganic Solids)

Full Marks : 30

The figures in the margin indicate full marks.

Answer ***all*** questions.

1. For the determination of the $[K^+]$: $[H^+]$ ratio in the given $KHSO_4$ sample by cation exchange method :

(a) Write down the principle mentioning all the equations involved and derive the working formula. 15

(b) Using the following data calculate the strength of ~0.02(N) NaOH solution. 2½+2½

(i) 0.1311 *g* of oxalic acid has been accurately weighed, transferred to a 100 mL volumetric flask and volume is made up with distilled water.

(ii) Standardization of ~0.02(N) NaOH by standard oxalic acid solution

No. of titrations	Volume of standard oxalic acid taken (mL)	Burette reading of NaOH solution (mL)			
		Initial	Final	Difference	Most frequent reading
1	5	0	5.5	5.5	5.5
2	5	0	5.4	5.4	
3	5	0	5.5	5.5	

(c) Using the above data, calculate the $[K^+]$: $[H^+]$ ratio in the given $KHSO_4$ solution by using the following specimen results. 5+5

(i) Standardization of $KHSO_4$ solution :

No. of titrations	Volume of $KHSO_4$ solution taken (mL)	Burette reading of NaOH solution (mL)			
		Initial	Final	Difference	Most frequent reading
1	5	0	5.7	5.7	5.8
2	5	0	5.8	5.8	
3	5	0	5.8	5.8	

(ii) Table for estimation of ($[K^+]$ + $[H^+]$) after passing the solution through the cation exchange column in H^+ form :

No. of titrations	Volume of $KHSO_4$ solution taken (mL)	Burette reading of NaOH solution (mL)		
		Initial	Final	Difference
1	5	0	11.5	11.5