

Q11) A tablet of antacid was dissolved in 100.0 mL of 0.1006 M solution of HCl of aliquot 25.0 mL → heated and titrated with 14.5 mL of 0.09913 M solution of NaOH. The weight (g) of CaCO_3 (100 g/mol) in the tablet is

- A) 0.431 B) 0.861 C) 0.108 D) 0.215

Q12) the solution should be heated before the titration because

- A) One of the products is volatile B) The analyte is insoluble
C) Both acid and base are weak D) The titration is fast

Q13-14:

A sample of 1.00 g of a mixture may contains carbonate, bicarbonate, or hydroxide is dissolved and diluted to 100 ml with distilled water, aliquot of 25.0 ml was titrated with 0.123 M HCl. The pH curve illustrates that the two end points are respectively at 11.9 and 20.1 ml

Q13: The sample is

- A) NaOH & NaHCO_3 B) Na_2CO_3 & NaHCO_3 C) NaOH & Na_2CO_3 D) Na_2CO_3 alone

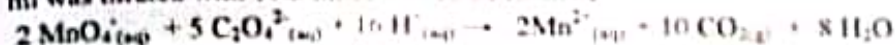
Q14: The mass percent of Na_2CO_3 (106 g/mol) in the sample is

- A) 62.1 B) 15.5 C) 26.2 D) 42.8

Q15: A sample of sodium carbonate was titrated with HCl. If the pH curve illustrates that the first end point is at 20.5 ml, the volume (ml) at the second end point should be at

- A) 41.0 B) 30.8 C) 20.5 D) 10.3

Q16: A sample containing oxalate weighing 2.124 g was dissolved in acid and diluted to 100 ml, aliquot of 25.0 ml was titrated with 16.3 ml of 0.0315 M KMnO_4 .



The mass percent of $\text{Na}_2\text{C}_2\text{O}_4$ (134 g/mol) is

- A) 80.9 B) 13.0 C) 32.4 D) 63.5

Q17-18:

A sample of 50.0 ml of water was titrated with 6.60 ml of 0.0103 M AgNO_3 to reach the chromate end point. Another 100.0 ml of water was titrated with 5.60 ml of 0.0916 M HCl to reach methyl orange end point.

Q17: The chloride content measured as part per million Cl^- (35.5 g/mol) is

- A) 96.4 B) 115 C) 48.2 D) 513

Q18: The total alkalinity of water measured as part per million CaCO_3 (100 g/mol) is

- A) 513 B) 410 C) 229 D) 256

Q19: The solution that used as standard solution and self-indicator is

- A) KMnO_4 B) AgNO_3 C) K_2CrO_4 D) Na_2CO_3

Q20-21:

A sample of 0.500 g of unknown containing NaCl and CaCl_2 was dissolved and the Ca^{2+} in the solution is precipitated as CaCO_3 (100 g/mol) producing 0.215 g. the remaining solution was titrated with 0.0696 M AgNO_3 requiring 38.0 ml to reach the end point.

Q20: The mass percent of CaCl_2 (111 g/mol) in the sample is

- A) 19.5 B) 79.6 C) 47.7 D) 14.1

Q21: The mass percent of NaCl (58.5 g/mol) in the sample is

- A) 22.3 B) 32.3 C) 48.4 D) 11.8

18/ $M \times V = \text{mol HCl} \times \frac{1}{2} \times \frac{1}{1} \times \text{Fact}$

Ca^{2+} CaCO_3 CaCO_3
 قبل التفاعل قبل التفاعل قبل التفاعل

$$\text{CaCO}_3 \text{ ppm} = \frac{0.0116 \times 5.60 \times 10^3 \times \frac{1}{2} \times \frac{1}{1} \times 100}{50 \times 10^{-3}} =$$

$$= 5129 \approx 513 \text{ The Answer is [A]}$$

19/ [A] kmho_u

20/ $\frac{6.215 \text{ g}}{100 \text{ g/mol}} = \text{mol CaCO}_3 = 2.15 \times 10^{-3}$

$$\text{mol CaCl}_2 = \text{mol CaCO}_3$$

$$\text{CaCl}_2 \% = \frac{2.15 \times 10^{-3} \times 111}{0.500 \text{ g}} \times 100$$

$$= 47.7 \%$$

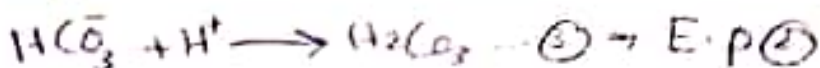
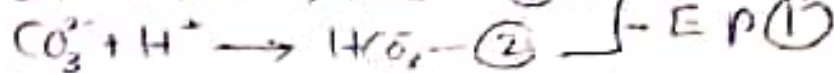
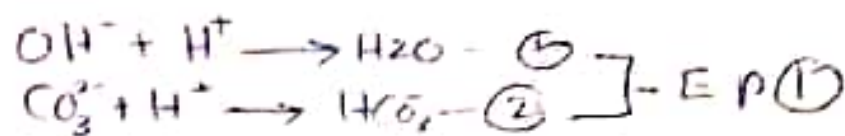
$$Q13/ \quad V_1 = 11.9 \text{ ml} \quad V_2 = 20.1 \text{ ml}$$

$$\Delta V = V_2 - V_1 = 8.2 \text{ ml}$$

$V_1 > \Delta V \rightarrow$ The sample is

C NaOH and Na_2CO_3

Q14/



- $M_{\text{HCl}} \times V_1 = \text{mol HCl} = \text{mol OH}^- + \text{mol CO}_3^{2-}$
 $0.123 \times 11.9 \times 10^{-3} = 1.4637 \times 10^{-3} \text{ mol}$

- $M_{\text{HCl}} \times \Delta V = \text{mol HCl} = \text{mol H}_2\text{CO}_3$

$0.123 \times 8.2 \times 10^{-3} = 1.0086 \times 10^{-3}$

$$\text{mol Na}_2\text{CO}_3 = 1.4637 \times 10^{-3} + 1.0086 \times 10^{-3}$$

$$= 2.4723 \times 10^{-3}$$

$$\text{Na}_2\text{CO}_3\% = \frac{2.4723 \times 10^{-3} \text{ mol} \times 106 \frac{\text{g}}{\text{mol}}}{1.00 \text{ g}} \times 100$$

$= 26.2 \rightarrow$ The answer is

C

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Q13-14:

A sample of 1.00 g of a mixture may contain carbonate, bicarbonate, or hydroxide is dissolved and diluted to 100 mL with distilled water, aliquot of 25.0 mL was titrated with 0.121 M HCl. The pH curve illustrates that the two end points are respectively at 11.9 and 20.1 mL

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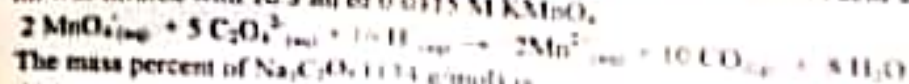
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Q151 [A] 41.0

Answer $\rightarrow \text{Na}_2\text{CO}_3 \rightarrow V_1 = \Delta V$

$$V_1 = 20.5 \text{ ml}$$

$$V_2 = ?$$

أستعمل طريقة أنه يطرح كل المعادلات مع V_1 والنتيجة
التي يقطع تاريخ المطرح 20.5 ml هو الجواب الصحيح

$$\checkmark \quad 41.0 - 20.5 = 20.5$$

Q16/ $M \times V = \text{mol} \times \frac{5}{2} \times \frac{100}{25} \times 134$
 kmno_4 \downarrow \downarrow \downarrow
 نقول لمولات $\text{Na}_2\text{C}_2\text{O}_4$ عند عودتك \downarrow نقول بجرامات

$$\text{Na}_2\text{C}_2\text{O}_4\% = \frac{0.0315 \times 16.3 \times 10^{-3} \times \frac{5}{2} \times \frac{100}{25} \times 134}{2.124 \text{ g}} \times 100$$

$$= 32.3\% \approx 32.4\% \text{ Answer [C]}$$

Q17/ $\text{mol Cl}^- = \text{mol AgNO}_3 = M \times V$
 $0.0100 \times 6.60 \times 10^{-3}$
 $= 6.798 \times 10^{-5} \text{ mol}$

$$\text{ppm Cl}^- = \frac{6.798 \times 10^{-5} \times 35.5 \times 10^3}{50 \times 10^{-3}}$$

$$= 48.2 \text{ Answer [C]}$$

Q8 / ☐ 2,3

Q9 / ☐ 3,4

Q10 / ☐ acetic acid

Q11 / Total mol HCl = $M \times V$
 $0.1006 \times 1.00 \times 10^{-3}$
 $= 0.0006 \text{ mol}$

- mol HCl (unreacted) = mol NaOH
 $M \times V$
 $0.0913 \times 14.71 \times 10^{-3}$
 $= 1.4582 \times 10^{-3} \text{ mol}$

- mol HCl (Reacted) = $0.0006 - 1.4582 \times 10^{-3}$
 $= 0.6018 \times 10^{-3}$

mol $\text{CaCO}_3 = \frac{1}{2} \text{ mol HCl Reacted}$
 $= 4.3009 \times 10^{-3} \times \frac{25}{100} \times 100 =$

wt $\text{CaCO}_3 = 0.1075 \approx 0.108$

Answer is ☐

Q12 / ☐ the analyte is Insoluble

Q₁ ☐ 2,3

Q₂ :-

☐ AgNO₃ and KMnO₄

Q₃ :- ☐ spontaneous

Q₄ :- ☐ antacid

Q₅ :- ☐ more, last

Q₆ :- ☐ acidic, high

Q₇ : ① Total mol NaOH = $M \times V$
 $0.123 \times 50.0 \times 10^{-3} = 6.15 \times 10^{-3} \text{ mol}$

② mol (NaOH) (unreacted) = mol HCl = $M \times V$
 $0.116 \times 13.2 \times 10^{-3}$
 $= \cancel{4.61 \times 10^{-3}}$
 1.5312×10^{-3}

③ mol (NaOH) (reacted) =
 $6.15 \times 10^{-3} - \cancel{4.61 \times 10^{-3}} = \boxed{4.6188 \times 10^{-3}}$

④ mol NaOH = mol NH₄Cl

$$\text{NH}_4\text{Cl \%} = \frac{4.6188 \times 10^{-3} \text{ mol} \times 53.5 \frac{\text{g}}{\text{mol}}}{0.500} \times 100$$

$$= 49.4 \%$$

Answer is

☐