දුලාන් මධුරංග- රසායන විද්‍යාව විභාග මධ්‍යස්ථානය

Special Online Speed Test

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ), 2023 අගෝස්තු
General Certificate Of Education (Adv. Level) Examination, August 2023

රසායන විද්‍යාව I Chemistry I	02	S/E	I

Universal gas constant $R = 8.314\ J\ K^{-1}\ mol^{-1}$ Plank's constant $h = 6.626\times10^{-34} J\ s$

Avogadro constant $N_A = 6.022\times10^{23}\ mol^{-1}$ Velocity of light $c = 3\times10^{8} m\ s^{-1}$

Introduction to paper Class-08
Acid-Base Titrations

1. In the titration of 25·0 cm^3 portions of NaOH solution with HCl solution, which of the following activities is the most essential?
   (1) Washing the pipette out with HCl solution.
   (2) Washing the titration flask with NaOH solution.
   (3) Measuring the temperatures of the titrating solutions.
   (4) Filling the burette up to the zero mark with HCl solution.
   (5) Rinsing the inside of the burette with the HCl solution.

2. Which one of the following statements is true regarding titrations?
   (1) In an acid base titration, the acid should always be placed in the burette.
   (2) The burette should always be filled up to the zero mark at the beginning of a titration.
   (3) The solution remaining at the pipette tip after delivering, should be very carefully blown i titration flask.
   (4) Some titrations do not require an indicator to be added to detect the end-point.
   (5) For the calculation, the average of the two burette readings at the end point should be taken two readings are widely different to each other.

3. The molar ratio NaOH : Na_2CO_3 in an aqueous solution of NaOH and Na_2CO_3 is 1 : 2. When 25·00 cm^3 of this solution is titrated with 0·1 mol dm^{-3} HCl with phenolphthalein as indicator, the end point is 15·00 cm^3. When the same titration is repeated using methyl orange instead of phenolphthalein as indicator, the end point (cm^3) is
   (1) 15·00 (2) 20·00 (3) 25·00
   (4) 30·00 (5) 40·00

4. When 25·00 cm^3 of a Na_2CO_3 solution is titrated with an HCl solution (in burette), using phenolphthalein as indicator, the end point was observed at 25·00 cm^3.
   When the titration was repeated using 25·00 cm^3 of the same HCl solution and the same Na_2CO_3 solution (in burette) and using the same indicator, what will be the observed end point?
   (1) 25·00 cm^3 (2) 12·50 cm^3 (3) 50·00 cm^3
   (4) 37·50 cm^3 (5) an end point cannot be obtained.

5. CO_2 was passed through 25.00 cm^3 of a 0.10 mol dm^{-3} NaOH solution until 50% of NaOH was converted to Na_2CO_3. This solution was titrated with 0.10 mol dm^{-3} HCl solution using phenolphthalein as the indicator. The endpoint of the titration would be,

(1) 1.75 cm^3 (2) 20.00 cm^3 (3) 37.50 cm^3 (4) 25.00 cm^3 (5) 12.50 cm^3

6. A student intends to titrate 25·00 cm^3 of solution **Y** with solution **X**. Which of the following washing procedures is most suitable in preparation for this titration?

	Washing burette with	Washing titration flask with
(1)	distilled water	solution **Y**
(2)	solution **X**	solution **Y**
(3)	solution **X**	distilled water
(4)	solution **Y**	distilled water followed by solution **X**
(5)	distilled water followed by solution **X**	distilled water

7. S is a solution of Na_2CO_3 and $NaHCO_3$ in water. By which method/methods given below can the concentrations of Na_2CO_3 and $NaHCO_3$ in S be determined by titrating 25·0 cm^3 of S with standard HCl?

(*a*) Using phenolphthalein as indicator
(*b*) First using methyl orange as indicator and further titrating the same solution using phenolphthalein as indicator
(c) First using phenolphthalein as indicator and further titrating the same solution using methyl orange as indicator
(*d*) Tirate using phenolphthalein as indicator and thereafter titrate a separate 25·0 cm^3 of S using methyl orange as indicator

8. Which of the following is a correct step/are correct steps, in the measurement of a given volume of solution using a pipette?

(*a*) When the level of solution in the pipette is adjusted to coincide with the graduated mark, the tip of the pipette must be held immersed in the solution.
(*b*) In transferring the solution to the titration flask the pipette tip should be held against the inner surface of the titration flask.
(*c*) In transferring the solution to the titration flask the pipette should be held vertical and the flask held inclined.
(*d*) The little bit of solution remaining in the tip of the pipette, after the transfer, should be blown into the flask.

9. NaOH reacts with urea as follows.

$$2NaOH + NH_2CONH_2 \rightarrow Na_2CO_3 + 2NH_3\uparrow$$

0·6 g of urea (relative molecular mass of urea = 60·0) reacted completely with 25·0 cm^3 of 1·0 mol dm^{-3} NaOH. All NH_3 was expelled by boiling. The volume of 0·5 mol dm^{-3} HCl necessary to neutralise the resulting solution is

(1) 10·0 cm^3. (2) 12·5 cm^3. (3) 20·0 cm^3. (4) 25·0 cm^3. (5) 50·0 cm^3.

10. Solution S is prepared by mixing equal volumes of 0.2 mol dm^{-3} aqueous H_2SO_4 and 0.2 mol dm^{-3} aqueous CH_3COOH. 25.0 cm^3 portions of S are titrated separately with 0.1 mol dm^{-3} NaOH solution (in burette) using (A) phenolphthalein and (B) methyl orange as indicators. The end-points of the two titrations are respectively

(1) (A) 75.0 cm^3 (B) 25.0 cm^3.
(2) (A) 25.0 cm^3 (B) 25.0 cm^3.
(3) (A) 75.0 cm^3 (B) 50.0 cm^3.
(4) (A) 50.0 cm^3 (B) 75.0 cm^3.
(5) (A) 25.0 cm^3 (B) 50.0 cm^3.