SET 6

233/3 CHEMISTRY PRACTICAL

CONFIDENTIAL

Each candidate must be provided with:-

1. 150 cm3 of solution A
2. 150cm3 of solution B
3. 2.0g of solid M
4. Burette
5. Pipette
6. Pipette filler
7. Conical flasks 2 pieces
8. 100ml measuring cylinder
9. 200cm3 distilled water
10. 3.0g of solid K (weighed accurately)
11. Thermometer ( 0 – 1000C)
12. Test tube holder
13. Solid Q about 1g
14. 20cm tissue paper
15. Stop watch/wall clock

In addition the candidate should have access to:-

* Ammonia solution supplied with a dropper
* 2M Sodium hydroxide supplied with a dropper
* 0.1M Barium Nitrate supplied with a dropper
* 2.0M Hydrochloric acid supplied with a dropper
* Hot water bath (150cm3 tap water heated using 200ml or 250ml beaker)
* Methyl Orange indicator supplied with a dropper

**Preparations**

1. Solution A: 21.5cm3 of Conc. Hydrochloric acid in 1 litre solution.
2. Solution B: 1g of NaOH in 1 litre solution.
3. Solid M: Mixture of CaCO3 and CaCl2 in the ratio 3:1
4. Solid K: Naphthalene powder.
5. Solid Q: Magnesium Sulphate

**Note**

Mind about the source of solid K Naphthalene.

CHEMISTRY PRACTICAL

MARKING SCHEME

Question I

Procedure I & II

Table I & II

Marking points

(i) Complete table (1 mk)

(ii) Decimal points ( 1 mk)

(iii) Accuracy ( 1mk)

(iv) Principles of averaging ( 1mk)

(v) Final answer ( 1mk)

**Conditions**

Complete table with three titrations done ( 1mk)

Incomplete table with two titrations done ( ½ mk)

Incomplete table with only one titration done (0 mk)

Penalties

* Inverted table.
* Wrong arithmetic.
* Burette reading above 50cm3 unless explained.
* Unrealistic titre values below 1cm3 and above 100cm3.
* Penalize ½ mk to a max of ½ mk.

Decimals (Tied to 1st and 2nd rows only)

* Award 1mk for 1 d.p or 2 d.p used consistently
* In case 2 d.p. used the 2nd decimal place should be ‘0’ or ‘5’.

Accuracy

 Any of the candidates titre values is compared with the school value.

If within ± 0.1 award ( 1mk)

If outside ± but within ± 0.2 award ½ mk.

If outside ± 0.2 award 0 mk.

**Principals of averaging**

NB: Values averaged must be with ± 0.2 from one another.

* Values averaged must be shown for ½ mk.
* Correct working for averaging to atleast 2 d.p. unless it works out exactly.

**Final answer**

Candidates correctly worked average titre is compared with the school value if within ± from the school value award 1mk

If outside ± but within ± 0.2 award ½ mk.

If outside ± 0.2 award 0 mk.

**CALCULATIONS PROCEDURE I**

(II) Moles of Sodium hydroxide solution B in 25 cm3.

25 x 0.25

 1000

(III)

|  |  |
| --- | --- |
| Moles of HCl used 1/1 x Ans. II ½  | OR Concentration of HCl ½ mk  |
| Concentration of HCl 1000 x Ans II ✓ 1  Ans I = C.A.O ½  |  Mar. Ans I = 1/1  0.25 x 25 C.A.O ½  |

CALCULATIONS PROCEDURE II

(II) Moles of NaOH used.

 Ans (ii) (I) x 0.25 ½

 1000

(III) Moles of HCl in 25cm3 of solution C

Ans (ii) II X 1 ½

 1

= C.A.O ½

(IV) Moles of HCl in original 25.0cm3 of HCl (Solution A) used.

 25.0 x Ans. (i) III ½

 1000

 ⇒ C.A.O ½

(V) Moles of HCl that were used to react with Calcium Carbonate solid M

|  |  |
| --- | --- |
| Ans IV ½ - Ans III x 100 ½  25= C.A.O ½  | OR Ans IV – ½ 4 x Ans III ½ C.A.O ½  |

(VI) Reacting ratio

HCl : CaCO3

2 : 1 ½

Moles of Calcium Carbonate that reacted with the acid.

Ans V x 1 ½

 2

= C.A.O ½

* For all calculations ignore units otherwise penalise ½ mk for wrong units used.
* Moles should be worked to atleast 4 d.p.
* Concentration should be worked to atleast 3 d.p.
* Mass should be worked to atleast 1 d.p.

**Question 2**

Table III

Marking points

1. Complete table 2 mk
2. Decimals 1 mk
3. Accuracy 1 mk
4. Trend 1 mk

**Conditions**

* Complete table with 8 entries (1mk)

Incomplete table with 6 to 7 entries ( ½ mk)

Incomplete table with less than 6 entries ( 0 mk)

* Award 1 mk for temperature given in whole numbers consistently or 1 d.p with decimal place value being ‘0’ or ‘5’ and used consistently.
* Accuracy: Compare the candidates constant temp with the school value if ± 20C award 1 mk otherwise award 0 mk
* Trend: Award if the temperature show continuous decrease followed by a constant temperature then a further decrease in temp for ( 1mk) otherwise award 0 mk.

(a) **Graph**

**Marking points**

Scale ½ mk

Axes ½ mk

Plots 1 mk

Curve 1 mk

**Conditions**

* Award for scale if actual plots occupy at least half the grid area
* Award for axes if the axes are labelled.
* Award 1mk if 7 to 8 points are correctly plotted.
* Award 1 mk for curve if it is smooth and show the constant temperature.

(b) Freezing point.

- Showing on graph ½ mk

- Correct answer ½ mk

**Question 3**

|  |  |
| --- | --- |
| Observation | Inference |
| (i) Solid Q dissolves ½ colourless solution formed ½  | Q is soluble ½ Cu2+, Fe2+, Fe3+ absent. |
| (a) White ppt ½ insoluble ½  | Mg2+, Al3+, Pb2+ |
| (b) White ppt ½ insoluble ½  | Mg2+ ½ present |
| (c) (I) White ppt 1 mk | SO42-, SO32-, CO32- present |
| (II) White ppt insoluble 1 mk | SO4 2- 1mk  |

**Conditions**

* Any contradicting cation cancels a correct cation.
* Any contradicting anion cancels a correct anion.
* For part (a) and (c) I

3 ions award 1mk

2 ions award ½ mk

1 ion award 0 mk