**LANJET PRE MOCK EVALUATION 2024**

**CHEMISTRY (233/3)**

**PAPER 3 – MARKING SCHEME**

**Q1**. You are provided with;

* Solution A which is dilute hydrochloric acid.
* Solution B which is made of dissolving 5.3g of Na2Co3 in 500cm3 of dilute water.

You are required to standardize solution A.

Procedure 1

i) Mark your conical flasks as 1,2,3

ii) Put solution A into the burette.

iii) Place25cm3 of solution B into conical flask 1 and titrate with solution A using 3 drops of phenolphthalein indicator. Retain the content for next procedure.

iii) Record your results in table1 below and repeat the procedure using other flask 2 and 3respectively.

Table 1

|  |  |  |  |
| --- | --- | --- | --- |
|  | I  | II | III |
| Find burette readings |  |  |  |
| Initial burette readings |  |  |  |
| Volume v1 A used (cm3)  |  |  |  |

Calculate the average volume v1 of solution A used. (5mks)

**A=12.5 ± 0.1 √ ± 0.2** √

**CT√**

**D√**

**PA√**

**FA√**

Procedure 2

i) Refill the burette with solution A.

ii) Add 3 drops of methyl orange indicator to the content of conical flask 1 and continue titrating with solution A.

iii) Record your result in table 2 below.

 Repeat procedure 2 using the other conical flask 2 and 3 respectively. Fill the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| Find burette readings |  |  |  |
| Initial burette readings |  |  |  |
| Volume v2 A used  |  |  |  |

**A=12.5 ± 0.1 √ ± 0.2** √

**CT√**

**D√**

**PA√**

**FA√**

Calculate the average volume of solution v2 of solution A used. (5mks)

a) Calculate the total volume of v1 + v2 used in table 1 and table 2. (1mk)

 **12.5 + 12.5**

 **= 25.0cm3 √**

b) Write the chemical equation between solution A and solution B. (1mk)

 **Na2CO3 (aq) + 2HCl (aq) 2NaCl (aq) + CO (g) + H2O (l)**

c) Determine the concentration of solution B in moles per litre (Na=23 O=16 C=16) (1mk)

 **Molarity in moles/l = g/l**

 **RFM √**

 **= 5.3 x 2 = 0.1m**

 **(23 x 2 + 12 + 16 3)√**

d) Calculate the number of moles of solution A used in titration. (1mk)

**Moles of B = 0.1 x 25 moles A moles ratio 1:2**

 **1000 = 0.0025 x 2**

 **= 0.0025√ = 0.005 moles**√

e) Calculate the concentration of solution A in moles per litre. (2mks)

**0.005 X 1000√**

 **25**

**= 0.2M√**

**Q2.**

You are provided with solid E

i) Place little amount of solid E on a watch glass.

Describe its appearance. (2 mks)

 **Write crystalline solid.√**

ii) Place all amount of solid E in a boiling tube. Add about 10cm3 of distilled water. Shake the mixture.

Observations Inferences

**Solid dissolved forming - Soluble salt/ compound**

**colorless solution√ - Absence of Fe2+/ Fe3+/cu2+**

 **or colored ions.**

 (1mk) (1mk)

iii) Divide the resulting solution into 4 portions. To the first portion, add drops of Barium Nitrate provide.

Observations Inferences

 **White precipitate formed SO32- All 3 = √**

 **SO42- CO32- present 2 = √**

 **1 =**

 (1mk) (1mk)

iv) To the mixture attained in (iii) acidity using about 5 drops of nitric provided in the access.

Observations Inferences

 **White precipitate SO32- 2 =√**

 **dissolved forming present 1 =√**

 **colorless solution CO32--**

 (1mk) (1mk)

v) To the second portion add 3 drops of acidified potassium chromate (vi) provided.

Observations Inferences

**Orange potassium SO32- confirmed.**

**Turns green**

 (1mk) (1mk)

vi) To the third portion add ammonia solution provided.

Observations Inferences

 **No white precipitate AP+ K+**

 **√ Zn2+ Absent√ Lit present**

 **Pb2+ Na+ √**

 (1mk) (1mk)

vii) To the last portion, dip a glass rod and place it on non luminous flame

Observations Inferences

**Non luminous flame**

**Turns to golden yellow Na+ confirmed.**

(1mk) (1mk)

(Q3.) You are provided with solid M ,carry out experiment and record observation and inferences in spaces provided

i) Take half spatula full M and ignite using a luminous flame

**observation inferences ( 2mk)**

Burns with yellow sooty alkenes or alkynes present

flame

ii) Place all amount of solid M in a boiling tube. Add about 20cm3 of distilled water. Shake the mixture and divide the into 4 portions

Observations Inferences

**Dissolves to form colourless polar compound present**

**ROH,RCOOH Present**

**solution**

 (1mk) (1mk)

iii). To the first portion, add 2-3drops of bromine water provided.

Observations Inferences

**Yellow bromine water** alkenes or alkynes present

**decolourised**

 (1mk) (1mk)

 iv) To the second portion add 3 drops of acidified potassium chromate (vi) provided.

Observations Inferences

**Orange colour persists**

 ROH Absent

 (1mk) (1mk)

vi) To the third portion few crystals of sodium carbonate provided

Observations Inferences (2mks)

Effervescence observed H+Prsent

vi) To the forth portion determine the PH of solution using universal indicator

Observation inferences(1mks

PH 5 Weakly acidic compound present