**NAME: ……………………………………………….…………. ADM NO: ………… CLASS: ………………**

**CHEMISTRY**

**FORM 3**

**PAPER 3**

**TIME: 1 HR 25 MIN**

**Q1 = 11MKS**

**Q2 = 14MKS**

Q1. You are provided with:

Solution A: Potassium Chromate Vi

Solution B : 0.1mNa2SO3

You are required to determine the number of moles dichromate VI ions (Cr2O2-7) in one litre of solution.

PROCEDURE

Fill the burette with solution B. Pipette 25cm3 of solution A and transfer it into conical flask. Titrate until a permanent green colour is obtained. Record your results in table below and repeat the procedure to fill the table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | I | II | III |
| Find burette readings | **8.0** | **15.5** | **23.0** |
| Initial burette readings  | **0.0** | **8.0** | **15.5** |
| Volume of solution B (cm3)  | **8.0** | **7.5** | **7.5** |

1. Determine the average volume of solution B. (5mks)

**7.5 + 7.5 = 7.5cm3**

 **2**

**CT√**

**D√**

**PA√**

**A± 0.1√**

**±0.2√**

**FA√**

2. Calculate the number of moles of solution B. (2mks)

**1.0 x 7.5**

 **1000**

**= 0.00075moles**

. Given that the ionic equation for the reaction between dichromate ion and sulphate is;

Cr2O2-7(aq) + 3SO2-3(aq) + 8H+(aq) 2Cr3+(aq) + SO2-4(aq) + 4H2O(l)

Calculate;

i) Number of moles of dichromate IV ion in 25cm3 (2mks)

**0.00075**

 **3**

**= 0.00025 moles**

ii) Moles of dichromate ion one litre of solution.

**0.00025 x 1000**

 **25**

**=0.01moles/litre**

. You are provided with substance E, carry out the tests below and write your observations and inferences in the space provided.

a) Describe the appearance of substance E.

**White crystalline solid// colourless crystalline solid.**

b) Place one third of substance E in the test tube. Heat it strongly.

 Observation inferences

**colourless vapor on condenses on cover plots Hydrate salt// contains water of crystallization**

 (1mk) (1mk)

c) Place remaining amount of E in boiling tube. Add about 10cm3 of distilled water and shake well. Retain the mixture for tests in d) below.

 Observations inferences

 **Solid dissolved forming colorless solution soluble salt**

 **Absence of Fe2+, Fe3+,Cu2+**

 (1mk) (1mk)

d) Use about 2cm3 potion of the mixture obtained in (c) for tests (i) to (iv)

i) Add 2 to 3 drops of lead (ii) Nitrate to the mixture.

 Observation inferences

 **White precipitate SO42-**

 **SO32- Present All=1√**

 **CO32- 3=√**

 **Cl- 2 or 1 = 0**

(1mk) (1mk)

ii) Add 2 to 3 drops of barium Nitrate to second portion of the mixture.

 Observation inferences

 **White precipitate SO42-**

 **SO32- All=1√**

 **CO32- 2=√**

 **1 = 0**

(1mk) (1mk)

iii) Add five drops of dilute nitric (v) acid to the mixture in (ii) above

 Observation inferences

  **White precipitate present SO42- confirmed**

(1mk) (1mk)

iv) To the last portion, add few then excess drops of sodium hydroxide.

 Observation inferences

 **White precipitate present Mg2+ √ present**

 **Insoluble in excess√**

(1mk) (1mk)

e) Give the formula of cation and anion present in substance E.

Cat ion **Mg2+**

Anion **SO42**