

**NATIONAL ACADEMY FOR LEARNING
BENGALURU
2021 – 2022
PREPARATORY EXAMINATION
CHEMISTRY
Paper 2 (Practical)**

Grade: 12 ISC

Maximum Marks: 30

Time: 3 hours

No. of Pages: 4

Read the questions carefully and follow the given instructions.

*Answer **all** questions.*

All working, including rough work, should be done on the same sheet as the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [].

Question 1

- **C-10** is a solution containing 1.95gms of potassium manganate (VII) KMnO_4 per litre.
- **C-11** is a solution prepared by dissolving 23.2 gms of hydrated ammonium iron(II) sulphate crystals, $(\text{NH}_4)_2\text{SO}_4 \cdot \text{FeSO}_4 \cdot x\text{H}_2\text{O}$ per litre.

PROCEDURE:

Rinse and fill the burette with the given solution **C-10** (KMnO_4). Pipette out 25 ml of **C-11** (hydrated ammonium iron (II) sulphate solution) and transfer into a clean conical flask.

To this, add 20 ml of **C-12** (dilute sulphuric acid) specially provided for titration.

Titrate the solution in the conical flask with **C-10** (KMnO_4) slowly till one drop of this gives a light permanent pink colour to the solution **C-11** in the flask. The pink colour should not disappear on shaking the contents in the conical flask.

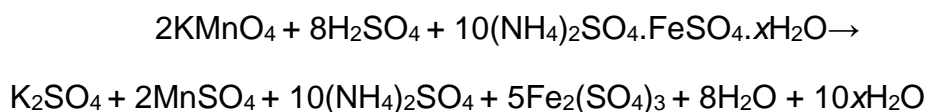
Repeat the above procedure to get atleast two concordant readings. Tabulate your readings.

State:

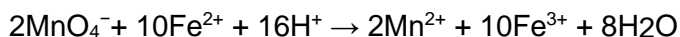
- a. The capacity of the pipette used.
- b. The titre value you intend to use in your calculations.

Show the titre value to the Examiner.

The equations for the above reactions are as follows:



The ionic equation for the reaction is:



Relative atomic masses:

K =39 Fe=56 Mn=55 S =32 N =14 H=1 O =16

Calculate the following:

- The **molarity** of the solution of potassium manganate(VII) **C-10**.
- The **molarity** of hydrated ammonium iron(II) sulphate solution **C-11**.
- The **molecular mass** of hydrated ammonium iron(II) sulphate deduced from the experimental data.
- The **numerical value** of x , i.e. the number of molecules of water of crystallisation in $(\text{NH}_4)_2\text{SO}_4 \cdot \text{FeSO}_4 \cdot x\text{H}_2\text{O}$

Note: Molarity must be calculated up to at least 4 decimal places.

Question 2

[4]

You are provided with two organic compounds, **C-13** and **C-14**.

Perform the experiments given below on each of the two compounds. Record the changes taking place at every step of the experiment.

Note the smell of the substance formed, if significant, the colour of the solution obtained, the colour of the precipitate produced and any other observations you may have. State the identity of each compound based on the experiments and observational changes.

PROCEDURE:

a. Substance C-13

(i)	Take 2ml of C-13 in a test tube. To this, add a few crystals of iodine followed by a few drops of sodium hydroxide solution till the colour disappears. Warm the contents gently and cool
(ii)	Take 1ml of C-13 in a test tube and add 1ml of freshly prepared sodium nitroprusside solution; followed by 4-5 drops of dilute sodium hydroxide solution.
(iii)	Take 2ml of saturated solution of sodium bisulphite (NaHSO_3) in test tube. To this, add a few drops of C-13 . Shake well and gently warm the contents.

b. Substance C –14

Substance **C-14** is an unknown sample of either carbohydrate or protein. Carry out the following experiments and record all your observations. State the identity of the compound based on the experiments and observational changes:

Dissolve 1g of **C – 14** in 10ml of distilled water.

(i)	Take 2ml of C-14 solution and add 2ml of Fehling's solution and heat strongly.
(ii)	Take 2ml of C-14 solution and add 2ml of Tollen's reagent and heat strongly.
(iii)	Take 1ml of C-14 solution and add few drops of alcoholic α -naphthol solution and then 1ml of conc. H_2SO_4 carefully to the side of the test tube.

Question 3

[4]

Analyse qualitatively the substance **C-15** which contains one anion and one cation. Identify these ions.

(a) While testing for **anion** you must mention:

- (i) How the gases were identified.
- (ii) The confirmatory test for anion.

Show the results as required, to the Visiting Examiner.

(b) While testing for **cation** you must mention:

- (i) How the original solution for group analysis was prepared.
- (ii) The formal group analysis with pertinent group reagents.
- (iii) The confirmatory test for cation.

Show the results as required, to the Visiting Examiner.

Note: Use of qualitative analysis booklet/table is not allowed.
