

CHEMISTRY

Paper – 2

(PRACTICAL)

Three hours and a quarter

*(The first 15 minutes of the examination are for reading the paper only.
Candidates must NOT start writing during this time).*

ALL ANSWERS MUST BE WRITTEN IN THE ANSWER BOOKLET PROVIDED SEPARATELY.

Question 1 is an oxidation-reduction titration in which sufficient working details are given. All essential working must be shown.

Question 2 is an exercise dealing with identification of organic compounds. Credit will be given for precise observations recorded and for well-drawn deductions.

Question 3 is an exercise in qualitative analysis.

Read the questions carefully and follow the given instructions.

Attempt all questions.

All workings, including rough work, should be done on the same sheet as, and adjacent to, the rest of the answer in the answer booklet.

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

Question 1.

[7]

You are provided with two solutions as follows:

- (a) **C-10** is a solution containing 1.6 gms of potassium permanganate (KMnO_4) per litre.
- (b) **C-11** is a solution containing 19.6 gms of hydrated ammonium iron (II) sulphate $[(\text{NH}_4)_2 \text{SO}_4 \cdot \text{FeSO}_4 \cdot x \text{H}_2\text{O}]$ per litre.

PROCEDURE

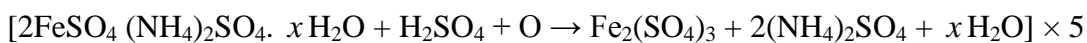
Rinse and fill the burette with the given solution **C-10**. Pipette out $20\text{cm}^3/25\text{cm}^3$ of solution **C-11** into a clean conical flask. Add to it about 20cm^3 of **C-12** (dilute sulphuric acid) in the conical flask. Run down C-10 solution from the burette into the conical flask till a permanent light pink colour is imparted to the solution. Note the final reading of the burette. *Show it to the Visiting Examiner.* Repeat the above procedure of the titration to get at least two concordant readings.

Tabulate atleast three readings.

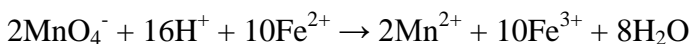
State the:

- (i) capacity of the pipette you used.
- (ii) titre value you intend to use in your calculations.

The equations for the reactions are as follows:



The ionic equations for the reactions are as follows:



Relative atomic masses:

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

Calculate the following:

- (i) The **molarity** of potassium permanganate solution (C-10).
- (ii) The **molarity** of the hydrated ammonium iron (II) sulphate solution (C-11).
- (iii) The **molecular mass** of hydrated ammonium iron (II) sulphate.
- (iv) The **value** of x or number of molecules of water of crystallization.

Question 2.

Substances **C-13** and **C-14** are organic compounds. Carry out the following experiments and note down all the changes taking place at each step of the experiment.

Note: the smell of the substances formed, colour of the solution obtained and precipitate formed. Identify the compounds on the basis of your observations and deductions.

(a) Substance C-13

- (i) Take 1 cm^3 of aqueous solution of C-13, add 1 cm^3 of Tollen's reagent and heat it in a water bath for 5 minutes.
- (ii) To 2 cm^3 of aqueous solution of C-13 in a test-tube, add 2 cm^3 of Fehling's solution and warm.
- (iii) To 2 cm^3 of aqueous solution of C-13 in a test-tube, add few drops of sodium hydroxide solution and heat to boiling.
- (iv) To 1 cm^3 of C-13 solution in a test-tube, add 2-3 drops of alcoholic α -naphthol solution. Add 1 cm^3 of conc H_2SO_4 slowly along the sides of the test-tube.

(b) Substance C-14

- (i) To 2 cm^3 of C-14 solution, add 1 cm^3 of blue litmus solution.
- (ii) To 2 cm^3 of C-14 solution, add $3-4\text{ cm}^3$ of neutral FeCl_3 solution.
- (iii) To 2 cm^3 of C-14 in a test-tube, add $3-4\text{ cm}^3$ of bromine water.

Question 3.

Analyse qualitatively the substance **C-15** which contains two anions and two cations. Identify these ions. *The Visiting Examiner will check one observation of an anion or a cation during the salt analysis.*

[8]

- (a) While testing for **anions** you must mention:
- (i) How the water/soda extract was prepared?
 - (ii) How the gases were identified?
 - (iii) One confirmatory test for each anion.
- (b) While testing for **cations** you must mention:
- (i) How the original solution for group analysis was prepared?
 - (ii) The formal group analysis with pertinent group reagents?
 - (iii) One confirmatory test for each cation.

Note:

1. Use of qualitative analysis booklets/tables are not allowed.
2. Dry tests are not accepted as confirmatory tests.
3. Tabulate the experiment, observation and inference as per the example given below.
4. If the *experiment* is incorrect, no marks will be awarded for the *observation* and *inference*.

Sl. No.	Experiment	Observation	Inference
1.			
2.			