

CHEMISTRY

PAPER – 2

(PRACTICAL)

(Three hours)

*(Candidates are allowed additional 15 minutes for only reading the paper.
They 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 deduction.

Question 3 is an exercise in qualitative analysis.

Read the questions carefully and follow the given instructions.

Attempt 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 [].

Attempt all questions.

Question 1

You are provided with two solutions as follows:

- C-10 is a solution prepared by dissolving 25 gms of sodium thiosulphate crystal ($\text{Na}_2\text{S}_2\text{O}_3 \cdot x\text{H}_2\text{O}$) per litre.
- C-11 is a solution prepared by dissolving 5 gms of potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) per litre.

This Paper consists of 4 printed pages.

PROCEDURE:

Rinse and fill the burette with the given solution **C-10** ($\text{Na}_2\text{S}_2\text{O}_3 \cdot x\text{H}_2\text{O}$). Pipette out 20 ml or 25 ml of solution **C-11** ($\text{K}_2\text{Cr}_2\text{O}_7$) in a clean conical flask. To this, add 20 ml of **C-12** (dilute sulphuric acid) and about 20 ml of **C-13** (10% solution of potassium iodide). Now add about 20 ml of distilled water, followed by a pinch of sodium hydrogen carbonate (**C-14**). Shake the contents of the flask and cover it with a watch glass. Allow the solution to stand for about 5 minutes till the solution becomes dark reddish brown.

Titrate the solution by running **C-10** from the burette till the solution turns yellowish green. Add about 2 to 3 ml freshly prepared starch (**C-15**). The colour of the solution changes to dark blue. Continue adding **C-10** drop-wise till addition of one drop of **C-10** changes the colour of the solution from blue to light green.

Repeat the above procedure of titration to get at least two concordant readings.

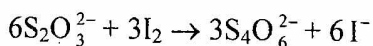
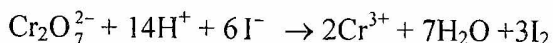
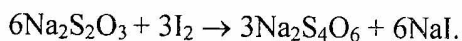
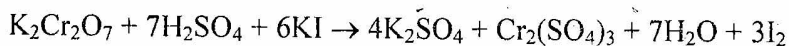
Tabulate your readings.

State:

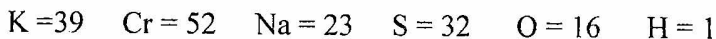
- (a) The capacity of the pipette used.
- (b) The titre value you intend to use in your calculations.

Show the titre value to the Visiting Examiner.

The equations for the above reactions are as follows:



Relative atomic masses:



Calculate the following:

- (i) The **molarity** of potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) solution **C-11**.
- (ii) The **molarity** of sodium thiosulphate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot x\text{H}_2\text{O}$) solution **C-10**.
- (iii) The **molecular mass** of sodium thiosulphate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot x\text{H}_2\text{O}$).
- (iv) The **numerical value** of x .

Note: Molarity must be calculated upto 4 decimal places at least, in order to avoid error.

Question 2

[5]

You are provided with two organic compounds, **C-16** and **C-17**.

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 on the basis of the experiments and observational changes.

PROCEDURE:

(a) Substance C – 16

- (i) Take 1 ml of **C-16** in a test tube and add 1 ml of Fehling's solution. Warm the contents.
- (ii) Take 2 ml of **C-16** in a test tube and add 1 ml of lead acetate solution followed by 1 ml of ammonium hydroxide solution. Boil the contents.
- (iii) Take 2 ml of **C-16** in a test tube and add 2 to 3 drops of alcoholic α -naphthol solution. Pour conc. sulphuric acid slowly along the side of the test-tube.

Show the results as required to the Visiting Examiner.

(b) Substance C-17

- (i) Take 1 ml of **C-17** in a test-tube and add a few drops of water. Now add about 1 ml of sodium hypochlorite solution; Shake the contents.
- (ii) Take 1 ml of **C-17** in a test-tube and add a few drops of dilute sulphuric acid. Now add 1 ml of potassium dichromate solution. Shake and warm the contents.
- (iii) Take 1 ml of **C-17** in a test-tube and add 1 ml of conc. hydrochloric acid to it. Now, add a few drops of neutral ferric chloride solution and dilute the contents with water.
- (iv) Take 2 ml of **C-17** and dilute it with water. To this, add a few drops of bleaching powder solution and shake. Now, add a few drops of ammonium sulphide solution and shake.

Show the results as required to the Visiting Examiner.

Question 3

Analyse qualitatively the substance **C-18** which contains *two* anions and *two* cations. Identify these ions.

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

- (i) How the solution/soda extract was prepared.
- (ii) How the gases were identified.
- (iii) The confirmatory test for each anion.

Show the results as required to the Visiting Examiner.

(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) The confirmatory test for each cation.

Show the results as required to the Visiting Examiner.

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

Question 4

Show the following to the Visiting Examiner for assessment:

- (a) Project
- (b) Chemistry Practical File.