CHEMISTRY

PAPER – 2

(PRACTICAL)

(Three hours)

10 Years Question Paper.com

*(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 (a) **identification of an organic compound** and (b) **identification of a compound as carbohydrate or protein**. 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 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 [ ].

Mathematical Tables are provided.

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*Attempt **all** questions.*

Question 1 **[8]**

You are provided with two solutions as follows:

- **C-10** is a solution prepared by dissolving 3·5 gms of **impure** sample of potassium manganate(VII), $KMnO_4$ per litre.
- **C-11** is a solution prepared by dissolving 6·5 gms of oxalic acid, $H_2C_2O_4.2H_2O$ per litre.

This Paper consists of 4 printed pages.

PROCEDURE:

Rinse and fill the burette with potassium manganate(VII) solution **C-10** ($KMnO_4$).

Pipette out 20 ml or 25 ml of the oxalic acid solution **C-11** ($H_2C_2O_4.2H_2O$) in a clean conical flask. To this, add 20 ml of dilute H_2SO_4, **C-12**, specially provided for this purpose. Warm the contents of the flask to 60°C – 70°C. The heating should be continued till the first bubble appears at the bottom of the flask.

Remove the conical flask from fire and titrate this solution by running solution **C-10** from the burette. Shake the solution constantly till a permanent pale pink colour is obtained. Ensure that the pink colour obtained does not disappear on shaking the contents of the conical flask.

Repeat the above procedure 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:

$2KMnO_4 + 3H_2SO_4 + 5H_2C_2O_4 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO_2$

$2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$

Relative atomic masses:

K = 39 Mn = 55 C = 12 O = 16 H = 1

Calculate the following:

(i) The **molarity** of oxalic acid solution **C-11.**

(ii) The **molarity** of potassium manganate (VII) solution **C-10.**

(iii) The **strength** of potassium manganate(VII) solution in gms per litre.

(iv) The **percentage purity** of the sample of potassium manganate (VII) solution.

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

Question 2 [5]

(a) Substance **C–13** is an organic compound. Perform the experiments given below. Record the changes taking place at each step of the experiment.

Note the smell of the substance formed, the colour of the substance obtained, the colour of the precipitate produced, changes on heating and cooling and any other observations you may have. State the identity of the compound on the basis of the experiments and observational changes.

Substance C–13

PROCEDURE:

(i) Take 2 ml of **C-13** in a test tube. To this, add 1 ml of Tollen's reagent. Warm the contents in a water bath.

(ii) Take 2 ml of **C-13** in a test tube and add 1 ml of freshly prepared pyrogallol solution. Shake the contents. Add 2 ml of concentrated hydrochloric acid and warm the contents in a water bath.

(iii) Take 2 ml of **C-13** in a test tube and add a few crystals of resorcinol, shake the contents. Slowly add 1 ml of concentrated sulphuric acid along the sides of the test tube.

(b) 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 as carbohydrate or protein on the basis of the experiments and observational changes.

Substance C-14

PROCEDURE:

Take the sample **C-14** in a test tube. Dissolve it in 10 ml of distilled water in order to obtain saturated solution. Divide the solution into three parts.

(i) To the first part of **C-14**, add 2 drops of alcoholic α-naphthol solution followed by 1 ml of concentrated H_2SO_4 carefully by the side of the test tube.

(ii) To the second part of **C-14**, add 1 ml of lead acetate solution, heat to boil. Now, add 5 ml of ammonium hydroxide solution and heat to boil again.

(iii) To the third part of **C-14**, add 1 ml of copper sulphate solution, followed by 3 ml of sodium hydroxide solution.

Question 3 [7]

Analyse qualitatively the substance **C-15** 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 [7]

(b) Chemistry Practical File. [3]