K-401

MCH-508

PHYSICAL CHEMISTRY-II

M.Sc. Chemistry (MSCCH)

2nd Semester Examination, 2023 (Dec.)

Time : 2 Hours]   **[Max. Marks : 35**

Note : This paper is of Thirty Five (35) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Nine and Half (9½) marks each. Learners are required to answer any Two (02) questions only.

$(2 \times 9\frac{1}{2} = 19)$

1. Discuss the kinetics of consecutive reaction

    $A \longrightarrow B \longrightarrow C$

2. Describe activated complex theory of reaction rates and compare it with the collision theory of reaction rates.

3. Draw the polarogram of a solution containing two different metal ions. How is the polarogram useful for analysis of the solution? Explain it.

4. Discuss the titration curve obtained in the conductometric titration of the following:

    (a) CH_3COOH solution against NH_4OH solution.

    (b) NaOH solution against HC1 solution

    (c) A mixture of HC1 solution and CH_3COOH solution against NaOH solution.

    (d) $AgNO_3$ solution with KC1 solution.

5. Discuss the kinetics of photochemical reaction between hydrogen and chlorine in presence of oxygen.

SECTION–B
(Short Answer Type Questions)

Note : Section 'B' contains Eight (08) short answer type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only.   (4×4=16)

1. Discuss the kinetics of photochemical reaction between hydrogen and bromine.

2. Discuss the primary salt effect on ionic reactions in solution.

3. How can you determine order of reaction by half-life method?

4. Calculate the values of frequency, quantum energy and Einstein for 500 nm radiation.

5. Write a note on fluorescence and phosphorescence.

6. Give any two methods for the prevention of corrosion.

7. Calculate the EMF of a zinc-silver cell at 30°C when activity of Zn^{2+} ions is 0.5 and activity of Ag^+ ions is 1.0.

Standard reduction potentials at 30°C are:

(i) Ag^+ / Ag electrode = + 0.799 volts

(ii) Zn^{2+} / Zn electrode = – 0.760 volts

8. Define EMF of a cell. How do you measure it experimentally?

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