

**P-81**

Total Pages : 3

Roll No. ....

## **MCH-508**

### **Physical Chemistry-II**

M.Sc. Chemistry (MSCCH)

IInd Semester Examination, 2023 (June)

**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 answer 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 ( $9\frac{1}{2}$ ) marks each. Learners are required to answer any Two (02) questions only.  
( $2 \times 9\frac{1}{2} = 19$ )

- 1.** What are electrochemical cells. Discuss the types of electrochemical cells and derive Nernst equation.

2. Explain the following :
- (a) Debye- Huckel theory of strong electrolytes.
  - (b) Transition state theory of reaction rate.
3. (a) Define quantum yield of a photochemical reaction. Discuss the reasons of high and low quantum yield with examples.
- (b) Calculate the potential of the cell at 298 K.
- Given :  $E^\circ \text{Zn}^{2+}/\text{Zn} = -0.76 \text{ V}$ ;  $E^\circ \text{Cu}^{2+}/\text{Cu} = + 0.33 \text{ V}$
- $\text{Zn}/\text{Zn}^{2+} (a = 0.1) // \text{Cu}^{2+} (a = 0.01) / \text{Cu}$
4. Write explanatory notes on the following :
- (a) Primary and secondary salt effect.
  - (b) Jablonski diagram.
5. (a) Describe gas phase photolysis.
- (b) Discuss any one electroanalytical technique in detail.

## 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. Explain amperometric titrations.

2. Write short notes on the following :
    - (a) Liquid junction potential.
    - (b) Ionic strength.
  3. Explain collision theory of reaction rate along with limitations.
  4. Define overvoltage. Discuss the factors affecting overvoltage.
  5. Write short notes on the following :
    - (a) Dropping mercury electrode.
    - (b) Opposing and parallel reactions.
  6. What are photochemical reactions. Describe Lambert-Beer's law.
  7. Define corrosion. Discuss different theories of corrosion.
  8. Explain the kinetics of photochemical reaction between hydrogen and chlorine.
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