

S-449

Total Pages : 3

Roll No.

MCH-508

Physical Chemistry-II

M.Sc. Chemistry (MSCCH)

2nd Semester Examination, 2022 (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.

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. (a) What are concentration cells? Discuss the types of concentration cells.

- (b) Give difference between thermal and photochemical reactions. Discuss Lambert-Beer's law.
2. Explain the term activity and activity coefficient of an electrolyte in detail. Describe EMF method for the determination of activity coefficient.
3. Write explanatory notes on the following :
- (a) Liquid junction potential and its determination.
- (b) Applications of polarography.
4. Describe collision theory of reaction rate along with its limitations. Discuss Lindemann's theory to explain the mechanism of unimolecular reactions.
5. Explain the following :
- (a) Jablonski diagram.
- (b) Primary and secondary salt effect.

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. Define overvoltage. Discuss the factors affecting overvoltage.

2. What are electrochemical cells. Derive Nernst equation.
 3. Discuss Debye-Huckel theory of strong electrolytes.
 4. Write short notes on the following :
 - (a) Acid-base catalysis.
 - (b) Transition state theory.
 5. Define electrode potential. Calculate EMF of a cell at 298 K. Given : $E^0_{\text{cd}^{2+}/\text{cd}} = -0.40 \text{ V}$; $E^0_{\text{cu}^{2+}/\text{cu}} = +0.33 \text{ V}$
$$\text{Cd} + \text{Cu}^{2+} (a = 1) \rightleftharpoons \text{Cd}^{2+} (a = 1) + \text{Cu}$$
 6.
 - (a) Discuss consecutive reactions with examples.
 - (b) Define quantum yield. What are the reasons of high and low quantum yield.
 7. Define corrosion and discuss different methods to prevent corrosion.
 8. Explain the kinetics of photochemical reaction between hydrogen and bromine.
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