

B.Sc. (Hons.) 4th Semester Examination,

May-2024

CHEMISTRY

Paper-P-24

Physical Chemistry (CH(H)-207)

Time allowed : 3 hours ] [ Maximum marks : 40

Note : Attempt five questions in all, Question 1 is compulsory. Selecting one question from each section.

1. (a) Define Second law of Thermodynamics.  $1 \times 8 = 8$
- (b) Define Spontaneous process.  $\checkmark$
- (c) Define Standard Reduction Potential.  $\checkmark$
- (d) What do you mean by Chemical Potential.  $\checkmark$
- (e) Define Electrolytic Cell.  $\checkmark$
- (f) What do you mean by Standard Oxidation potential.  $\checkmark$
- (g) What do you understand by Galvanisation.  $\checkmark$
- (h) What do you mean by Buffer Action.  $\checkmark$

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92238

## Section-I

2. (a) Explain in detail about the Carnot cycle. 4,4
- (b) How will you show that  $[\Delta A]_T = nRT \ln \frac{P_1}{P_2}$
3. (a) How will you show that  $\Delta S = C_p \ln \frac{T_2}{T_1}$ ? 4,4
- (b) Explain the criterion of spontaneity in terms of entropy change and Gibb's free energy.

## Section-II

4. (a) Derive Clausius Clapeyron equation. 4,4
- (b) Explain the variation of chemical potential with temperature.
5. (a) Derive Gibb-Helmholtz Equation. 4,4
- (b) Explain in detail about the Nernst Heat Theorem.

## Section-III

6. (a) Explain in detail about the Reversible and Irreversible electrodes. 4,4

92238

- (b) Explain in detail about the Standard Hydrogen Electrode.
7. (a) Explain in detail about the Nernst Equation with suitable examples. 4,4
- (b) Explain in detail about the following :
- (i) Polarisation
  - (ii) Over potential

#### Section-IV

8. (a) Explain in detail about the Hydrolysis of Salts. 4,4
- (b) Derive Henderson-Hassel equation to determine the pH of Acidic buffer.
9. (a) Explain the Electrochemical cell theory for the corrosion of iron. 4,4
- (b) How can you determine the pH of the unknown solution using quinhydrone electrode.