Reg. No. : ....

Name : ....

**I Semester M.Sc. Degree (C.B.C.S.S. – OBE – Reg./Supple./Imp.)
Examination, October 2024
(2023 Admission Onwards)
CHEMISTRY/CHEMISTRY WITH DRUG CHEMISTRY SPECIALIZATION
MSCHD01C04/MSCHE01C04 : Physical Chemistry – 1**

Time : 3 Hours　　　　　　　　　　　　　　　　　　　　　　Max. Marks : 60

SECTION – A

Answer **any five** questions. Short answer questions. **Each** carries **three** marks.

1. State the third law of thermodynamics and explain its significance.

2. Explain the influence of temperature and pressure on ion conductance in electrolyte solutions.

3. Explain liquid junction potential. How is it eliminated ?

4. Differentiate deposition, dissolution and decomposition potentials.

5. What are the differences between Electrostatic Double-Layer Capacitors (EDLC) and pseudocapacitors ?

6. What is passivity of metals ? Explain its importance.　　　　　　　　(5×3=15)

SECTION – B

Answer **any three** questions. Short answer questions. **Each** question carries **six** marks.

7. Explain the Seebeck effect, Peltier effect and Thomson effect in thermoelectricity.

8. Construct the phase diagram of the water system and discuss it.

9. Derive the equation for the Debye-Huckel limiting law. Why it is called a limiting law ?

10. Describe the principle of polarography. Derive an equation for halfwave potential.

11. Explain the principle of cyclic voltammetry. Why CV has been recognised as the most versatile analytical technique ?　　　　　　　　(3×6=18)

P.T.O.

SECTION – C

Answer **any three** questions. Essay type questions. **Each** question carries **nine** marks.

12. Explain the physical significance of partial molar quantities. Derive the expression of variation of chemical potential with pressure and temperature.

13. Derive the Debye-Hückel-Onsager equation for ion conductance and explain its relevance to electrolyte solutions.

14. Explain hydrogen and oxygen overvoltage. Discuss the various theories of overvoltage.

15. Explain in detail the working principle, reactions and applications of lithium-ion batteries.

16. Describe in detail the thermodynamics of corrosion, measurement of corrosion rate and corrosion prevention by cathodic protection.　　　　　(3×9=27)