

**M.Sc. II Semester Degree Examination, October - 2023****CHEMISTRY****Electro-, Quantum and Photochemistry****(NEP)**

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with Question No. **1 compulsory** and each question carries **equal** marks.

1. (a) Explain Debye-Huckel theory of strong electrolytes. **5+5+4=14**
(b) Discuss Helmholtz-Perin electrical double layer and its thermodynamic effects.
(c) Explain construction and working of H₂-O₂ fuel cell.
2. (a) Discuss Overvoltage and activation Overvoltage. **5+5+4=14**
(b) Write notes on : (i) Diffusion Current (ii) Stationary Current
(c) Describe Buttler-Volmer equation and its significance.
3. (a) What are Operators? Discuss Linear and Hamiltonian operators. **5+5+4=14**
(b) State and derive Variation Theorem.
(c) Discuss Schrodinger wave equation for particle in three dimensional box.
4. (a) Explain Jablonski diagram of photochemical reactions. **5+5+4=14**
(b) Write a note on quantum yield and its determination with example.
(c) Differentiate Singlet state and Triplet state in Photochemistry.
5. (a) Define Term Symbol? Give its significance in photochemical reactions. **5+5+4=14**
(b) Discuss Ster-Volmer equation.
(c) Write a note on ZnO TiO₂ as a photocatalytic materials.



- 6.** (a) Explain effect of current density on overvoltage. **5+5+4=14**
(b) What are the postulates of quantum mechanics ?
(c) Explain Heisenberg uncertainty principle.
- 7.** (a) Discuss Stark-Einstein law of photochemical equivalence. **5+5+4=14**
(b) Describe Frank-Condon principle.
(c) Explain Flash photolysis with applications.
- 8.** (a) Write a note on ionic product of water. **5+5+4=14**
(b) Discuss Simple Harmonic Oscillator.
(c) Explain :
(i) Laws of Photochemistry.
(ii) Actinometry with its types.

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