

**Department of Chemistry**  
**School of Chemical & Life Sciences, Jamia Hamdard**  
**M.Sc. Chemistry/Semester II**  
**Paper Code: MCHCC--101**  
**Paper Title: Physical Chemistry-I**

Time 3 hours

Maximum Marks 60

Abbreviations Used

CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level

1-Remember; BT level

2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

**Section A**

Very Short Type Questions

(10x2=20Marks)

| Q. No | Question                               | Marks | BTL | CLO | PLO |
|-------|----------------------------------------|-------|-----|-----|-----|
| 1. ✓  | What is Tafel diagram?                 | 2     | 1   | 1   | 1   |
| 2. ✓  | What is Phase diagram?                 | 2     | 2   | 2   | 1   |
| 3.    | Define is quantum mechanics?           | 2     | 2   | 3   | 1   |
| 4.    | Define component?                      | 2     | 2   | 4   | 1   |
| 5.    | What is Le-chateliars Principal?       | 2     | 1   | 4   | 1   |
| 6.    | What is application of Eigen Function? | 2     | 2   | 4   | 1   |
| 7. ✓  | What is surface excess fuction?        | 2     | 2   | 2   | 1   |
| 8. ✓  | What is electro cardiography?          | 2     | 2   | 3   | 1   |
| 9.    | What is surface tension?               | 2     | 2   | 3   | 1   |
| 10. ✓ | What is nano catalyst?                 | 2     | 2   | 4   | 1   |

**Section B**

Long Type question (Attempt any two out four)

(10x2=20)

| Q. No | Question                                                                                       | Marks | BTL | CLO | PLO |
|-------|------------------------------------------------------------------------------------------------|-------|-----|-----|-----|
| 1.    | Drive expression for Debye Huckel rule.                                                        | 10    | 6   | 1   | 3   |
| 2     | Derive Ilkovic equaqtion.                                                                      | 10    | 5   | 2   | 3   |
| 3.    | Derive an expression Translational, Rotational, vibrational and electronic partition function. | 10    | 5   | 2   | 3   |
| 4     | Explain various postulates of Quantum mechanics.                                               | 10    | 6   | 3   | 3   |

**PTO**

**Section C**

Short Type questions. (Attempt all questions)

(4x5=20)

| Q.NO | Questions                                                                                                                                                                          | Marks | BTL | CLO | PLO |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|-----|-----|
| 1.   | What is Laplace equation?<br>OR<br>What Kelvin Equation? .                                                                                                                         | 4     | 3   | 1   | 2   |
| 2.   | Derive angular momentum operator and find out the commutator between position & momentum?<br>OR<br>Derive the expression of Normalised $\psi$ for particle in one dimensional box. | 4     | 4   | 2   | 2   |
| 3    | What are Excess functions?<br>OR<br>How will you determine fugacity?                                                                                                               | 4     | 3   | 3   | 2   |
| 4    | What is Graham-Devanathan model of electrified interfaces?<br>OR<br>Derive Butler-Volmer equation.                                                                                 | 4     | 3   | 4   | 2   |
| 5    | What are surface films?<br>OR<br>Derive BET equation.                                                                                                                              | 4     | 4   | 4   | 2   |

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