

CODE: 196302  
NOVEMBER 2020

TIME: 3Hrs  
MAX. MARKS : 50

*PART A*

(10 x 2=20)

*Answer any TEN questions*

1. Define Eigen function and Eigen value?
2. What are called Quantum mechanical tunneling?
3. Define reducible representations?
4. What are called point group?
5. What is kinetic isotope effect?
6. Define the collision theory of reaction rates?
7. What is Zeta potential?
8. Write any two limitations of electrical double layer?
9. What is Physical adsorption?
10. Define adsorption isotherm?
11. Write the significance of transfer coefficient?
12. Define the term enthalpy of activation?

*PART B*

(2 x 5=10)

*Answer any TWO questions*

13. Explain all the operators involved in Quantum theory.
14. How to calculate the rotational constant and bond length using rigid rotor?
15. Explain great orthogonality theorem and its consequences.
16. Construct the character table of  $C_{2v}$  groups.
17. Explain in detail the Lindemann theory of reaction rates?
18. Compare the collision theory and transition theory of reaction rates.
19. Explain in detail the Helmholtz-Perrin electrical double layer.
20. What is acid-base catalysis? Explain the mechanism of acid-base catalysis.

*PART C*

(2x10=20)

*Answer any TWO questions*

21. Explain in detail and derive the time-dependent Schrödinger wave equations of a particle in a 1D box.
22. Explain in detail the applications of molecular vibrations.
23. Explain in detail the activation theory of reaction rates?
24. Explain the Guoy-Chapmann and Stern models of electrical double layer and write its applications and limitations.
25. Derive in detail the Langmuir-Hinshelwood mechanism?

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