Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17CH2003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ATOMIC STRUCTURE, THERMODYNAMICS AND**  **ELECTROCHEMISTRY** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | What are the postulates of quantum theory of radiation? | CO1 | 4 |
| b. | Explain the production of cathode rays with a diagram. | CO1 | 10 |
| c. | Analyse the different properties of cathode rays. | CO1 | 6 |
| **(OR)** | | | | |
| 2. | a. | Explain the probability of finding an electron in a given volume using radial probability curves. | CO1 | 12 |
| b. | Which principle deals about uncertainity of electrons? Explain the principle. | CO1 | 8 |
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| 3. | a. | Define spontaneous process and spontaneity with examples. | CO2 | 4 |
| b. | Give the six features of spontaneous process. | CO2 | 6 |
| c. | Derive Gibbs-Duhem equation and give the expression for chemical potentials of mixtures. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Define Chemical Potential and derive an equation for chemical potential of an ideal gas. | CO2 | 08 |
| b. | Derive Gibbs-Helmholtz equation involving Gibbs free energy(G) and work function(A). | CO2 | 12 |
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| 5. | a. | Define Standard Electrode Potential. Explain how electrode potentials of Zinc and Copper are measured. | CO4 | 12 |
| b. | Explain an electrochemical cell and explain how the standard emf of the cell can be calculated. | CO5 | 08 |
| **(OR)** | | | | |
| 6. | a. | Calculate the electrode potential of zinc in 0.5M ZnSO4 solution at 25oC. Given: Eo of Zn/Zn2+ is – 0.763V. | CO4 | 06 |
| b. | Explain in detail the primary and secondary batteries with examples. | CO5 | 14 |
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| 7. | a. | Differentiate various oxide layers and explain oxidation corrosion. | CO6 | 10 |
| b. | Analyse in detail the various factors influencing corrosion. | CO6 | 10 |
| **(OR)** | | | | |
| 8. | a. | Discuss two methods of cathodic protection of corrosion. | CO6 | 10 |
| b. | Briefly discuss how change in environment and application of protective coating help in minimizing corrosion. | CO6 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Discuss in detail the various postulates of quantum mechanics and derive Schrodinger equation. | CO1 | 10 |
| b. | Using three dimensional box how energy and wave function of a particle can be calculated. | CO1 | 10 |