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



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

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| **Code :** | **17CH3021** | **Duration :** | **3hrs** |
| **Sub. Name :** | **APPLIED 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. | Describe the mechanisms of electrochemical corrosion with suitable diagrams. | CO3 | 10 |
| b. | Explain the following with neat diagrams:  (i) Galvanic corrosion; (ii) Differential aeration corrosion. | CO3 | 10 |
| **(OR)** | | | | |
| 2. | a. | Describe the passivation behavior of metals and alloys. | CO4 | 5 |
| b. | Explain any five factors influencing the rate of corrosion based on nature of environment. | CO3 | 5 |
| c. | How to monitor corrosion by using the following techniques:  (i) Ultrasonic testing; (ii) Radiographic testing. | CO4 | 10 |
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| 3. | a. | Illustrate the general principle of electroplating technique with a diagram. | CO4 | 5 |
| b. | Explain the role of following organic additives used in electrolyte bath of an electroplating process:  (i) Brighteners; (ii) Levellers;  (iii) Structure modifiers; (iv) Wetting agents. | CO4 | 10 |
| c. | Describe any five methods of cleaning articles before electrodeposition. | CO4 | 5 |
| **(OR)** | | | | |
| 4. | a. | Describe the importance of chromium plating with a neat sketch. Present its bath composition. | CO4 | 10 |
| b. | Explain the following techniques with suitable clear diagrams: (i) Anodizing of aluminium; (ii) Electroforming | CO4 | 10 |
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| 5. | a. | Describe any five principles of energy conservation. | CO5 | 10 |
| b. | Explain the principle of thermodynamic reversibility in an electrochemical cell. | CO5 | 10 |
| **(OR)** | | | | |
| 6. | a. | Derive Gibss equation. How it is helpful in calculating the EMF of a reversible cell. | CO5 | 10 |
| b. | Explain any five battery characteristics. | CO5 | 10 |
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| 7. | a. | Describe the construction, electrochemistry and performance characteristics of alkaline manganese dioxide cells. | CO6 | 10 |
| b. | Desribe the working principle, charging and discharging reactions of a lead-acid battery system with a diagrm. | CO6 | 10 |
| **(OR)** | | | | |
| 8. | a. | Explain the assembly, performance characteristics and applications of nickel – cadmium rechargeable batteries. | CO6 | 10 |
| b. | Describe the principle of operation of photoelectrochemical cells with neat diagrams. | CO6 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Derive the Nernst equation for electrode potential. | CO1 | 5 |
| b. | Explain the working principle, types and application of transducers. | CO2 | 10 |
| c. | Describe the working principle of Tast polarography. | CO2 | 5 |