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



**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **17CH1002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **APPLIED CHEMISTRY** | **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. | Discuss softening of hard water by ion exchange resin method with a neat sketch. | CO1 | 10 |
| b. | A sample water contains Ca (HCO3)2 = 162 mg/l,CaCl2 = 11.1 mg/l, MgCl2 = 190 mg/l, MgSO4 = 120 mg/l. Calculate total, permanent and temporary hardness present in it. | CO1 | 5 |
| c. | How dissolved oxygen in boiler feed water causes boiler corrosion? Suggest two methods for its removal. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | With a neat sketch describe how reverse osmosis is used in desalination of water. | CO1 | 10 |
| b. | Calculate total, temporary and permanent hardness of a water sample containing Mg(HCO3)2 = 7.3 mg/l, Ca(HCO3)2 = 16.2 mg/l, CaCl2 = 111mg/l, MgSO4 = 120 mg/l. | CO1 | 5 |
| c. | Point out the disadvantages of scale and sludge formation in boilers. | CO1 | 5 |
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| 3. | a. | Derive Gibb’s Hemholtz equation. | CO2 | 10 |
|  | b. | Calculate the enthalpy of formation of ethane; given that the enthalpies of combustion of carbon, hydrogen and ethane are -394, -286 and -1542 kJ/mol respectively.  Target equation: 2C(s) + 3 H2 C2H6 (g) | CO2 | 5 |
|  | c. | Differentiate path function and state function with examples. | CO2 | 5 |
| (OR) | | | | |
| 4. | a. | Prove Cp- Cv= R | CO2 | 10 |
|  | b. | Calculate the enthalpy of formation of carbon monoxide; given that the enthalpies of combustion of carbon and carbon monoxide are -394, -283KJ/mol respectively.  Target equation:C(s) + ½ O2 CO (g) | CO2 | 5 |
|  | c. | State first and second law of thermodynamics. | CO2 | 5 |
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| 5. | a. | Construct a lead acid battery and explain the working of the battery in detail. | CO3 | 15 |
|  | b. | Define electrode potential. Calculate the emf of Daniel cell at 25oC when the concentration of zinc sulphate and copper sulphate are 0.01M and 0.1M respectively. The standard potential of cell is 1.1 volt. | CO3 | 5 |
| (OR) | | | | |
| 6. | a. | Derive Nernst equation for electrode potential. Mention any one application of electrochemical series. | CO3 | 10 |
|  | b. | Why electrochemical sensors are more preferred than other sensors? Highlight the working of an electrochemical sensor with an example. | CO3 | 10 |
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| 7. | a. | Suggest any five methods to control corrosion in metals. | CO4 | 10 |
|  | b. | Discuss compression and injection moulding of plastics with a neat sketch. | CO5 | 10 |
| (OR) | | | | |
| 8. | a. | Comment on the applications of polymers in everyday life. | CO5 | 10 |
|  | b. | Write the mechanism of rusting of iron. | CO4 | 5 |
|  | c. | Compare and contrast biopolymers and biodegradable polymers with examples. |  | 5 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Summarize the methods of preparation of nanomaterials using bottom up approach. | CO6 | 10 |
|  | b. | Give a detailed account on the chemistry of solar cells. Mention any three advantages and disadvantages. | CO6 | 10 |

ALL THE BEST