**H.T No**

**Regulations:**

**A15**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 5H131 Date: 19-June-2019 (AN)**

**B.Tech I Year I-Semester External Examination, June-2019 (Supplementary)**

**ENGINEERING CHEMISTRY (Common to All)**

**Time: 3 Hours Max.Marks:75**

***Note: a****) No additional answer sheets will be provided.*

*b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.*

*c) Missing data can be assumed suitably.*

**Part - A Max.Marks:25**

**Answer all QUESTIONS.**

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| 1. | Why the hardness of water is expressed in terms of CaCO3 equivalents. Mention the various types of units to express the hardness of water? | [3M] |
| 2. | Arrange the increasing order of reducing capacity of Li+, Zn+2, Al+3, Fe+2, Fe+3 and Cu+2 | [3M] |
| 3. | Mention the recharging reactions involved in Pb-Acid battery. | [3M] |
| 4. | Write a note on Passivity. | [3M] |
| 5. | What is Reduced Phase Rule? Why it was reduced. | [3M] |
| 6. | Define eutectic point and write its composition in silver and lead alloy. | [2M] |
| 7. | How will you remove CO2 from water which causes boiler corrosion? | [2M] |
| 8. | Differentiate Primary and Secondary batteries. | [2M] |
| 9. | Calculate the components and phases exist for decomposition of calcium carbonate. | [2M] |
| 10. | Define alloy and write it’s any two properties. | [2M] |

**Part – B Max.Marks:50**

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.**

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| 11. | a) | Explain the removal of hardness of water by ion-exchange Process and give its advantages over other methods. | [6M] |
|  | b) | Calculate the temporary and permanent hardness of water sample containing Mg(HCO3)2= 7.3mg/L, Ca(HCO3)2= 16.2mg/L, MgCl2= 9.5mg/L, CaSO4=13.6mg/L). | [4M] |
|  |  |  |  |
| 12. | a) | What are reference electrodes? Explain the application of Quinhydrone electrode? | [6M] |
|  | b) | Determine the Potential of Hydrogen electrode at pH = 10. | [4M] |
|  |  |  |  |
| 13. | a) | What are fuel cells? Explain the construction of H2-O2 fuel cell and mention its advantages over other electrochemical cells. | [6M] |
|  | b) | Write down the applications of Photovoltaic Cell. | [4M] |
|  |  |  |  |
| 14. | a) | Explain electro chemical corrosion theory of corrosion in the rusting of iron. | [6M] |
|  | b) | Iron does not rust even if Zn coating is broken in a galvanized iron pipe but rusting occurs much faster if tin coating over iron is broken. Explain? | [4M] |
|  |  |  |  |
| 15. | a) | Define Phase, Component, and Degrees of freedom with suitable examples. | [3M] |
|  | b) | Explain the phase diagram of Water system. | [7M] |
|  |  |  |  |
| 16. | a) | Describe galvanizing method used to control corrosion of metal. | [6M] |
|  | b) | Write the principle of cathodic protection and explain sacrificial anodic and impressed current method. | [4M] |
|  |  |  |  |
| 17. | a) | Write a note on Reverse osmosis. | [4M] |
|  | b) | How the solubility of sparingly soluble salts can be determined? | [3M] |
|  | c) | What is the effect of pH on rate of corrosion? | [3M] |
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| 18. | a) | Explain the properties of alloys. | [5M] |
|  | b) | Define Break point chlorination. | [5M] |

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