**End Semester Examination 2024**

**Roll No.** | | | | | | | |

**Name of the Course: B.Tech** **Semester: II**

**Name of the paper: Engineering Chemistry** **Paper Code: TCH 201**

**Time: 3 Hour**

**MM: 100**

**Note:**

(i) Answer **all the questions** by choosing **any two of the sub questions.**
(ii) Each question carries 10 marks.

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|---|---|---|
| **Q.1** | **(2x10=20 Marks)** | **$CO_1$** |
| **a)** | Explain conductor, semiconductor and insulators on the basis of band theory. | |
| **b)** | Define UV- Visible spectroscopy. Also give its applications | |
| **c)** | Draw the molecular orbital diagram of CO. Also explain its bond order. | |
| **Q.2** | **(2x10=20 Marks)** | **$CO_2$** |
| **a)** | Explain Ion –exchange method of water softening in detail. | |
| **b)** | Define hardness and its types. Also give the measurement of hardness. | |
| **c)** | A water sample has the following analysis:<br>$Mg(HCO_3)_2$= 7.3 mg/L, Ca $(HCO_3)_2$= 16.2 mg/L, $CaSO_4$ = 13.6 mg/L, $MgCl_2$= 9.5 mg/L, NaCl= 50 mg/L. Calculate the temporary and permanent hardness. | |
| **Q.3** | **(2x10=20 Marks)** | **$CO_3$** |
| **a)** | Give the preparation and uses of Nylon 6, Nylon 6:6 and Dacron. | |
| **b)** | Explain degree of polymerization and functionality of monomer. Also give the detailed classification of polymers. | |
| **c)** | Explain addition polymers. Give the mechanism of addition polymerization. | |
| **Q.4** | **(2x10=20 Marks)** | **$CO_4$** |
| **a)** | Give the composition and uses of LPG. | |
| **b)** | What are renewable sources of energy. Define Biogas plant. | |
| **c)** | Give the definition of fuel. Give the classification and characteristics of good fuel. | |
| **Q.5** | **(2x10=20 Marks)** | **$CO_5$** |
| **a)** | Give the derivation of Nernst equation. Also explain electrochemical series. | |
| **b)** | Calculate the cell potential ($E_{cell}$) for the following cell:<br>Ni (s)/ $Ni^{2+}$ (0.01M)// $Cu^{2+}$ (0.1 M)/ Cu (s)<br>Given, $E°_{(Cu^{2+}/Cu)}$ = 0.34V<br>$E°_{(Ni^{2+}/Ni)}$ = -0.25 V | |
| **c)** | Define electrochemical cell by giving the example of Daniel cell. | |