

Total No. of Questions : 09]

[Total No. of Pages : 02

**B.Tech. (Sem. - 1<sup>st</sup> / 2<sup>nd</sup>)**

**ENGINEERING CHEMISTRY**

**SUBJECT CODE : CH - 101 (2k4 & Onwards)**

**Paper ID : [A0112]**

[Note : Please fill subject code and paper ID on OMR]

**Time : 03 Hours**

**Maximum Marks : 60**

**Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Five** questions from Section - B & C.
- 3) Select atleast **Two** questions from Section - B & C.

**Section - A**

**Q1)**

**(Marks : 2 each)**

- a) What is break point chlorination?
- b) Bolt and nut made of same material is preferred in practice. Why?
- c) What is  $R_f$  value in chromatography?
- d) An aqueous solution of copper sulphate is acidic in nature. Why?
- e) What are the dark reactions?
- f) Corrosion is reverse to extraction. Explain.
- g) Define and explain degree of freedom.
- h) Why is TMS used as an internal standard for NMR?
- i) Why water softened by zeolites is unfit for use in boilers?
- j) Mention two limitations of phase rule.

**Section - B**

**(Marks : 8 each)**

- Q2)** What are ion exchange resins? Discuss their application in water softening.  
How are spent resins regenerated?

- Q3)** (a) Explain the process of galvanization of iron. How does it prevent the corrosion of iron?
- (b) Outline the difference in hydrogen embrittlement and pitting corrosion with suitable examples.
- Q4)** Write detailed notes on :
- (a) Partition chromatography.
- (b) Paper chromatography.
- (c) Thin layer chromatography.
- Q5)** (a) What are secondary cells? Describe the construction of one secondary cell.
- (b) A cell consists of two hydrogen electrodes. The negative electrode is in contact with a solution of  $10^{-6}$  M hydrogen ions. The EMF of the cell is 0.118 V at  $25^{\circ}\text{C}$ . Calculate the concentration of hydrogen ion at positive electrode.

### Section - C

*(Marks : 8 each)*

- Q6)** (a) Describe and discuss Jablonski diagram for depicting various photo processes.
- (b) What are the conditions required for laser action to take place? Describe optical pumping of lasers.
- Q7)** (a) Explain processes that contribute to the finite width of a spectral line.
- (b) What are different kinds of electronic transitions? Explain chromophores and auxophores.
- Q8)** (a) Give the high resolution  $^1\text{H}$  NMR of methyl ethyl ether.
- (b) Write short notes on chemical shift and magnetic resonance imaging.
- Q9)** (a) What is condensed phase rule? When is it applied?
- (b) Draw a neat labelled phase diagram of water system and explain areas, curves and triple points on it.