

Roll No. ....

Total No. of Questions : 09]

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**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) Cause of chemical shift in NMR.
- b) Specifications for water to be used for drinking purpose.
- c) What is priming and foaming.
- d) Difference between Galvanic cell and Electrolytic cell.
- e) Corrosion is reverse to extraction. Justify.
- f) What is meant by metastable equilibrium?
- g) Photosensitized reactions?
- h) Difference between GC and HPLC technique of chromatography.
- i) Cause of alkalinity of saw water.
- j) Advantages and limitations of lime soda process.

**Section - B**

**(Marks : 8 Each)**

- Q2)** (a) Describe method involved in treatment of water required for industries.  
(b) State any two difference between hot and cold lime soda process.

- Q3)** (a) What is soil corrosion? What are the factors that affects soil corrosions.  
(b) Explain mechanism of rusting of Iron in acidic and neutral environment.
- Q4)** (a) Describe various kinds of supports used in columns and their properties.  
(b) Give schematic diagram of HPLC apparatus showing various parts.
- Q5)** (a) Define emf. How is the emf of a cell determined?  
(b) Derive an expression for the emf of a concentration cell.

### Section - C

*(Marks : 8 Each)*

- Q6)** (a) What do you understand by term spin-spin coupling? Is the coupling constant independent of the applied field or depend on it.  
(b) Indicate diagrammatically the splitting of signals in NMR spectra of  $\text{CH}_2\text{Br}-\text{CHBr}_2$ ,  $\text{CH}_3-\text{CHBr}_2$  and  $\text{CH}_3-\text{CH}_2\text{Br}$ .
- Q7)** (a) What type of molecules give pure rotational spectra? Derive expression for frequency of rotational lines.  
(b) What type of molecules exhibit vibrational-rotational spectra and why?
- Q8)** (a) How does  $\text{CO}_2$  system differ from water system?  
(b) Explain the terms Eutectic point, Eutectic composition, constant boiling mixture, triple point.
- Q9)** (a) A sample of gaseous HI was irradiated by light of wavelength 253.7 nm when 307 J of energy was found to decompose  $1.30 \times 10^{-3}$  moles of HI. Calculate quantum yield for the dissociation of HI.  
(b) State and explain Einstein law of photochemical equivalence. What is meant by quantum yield of a photochemical process.

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