

Roll No.

Total No. of Questions : 09]

[Total No. of Pages : 02

B.Tech. (Sem. -1st)
ENGINEERING CHEMISTRY

SUBJECT CODE : CH - 101

Paper ID : [A0110]

[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

(Marks : 2 Each)

Q1)

- a) Give difference between photochemical and thermal reactions.
- b) Why is salt bridge used in concentration cell?
- c) What is meant by rusting of iron?
- d) What salts are responsible for temporary and permanent hardness of water?
- e) What do you understand by finger print region?
- f) 1, 3 - Butadiene possess λ_{\max} at higher value than that of ethene. Explain.
- g) Give the possible vibration(s) for a molecule of HCl.
- h) Match λ_{\max} of 294 and 274 nm for cis - stilbene / trans- stilbene ($C_6H_5 - CH = CH - C_6H_5$). Explain your observation.
- i) The 1H NMR spectrum of $C_2H_4Br_2$ has only one signal. What could be its structure?
- j) Define Phase rule?

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P.T.O.

Section - B

(Marks : 8 Each)

- Q2)** (a) Discuss chemical coagulants used for municipal water.
(b) A water sample contains 40 ppm of Ca^{2+} , 36 ppm of Mg^{2+} , 48 ppm of SO_4^{2-} and 366 ppm of HCO_3^- . Calculate the amount of lime and soda needed for softening.
- Q3)** (a) Explain cathodic protection.
(b) Discuss the mechanism of wet corrosion.
- Q4)** (a) Discuss the concentration cells.
(b) Describe emf of electrochemical cell by taking suitable example.
- Q5)** Draw the flow-diagram of liquid chromatography instrument. Discuss its principle.

Section - C

(Marks : 8 Each)

- Q6)** (a) Describe mechanism of photosynthesis.
(b) A solution containing 30.1 g/L of a dye, in 1 cm cell, absorbs 50% of blue light ($\lambda = 435\text{nm}$). Under the same conditions, what % age of light will be absorbed by a solution containing 15.05 g/L of the dye?
- Q7)** (a) Give the scope of IR spectroscopy.
(b) Explain Frank-Condon principle.
- Q8)** (a) Discuss magnetic resonance imaging.
(b) Explain shielding and deshielding of protons.
- Q9)** Draw and discuss phase diagram of Helium system.

