



JK LakshmiPat University Jaipur.
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, May 2016
B. Tech. I year, II Semester CH-101 (CHE, CE & ME)

Roll No.....

CH101: ENGINEERING CHEMISTRY

Time: 3.00 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

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- Q.1 Objective type (1 marks each) 10**
- i. 1 ppm = ...mg/l = ... $^{\circ}\text{Fr}$ = ... $^{\circ}\text{Cl}$.
 - ii. Write the chemical name of C_4AF .
 - iii. Write the ions responsible for Alkalinity in water.
 - iv. Write the formula of Viscosity Index of a Lubricant.
 - v. Give the structure of Ethylene Di amine Tetra Acetic acid.
 - vi. Explain the role of Gypsum in cement.
 - vii. Give the name and structure of monomer of Natural Rubber.
 - viii. Write the types of copolymers?
 - ix. Define the term Functionality and Degree of polymerization.
 - x. Write the relations between atomic radius and edge length for SCC, FCC and BCC crystal.
- Q.2 Short answer type questions (2.5 marks each) 10**
- i. Give the classification of polymers on the basis of Structure.
 - ii. What is Hardness? Why hard water consumes a lot of soap, explain with chemical reactions.
 - iii. Define the Flash and fire point for a lubricant.
 - iv. Drive the relations between Atomic radius and edge length for a BCC unit cell?
- Q.3A What is Lubricant? Explain thick film mechanism of Lubrication. 5**
- Q.3B An exhausted Zeolite softener was regenerated by passing 150 liters of NaCl solution, having strength 150gm/L of NaCl. If the hardness of water is 600 ppm, calculate the total volume of water that is softened by this softener. 5**
- Q.4A What is Elastomer? Explain the Vulcanization of raw rubber with reaction. 5**
- Q.4B Write the Chemical Reactions take place during Lime Soda Process. 5**

Q.5A Derive the Bragg's equation to calculate the separation between two parallel planes of a crystal? 5

Q.5B Explain the setting and hardening of cement with reactions. 5

Q.6A A crystal has FCC structure; its density is 2.18 gm/cm^3 . Calculate the distance between two adjacent atoms? (Given $M = 58.5$ and $N_A = 6.023 \times 10^{23}$) 5

Q.6B Write short notes on (i) PASSIVITY and (ii) Galvanizing process 5

Q.7A What is Fullerenes? Explain the structural features and application of fullerene. 5

Q.7B Give the structural properties and types of Carbon Nano Tubes (CNT). 5

OR

Q.7B Calculate the Temporary and Permanent and Total hardness of a sample of water in ppm and in $^\circ\text{Fr}$. This water sample on analysis gives following impurities:

Impurity	$\text{Ca}(\text{HCO}_3)_2$	$\text{Mg}(\text{HCO}_3)_2$	MgSO_4	CaSO_4	CaCl_2
Quantity (mg/L)	10.5	12.5	2.6	7.5	8.2
Mol.Wt.	162	146	120	136	111

Q.8 Give the mechanism of electrochemical corrosion taking iron as example 10
(a) By Hydrogen evolution (b) By absorption of Oxygen

OR

Q.8 Discuss the significance of viscosity in lubricating oil. How the viscosity is determined by Red-wood viscometer? 10

Q.9 What is Cement? Give chemical reactions taking place in different zones of rotary kiln process in cement manufacturing. 10

OR

Q.9 Give the preparations and properties of following polymer. 10
(i) Polystyrene (ii) PMMA (iii) PVC (iv) Nylon 6:6 (v) SBR

Q.10 A standard hard water contains 15 gm CaCO_3 per liter. 20 ml of this required 25 ml of EDTA solution. 100 ml of water sample required 18 ml of same EDTA solution up to end point. The same sample after boiling required 12 ml of EDTA solution. Calculate the Temporary and Permanent hardness of water sample. 10