

JK Lakshmi Pat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, December 2015
B. Tech. I year, I Semester CH-101 (Back Paper)

Roll No.....

CH101: ENGINEERING CHEMISTRY-I

Time: 3.00 hours

Max. Marks: 100

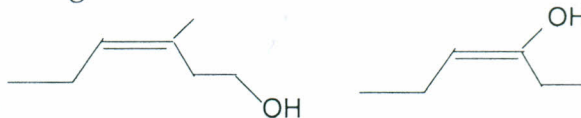
Instructions to students:

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.

Q.1 Objective type (1 marks each)

10

- i. What is the formula to convert hardness into equivalent of CaCO_3 .
- ii. Write name and formula of four salts responsible for permanent hardness.
- iii. Write the formula of Gypsum and its role in cement.
- iv. Give the formula of any two Coagulants.
- v. Write the name and formula of Nylon 6:6 monomers.
- vi. Write the chemical name of C_3A for cement manufacturing.
- vii. Write the formula to calculate viscosity index of a lubricant
- viii. Write the formula to calculate the Specific rotation of an optical isomer.
- ix. Give the structure of Ethylene Di amine Tetra Acetic acid.
- x. Assign the E and Z for following



Q.2 Short answer type questions (2.5 marks each)

10

- i. What is Hardness? Define Scale and Sludge in boilers.
- ii. Give the classification of Polymers on the basis of types of monomer used.
- iii. Define the Cloud and Pore point for a lubricant.
- iv. X-ray of wavelength $1.54 \text{ \AA}$ strike at an angle 22.5° on a crystal plane, assuming that $n = 1$, Calculate the spacing between two parallel planes?

Q.3A Define the co-polymerization taking suitable examples.

5

Q.3B What is Lubricant? Explain the mechanism of Boundary Lubrication.

5

Q.4A The hardness of 10,000 L of a sample of water was removed by Zeolite process. The softener then required 400 L of NaCl of strength 100 gm/L for regeneration. Calculate the hardness of water sample in ppm.

5

Q.4B Write short notes on 5
(i) Inductive effect
(ii) Carbocation

Q.5A Give the mechanism of SN1 reaction with energy profile diagram taking suitable example 5

Q.5B How the hardness of water is removed by Zeolite process explain with reactions? 5

Q.6A Write short notes on Borosilicate and Potash Glass with their uses. 5

Q.6B 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: 5

Impurity	$\text{Ca}(\text{HCO}_3)_2$	$\text{Mg}(\text{HCO}_3)_2$	MgSO_4	CaSO_4	CaCl_2
Quantity (mg/L)	4.0	6.0	10	8.0	8.2
Mol.Wt.	162	146	120	136	111

Q.7A Give the five differences between Thermoplastic and Thermosetting Polymers. 5

Q.7B Explain the setting and hardening of Portland cement with reactions? 5

OR

Q.7B Give the mechanism of Aldol and Backmann rearrangement. 5

Q.8 Give the preparations and properties of following polymer. 10

(i) TEFLON (ii) PMMA (iii) PAN (iv) Nylon 6:10 (v) SBR

OR

Q.8 Define Flash and Fire point for a lubricant, how these points are determined by Pensky marten's apparatus. 10

Q.9 Explain the optical Isomerism? What is the required condition to show optical isomerism give with example? 10

OR

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

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