

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, November 2017

B. Tech. I year, I Semester

CH-101 (CSE, ECE, EE, CSE - IBM - BDA/RH)

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 |
| | <ol style="list-style-type: none"> i. Write the structure Ethylene Di amine Tetra Acetic acid. ii. Give the structure of monomer of Natural Rubber. iii. Write the formula to calculate Viscosity Index of a Lubricant. iv. Give the formula of any two coagulants. v. Write the structure of monomer of Nylon 6. vi. Define the term Functionality and Degree of polymerization. vii. What is the effect of pH on corrosion? viii. Sodium metal crystallizes into BCC lattice with cell edge $4.29 \text{ \AA}$. What is the radius of sodium atom? ix. Write name and formula of four salts responsible for permanent hardness. x. Write the chemical name of C_4AF. | |
| Q.2 | Short answer type questions (2.5 marks each) | 10 |
| | <ol style="list-style-type: none"> i. Explain the Hardness of water, why hard water consumes lot of soap? ii. Define unit cell of a Crystal? What are the parameters of a unit cell? Explain with figure. iii. Give the classification of Polymers on the basis of Tacticity. iv. X-Ray of wavelength $1.65 \text{ \AA}$ strike at an angle 22.5° assuming $n=1$. Calculate spacing between two plates | |
| Q.3A | Explain the process of Galvanization with figure. | 5 |
| Q.3B | Derive the Bragg's equation to calculate the distance between two parallel planes of a crystal. | 5 |

- Q.4A What is Lubricant? Explain the mechanism of Thin film lubrication with suitable diagram. 5
- Q.4B Write short notes on (i) Crevice corrosion and (ii) Passivity 5
- Q.5A Explain the structural features and application of Fullerene with figure. 5
- Q.5B Explain the Ion exchange process of water softening with reactions. 5
- Q.6A 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.6B Give chemical reactions taking place in different zones of rotary kiln during the cement manufacturing. 5
- Q.7A Explain the process of Vulcanization of rubber with reactions. 5
- Q.7B Nickel crystallizes in a face-centred cubic lattice. If the density of the metal is 8.908 g/cm^3 , what is the unit cell edge length in pm? ($M = 58.69$, $N_A = 6.023 \times 10^{23}$) 5
- OR**
- Q.7B Explain the setting and hardening of Portland cement with reactions? 5
- Q.8 Give the preparations and properties and applications of following polymer 10
(i) Dacron (ii) PMMA (iii) PVC (iv) Nylon 6:6 (v) Buna -N
- OR**
- Q.8 Define Flash and Fire point for a lubricant, how these points are determine by Pensky marten's apparatus. 10
- Q.9 Taking iron as example explain the mechanism of electrochemical corrosion 10
(a) By Hydrogen evolution (b) By absorption of Oxygen
- OR**
- Q.9 Define Carbon Nano Tubes (CNT)? Give the types of CNTs and their applications. 10
- Q.10 0.5 gm of CaCO_3 was dissolved in HCl and the solution made up to 500 ml with distilled water. 50 ml of this standard hard water solution required 48 ml of EDTA solution for titration. 50 ml of a hard water sample required 15 ml of EDTA and after boiling it required 10 ml of EDTA solution. Calculate the total, temporary and permanent hardness present in water sample. 10