



B.TECH.

THEORY EXAMINATION (SEM-II) 2016-17
ENGINEERING CHEMISTRY

Time : 3 Hours

Max. Marks : 100

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

1. Explain the following:

10 x 2 = 20

- What do you understand by temporary and permanent hardness of water.
- Why β carotene absorbs light in visible region?
- Explain why the value of NCV is greater than GCV.
- Explain the bonding and antibonding molecular orbitals .
- Define polymer and polymerization.
- What is unit cell? What are its types?
- What is meant by elastomers?
- Calculate the bond order of O_2 ?
- Predict the number of signals in CH_3CH_2OH .
- Explain Priming and Foaming.

SECTION – B

2. Attempt any five of the following questions:

5 x 10 = 50

- What is metallic bond? Explain it on the basis of Molecular Orbital theory.
 - With the help of MO diagram, calculate the bond order, nature of the following:
 N_2 & O_2
- Differentiate between addition and condensation polymerization with suitable examples?
 - Write the method of preparation for the following polymers:
(i) PMMA (ii) Orlon (iii) Polystyrene
- Discuss the Zeolite method for water softening.
 - The hardness of 1000-liters of a water sample was completely removed by passing it through a zeolite softener. The softener then required 30 liters of NaCl solution containing 1.5 g/l of NaCl for regeneration. Calculate the hardness of the sample of water.
- Write possible optical isomers in tartaric acid.
 - What is the difference between enantiomers and diastereoisomers?
- Define the terms chromophore and auxochrome in UV spectroscopy.
 - A compound having concentration 10^{-3} g/l resulted absorbance value 0.20 at λ_{max} 510 nm using 1.0 cell. Calculate its absorptivity and molar absorptivity values. Molecular weight of compound is 400.
- What is electrochemical corrosion? Write down the mechanism involved in electrochemical corrosion. Calculate the amount of rust ($Fe_2O_3 \cdot 3H_2O$) formed by complete rusting of 1 kg of iron.
- Describe the structure of graphite. How it acts as conductor of electricity. Show, how does the S_N^2 reaction give rise to inverted product while S_N^1 reaction gives a racemic mixture.
- Show, how does the S_N^2 reaction give rise to inverted product while S_N^1 reaction gives a racemic mixture.



**Attempt any two of the following questions:****2 x 15 = 30**

- 3 (i) What is biogas? How biogas is produced? With the help of diagram, explain Biogas Plant.
- (ii) What is potable water? What are its chemical requirements?
- 4 (i) What are bio degradable polymers? Discuss their applications?
- (ii) How do you prepare the following polymers? (a) Bakelite (b) Perspex (c) Cis-1,4-polyisoprene cross linked through non metal
- 5 (i) For a XY_2 bent molecule show various types of stretching and bending vibrations in IR
- (ii) Calculate temporary and total hardness of a water sample containing: Ca $(HCO_3)_2$ = 17.4 mg /lit, Mg $(HCO_3)_2$ = 9.3mg/lit, $CaSO_4$ = 12.6 mg/lit and $MgCl_2$ = 8.7 mg /lit.

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