



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 199103

Roll No.

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B. Tech.

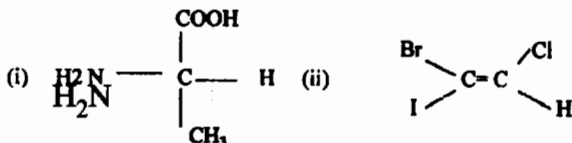
(SEM. I) (ODD SEM.) THEORY
EXAMINATION, 2014-15
ENGG. CHEMISTRY

Time : 3 Hours]

[Total Marks : 80

SECTION - A

1. Attempt any EIGHT Parts. 2x8=16
- (a) Calculate the density of NaCl which crystallizes in a fcc lattice with unit cell length of 0.4nm.
- (b) What is Ziegler Natta catalyst?
- (c) Write the two example of molecule which has optical activity without chiral carbon.
- (d) Assign R or S and E or Z configuration to the following compound:



- (e) Define isotactic and syndiotactic polymer.
- (f) Name the substrate and product name of Diels Alder reaction.

- (g) Why Cu gets deposited on iron nail immersed in copper sulphate solution?
- (h) What is the Principal of EDTA titration?
- (i) What is addition and condensation polymerization?
- (j) How many NMR signals obtained in $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ & $(\text{CH}_3)_2\text{CH}\cdot\text{CHO}$

SECTION - B

2 Attempt any THREE questions. 8x3=24

- (a) (i) Describe the different conformation of n-Butane with energy diagram.
- (ii) What do you understand Concentration cell, give the cell equation?
- (b) (i) What is meant by space lattice? Calculate the total no. of atom in Simple cubic, FCC & BCC.
- (ii) Calculate the density of compound if 200g of this compound contain 24×10^{23} atoms, edge length is 200pm. The compound having FCC geometry.
- (c) (i) What are elastomers? Explain the process of vulcanization.
- (ii) Give the preparation and use of BUNNA-S and butyl rubber. Distinguish between homopolymer and copolymer.
- (d) (i) In $(\text{CH}_3)_3\text{-Br}$ and $\text{CH}_3\text{-Br}$ which molecule undergo SN^1 and SN^2 process and which molecule gives inverted and which give mixture of products.
- (ii) What are enantiomers and diastereomers? Explain the optical isomerism of tartaric acid.

SECTION - C

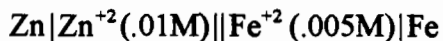
Note. Attempt all FIVE questions. Each question carries equal marks.

3. Attempt any One of the following: 8x5=40
- (a) Explain the mechanism of hydrogen evolution and oxygen absorption in electrochemical corrosion.
- (b) What are organometallic compounds? Explain their synthetic method and applications.
4. Attempt any One of the following:
- (a) Write a short on softening of water by Zeolite process.
- (b) Calculate the total badness of water containing 16.8 mg/L of $\text{Mg}(\text{HCO}_3)_2$, 19.0 mg/L of MgCl_2 , 24.0 mg/L of MgSO_4 and 22.0 mg/L CaCl_2
5. Attempt any One of the following:
- (a) What is biogas? Explain biogasification process with help of biogas plant.
- (b) Give the relation between NCV & GCV. The following data obtained in Bomb calorimeter:
- | | |
|---------------------------------|----------------|
| Weight of crucible | = 3.469gm |
| Weight of crucible+fuel | = 4.678gm |
| Water equivalent of calorimeter | = 570gm |
| Water taken in calorimeter | = 2200gm |
| Rise in temperature | = 2.3°C |
| Colling correction | = 0.047°C |
| Acid calorimeter | = 62.6°C |
| Fuse wire calorimeter | = 3.8 °C |
| Cotton thread calorimeter | = 1.6 calories |
- Calculate the GCV of fuel sample. If the fuel contains 6.5% H, determine the value of NCV.

6. Attempt any One of the following:
- (a) Write the mechanism and application of following reactions.
- (i) Beckmann Rearrangement reaction
 - (ii) Cannizzaro Reaction mechanism with suitable example
- (b) Explain the following polymers with their application
- (i) BAKELITE
 - (ii) PMMA
 - (iii) Nylon-66
 - (iv) PAN
 - (v) Polythene

7. Attempt any One of the following:

- (a) (i) Write the short note on Galvanic cell.
(ii) Calculate the Emf of cell



$$E^0(\text{Zn}|\text{Zn}^{+2}) = -0.763\text{v and } (\text{Fe}|\text{Fe}^{+2}) = -0.44\text{V}$$

- (b) Describe the various types of liquid crystals. Distinguish between nematic and smectic liquid crystals.
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