

Printed Pages : 4



EAS-102

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

**PAPER ID : 199108**

Roll No.

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### **B. Tech.**

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

Time : 3 Hours]

[Total Marks : 100

#### **SECTION - A**

1. Attempt **all** questions : **(10×2=20)**
- What is space lattice ?
  - What is invariant system ? Give an example of invariant system.
  - Differentiate between enantiomers and diastereomers
  - Differentiate between LDPE and HDPE.
  - What is Ziegler-Natta catalyst ?
  - What do you mean by caustic embrittlement ?
  - Define the term Bathochromic and Hypsochromic shift.
  - What are thermosetting polymers ?
  - Why should an ideal fuel have moderate ignition temperature ?
  - What is cathodic protection ?

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### SECTION - B

- 2 Attempt any **three** questions: **(3×10=30)**
- (a) (i) On the basis of band theory, differentiate between conductors, semiconductors and insulators.  
 (ii) Calculate density of BCC crystal. Side of cube is  $4A^\circ$  and  $M = 60$
- (b) What are the properties of a good fuel ? Define, High and low calorific values. A 0.8g sample of a solid fuel was completely combusted in the excess of oxygen using bomb calorimeter. The rise in temperature of water in calorimeter was  $2.5^\circ\text{C}$ . Calculate the High Calorific Value of the fuel. If water taken in calorimeter is 2000g and water equivalent of calorimeter is 2200g. Also calculate low calorific value. (Given; % H in fuel=2.2).
- (c) A compound has molecular formula  $\text{C}_2\text{H}_3\text{Cl}$ . It can show geometrical isomerism. The compound has two NMR-Signals. The splitting, under high resolution of NMR shows one doublet and one triplet. Identify the compound with the proper explanation.
- (d) Write the method of preparation and uses for of following polymers:  
 (i) Nylon-6 (ii) Nylon 6, 6 (iii) Nylon 6, 10 (iv) PMMA
- (e) What is elimination reaction ? Explain its reaction mechanism with an example.

### SECTION- C

- All questions are compulsory : **(10×5=50)**
- 1 Attempt any **two** of the following : **(5×2=10)**
- i) Derive Bragg's equation for diffraction of X-rays by a crystal. In Bragg's reflection of X-rays, a reflection was found  $30^\circ$  with lattice plane of spacing  $1.87A^\circ$ . If this is second order reflection, calculate the wavelength of X-rays.

- ii) Discuss properties and application of fullerene.
  - iii) Discuss in brief the classification and application of liquid crystal.
- 2** Attempt any **two** of the following : **(5×2=10)**
- i) Discuss the thermoplastic resins. Write the synthesis and applications of polystyrene and polyvinyl chloride.
  - ii) Equal number of molecules (say 10) with  $M_1 = 10,000$ , and  $M_2 = 100,000$  are mixed calculate  $M_n$  and  $M_w$ .
  - iii) How organometallics are being used for polymerization?
- 3** Attempt any **two** of the following : **(5×2=10)**
- i) By using appropriate example discuss and illustrate the stereochemical implication of  $SN^1$  and  $SN^2$  reaction.
  - ii) A solution shows a transmittance of 20% when taken in a cell of 2.5cm thickness. Calculate its concentration if the molar absorption coefficient is  $12,000 \text{ dm}^3 \text{ mol}^{-1} \text{ cm}^{-1}$
  - iii) What is optical activity? Give stereoisomer of tartaric acid. How do you account for lack of optical activity in meso form and racemic mixture?
- 4** Attempt any **two** of the following : **(5×2=10)**
- i) With the help of phase of phase diagram of water, calculate the degree of freedom at triple point.
  - ii) Explain the lime-soda process used for softening the hard water.

iii) A Standard hard water contain 15grams of  $\text{CaCO}_3$  per litre. 20 ml of this required 25ml of EDTA solution while 100ml of sample required 18ml of EDTA. The sample water after boiling required 12ml EDTA solution. Calculate the temporary hardness of the given sample expressed in terms of parts per million (ppm).

5 Attempt any **two** of the following; **(5×2=10)**

- i) What is corrosion? Explain electrochemical theory of corrosion.
  - ii) Write short note on Biogas and Biomass.
  - iii) What are lubricants? Give the classification of lubricants.
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