

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

**PAPER ID : 9914**

Roll No.

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### B.Tech.

FIRST SEMESTER EXAMINATION, 2006-07

### CHEMISTRY

Time : 3 Hours.

Total Marks : 100

**Note :** (i) Attempt **ALL** questions.

(ii) All questions carry equal marks.

(iii) Make suitable structures/fig. where required.

(iv) Be precise in your answer.

1. Attempt *any four* parts of the following : (5x4=20)

(a) Show molecular orbitals of H-F molecule with the help of diagram and calculate bond order.

(b) Write down a brief note on fullerenes and its applications.

(c) Calculate density of a BCC crystal. Side of cube is 4 Å and  $M=60$ .

(d) Derive Bragg's equation.

(e) With the help of Band Theory, explain conductors, insulators and semiconductors.

2. Attempt *any four* parts of the following : (5x4=20)

- (a) A compound has molecular formula  $C_2H_3Cl$ . 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 help of proper explanation.
- (b) With suitable examples differentiate isotactic, syndiotactic and atactic polymers.
- (c) What are Copolymers ? How does Buna-S differ from Buna-N ?
- (d) Show the chemical reactions for the formation of Nylon - 6 and Nylon - 66.
- (e) Describe in brief about conducting polymers with their applications.

3. Attempt *any two* parts of the following : (10x2=20)

- (a)
  - (i) What are carbonium ions ? Show hybridisation in carbocations and discuss stability of primary, secondary and tertiary carbonium ions.
  - (ii) Show, how does  $SN_2$  reactions give rise to inverted product ?
- (b) Define :
  - (i) Enantiomers and Diastereoisomers.
  - (ii) Which of the following compounds are optically active, and why ? n-propanol, allenes, n-butanol and 2-Chlorobutane.
- (c)
  - (i) What is E - Z system of nomenclature ? In what way it is better than cis, trans-nomenclature ?
  - (ii) Describe the mechanism of Cannizzaro's reaction.

