

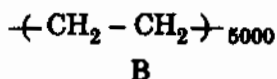
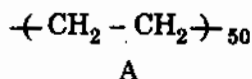
**FINAL YEAR B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2005****Part III—Group X—Polymer Chemistry****Paper V—POLYMER CHEMISTRY—I**

Time : Three Hours

Maximum : 60 Marks

**Section A***Answer either (a) or (b) of each question and each question carries 2 marks.*

- (a) What is sequence isomerism in Polymerization ?  
(b) Why does isotactic PP chain fold into a helical form ?
- (a) Distinguish plastics, rubbers and fibers in terms of modulus of elasticity.  
(b) Why is nylon salt first prepared for the manufacture of nylon 66 ?
- (a) Which of the following materials will be most suitable for the manufacture of sewage pipe ? Why ?



- (b) How do physical properties of polymers generally vary according to their average molecular weights ?
- (a) What are the disadvantages of the cryoscopic and ebullioscopic methods of determining the molecular weights when used for high molecular weight compounds ?  
(b) Draw molar mass distribution curve and show the regions where  $M_n$  and  $M_w$  occur and give their mutual relationship.
- (a) How is an initiator different from a catalyst ?  
(b) What is Trommsdorff effect ?
- (a) What is kinetic chain length ? What is its significance ?  
(b) What are the factors that determine the polymerization mechanism best suited for a monomer ?
- (a) How can you predict the gel point in step growth polymerization ?  
(b) If 0.52 moles of terephthalic acid are reacted with 0.50 moles of ethylene glycol, what is the degree of polymerization at 90 % reaction ?
- (a) How can you predict the copolymer nature on the basis of reactivity ratios ?  
(b) What is meant by Q-e scheme ?
- (a) What is the composition of natural rubber latex ?  
(b) What are the basic functions of nucleic acids ?
- (a) What is PTFE ? What are its outstanding characteristics ?  
(b) What is caprolactam ? What is it used for ?

(10 × 2 = 20 marks)

**Turn over**

**Section B**

*Answer either (a) or (b) of each question and each question carries 4 marks.*

11. (a) Distinguish thermoplastics and thermosets with examples. Where would you use thermosets ?  
(b) Briefly describe the main applications of silicon based polymers.
12. (a) Explain the kinetic features of free radical polymerization.  
(b) Briefly describe the significance of chain transfer reactions in free radical polymerizations.
13. (a) What are the salient features of cationic polymerization in comparison to free radical polymerization ?  
(b) What is DNA directed protein synthesis ?
14. (a) What is reclaimed rubber ? Explain briefly one method for its manufacture.  
(b) What are living polymers ? How are they manufactured ?
15. (a) What are the merits of natural rubber compared to synthetic rubbers ? What is coagulation ? How is it done ?  
(b) Compare the structure and properties of HDPE, LDPE and LLDPE.

(5 × 4 = 20 marks)

**Section C**

*Answer either (a) or (b) of each question and each question carries 10 marks.*

16. (a) Briefly explain the kinetics of free radical polymerization.  
(b) What are the different techniques of polymerization ? Describe any one with a specific example.
17. (a) What are engineering plastics ? Describe the manufacture, properties and applications of any one engineering plastic.  
(b) Briefly explain the principle of determining the molecular weight of Polymers by the light scattering technique.

(2 × 10 = 20 marks)