



NATIONAL OPEN UNIVERSITY OF NIGERIA
14/16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS

SCHOOL OF SCIENCE AND TECHNOLOGY
OCTOBER 2013 EXAMINATION

Course Code: CHM 302

Course Title: Polymer Chemistry 1

Time Allowed: 2 Hours

INSTRUCTION: Answer any four Questions

1.
 - a) i. Discuss each of the following: Elastomers, Fibers, Thermosetting.
(7½ marks)
 - ii. Give 5 differences between addition and condensation polymerization.
(5 marks)
 - b) Name the various types of synthetic rubber. (5 marks)
2.
 - a) What are Cross-linked polymers? (2½ marks)
 - b) i. Classify and explain briefly polymers based on their stereochemistry.
(5 marks)
 - ii. Outline the established methods of producing polyethylene.
(5 marks)
 - c) Discuss the Effect of polarity on solubility of Polymers.
(5 marks)
3.
 - a) Discuss the 3 basic mechanisms by which addition- chain growth polymerization can occur. (6 marks)
 - i. What are condensation polymers and give 3 examples. (3 marks)
 - b) Discuss the effect of temperature and pressure respectively on the solubility of polymers. (6 marks)
 - ii. The structures of polymers and their functions depend on the following factors. List all of these factors. (2½marks)
4.
 - a) List and explain briefly the different types copolymers based on the arrangements of the two monomers. (6 marks)
 - b) Explain the mechanism of the Ziegler-Natta process for substituted ethylenes.
(3 marks)
 - c) Discuss on the Applications of polymer solubility. (4½ marks)
 - d) On which factors does the solubility of polymers depend? (4 marks)
5.
 - a) Discuss on the following properties of polymers: (10 marks)
 - i. Tensile strength
 - ii. Young's modulus
 - iii. Glass transition temperature
 - iv. Melting point
 - b) Explain the following: (7½ marks)

- i. Recycling of polymers
- ii. Chlorine attack (acetal resin plumbing joints)
- iii. Biodegradations in polymers

6.

- a) Describe briefly the 3 stages by which addition chain growth polymerization mechanisms occur. (6 marks)
- b) Differentiate between natural and synthetic rubber.
(4 marks)
- c) Mention any 4 guidelines to be taken into cognizance in designing synthetic polymerization reactions to produce the desired products.
(4 marks)
- d) Explain the Ozone cracking in natural rubber tubing.
(3½marks)

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