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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**MARCH/APRIL 2015 EXAMINATION**

**COURSE CODE: CHM 302**

**COURSE TITLE: Polymer Chemistry I**

**Time: 2 Hours**

**INSTRUCTION: Answer any Four Questions**

1. A. Write short notes on the following: (2½ marks each)
2. Elastomers
3. Fibers
4. Resins
5. Thermosetting

B. i List the Eight guidelines taken into cognizance in the production of the appropriate. (4 marks)

ii Write short note on Addition Polymerization reaction. (3½ marks)

1. A i. Explain the formation of Thermoplastic. ( 5 marks)

ii. Write the reaction showing the formation of Nylon (polyamide) and Dacron (polyester). (7½ marks)

B i. State and explain the three stages that occur in the mechanism of Addition polymerization reaction. (3 marks)

 ii. List any four patterns by which Addition Polymerization can occur. (2 marks)

1. A. In each of the under listed addition chain growth reactions below, outline the causes of the following terms-

 i. Termination of the Cationic Addition- Chain growth reaction (3marks)

 ii. Termination of the Anionic Chain growth reaction (3 marks)

 iii. Termination of the Radical Chain growth reaction (3 marks)

 B. i Explain the Effect of Temperature on Solubility. (4 marks)

 ii. Write short notes on the following: (4½ marks)

* Statistical copolymer
* Grafted copolymer
* Block copolymer
1. A. i Define the Partition Coefficient. (1 mark)

ii Enumerate the term Crosslinking in Polymers. (6 marks)

B. i State five starting materials from chemical industry and its use in polymer production. (5 marks)

iiClassify polymers based on their stereochemistry. (3 marks)

iii Explain the Phillips process in the production of Polyethylene. (2½ marks)

1. A. Enumerate the following addition polymerization reaction: (15 marks)
* Radical addition chain growth polymerization
* Cationic addition chain growth polymerization
* Anionic addition chain growth polymerization

 B. Outline five major contributions of John Wesley Hyatt in Polymer. (2½ marks)

1. A. Write short notes on the following physical properties of Polymers: (9½ marks)
* Melting Point (3 marks)
* Boiling Point ( 3 marks)
* Biodegradation in Polymers (3½ marks)

 B. Elucidate the Chemical properties of Polymers. (8 marks)