



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE AND APPLIED SCIENCE
SEPTEMBER 2020_1 EXAMINATION

COURSE CODE: CHM408

COURSE TITLE: Polymer Chemistry II

CREDIT: 2 Units

TIME ALLOWED: 2 Hours

INSTRUCTION: Answer Question ONE (1) and any other Three (3).

- Q1. a) What is Polymerization? Hence, list two types of polymerization. **(4 marks)**
- b) (i) Briefly explain ionic Polymerization **(3 marks)**
(ii) Define the following mechanical properties of polymer:
Compressive strength and impact strength **(2 marks)**
- c) (i) Briefly explain polymer stereochemistry **(3 marks)**
(ii) Mention two applications of natural rubber **(2 marks)**
- d) (i) List the different types of copolymers **(2 marks)**
(ii) Define thermoplastic polymers **(3 marks)**
- e) Define polymer degradation **(3 marks)**
- f) List three physical properties of a polymer that can be identified by Differential scanning calorimetry. **(3 marks)**
- Q2. a) Give five characteristics of addition polymerization? **(5 marks)**
- b) Using chemical equation, describe condensation polymerization. **(4 marks)**
- c) Outline four types of polymer isomerism and explain any one. **(6 marks)**
- Q3. a) Describe the solution process when a polymer is added to a solvent **(5 marks)**
- b) Give Gibb's thermodynamic equation for describing a given system, defining each term. **(4 marks)**
- c) Mention at least three applications each of thermoplastic and thermosetting polymers. **(6 marks)**

Q4. a) Enumerate six benefits of polyurethane.

(6 marks)

b) List nine applications of polyurethane.

(9 marks)

Q5. a) Describe the term “phase equilibrium” in polymeric solutions.

(7 marks)

b) List the five factors that affect dissolution of polymers based on their chemical structures and explain one of the factors.

(8 marks)