



NATIONAL OPEN UNIVERSITY OF NIGERIA
DEPARTMENT OF CHEMISTRY
2023_1 EXAMINATIONS

COURSE CODE: CHM408

COURSE TITLE: POLYMER CHEMISTRY

INSTRUCTION: *Answer question 1 and any other 2 questions*

CREDIT UNIT: 2
TIME: 2 HRS

1. (a) What can you do as a chemist to control the way polymers go through Free Radicals Polymerization? 4½ marks
(b) Write a balanced equation for the polymerization of acrylonitrile. 3 marks
(c) Give four (4) examples of polymers that undergo anionic polymerization. 4marks
(d) Briefly explain the term "Polymer Solubility". 6 marks
(e) List the chemical properties of Polymers that determines its solubility. 5marks
(f) State the main cause of premature cracking. 3½ marks
(g) Highlight the factors that photolytic degradation depends on. 4marks
2. (a) What ranges of compounds may serve as an initiator in an anionic polymerization? 8 marks
(b) Which of the initiators in question 2 (a) is the most commercially used, give its structure and explain briefly how it is applied. 12 marks
3. (a) Discuss the cationic polymerization of olefin monomers. 9 marks
(b) Write on the use of classical protonic acids as initiators of cationic polymerization. 11 marks
4. (a) Outline five advantages of copolymerization (5 marks)
(b) Compare and contrast the phase attributes of polymer solutions to small molecule solutions in terms of miscibility. 15marks
5. Write on the application (with examples where necessary) of the following in Polymer analysis:
 - I. IR Spectroscopy 14 ½ marks
 - II. NMR Spectroscopy 5 ½ marks