

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCES**

**FEBRUARY/MARCH2018 EXAMINATION**

**COURSE CODE: CHM 302**

**COURSE TITLE: POLYMER CHEMISTRY 1**

**TIME: 2 HOURS**

**INSTRUCTION: Question one is compulsory. Answer question one and**

**any other three questions.**

**QUESTIONONE**

1ai)Polymers are macromolecule while all macromolecules are not polymers. Explain.

3 marks

1aii) Enumerate on the classes of polymers.11 marks

1b) Expatiate on condensation polymerization.5marks

1c) Account for the principle of liquid crystal nature of polymers.3 marks

1d) Explain briefly crystallinity in polymers.3 marks

**QUESTION TWO**

2a**)** Write short note on addition polymerization including the mechanism of its formation.

15 marks

**QUESTION THREE**

3a).How do the arrangements of molecules within a polymer and link between molecular chains in a polymer determine the properties, shapes and uses of the following:

i. Thermosets

ii.Thermoplastics

 12 marks

3b) Will cross-links be possible in polyalkanes ? Give reason for your answer.

3 marks

**QUESTION FOUR**

Enumerate on the effect of chain length on the physical properties of polymers.

9 marks

Highlight the main differences between elastomers and fibers.6 marks

**QUESTION FIVE**

5a) Write short notes on the following types of linkages in polymers;

i. Linear alternating copolymers

ii Random or statistical copolymers

iii Block copolymers

11 marks

5b) Complete the following polymerization reactions;

1. nCH2= CH2O2 initiator 2 marks

1500atm, 20000C

1. HOOC[CH2]4COOH + H2N[CH2]6NH2-2H2O2 marks