



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
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**JABI - ABUJA.**  
**FACULTY OF SCIENCES**  
**DEPARTMENT OF PURE AND APPLIED SCIENCE**  
**2025\_2 EXAMINATIONS.**

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COURSE CODE: CHM 302

COURSE TITLE: POLYMER CHEMISTRY 1

COURSE UNIT: 2

TIME: 2 HOURS

INSTRUCTION: Answer question one and any other two questions.

**QUESTION ONE**

- ai. Define the term polymers (1 mark).
- ii. Distinguish between natural and synthetic polymers using suitable examples. (4 marks)
- bi. What is polymerization? (1 mark)
- ii. Briefly describe the two main types of polymerization processes. (4 marks)
- c i. What are biopolymers? (2 marks)
- cii. Mention any four (4) naturally-occurring polymers (1 mark each=4 marks).
- d. Mention four (4) polymer products used daily by humans (4 marks)
- e. State the main source of raw materials for production of polymers (2 marks).
- fi. What is the role of a catalyst in polymerization reactions? (1 mark per point x 3 =3 marks)
- ii. Give an example of a catalyst used in polymerization. (2 marks)
- g. Name the three (3) common stages of polymerisation (3 marks)

**QUESTION TWO**

2a. Distinguish between plastic polymers and thermoplastic polymers? (4 marks)

b. Complete the Table below (14 marks)

Polymer	Abbreviation	Recycling number	Examples of Plastic Material
Polyethylene terephthalate			
High density polyethylene			
Polyvinylchloride [PVC]			
Low density polyethylene			
Polypropylene			
Polystyrene			
For all other plastics			

c. Draw the chemical structure of Nylon-6,6 (2 marks)

**QUESTION THREE**

Define the term "raw materials" in the context of polymer production. (4 marks)

Write brief notes on Natural Rubber and Cellulose as two natural sources of raw materials used in polymer production. (4 marks)

Discuss the environmental implications of sourcing raw materials for polymers from non-renewable versus renewable sources. (12 marks)

#### QUESTION FOUR

Write short notes on Fibers ii. Resins iii. Elastomers (15 marks)

Describe a cross-linked polymer (4 marks)

The chemical process by which the physical properties of natural or synthetic rubber are improved is referred to as \_\_\_\_\_ (1 mark)

#### QUESTION FIVE

Distinguish between step-growth and chain-growth polymerization. (4 marks)

Discuss the mechanism of free radical polymerization, including the stages of initiation, propagation, and termination. (12 marks)

Give examples of monomers that undergo this type of polymerization (4 marks)