



**NATIONAL OPEN UNIVERSITY OF NIGERIA PLOT 91, CADASTRAL ZONE,
NNAMDI AZIKIWE EXPRESSWAY, JABI – ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2022_1 EXAMINATION.**

COURSE CODE: CHM 409




COURSE TITLE: POLYMER CHEMISTRY

COURSE UNIT: 2

INSTRUCTION: Answer question 1 and any other two questions

Time : 2 hours

QUESTION 1

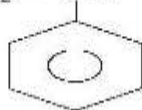
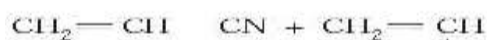
1. (a) Highlight any **five (5)** factors that affect solubility of a polymer in a solvent **(10 marks)**
(b) (i) Give five (5) examples of fibre forming polymers **(5 marks)**
(ii) What is the molecular weight of polystyrene (PS), with a degree of polymerization of 3×10^4 ? **(9 marks)**
(c) Give the names of the polymers with the following recycling identification codes
(i)  **(2 marks)** (ii)  **(2 marks)** (iii)  **(2 marks)**

QUESTION 2

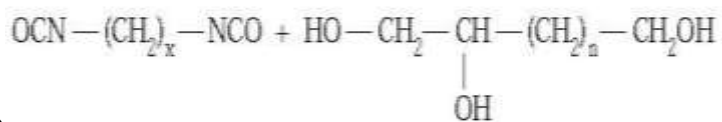
2. Discuss briefly the following properties of polymers:
(a) Mechanical **(5 marks)**
(b) Tensile strength **(5 marks)**
(c) Young's modulus **(5 marks)**
(d) Transport **(5 marks)**

QUESTION 3

3. Show the polymer formed by the reaction of the following monomers. Is the resulting polymer linear or branched/cross-linked?



- (a) **(8 marks)**



(b)

(8 marks)

(c) Define Thermoset. Give one example. **(4 marks)**

QUESTION 4

4. (a) Discuss any three (3) established methods for producing Polyethylene **(15 marks)**
 (b) Which of the methods discussed in (a) above will you prefer as an industrialist to produce polythene? Justify your answer **(5 marks)**

QUESTION 5

5. (a) (i) What is degradation of polymer? **(3 marks)**
 (ii) Mention any four (4) factors that can affect the degradation of polymer. **(8 marks)**
 (b) Give the significant contributions and discoveries made by the following scientists in Polymer Chemistry;
 (i) Hermann Staudinger **(3 marks)** (ii) Louis Chardonnet **(3 marks)** (iii) Alexander Parkes **(3 marks)**