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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**University Village, NnamdiAzikiwe Expressway, Plot 91, Cadastral Zone, Jabi, Abuja**

**FACULTY OF SCIENCE**

**JULY 2017 EXAMINATION(POP)**

**COURSE CODE: CHM 408**

**COURSE TITLE: POLYMER CHEMISTRY**

**COURSE UNIT: 2 Units**

**TIME: 2 hours**

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

**Question 1**

a) Describe any five simple identification tests for polymer. (***12 marks)***

b) Write short notes on the following basic thermodynamic parameters: Enthalpy, Entropy and Gibbs’ free energy. ***4marks***

c) Give a formula that connects these parameters together. **(1 mark)**

***d)*** Explainthe effects of each of the following on

polymer solubility:

i) polarity ii) cross linking iii) molecular weight iv)branching

(2 marks each = **8 marks**)

**Question 2**

1. **Give a detailed explanation of copolymerization. ( 4 marks)**
2. **Mention the benefits of copolymerization ( 5 marks)**
3. **List and discuss the different types of copolymers. ( 6 marks)**

**Question 3**

a) List and explain six properties of thermoplastics that distinguish them from thermosetting

bpolymers 6 MARKS

b) Enumerate five agents of degradation and likely susceptible polymers. **(5 marks)**

c).i. Explain with illustrations the meaning of polymer degradation.

ii. List the different types of polymer degradation you know. **(2 Marks each; 4 marks)**

**Question 4**

a) Discuss in detail each of the following types of isomerism:

i) Orientational isomerism. **(3marks)**

ii) Geometrical isomerism. **(3marks)**

iii) Structural isomerism. **(3marks)**

b) Differentiate between tactic and atactic polymers. **(4 ½ marks)**

5a) List any five instrumental techniques for polymer analysis. (5 marks)

5b) Discuss the five instrumental techniques for polymer analysis listed in (5a) above.(10 marks)