NATIONAL OPEN UNIVERSITY OF NIGERIA
14/16, Ahmadu Bello Way, Victoria Island

SCHOOL OF SCIENCE AND TECHNOLOGY
October, 2013 Examination

COURSE CODE: CHM408

COURSE TITLE: POLYMER CHEMISTRY

Duration: 2 hrs

Answer only four questions (each question carriers a total 17 $\frac{1}{2}$ marks)

Question 1

a) Define the term Polymer. Give five examples of addition polymer.
(**7** $\frac{1}{2}$ marks)

b) Differentiate between condensation polymers and addition polymers.
(10 marks)

Question 2

a) Discuss in detail each of the following isomerism:

i) Orientational isomerism. (3 $\frac{1}{2}$ marks)

ii) Geometrical isomerism. (3 $\frac{1}{2}$ marks)

iii) Structural isomerism. (3 $\frac{1}{2}$ marks)

b) Differentiate between tactic and atactic polymers.
(7marks)

Question 3

a) List and explain the types of copolymers that you know. Give examples.
(8 $\frac{1}{2}$ marks)

b) State any five advantages of copolymerization.
(10marks)

Question 4

a) List and explain the types of polymer solvents.
(6 marks)

b) Discuss the solution process which occurs when a polymer is added to a solvent. (5 $\frac{1}{2}$ marks)

c) Explain how the following affects polymer solubility:
i) polarity ii) cross linking iii) molecular weight iv) branching
(8 marks)

Question 5

a) Enumerate seven differences between thermoplastic and thermosets (7 marks)

b) Outline the relevance of chromatography in the polymer industry (6 marks)

c) State three physical properties of polymer that can be identify by the following techniques:

i) infrared/FTIR ii) thermomechanical analysis iii X-ray ($4\frac{1}{2}$ marks)

Question 6

a) Discuss in detail the mechanical properties of polymers. (5 marks)

b) Enumerate five agents of degradation and likely susceptible polymers. ($7\frac{1}{2}$ marks)

c) Define polymer degradation and enumerate the types of polymer degradation. (5 marks)