

BOWEN UNIVERSITY, IWO, OSUN STATE
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
INDUSTRIAL CHEMISTRY PROGRAMME
2022/2023 B.SC DEGREE SECOND SEMESTER EXAMINATION

Course Code: CHM 232 Courses Title: Macromolecular Chemistry I Credit: 2

Date: 20/06/2023

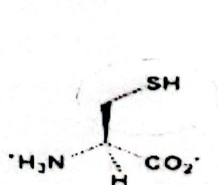
Time Allowed: 2 hours

INSTRUCTIONS: Answer **FOUR** questions in all. **TWO** from Each Section
Each question carries **equal** marks
Answer each **MAIN** question on a fresh page

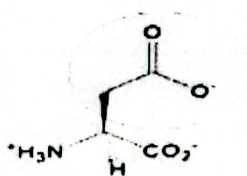
SECTION A

Question 1

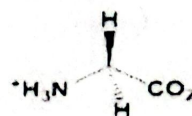
- a. i. Give a concise definition of macromolecules? 2 marks
 ii. Give the structural representation of an alpha amino acid and indicate the various functional groups present. 3 marks
- b. Briefly explain the formation of peptide bonds in proteins. 8 marks
- c. i. There are a total of 20 alpha amino acids that are commonly incorporated into protein structures, classified according to their solubility and their functional groups. Hence the identity and function of a peptide or a protein is determined by the primary sequence of amino acids within its structure. With this information, state the number and names of classes they are grouped into. 3 marks
 ii. Consider the amino acids listed below and match each of them with a particular class. 4 marks



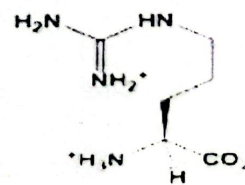
i.



ii.



iii.



iv.

Question 2

- a. What is polymerization? 2 marks
- b. State the various stages involved in the polymerization process. 3 marks
- c. Write briefly on copolymers. 7 marks
- d. Give a concise account of addition and condensation polymerization. 8 marks

Question 3

- a. Enumerate the various methods of determining the molecular weight of macromolecules 4 marks
- b. List three types of proteins and state their functions in biological systems. 6 marks
- c. Differentiate between oligopeptide and polypeptide. 4 marks
- d. Write a short note on the molecular weight determination of macromolecules. 6 marks

SECTION B

QUESTION THREE

- a. What is crystallinity and what are the properties of highly crystalline polymers? 5 marks
- b. How do these factors affect crystallinity? 6 marks
 - i. Regularity of the chain
 - ii. Molecular weight
 - iii. Presence of secondary forces
- c. Briefly explain three major groups of macromolecules that are essential in the industry apart from biological macromolecules. 9 marks

QUESTION FOUR

- a. List the methods for determining percentage crystallinity. 3 marks
- b. Define crystallinity index and explain how it can be measured. 6 marks
- c. Mention factors responsible for a polymer's tendency to have order and form crystallites. 3 marks
- d. Explain the correlation between crystallinity and density of polymers. 3 marks
- e. What is glass transition temperature and how does it affect pure crystalline polymers? 5 marks

QUESTION FIVE

- a. Mention the natural macromolecules and their monomers. 8 marks
- b. Indicate the bond/linkage for each of the macromolecules in 'a'. 4 marks
- c. Give the function(s) of each macromolecule in the body. 8 marks