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**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**SECOND YEAR SECOND SEMESTER
MAIN EXAMINATIONS**

FOR THE DEGREE OF BSC (CHEMISTRY)

COURSE CODE: SCH 223

COURSE TITLE: BIOCHEMISTRY

DATE: 25/04/2023

TIME: 2:00-4:00PM

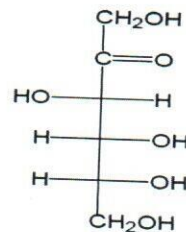
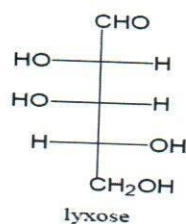
INSTRUCTIONS TO CANDIDATES:

TIME: 2 Hours

Answer question ONE and any TWO of the remaining

QUESTION ONE [30 MARKS]

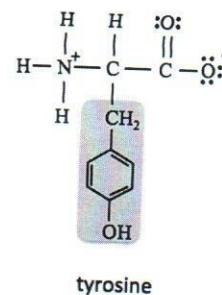
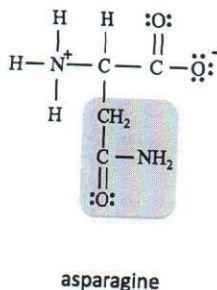
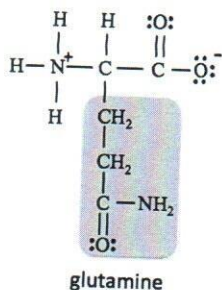
- a. Outline three properties of biomacromolecules: (3 marks)
- b. Giving an example in each case differentiate the following terms: (4 marks)
- i. Saturated and monounsaturated fatty acids ii. Isomerases and ligases
- c. Define the following terms (5 marks)
- i. Stereogenic center ii. Anomeric carbon iii. Anomers iv. Levorotatory substance
- v. Biochemistry
- d. Draw the Fischer and Harwoth projections (4 marks)
- i. α -D-glucose ii. β -D-glucose
- e. Glyceraldehyde is an aldotriose, draw and label the Fischer projection of D and L forms
- f i. Identify the following compounds as D or L isomers (4 marks)



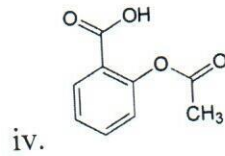
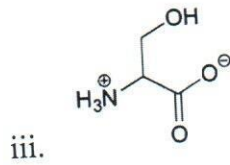
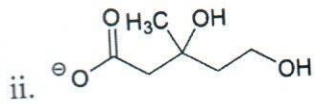
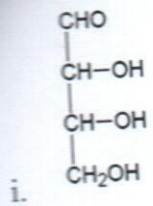
- ii. Draw the mirror images of the sugars in (i) above (2 marks)
- iii. Calculate the number isomers that both lyxose and fructose will have (4 marks)
- g. Name two forms of starch (2 marks)

QUESTION TWO [20 MARKS]

- a. Name two examples of waxes (2 marks)
- b. State two functions of lipids (2 marks)
- c. A student was asked to separate the following proteins using gel filtration chromatography. Giving an explanation, indicate the order of elution. (4 marks)



- d. What do you understand by Isocratic and Gradient elution? (6 marks)
- e. Identify the chiral carbons by putting an asterick (*) against it in the following molecules. (6 marks)



QUESTION THREE [20 MARKS]

- a. Draw and name four nonpolar amino acids giving their short names abbreviation (8 marks)
- b. Name and discuss the two interactions in protein structure (6 marks)
- Hydrophobic Interactions
 - Hydrogen Bonding
- c. A student was provided with a mixture of proteins. Briefly explain how he could use differential precipitation to separate the protein mixture. (6 marks)

QUESTION FOUR [20 MARKS]

- a. With the aid of graphs, discuss the factors affecting enzyme activity (10 marks)
- b. Discuss the role of cell lysis and enzymatic treatment during isolation of nucleic acids. (2 marks)
- Cell lysis: (2 marks)
 - Enzymatic treatment: (2 marks)
- c. Explain and illustrate the difference between a glycosidic bond, peptide bond and a phosphodiester bond (6 marks)

QUESTION FIVE (20 MARKS)

Discuss fatty acid metabolism