



CRAWFORD UNIVERSITY
COLLEGE OF NATURAL AND APPLIED SCIENCES
DEPARTMENT OF INDUSTRIAL CHEMISTRY
RAIN SEMESTER EXAMINATION 2020/2021

COURSE CODE: CHM 456

COURSE TITLE: CHEMISTRY OF MACROMOLECULES

UNITS: 2

TIME ALLOWED: 2Hrs

DATE: JULY, 2021

INSTRUCTIONS: Answer three (3) Questions from section A and 1 from section B

SECTION A

Q1a. Amino acids are amphoteric; since they can react with both acids and bases, use appropriate reactions to illustrate this unique property of amino acids **5 mks**

b. Using appropriate examples, differentiate between a primary and secondary α amino acids **4mks**

c. Briefly describe three important polysaccharides that are made of glucose units **6 mks**

Q2a. The amino acid threonine (2S, 3R) – 2- amino-3-hydroxybutanoic and has two chirality centres

(i). Draw Fischer projection of threonine **2 mks**

(ii). Draw a Fischer projection of threonine diastereomer and label its chirality centre as R or S. **3 mks**

b. Show how you would prepare the following α amino acids from the appropriate carboxylic acids **10 mks**

(i). Phenylalanine (ii) Valine

Q3a. Discuss any two methods of amino acid synthesis **10 mks**

b. Draw the structure of M-P-V-G and indicate the amide bonds therein **5 mks**

Q4a. Briefly explain the concept of Edman degradation in relation to peptide sequencing **5 mks**

b. Write all the five steps required for the synthesis of Leu – Ala from alanine and leucine **10mks**

SECTION B

Q5a. Write the saponification reaction of glyceryl dioleatemonopalmitate with aqueous NaOH **5 mks**

b. Using glyceraldehyde, differentiate between D and L notation **5 mks**

c. Using 2-butanol, differentiate between S and R configurations **5 mks**

Q6a. With the aid of appropriate diagram, differentiate between Fischer and Haworth Projection **5 mks**

b. Briefly discuss the effects of oxidizing and reducing agents on monosaccharides **4mks**

c. Name any three each of monosaccharides and disaccharides with their corresponding structural diagrams. **6 mks**