



KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

FORTH YEAR FIRST SEMESTER
SPECIAL/SUPPLIMENTARY EXAMINATIONS

FOR THE DEGREE OF BSC (CHEMISTRY)

COURSE CODE: SCH 433E

COURSE TITLE: CHEMISTRY OF CARBOHYDRATES

DATE: 10/02/2021

TIME: 2-4 Pm

INSTRUCTIONS TO CANDIDATES:

TIME: 2 Hours

Answer question ONE and any TWO of the remaining

KIBU observes ZERO tolerance to examination cheating

QUESTION 1 (30 MARKS)

a) State five biological importance of carbohydrates(5 marks)

b) Define the following terms

(5 marks)

- i) Anomeric carbon ii) Stereogenic center iii) A dextrorotatory substance iv) Raffinose
v) Ketopentose

c) Giving an example in each case differentiate the following terms

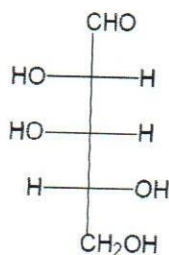
i) Oligosaccharides and polysaccharides(2 marks)

ii) Amylose and amylopectin(2 marks)

iii) Fischer Projection and Haworth projection(2 marks)

d) Draw and name the Fischer projections of D- glyceraldehyde and L- glyceraldehyde. (4 marks)

e) Carefully study the structure of lyxose below and answer the questions that follow.



i) Identify whether compound is a D or L isomer. (1 mark)

ii) Draw mirror image of the compound and indicate whether it is a D or L isomer (1 mark)

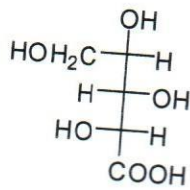
iii) How many isomers will the compound above have? (2 marks)

iv) In which direction will the mirror image of lyxose drawn above rotate plane polarised light? Explain. (2 marks)

f) Discuss at least two chemical properties of monosaccharides (4 marks)

QUESTION 2 (20 MARKS)

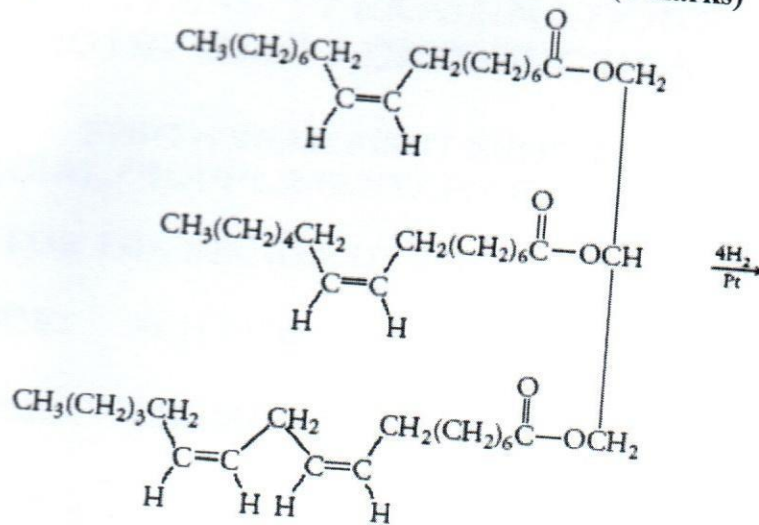
a) Determine whether the following carbohydrate derivative has a D or L configuration (4 marks)



bi) Outline the similarities between amylose and amylopectin. (3 marks)

ii) State their structural differences with the aid of a diagram show this concept. (9 marks)

c) Unsaturated triglyceride is converted to a saturated triglyceride by reaction with hydrogen in the presence of a catalyst. Draw and explain why the structures of the product formed when H₂ was in limited supply and when it was excess are different. (4 marks)



QUESTION 3 (20 MARKS)

a) Draw the Haworth projections and chair conformation of an β -D-glucose. (2 marks)

b) Discuss maillard reaction in carbohydrates (3 marks)

c) Sugar can be substituted in manufacturing industries. Draw and discuss three of this substitutes available in the market today (15 marks)

QUESTION 4 (20 MARKS)

a) Discuss digestion and absorption of carbohydrates, including the actions of carbohydrate digestive enzymes (17 marks)

b) Differentiate between glycemic response and glycemic index (2 marks)

c) State two factors that affect carbohydrate absorption

(1 mark)