

CHUKA



UNIVERSITY

SUPPLEMENTARY / SPECIAL EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF BACHELOR OF SCIENCE

CHEM 103: GENERAL ORGANIC CHEMISTRY

STREAMS: BSC (Agricultural education and extension, Agricultural economics, Agriculture, Food science and technology, Environmental science, Natural resources, Wildlife enterprise & management, Animal science and Horticulture)

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 18/11/2020

8.30 A.M - 10.30 A.M.

INSTRUCTIONS:

- Answer all questions

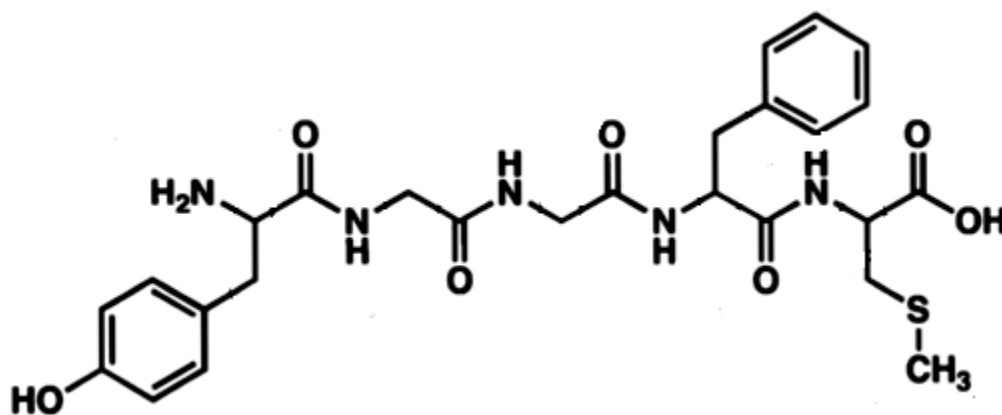
QUESTION ONE (30 MARKS)

- a) Draw the structures of the following compounds (10 marks)
- i. 3-ethyloctane
 - ii. 2,3-dimethyl-4-propylnonane
 - iii. 2,2,4,4-tetramethylhexane
 - iv. *trans*-1,3-diethylcyclopentane
 - v. *cis*-1-ethyl-4-methylcyclohexane
 - vi. 1-Hexanamine
 - vii. 2,3-Dimethylbut-2-ene
 - viii. 3-Ethyl-3-methylpent-1-yne
 - ix. 3-Methylbutanal
 - x. 2-Methylpropan-1-ol
 - xi. 5-Methyl-3-hexanone
- b) Ignoring compounds with double bonds write structural formulas and give names for all of the isomers with the formula C_5H_{12} . (4 marks)
- c) State 4 physical properties of alkanes (4 marks)

- d) Give the mechanism of reaction when methane reacts with chlorine in presence of light showing initiation, propagation and termination steps (6 marks)
- e) Given ethane and ethene, state the compound that is more soluble than the other in water and give an explanation for your answer. (3 marks)
- f) Give three uses of alkenes (3 marks)

QUESTION TWO (20 MARKS)

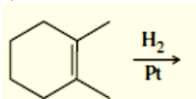
- a) Describe with the aid of suitable examples, the synthesis of alkanes from alkenes, stating the required conditions (4 marks)
- b) State two sources of alkanes (2 marks)
- c) Explain 4 chemical reactions of alkenes (8 marks)
- d) Met-enkephalin, an endorphin, serves as a natural pain reliever that changes or removes the perception of nerve signals. Label all the functional groups present in Met-enkephalin structure shown below. (6 marks)

**QUESTION THREE (20 MARKS)**

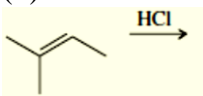
- a) For each of the following pair of compounds, predict the one with a higher boiling point. Justify your answers. (4 marks)
- Cis-1,2-dichloroethene or cis-1,2-dibromoethene
 - Cis or trans-2,3-dichlorobut-2-ene

- b) Briefly explain how you can distinguish between primary, secondary and tertiary alcohols. (6 marks)
- c) Write structures for the major organic products from the following reactions (10 marks)

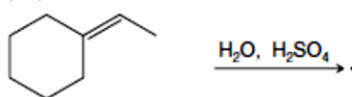
i)



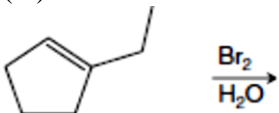
(ii)



(iii)



(vi)



(v)

