

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

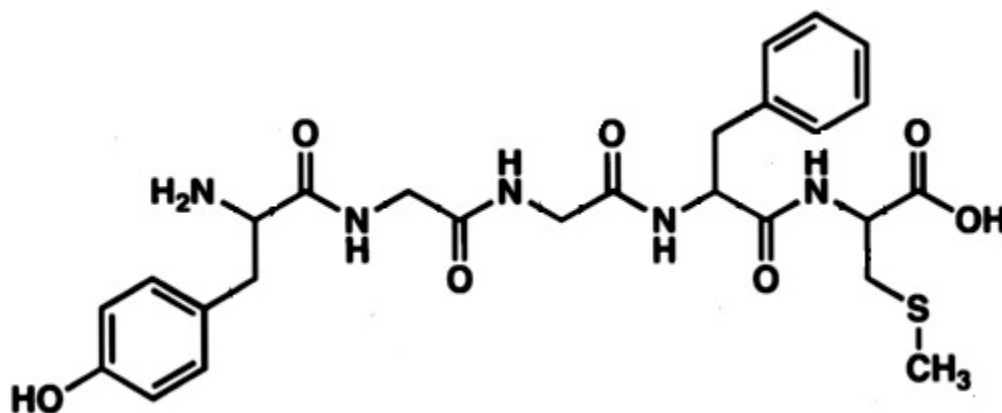
## QUESTION ONE (30 MARKS)

- 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)

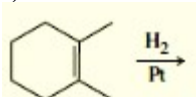
**QUESTION THREE (20 MARKS)**

- 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

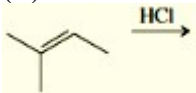
b) Briefly explain how you can distinguish between primary, secondary and tertiary alcohols. (6 marks)

c) Write structures for the major organic products from the following reactions (10 marks)

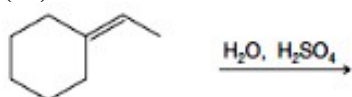
i)



(ii)



(iii)



(vi)



(v)

