

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATION**

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

CHEM 334: ORGANIC CHEMISTRY IV

STREAMS: BSC

TIME: 2 HOURS

DAY/DATE: FRIDAY 05/11/2021

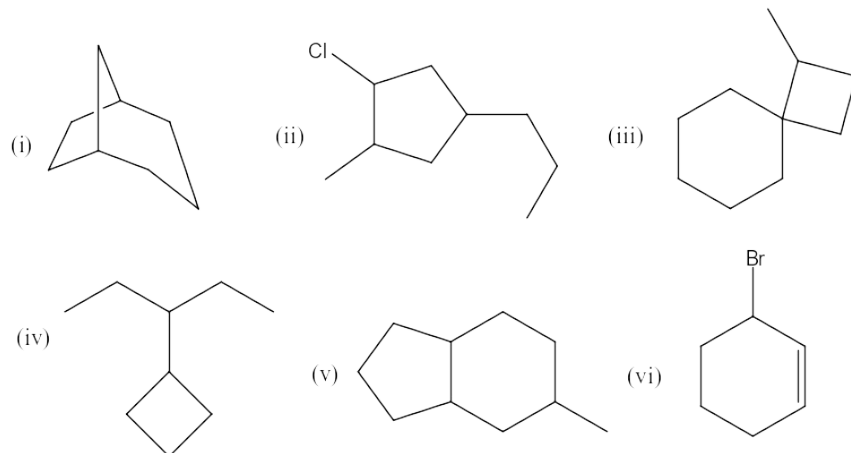
11.30 A.M – 1.30 P.M.

INSTRUCTIONS:

- Answer question **One** (Compulsory) and any other **Two** questions.

QUESTION ONE [30 MARKS]

(a) Write the substitutive IUPAC name of each of the following compounds (**6 marks**)



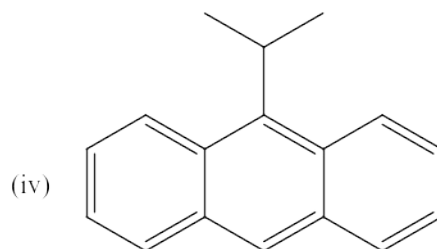
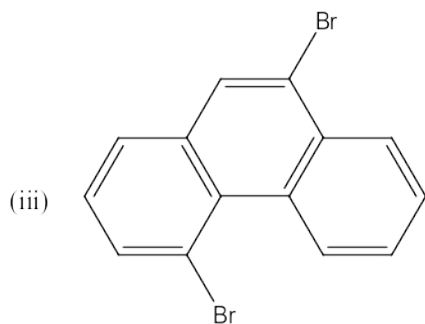
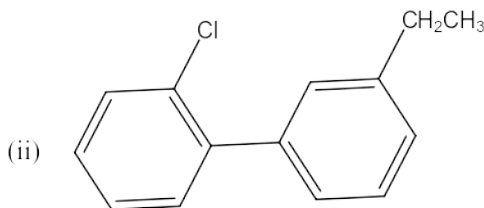
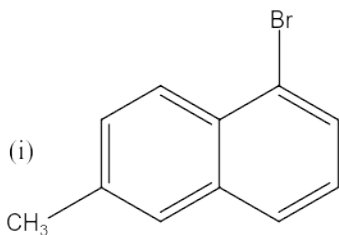
(b) Write the structure of major organic product(s) of the reaction of cyclopropane with the following reagents (**4 marks**)

(i) $\text{Cl}_2, \text{FeCl}_3$ (ii) $\text{Conc. H}_2\text{SO}_4$ (iii) $\text{Ni, H}_2, 80^\circ\text{C}$ (iv) $\text{Cl}_2, h\nu$

(c) Describe, with the aid of suitable examples, three methods that can be used to synthesize cyclopentane and its derivatives **(4½ marks)**

(d) Describe, with the aid of suitable examples, three methods that can be used to synthesize cyclohexane and its derivatives **(4½ marks)**

(e) Write the substitutive IUPAC name of each of the following compounds **(4 marks)**



(f) Describe, with the aid of suitable examples two methods that can be used to synthesize naphthalene and its derivatives **(4 marks)**

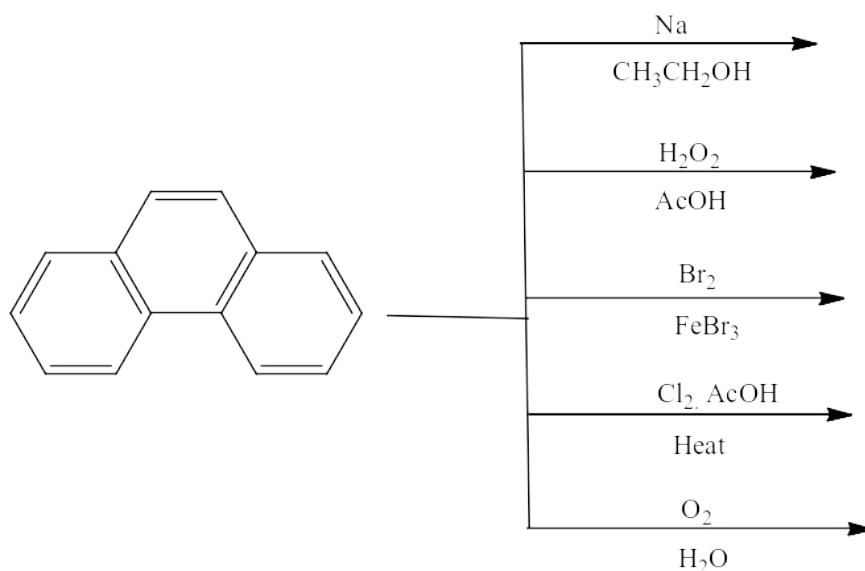
(g) Discuss the physical properties of cycloalkanes **(3 marks)**

QUESTION TWO [20 MARKS]

(a) Write equations for the synthesis of anthracene using the following methods **(6 marks)**

(i) Haworth synthesis (ii) Diels- Alder reaction

(b) Write the major organic product(s) of the following reactions (5 marks)



(c) Explain how the sequence of amino acids in peptides and proteins is determined (6 marks)

(d) Write equations for the stepwise synthesis of cyclopropane using the Perkin's method

(3 marks)

QUESTION THREE [20 MARKS]

(a) Explain how the sequence of amino acids in a polypeptide is determined using the Edman degradation (6 marks)

(b) Write the major organic product(s) of anthracene with each of the following reagents

(6 marks)

(i) Maleic anhydride (ii) HNO_3 , acetic anhydride (iii) H_2SO_4 , Heat

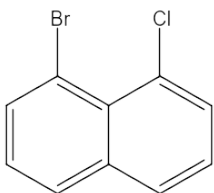
(iv) Br_2 (v) Dilute HNO_3 (vi) Na, Ethanol

(c) Discuss the structure of proteins

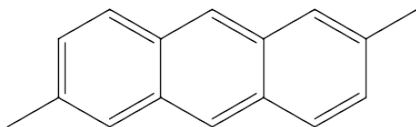
(8 marks)

QUESTION FOUR [20 MARKS]

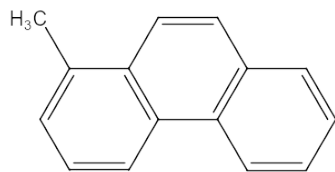
(a) Write the names of the following compounds

(6 marks)

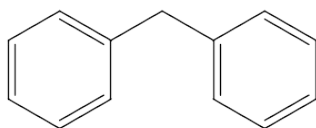
(i)



(ii)



(iii)



(iv)

(b) Design a stepwise synthesis of Tyr-Ala-Val tripeptide using the solid-phase peptide synthesis method **(8 marks)**

(c) Bradykinin is a nonapeptide released by blood plasma globulins in response to a wasp sting. It is a very potent pain-causing agent. Its constituent amino acids are 2R, G, 2F, 3P, S. The use of 2,4-dinitrofluorobenzene and carboxypeptidase shows that both terminal residues are arginine. Partial acid hydrolysis of bradykinin gives the following di- and tripeptides: FS + PGF + PP + SPF + FR + RP. What is the amino acid sequence of bradykinin? **(6 marks)**