UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BCE 2123
COURSE	: ORGANIC CHEMISTRY
SEMESTER/SESSION	: 2-2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **5** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Illustrate the structure formula for the following compounds: (12 marks)

i. 3-Chloropropene

ii. 3-Methyl-1-butene

iii. Diphenylmethane

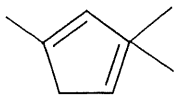
iv. 2-Methyl-1,5-heptadiene

v. 3-Ethyl-2,2-dimethyl-3-octene

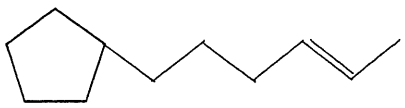
vi. 4-Tert-butyl-2-methylcyclohexene

b) Name these structure according to IUPAC: (3 marks)

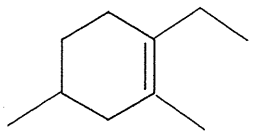
i.



ii.



iii.



c) Give the proper IUPAC names for the following compounds: (6 marks)

i. $H_2C=CHCH(CH_3)CH_2C(CH_3)_3$

ii. $CH_3CH=CHCH(CH_3)CH=CHCH(CH_3)_2$

iii. $CH_3CH_2CH=C(CH_3)CH_2CH_2CH_3$

QUESTION 2

a) Three different alkenes react with hydrogen in the presence of platinum or nickel catalyst to yield 2-Methylbutane. Identify the reactions involved for the **three (3)** alkenes.

(6 marks)

b) Show the reaction paths to produce propane through a Corey- Postner-Whitesides-House synthesis.

(6 marks)

c) Isomers are two or more compounds with same molecule formula but different in structure formula. Identify bond-line formulas for all of the isomers of $\mathbf{C_8H_{18}}$ that have methyl substituents.

(8 marks)

QUESTION 3

In the reaction of dehydrogenation of alcohol, alkene is produced from alcohol with the strong H_2SO_4 acid and at high temperature. The reaction sometimes yields mixture of products.

a) Determine the reaction of dehydrogenation of 2- Butanol and all its products.

(6 Marks)

b) The reaction above gives out major and minor products. In order to determine the products, Saytzeff rules is followed. From the reaction, differentiate which are the major and minor products and name the products.

(6 Marks)

c) There are few ways to synthesize alcohol, show **two (2) synthesis** reactions to produce tert-butyl alcohol

(8 Marks)

QUESTION 4

a) Determine the products of these reactions: (8 Marks)

i. Methylbenzene + Cl_2/uv

ii. Methylbenzene + $KMnO_4/\Delta$

iii. Ethylbenzene + Br_2/uv

iv. Styrene + $KMnO_4/\Delta$

b) Illustrate the synthesis path of these compounds from benzene:

(12 marks)

i. p-Bromonitrobenzene

ii. m-Chlorobenzoic acid

iii. 1-Phenyl-1-chlorobutane

iv. 1,2-Dibromo-4-nitrobenzene

QUESTION 5

a) Illustrate the structure for the following products: (10 Marks)

i. 2-chloro-2,3-dimethylpentane
ii. 2,2,2-trichloroethanol
iii. 3- bromo-2,4-dimethylhexane
iv. 1-bromo-2,2-dimethylpropane
v. 1,2-dichloro-3-methylbutane

b) Identify the nomenclature and the classification of the following alkyl halides . (9 marks)

i. $(CH_3)_2CHCH_2Cl$
ii. $CH_3CH_2CHBrCH_3$
iii. CH_2I_2

----------End of questions----------