

**UNIVERSITY OF FORT HARE**

**ORGANIC CHEMISTRY AND BIOCHEMISTRY FOR  
NURSING SCIENCE  
NCH 121E**

**DEGREE EXAMINATION  
NOVEMBER / DECEMBER 2019**

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**Time: 3 hours**  
**Subject: NCH 121E**  
**Marks: 100**

**This paper consists of 7 pages including the cover page**

**Internal Examiner**

**C. R. OHORO**

**External Examiner**

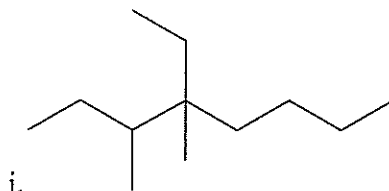
**INSTRUCTIONS**

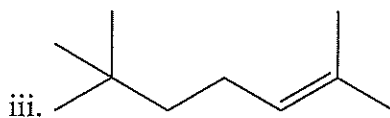
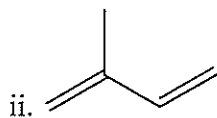
**Question one in Section A is compulsory. Answer any three questions from Section B.**

## SECTION A

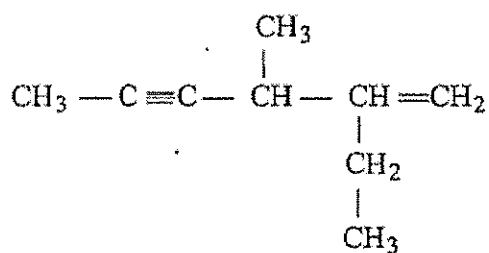
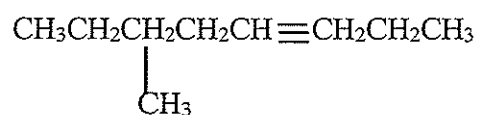
### QUESTION ONE

- 1.1 Define the following: (6)
- Catenation
  - Homologous series
  - Isomerism
- 1.2 What are hydrocarbons? (2)
- 1.3 Give 2 characteristics of homologous series (2)
- 1.4 Draw the structures of the following compounds: (5)
- 3-methylpentane
  - 2-ethyl-3-methylhexane
  - 2,4-dimethylnonane
  - 3,3-dimethyl-5-propyloctane
  - n-hexane
- 1.5 Differentiate between the following: (4)
- Saturated and unsaturated hydrocarbons
  - Acyclic and cyclic hydrocarbons
- 1.6 What type of bonds exist between carbon compounds? (1)
- 1.7 Give the IUPAC names of the following compounds below: (5)





iv.



v.

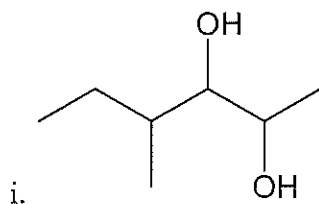
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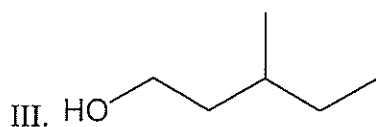
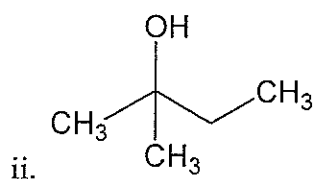
## SECTION B

### QUESTION 2

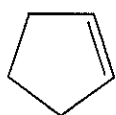
2.1 Describe the three classifications of alcohols based on their position. (6)

2.2 State the types of alcohols in the following compounds. (3)





2.3 Identify and give the names of the functional groups in the structure below: (2)

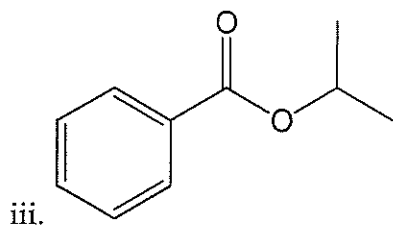
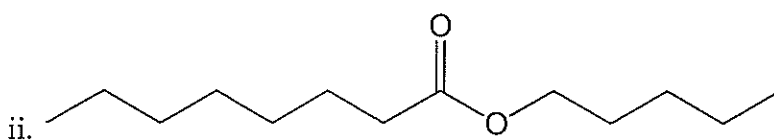
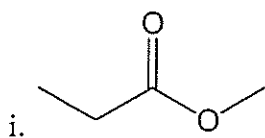


2.4 Draw the structures of the following compounds below: (4)

i. 4,4-dimethylheptanoic acid

ii. Heptanedioic acid

2.5 Give the IUPAC name of the following compounds below: (6)



2.6 Draw the structures of the 3 isomers of nonane. Include their names. (3)

2.7 What is the name of the product formed from the reaction between carboxylic acid and alcohol? (1)

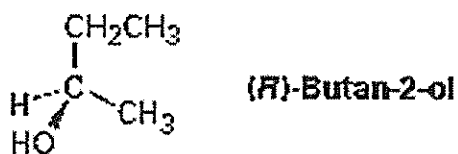
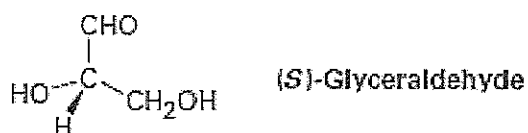
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### QUESTION THREE

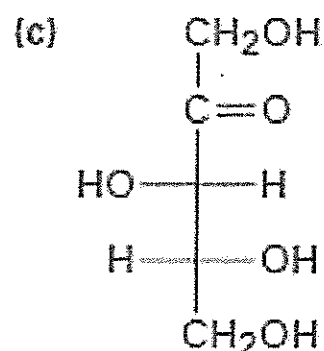
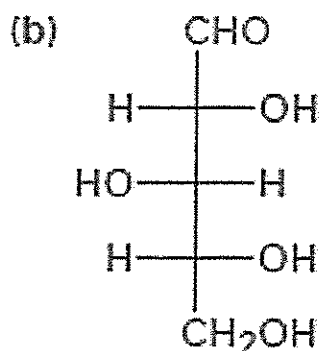
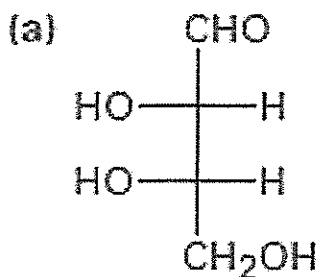
3.1. Classify the following as monosaccharides, disaccharides and polysaccharides: lactose, fructose, starch, glucose, sucrose, cellulose. (3)

3.2. Draw the structures of glucose and sucrose. (2)

3.3. Convert the following tetrahedral representations into a Fischer projection. (2)



3.4. Classify the sugars below as either L sugars or D sugars. (3)



3.5 State the difference between the two classes of lipids. (4)

3.6 State two functions of lipids. (2)

3.7. Describe the action of soap on oil. (3)

3.8 Mention the two main classes of steroid hormones. (2)

3.9 Give two examples each of a male and a female sex hormones. (4)

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#### QUESTION 4

4.1. Differentiate between proteins and peptides. (2)

4.2 State two properties of zwitterion. (2)

4.3 State three classification of amino acids. (3)

4.4. Deficiency of proteins causes kwashiorkor. What are three symptoms of kwashiorkor? (3)

4.5 State the two groups of vitamins? (2)

4.6 What are the three types of amino acids found in human system and where they are found? (6)

4.7 What are the two forms of vitamin K? (2)

4.8 State two deficiencies of Vitamin B3. (2)

4.9 Give three sources of vitamin C. (3)

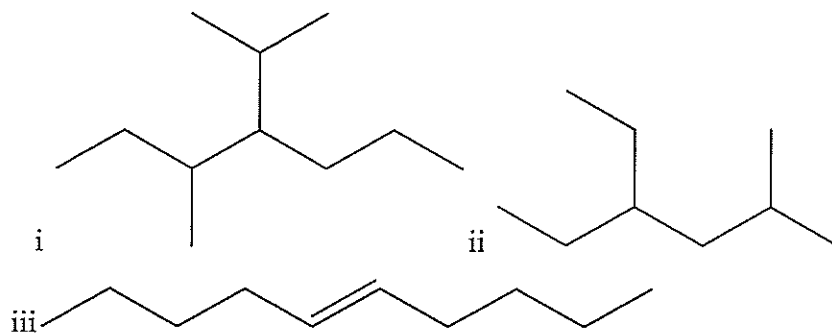
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### QUESTION 5

5.1 Copy and complete the table below: (12)

Classes of food	Source	Function	Deficiency
Carbohydrate			
Amino acid			
Vitamin A			
Vitamin E			

5.2 Give the IUPAC names of the following compounds below: (6)



5.3 Draw the structures of the organic compounds below: (6)

- Cyclobutane
- 3-Methylpentane-1,5-diol
- 2,3,4,5-Tetramethyl decane

5.4 What is an alkyl group? (1)

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