

NATIONAL UNIVERSITY OF LESOTHO
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
BACHELOR OF PHARMACY (HONOURS)

PHA 2401- ALIPHATIC CHEMISTRY

SUPPLEMENTARY EXAMINATION PAPER

AUGUST 2023 TIME: 3 HOURS TOTAL: 100 Marks

INSTRUCTIONS

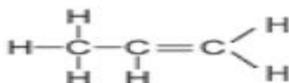
- **ANSWER ALL THE QUESTIONS IN THIS PAPER**
- **BEGIN EACH QUESTION ON A NEW PAGE**

1. Differentiate between the following terms used in organic chemistry. **10 marks**
 - a. Saturated hydrocarbons and unsaturated hydrocarbons.
 - b. Electrophiles and Nucleophiles specie.
 - c. Sigma and Pi bonding.
 - d. Symmetrical ether and Asymmetrical ether
 - e. Terminal alkynes and internal alkynes
2. Explain the three principles used to determine an orbital which electron will occupy. **10 marks**
3. Name the element that corresponds to each electronic configuration given below and draw their ground state electronic configuration energy diagram. **10 marks**
 - a. $1s^2$
 - b. $1s^22s^22p^2$
 - c. $1s^22s^22p^4$
 - d. $1s^22s^22p^6$
 - e. $1s^22s^22p^3$
4. Draw a condensed structural formula and give the correct names for all of the possible five structural isomers of hexane (C_6H_{14}). **10 marks**
5. a) Draw a skeletal structural formula and assign IUPAC name of primary, secondary and tertiary alcohols. **5 marks**
b) Mention atleast five pharmaceutical uses of alcohols. **5 marks**
6. Draw a condensed structural formula for each of the following molecules below. **10 marks**
 - a) *cis*-1,2-Dichloroethene
 - b) 2,5-Dimethyl-2-hexene
 - c) 1-Hepten-4-yne
 - d) 4,4-Dimethyl-1-pentyne
 - e) 4-Methyl-7-nonen-1- yne

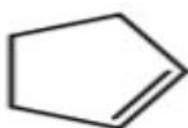
- f) 3-Ethylpentane
- g) Isobutane
- h) 4- Butyl-1,4- hexadiene
- i) 1,4- Pentadiene
- j) 2- Octanol

7. Describe and demonstrate the mechanism involved in the halogenation of alkanes with special emphasis on bromination of ethane. **10 marks**
8. Explain the laboratory tests that can be carried out to differentiate between the following hydrocarbons below. **10 marks**
- a) An alkene and alkane hydrocarbons
 - b) Terminal alkyne and internal alkyne
9. a) State the Markovnikov's Rule: in the absence of peroxide and demonstrate the application of Markovnikov's Rule by giving an example of addition reaction of an Alkene with hydrogen halide and assign an IUPAC name of the product. **5 marks**
- b) What are polyunsaturated compounds and explain the difference between three systems of polyunsaturated compounds. **5 marks**
10. Provide IUPAC names for the following molecules below. **10 marks**

A)



B)



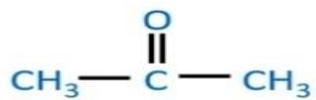
C)



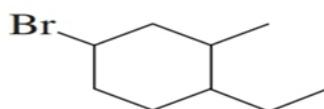
D)



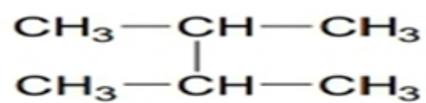
E)



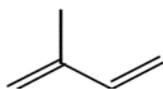
F)



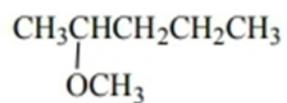
G)



H)



I)



J)



