UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of General Nursing
BACHELOR OF SCIENCE IN NURSING SCIENCE

RESIT EXAMINATION PAPER 2017

TITLE OF PAPER	:	ORGANIC CHEMISTRY AND BIOCHEMISTRY FOR NURSES
COURSE CODE	:	GNS 112
DURATION	:	2 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER **ANY FOUR** QUESTIONS
	:	EACH QUESTION **CARRIES 25** MARKS.
	:	WRITE NEATLY & CLEARLY
	:	NO PAPER SHOULD BE BROUGHT INTO OR OUT OF THE EXAMINATION ROOM.
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION ONE

a. Hydrocarbon A has the formula C_9H_{12} and absorbs 3 equivalents of hydrogen to yield B, C_9H_{18}, when hydrogenated over a Pd/C catalyst. Give the structures of both A and B **[4 Marks]**

b. _____ is the ability of carbon to form long chains with itself therefore creating millions of organic compounds. **[2 Marks]**

c. Organic compounds contain heteroatoms such as H, N, O, S, P and _____. **[2 Marks]**

d. Benzene contains only _____ hybridised carbons. **[2 Marks]**

e. Draw saturated structures for the following compounds and fill in non-bonding valence electrons where they can be found.

i) Bromo, chloroethane

ii) Carbon monoxide

iii) Methanal

iv) 2,4' dichloro biphenyl

v) 2-chloro-4-ethoxyhexanal **[5 ×3 Marks]**

[Total: 25 Marks]

QUESTION TWO

a. Explain what is meant by the term 'anticoagulant' and give three examples of anticoagulants. **[6 Marks]**

b. What is the difference between blood serum and blood plasma? **[5 Marks]**

c. Steriods are a class of biomolecules made up of three six-membered carbon rings and one five-membered ring with an aliphatic chain attached on the five carbon ring. Give three examples of steroids and give the function of each example. **[6 Marks]**

d. Draw all structural isomers of hexene, C_6H_{12}, that have unbranched carbon chains. **[8 marks]**

[Total: 25 Marks]

QUESTION THREE

a. Account for the following facts;

(i) Primary carbocations do not undergo S_N1 type of reactions.

(ii) Terminal alkenes form minor products of reactions involving the dehydration of alcohols.

[2×5 Marks]

b. Draw structures of the compounds described below and give the IUPAC name for each structure

(i) An aromatic compound containing one benzene ring and a single carboxyl group which is *ortho* to a bromo group and *para* to a hydroxyl group.

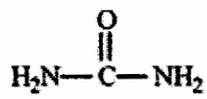
(ii) A straight chain of eight carbons with two methyl groups on the second carbon, an *iso*propyl group on the fourth carbon and a carbonyl group on the eighth carbon.

(iii) An unsaturated compound, C_3H_6, undergoes a halogenation reaction to produce dichloride product, A. Draw the molecular structure of Product A.

[15 Marks]

QUESTION FOUR

a) Consider the structure of urea shown below and do the following:



i) Fill in the non-bonding valence electrons that are missing from the line bond structure **[4 Marks]**

ii) Determine the hybridization of the carbon atom. **[2 Marks]**

iii) Predict the bond angle of NH_2–C=O in urea. **[3 Marks]**

b) There are two molecules with the molecular formula C_3H_9N. Draw them and describe how they differ. **[6 Marks]**

c) What is the difference between S_N1 and S_N2 reactions? Give examples of each type of reaction. **[10 Marks]**

QUESTION FIVE

a. Give the molecular formula of a hydrocarbon containing five carbon atoms that is;

(i) An alkane

(ii) Cycloalkane

(iii) An alkene

(iv) An alkyne.

[4 ×2 Marks]

b. Explain why the molecular formulae of the answers given in a. (i) and (ii) are different. **[Marks 4]**

c. Using appropriate examples, explain the difference between

(i) Alkane and an alkyl group

(ii) A saturated and unsaturated hydrocarbon

(iii) A branched and a straight chain hydrocarbon

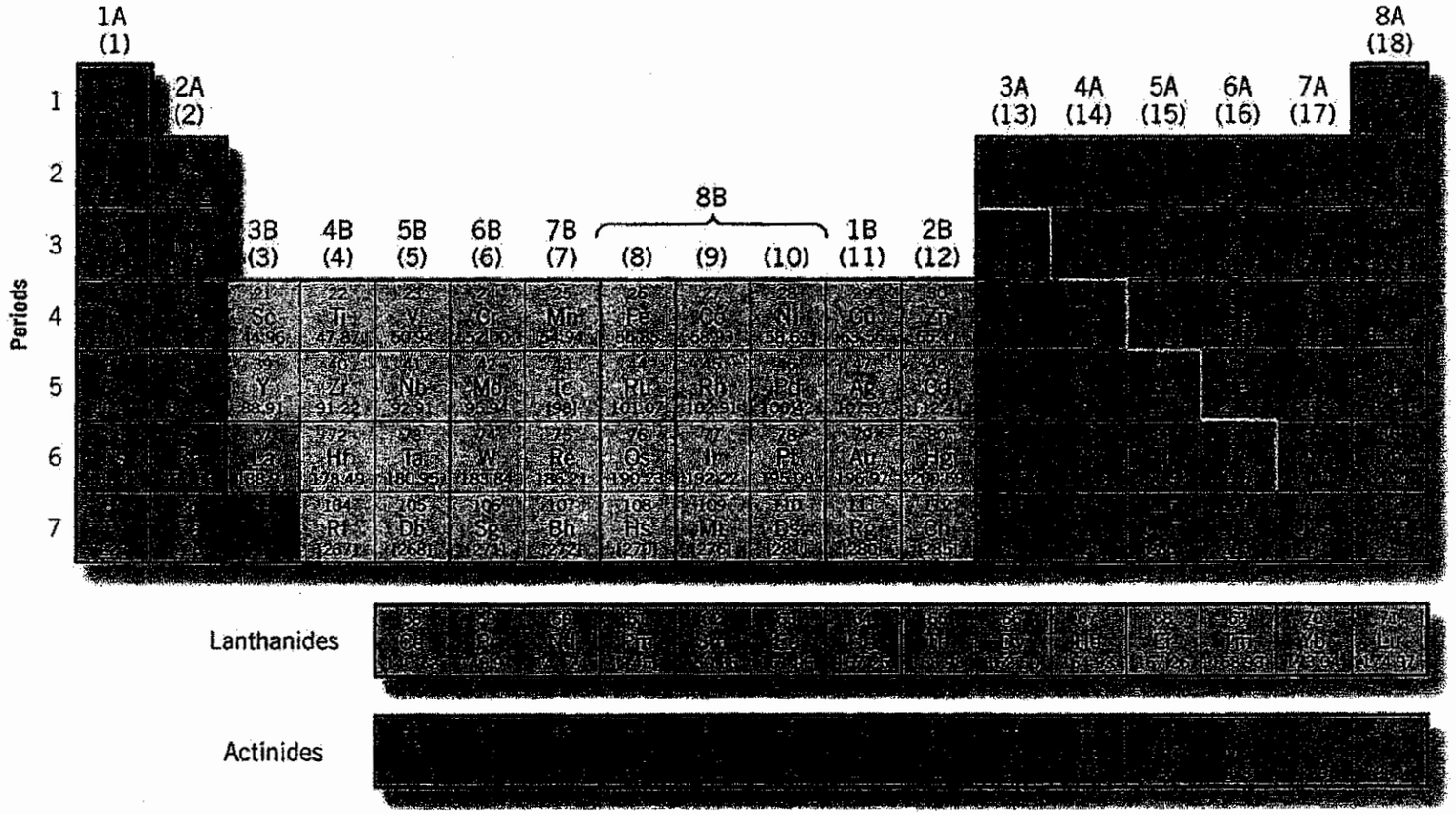
(iv) Benzene and cyclohexane

[8 Marks]

d. Write a balanced chemical equation for the reaction of 2-butene and bromine.

[5 Marks]

[Total: 25 Marks]


1A (1)
2A (2)
3A (13)
4A (14)
5A (15)
6A (16)
7A (17)
8A (18)
3B (3)
4B (4)
5B (5)
6B (6)
7B (7)
8B
(8)
(9)
(10)
1B (11)
2B (12)
Periods
1
2
3
4
5
6
7
Lanthanides
Actinides