UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of Environmental Health Science
BACHELOR OF SCIENCE IN NURSING SCIENCE

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

(i) An alkane

(ii) Cycloalkane

(iii) An alkene

(iv) An alkyne.

[Marks 8]

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) SP^2 and SP^3 hybridization

(iii) A branched and a straight chain hydrocarbon

(iv) A hydroxyl group and alcohol group

[8 Marks]

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

[5 Marks]

[Total: 25 Marks]

QUESTION TWO

a. Explain what is meant by the term 'anticoagulant' and give three examples of anticoagulants. **[7 Marks]**

b. What are the main components of blood? **[6 Marks]**

c. Discuss the following terms and give an example for each;

i. Oxidative damage

ii. Reactive oxygen species

iii. Antioxidant enzymes **[3 ×4 Marks]**

[Total: 25 Marks]

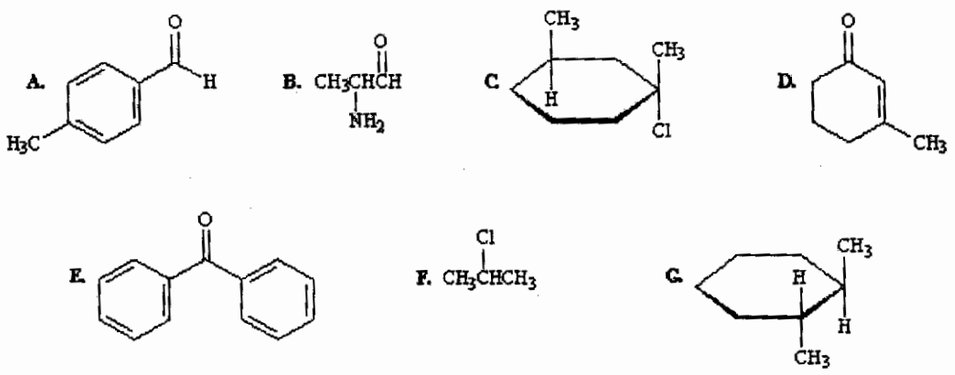
QUESTION THREE

a. Account for the following facts;

(i) The dehydration of alcohols cannot occur for alcohols that do not have β hydrogens. **[5 Marks]**

(ii) A Fatty acid molecule has a hydrophilic and a hydrophobic part. **[4 Marks]**

b. MATCH a structure below to each of the following descriptions (i-iv) and place the letter corresponding to the structure next to each description.



(i) An amino aldehyde

(ii) A tertiary chloride.

(iii)A cyclic alkane with two *trans* methyl groups

(iv)A cyclic ketone. **[16 Marks]**

[Total: 25 Marks]

QUESTION FOUR

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

(i) An aromatic compound containing one benzene ring, a bromine which is *meta* to an alcohol group and *para* to a hydroxyl group. **[5 marks]**

(ii) A straight chain of seven carbons with two methyl groups on the second carbon, an ethyl group on the fourth carbon and a carboxylic acid group on the seventh carbon. **[5 marks]**

(iii) An alcohol , $C_5H_{11}OH$, undergoes a dehydration reaction to produce an unsaturated product, A. Draw all possible molecular structures of Product A. **[6 Marks]**

b. Draw the structures of primary, secondary and tertiary alcohol examples. You may use generalized structures. **[9 marks]**

[Total: 25 Marks]

QUESTION FIVE

a. Define the following types of reactions;

(i) Dehydration reactions

(ii) Addition reactions

(iii) S_N2 reactions

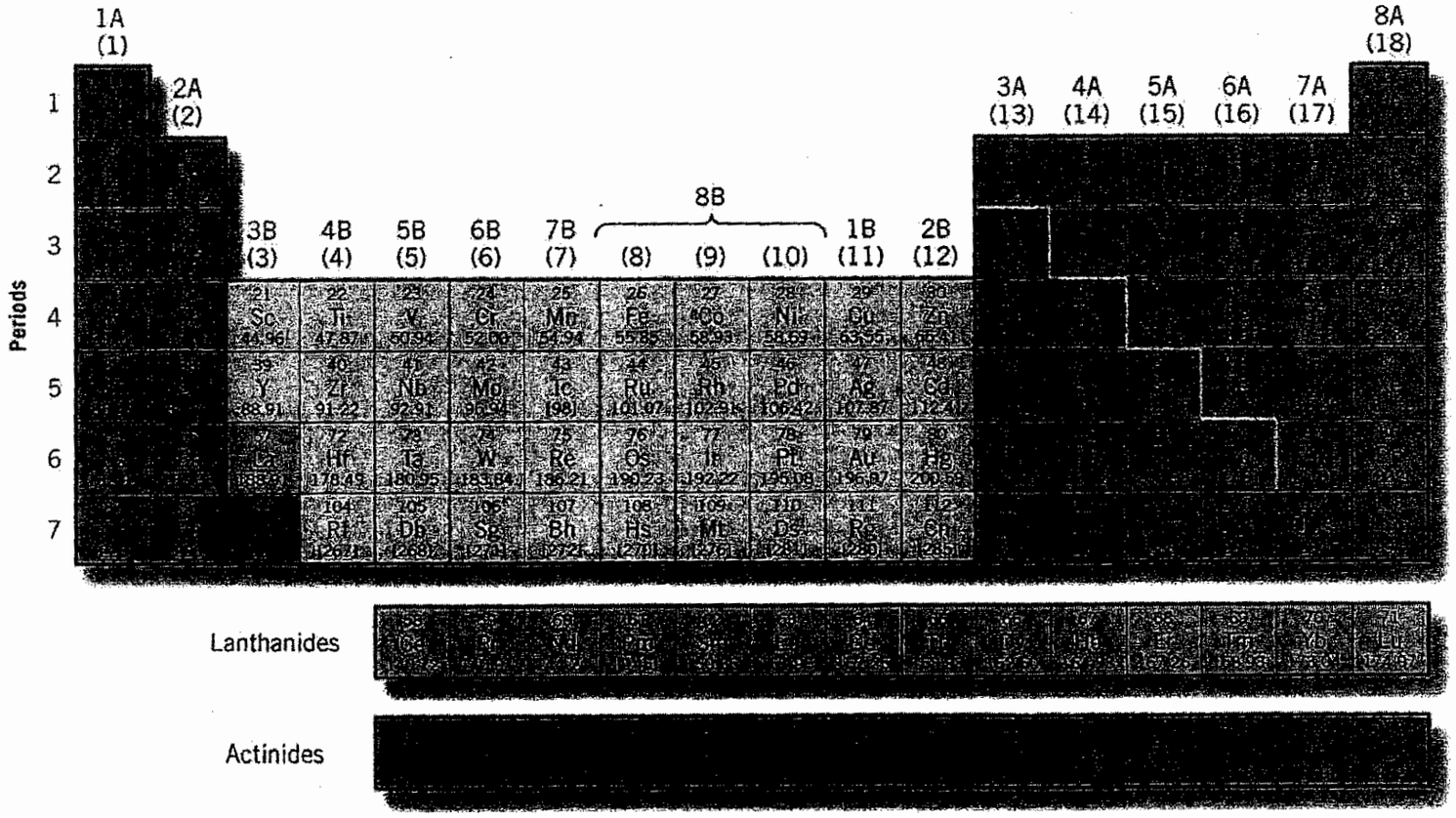
(iv) Hydrogenation reactions **[4× 3 Marks]**

b. Explain how enzymes function in biological systems and state the factors that affect their activity. **[8 Marks]**

c. Why are tertiary carbocations the most stable class of carbocations?

[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