

UNIVERSITY OF SWAZILAND Faculty of Health Sciences Department of Environmental Health Science

DEGREE IN NURSING SCIENCE

FINAL EXAMINATION PAPER 2015

TITLE OF PAPER

ORGANIC CHEMISTRY AND BIOCHEMISTRY

FOR NURSES

COURSE CODE

GNS 112

DURATION

2 HOURS

MARKS

100

INSTRUCTIONS

READ THE QUESTIONS & INSTRUCTIONS

CAREFULLY

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:

ANSWER ANY FOUR QUESTIONS

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EACH QUESTION **CARRIES 25** MARKS.

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WRITE NEATLY & CLEARLY

:

NO PAPER SHOULD BE BROUGHT INTO OR

OUT OF THE EXAMINATION ROOM.

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BEGIN EACH QUESTION ON A SEPARATE

SHEET OF PAPER.

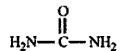
DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION ONE

- a) Draw saturated structures for the following compounds and fill in non-bonding valence electrons where they can be found.
 - i) 1,2 dichloroethane
 - ii) Carbon dioxide
 - iii) Methanol
 - iv) 4,5 divinyl octane
 - v) 2-bromo-4.methoxyhexanal

[10 Marks]

b) Consider the structure of urea shown below and answer the following questions



- Fill in the non-bonding valence electrons that are missing from the line bond structure.

 [6 Marks]
- ii) Determine the hybridization of the carbon atom. [3 Marks]
- c) There are two molecules with the molecular formula C₂H₇N. Draw them and describe how they differ.
 [6 Marks]

QUESTION TWO

- a. Account for the following facts;
 - (i) The boiling point of ethanol is 78.4 °C while the boiling point of ethane is -89 °C
 - (ii) Ethene is not soluble in water yet ethanol is soluble in water. [10 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, C₃H₆, undergoes a halogenation reaction to

produce dichloride product, A. Draw the molecular structure of Product A.

				[15 Marks]
JES	TION	THREE		
a.			is the ability of carbon to form long ch	ains with itself
	theref	ore creating milli	ions of organic compounds.	[3 Marks]
b.	Organ	ic compounds	contain heteroatoms such as H, N,	O, S, P and [3 Marks]
c.	Benze	ne contains only	hybridised carbons.	[3 Marks]
		int for the follow		. ,
	(iii)		int of ethanol is 78.4 °C while the boiling p	oint of ethane is
	(iv)	Ethene is not so	oluble in water yet ethanol is soluble in water	er
				[10 Marks]
.	Give	the molecular fo	rmulae of a hydrocarbon containing four ca	arbon atoms that
	is;			
	(i)	An alkane		
	(ii)	Cycloalkane		
	(iii)	An alkene		[6 Marks]
ES	STION	FOUR		
a.	Expla	in what is mean	t by the term 'anticoagulant' and give the	ree examples of
	an	ticoagulants		[6 Marks]
b.	What	is the difference	between blood serum and blood plasma	[4 Marks]
	Sterio	ds are a class of	biomolecules made up of three six-membe	red carbon rings
c.		ne five-membere	ed ring with an aliphatic chain attached on	the five carbon
c.	and o			
c.			oles of steroids and give the function of each	example.

d. Explain how antioxidant enzymes function and give three examples of antioxidant enzymes. (use chemical equations in your answer) [9 Marks]

QUESTION FIVE

- a. Write explanatory notes on the following carbohydrates. Include examples in you explanations
 - (i) Simple
 - (ii) Storage
 - (iii) Structural

[9 Marks]

b. State four properties of enzymes.

[8 Marks]

c. Explain how temperature and pH affects the activity of enzymes in biological systems. [8 Marks]

Rn(222) Ne 20.179 AI. 39.948 Xe 131.29 **He** ≠.0020 $\mathbf{At}_{(2lo)}$ **Br** 79.904 F 18.998 126.90 0 Se 38 Te 127.60 Po (200) S 32.064 AS 71,922 Sb 121.75 N 14.007 P 30.974 **Bi**208.98 **Pb** C 12011 Si. Ge 72.6/ Sn //8.7/ AI 26.982 **Ga** 69.723 [n ||14.82 TI 204.38 **B** Zn 65.39 Hg 200.59 Cd Cu 63.546 **Ag** 107.87 **Au** 196.97 **UNIVERSITY OF SWAZILAND** Atomic Weight Department of Chemistry Pd 106.42 Ni 58.69 Pt 195.08 **Ir** 192.22 Co 38,933 He + 0026 Fe 55.847 Ru 101.07 OS 190.2 Atomic Number Mn 54.938 Te Re 186.2 W 183.85 Cr 51.996 M0 95.94 50.942 Ta 180.95 N**b Ti Zr** 91.224 Hf. 178.49 Sc 44.956 La (38.91) Ac 227.03 **Be** Mg 24.305 Sr 87.62 Ba 137.33 **Ra** 226.03 Ca +0.078 $\stackrel{\mathbf{Li}}{\epsilon_{940}}$ **Na** 22.999 **K** 39.098 Cs. H 10007 **Rb** (223) Fr

58	65	09	61	79	63	22	9	. 98	29	89	69	20	7.1
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140.12	140.91	144.24		150.36					164.93	167.26	168.93		
06	16	25	93	94	95	96	26	8	86	100	101	102	103
Th	Pa	n	ď	P	Am	Cm	Bķ	Ct	Es	Fm	Md	%	Ľ
232.04	231.04	238.03			(234)	(247)	247	(251)	(223)	(257)	(258)		