



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

MAIN EXAMINATION PAPER 2017

- TITLE OF PAPER : ORGANIC CHEMISTRY FOR HEALTH SCIENCES
- COURSE CODE : EHS 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]

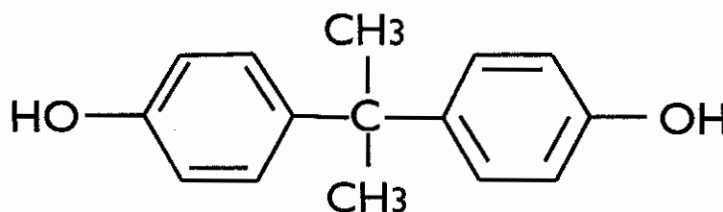
d. Write a balanced chemical equation for the reaction of 2-pentene and bromine.

[5 Marks]

[Total: 25 Marks]

QUESTION TWO

a. Bisphenol A, also known as BPA is a potential endocrine disruptor that we encounter in our daily lives. Its structure is shown in the diagram below.



- (i) Give the IUPAC name of BPA [4 Marks]
- (ii) In what type of products is BPA commonly found? [3 Marks]
- (iii) Is BPA listed under any international convention? If so, state the name of the convention. [6 Marks]

- b. Give the names of any three classes of organic chemicals listed under the Stockholm convention.

[12 Marks]

[Total: 25 Marks]

QUESTION THREE

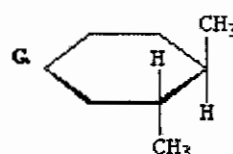
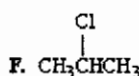
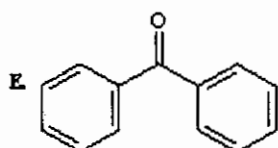
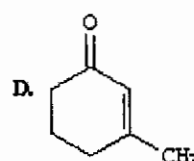
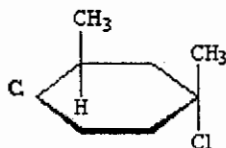
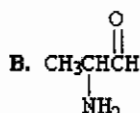
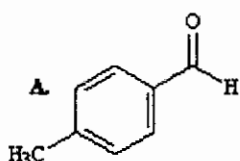
- a. Account for the following facts;

(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]
- a. 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 [12 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]

Periods

1A (1)	2A (2)	3B (3)	4B (4)	5B (5)	6B (6)	7B (7)	8B			1B (11)	2B (12)	3A (13)	4A (14)	5A (15)	6A (16)	7A (17)	8A (18)		
		Li 6.94	Be 9.01	B 10.81	C 12.01	N 14.01	O 16.00	F 18.99	Ne 20.18	Na 22.99	Mg 24.31	Al 26.98	Si 28.09	P 30.97	S 32.07	Cl 35.45	Ar 39.94		
		K 39.10	Ca 40.08	Sc 44.96	Ti 47.88	V 50.94	Cr 51.99	Mn 54.94	Fe 55.85	Co 58.93	Ni 58.69	Cu 63.55	Zn 65.38	Ga 69.72	Ge 72.61	As 74.92	Se 78.96	Br 79.90	Kr 83.80
		Rb 85.47	Sr 87.62	Y 88.91	Zr 91.22	Nb 92.91	Mo 95.94	Tc 98.91	Ru 101.07	Rh 102.91	Pd 106.42	Ag 107.87	Cd 112.41	In 114.82	Sn 118.71	Sb 121.76	Te 127.60	I 126.91	Xe 131.29
		Cs 132.91	Ba 137.33	Hf 178.49	Ta 180.95	W 183.84	Re 186.21	Os 190.23	Ir 192.22	Pt 195.08	Au 196.97	Hg 200.59	Tl 204.38	Pb 207.2	Bi 208.98	Po 209	At 210	Rn 222	

Lanthanides



Actinides

