



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of Environmental Health Science
BACHELOR OF SCIENCE IN ENVIRONMENTAL HEALTH
SPECIAL EXAMINATION PAPER 2016

TITLE OF PAPER : ORGANIC CHEMISTRY FOR HEALTH SCIENCES

COURSE CODE : EHS 112

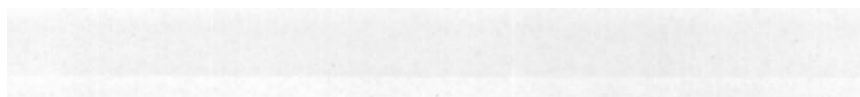
DURATION : 2 HOURS

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. Write explanatory notes on the following carbohydrates. Include examples in your explanations;
- i. Simple. [9 Marks]
 - ii. Storage. [8 Marks]
 - iii. Structural. [8 Marks]
- b. State four properties of enzymes.
- c. Explain how temperature and pH affects the activity of enzymes in biological systems.

QUESTION TWO

- a. PCBs are synthetic chlorinated hydrocarbons that have been used extensively since 1930 for a variety of industrial uses. PCBs have been shown to present a threat to human health and the environment because of their chemical stability and persistence.
- (i) Draw three examples of PCBs and name each compound [6 Marks]
 - (ii) Under what international convention was the production of these compounds banned [2 Marks]
- b. Give the IUPAC name for DDT and for what purposes it has been used in Swaziland [12 Marks]
- (i) Name any two compounds listed in the convention you mentioned in a(ii) [5 Marks]

QUESTION THREE

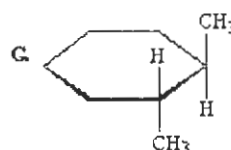
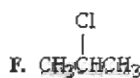
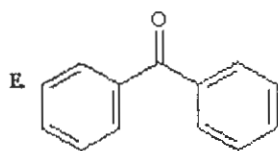
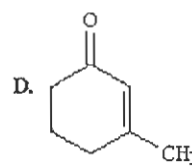
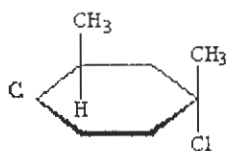
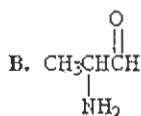
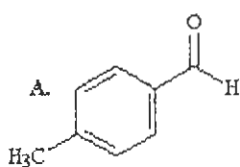
- a. Account for the following facts;
- (i) The boiling point of ethanol is 78.4 °C while the boiling point of ethane is -89 °C.
 - (ii) Ethene is not soluble in water yet ethanol is soluble in water. [10 Marks]
- b. Draw structures of the compounds described below and give the IUPAC name for each structure

- (i) An aromatic compound containing one benzene ring and a single ethyl group which is *meta* 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 propyl group on the fourth carbon and a carbonyl group on the eighth carbon.
- (iii) An unsaturated compound, C_5H_{10} , undergoes a halogenation reaction to produce dichloride product, A. Draw the molecular structure of Product A.

[15 Marks]

QUESTION FOUR

- a. What is the difference between substitution, elimination and addition reactions?
Give appropriate examples for each type of reaction. [9 Marks]
- b. MATCH a structure below to each of the following descriptions and place the letter corresponding to the structure in the blank.



- (i) An amino aldehyde
- (ii) A tertiary chloride.
- (iii) A cyclic alkane with two cis methyl groups
- (iv) An aromatic ketone.

[16 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.

[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) 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-pentene and bromine.

[5 Marks]



PERIODIC TABLE OF ELEMENTS

GROUPS																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
IA	IIA	IIIB	IVB	VB	VIB	VIB	VIII			IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA
1.008																	4.003
H																	He
1																	2
6.941	9.012																
Li	Be																
3	4																
22.990	24.305																
Na	Mg																
11	12																
TRANSITION ELEMENTS																	
39.098	40.078	44.956	47.88	50.942	51.996	54.938	55.847	58.933	58.69	63.546	65.39	69.723	72.61	74.922	78.96	79.904	83.80
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
85.468	87.62	88.906	91.224	92.906	95.94	98.907	101.07	102.91	106.42	107.87	112.41	114.82	118.71	121.75	127.60	126.90	131.29
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
132.91	137.33	138.91	178.49	180.95	183.85	186.21	190.2	192.22	195.08	196.97	200.59	204.38	207.2	208.98	(209)	(210)	(222)
Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
223	226.03	(227)	(261)	(262)	(263)	(262)	(265)	(266)	(267)								
Fr	Ra	**Ac	Rf	Ha	Unh	Uns	Uno	Une	Uun								
87	88	89	104	105	106	107	108	109	110								

*Lanthanide Series

**Actinide Series

140.12	140.91	144.24	(145)	150.36	151.96	157.25	158.93	162.50	164.93	167.26	168.93	173.04	174.97
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
58	59	60	61	62	63	64	65	66	67	68	69	70	71
232.04	231.04	238.03	237.05	(244)	(243)	(247)	(247)	(251)	(252)	(257)	(258)	(259)	(260)
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
90	91	92	93	94	95	96	97	98	99	100	101	102	103

() indicates the mass number of the isotope with the longest half-life.