

1st SEM. 2005/2006

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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME:

REMEDIAL YEAR IN AGRICULTURE

REMEDIAL YEAR IN AGRICULTURAL EDUCATION

COURSE CODE: CP 305

TITLE OF PAPER: CHEMISTRY AND SOIL FERTILITY

SECTION 1: INORGANIC CHEMISTRY SECTION 2: ORGANIC CHEMISTRY

SECTION 3: SOIL FERTILITY

TIME ALLOWED: TWO [2] HOURS

INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS, AT LEAST ONE [1]

FROM EACH SECTION.

NOTE:

THE PAPER CONTAINS FIVE [5] PAGES INCLUDING THE

COVER PAGE.

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SECTION 1: INORGANIC CHEMISTRY

QUESTION 1

(a)	Define or give short descriptions of the following terms and phrases:

(i)	An atom	[2]
(ii)	A liquid	[2]
(iii)	An ionic bond	[2]
(iv)	A proton	[2]
(v)	A solid	[2]

(b) The order of energies in subshells of atoms is as follows:

1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p, 5s, 4d, 5p, 6s, 4f, 5d, 6p, 7s, 5f, 6d

Construct electron configurations of the following elements. Each answer carries four [4] marks.

	<u>Z</u>	<u>Element</u>	
(a)	18	Argon	[5]
(b)	17	Chlorine	[5]
(c)	15	Phosphorus	[5]

[25]

QUESTION 2

(a) Briefly identify three [3] characteristics of ionic compounds.

[6]

(b) List the four [4] factors which affect the rate of any chemical reaction

[4]

Determine the formula mass of Albite [NaAlSi₃O₃] if the atomic masses are as follows: (c) Na = 22.9898 amu, Al = 26.9815 amu, Si = 28.0855 amu; and O = 15.9994 amu.

[15]

[25]

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SECTION 2: ORGANIC CHEMISTRY

QUESTION 3

- (a) Write the IUPAC names of the following compounds. Each answer carries two [2] marks.
 - (i) CH₃-CH-CH₂-CH₃ CH₃-CH-CH₂-CH₂-CH₃
 - (ii) CH₃-CH-CH₂-CH₂-CH₃ CH₃-CH₂
 - (iii) CH₃ CH₂ CHO
 - (iv) CH₃-CH-CH₂-C-CH₃ CH₃ CH₂ O
 - $\begin{array}{c} \text{OH} \\ \text{(v)} \qquad \text{CH}_3\text{-CH-CH}_2\text{-CH}_2\text{-CH}_2\text{-CH}_3 \\ \text{CH}_3\text{-CH}_2\text{-CH}_2 \qquad \text{OH} \end{array}$

[10]

- (c) Define or give brief descriptions of the following terms and phrases. Each answer carries five [5] marks.
 - (i) An unsaturated hydrocarbon [5]
 - (ii) A phenol

[5]

(iii) An ether

[5]

[25]

QUESTION 4

- (a) Copy and complete the following equations. Each answer carries five [5] marks.
 - (i) $CH_3-CH_3+Cl_2$

=

(ii) $CH_2F_2 + F_2$

=

(iii) $CH_2 = CH_2 + H_2$

=

	(111)	$CH_2 = CH_2 + H_2$	=	PAGE 4 OF 4				
	(iv)	$CH_2=CH_2+HCl$	=					
	(v)	$CH_2=CH-CH_3+Br_2$	=					
				[25]				
		SECTION 3:	SOIL FERTILITY					
		<u>ou</u>	ESTION 5					
(a)	Write	Write short notes on the following methods of fertilizer placement.						
	(i)	Broadcasting	[5]					
	(ii)	Banding	[5]					
(b)	b) Briefly discuss the following factors which affect decision-making when usi fertilizers:							
	(i)	Soil moisture content	[5]					
	(ii) (iii)	Ammonia volatilization losse Leaching losses	s [5] [5]					
	(111)	Leaching losses	[5]					
				[25]				
		QUI	ESTION 6					
(a)	Discu	Discuss the following methods of fertility evaluation.						
	(i)	Nutrient deficiency symptom	s [5]					
	(ii)	Field trials	[5]					
	(iii)	Greenhouse trials	[5]					
(b)	Write	Write brief notes on the following processes and activities.						
	(i)	Denitrification of nitrogen	[5]					
	(ii)	Location of plant roots	[5]					
				[25]				