



1ST SEM. 2004/2005

PAGE 1 OF 6

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: REMEDIAL YEAR IN AGRICULTURE

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 FOUR [4] QUESTIONS AT LEAST ONE
[1] QUESTION FROM EACH SECTION AND
ANY ONE [1] QUESTION FROM ANY SECTION.

DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED
BY THE CHIEF INVIGILATOR.

SECTION 1: INORGANIC CHEMISTRY

QUESTION 1

(a) Define or give brief descriptions of the following terms and phrases. Each answer carries two [2] marks.

- (i) Atom
- (ii) A Solid
- (iii) An Ionic bond
- (iv) An element
- (v) A molecule

[10]

(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 configuration of the following elements. Each answer carries four [2] marks.

<u>Z</u>	<u>ELEMENT</u>
(a) 8	Oxygen
(b) 12	Magnesium
(c) 16	Sulfur
(d) 19	Potassium
(e) 35	Bromine

[10]

(c) Briefly discuss any factor that influences the rate of chemical reactions.

[2]

(d) List three [3] characteristics of an Ionic compound.

[3]

[25]

QUESTION 2

a) Write molecular formulae for the following compounds, stating the necessary rules used once only. Use the following valences : Ca = 2; SO₄ = 2; H = 1; O = 2; Mg = 2;

Al = 3; Cl = 1; Na = 1.

- i) Calcium hydroxide [5]
- ii) Aluminum Chloride [5]
- iii) H₂O [5]

v) p - Bromophenol. [10]

c) Give brief definitions of the following words and phrases, provide an example where appropriate. Each answer carries one [1] mark.

- i) An alkene
- ii) An ether
- iii) an ester
- iv) An aldehyde
- v) A phenol [5]

[25]

QUESTION 4

a) Copy and complete the following equations. Each answer carries three [3] marks.

- i) $CH_2Cl_2 + Cl_2 =$
- ii) $CH_4 + Br_2 =$
- iii) $CH_4 + 2O_2 + Spark =$
- iv) $CH_2 = CH_2 + H_2 =$
- v) $CH_3 - CH = CH_2 + HCl =$

[15]

- b) i) Write the molecular formula of an alkane that has six [6] carbon atoms. [2]
- ii) What is the molecular formula of an alkane that has ten [10] hydrogen atoms. [2]
- iii) Determine the molecular formula of an alkene that has four [4] carbon atoms. [2]

iv) Given an alkyne that has five [5] carbon atoms, determine its molecular formula. [2]

v) A cyclohexane has six [6] carbon atoms, determine its structural formula. [2].

[25]

SECTION 3 : SOIL FERTILITY

QUESTION 5

a) Write short notes on the following fertilizer placement methods

i) The broadcast method

ii) Foliar spraying

iii) Injection

[15]

b) Briefly discuss the following factors that are taken into consideration before using chemical fertilizers.

i) Ammonia volatilization losses

[5]

ii) Location of plant roots

[5]

[25]

QUESTION 6

Write short notes on the following terms and processes:

i) Nutrient deficiency symptoms

[5]

ii) Greenhouse trials

[5]

iii)	Denitrification	[5]
iv)	Addition of organic manure as a source of nutrients	[5]
v)	Field trials.	[5]

[25]