

1st SEM. 2005/2006



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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: DIPLOMA IN AGRICULTURE YEAR 1
DIPLOMA IN AGRICULTURAL EDUCATION YEAR 1
DIPLOMA IN HOME ECONOMICS YEAR 1
DIPLOMA IN HOME ECONOMICS EDUCATION YEAR 1
REMEDIAL YEAR IN HOME ECONOMICS AND HOME
ECONOMICS EDUCATION.

COURSE CODE: CP 101

TITLE OF PAPER: CHEMISTRY

SECTION 1: INORGANIC CHEMISTRY
SECTION 2: ORGANIC CHEMISTRY

TIME ALLOWED: TWO AND A HALF [2.5] HOURS

INSTRUCTIONS: ANSWER ANY FOUR [4] QUESTIONS, TWO
[2] QUESTIONS FROM EACH SECTION.

NOTE: THE PAPER CONTAINS SIX [6] PAGES INCLUDING THE
COVER PAGE

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CHIEF INVIGILATOR.**

SECTION 1: INORGANIC CHEMISTRY

QUESTION 1

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

- (i) An acid
- (ii) A liquid
- (iii) Inorganic chemistry
- (iv) A deliquescent compound
- (v) Boiling point
- (vi) An atom
- (vii) A subshell
- (viii) A mixture
- (ix) Nucleus
- (x) A proton

[20]

- (b) Calculate the molarity (M) of a solution which was made up by dissolving 12.00 g of sodium chloride in 500 mL of total solution. Given the atomic masses of:

$$\text{Cl} = 35.4530 \text{ amu}$$

$$\text{Na} = 22.9898 \text{ amu.}$$

[5]

[25]

QUESTION 2

- (a) Calculate the atomic mass of magnesium given the abundances and masses of its naturally occurring isotopes. Show all your calculations and express your final answer to five [5] decimal places.

<u>ISOTOPE</u>	<u>ABUNDANCE, %</u>	<u>MASS, amu</u>
$^{24}_{12}\text{Mg}$	78.99	23.985042
$^{25}_{12}\text{Mg}$	10.00	24.985837
$^{26}_{12}\text{Mg}$	11.01	25.982593

[10]

- (b) What is the mass of three atoms of Platinum (Pt) in amu if the atomic mass of the element is 195.08 amu, and Avogadro's number is 6.022045×10^{23} atoms per mole. Show all the necessary calculations. [15]

[25]

QUESTION 3

- (a) Determine the formula mass of Albite $[\text{NaAlSi}_3\text{O}_3]$ if the atomic masses are as follows:

Na = 22.9898 amu; Al = 26.9815 amu; Si = 28.0855 amu; O = 15.9994 amu

[15]

- (b) If the total mass of sodium chloride is 50 grams what is the mass of chlorine in the compound given the following atomic masses ?

Na = 22.9898 amu; Chlorine = 35.453 amu .

[5]

- (c) Calculate the percent component of sodium using the above atomic masses. [5]

[25]

SECTION 2**QUESTION 4.**

- (a) Define or give brief descriptions of the following terms and phrases. Give an example where possible. Each answer carries two [2] marks.

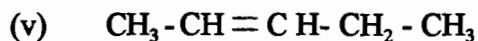
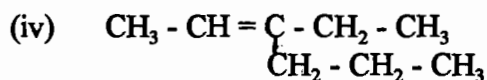
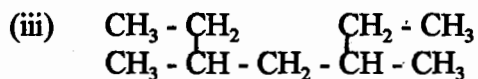
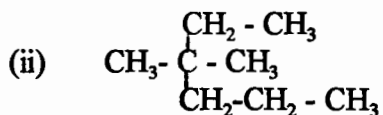
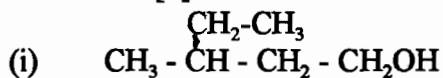
- (i) Saturated hydrocarbon
- (ii) Para director
- (iii) An alcohol
- (iv) A phenol
- (v) A hydrocarbon
- (vi) An alkene
- (vii) An alkyne
- (viii) An electrophile
- (ix) An alkane
- (x) A nucleophile

[20]

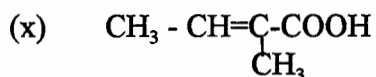
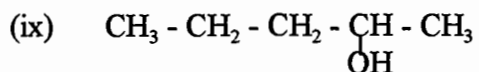
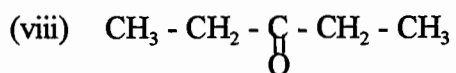
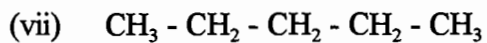
- (b) What is the molecular formula for an alkane that contains ten [10] carbon atoms ?
[1]
- (c) Write the molecular formula of an alkene containing four [4] carbon atoms.
[1]
- (d) What is the molecular formula for an alkyne containing twelve [12] hydrogen atoms ?
[1]
- (e) Determine the molecular formula of a cycloalkane that contains eight [8] carbon atoms.
[1]
- (f) What is the molecular formula for an alkyne that has twenty [20] hydrogen atoms?
[1]
[25]

QUESTION 5

- (a) Assign the IUPAC names to each of the following compounds. Each answer carries one [1] mark.



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[20]

(a) Write the IUPAC condensed structural formulae for the following compounds.
(Each answer carries one [1] mark.)

(i) dichloromethane

(ii) 2,3 - bromohexane

(iii) chlorocyclopentane

(iv) 2 - methyl - 2 - heptanol

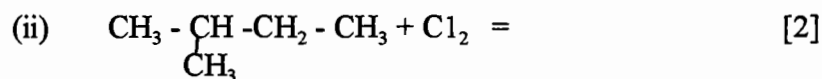
(v) 3 - methyl - 2 - butylamine

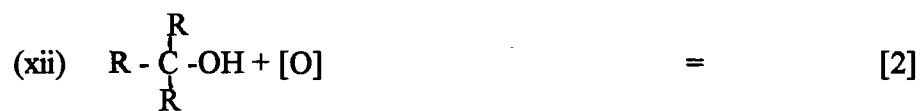
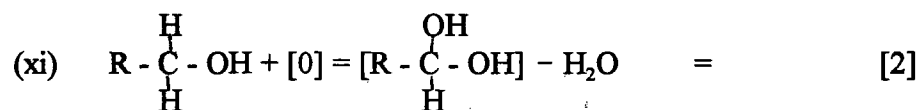
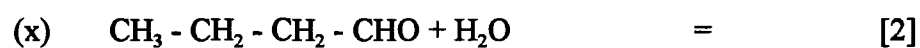
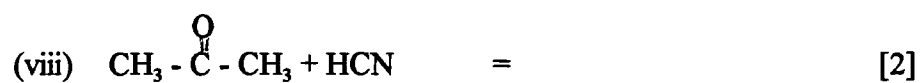
[5]

[25]

QUESTION 6

Copy and complete the following equations. (Each answer carries two [2] marks except for questions (a) which carries one [1] mark)





[25]