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SEM. 1 : 2016/2017

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**THE UNIVERSITY OF SWAZILAND**

**SPECIAL FINAL EXAMINATION PAPER**

- PROGRAMMES:** B.Sc. IN AGRONOMY YEAR 1  
B.Sc. IN HORTICULTURE YEAR 1  
B.Sc. IN AGRICULTURAL ECONOMICS AND AGRIBUSINESS  
MANAGEMENT YEAR 1  
B.Sc. IN AGRICULTURAL BIOSYSTEMS ENGINEERING YEAR 1  
B.Sc. IN ANIMAL SCIENCE YEAR 1  
B.Sc. IN ANIMAL SCIENCE DAIRY YEAR 1  
B.Sc. IN CONSUMER SCIENCES EDUCATION YEAR 1  
B.Sc. IN CONSUMER SCIENCES YEAR 1  
B.Sc. IN FOOD SCIENCE, NUTRITION AND TECHNOLOGY  
YEAR 1  
B.Sc. IN TEXTILE AND APPAREL DESIGN AND MANAGEMENT  
YEAR 1  
B.Sc. IN AGRICULTURAL EDUCATION AND EXTENSION YEAR 1

**COURSE CODE:** CPR103

**TITLE OF PAPER :** INTRODUCTORY CHEMISTRY  
SECTION 1 : INORGANIC CHEMISTRY  
SECTION 2 : ORGANIC CHEMISTRY

**TIME ALLOWED :** TWO [2] HOURS

**INSTRUCTION :** ANSWER FOUR [4] QUESTIONS WITH TWO [2] QUESTIONS  
FROM EACH SECTION

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CHIEF INVIGILATOR.**

SECTION 1 : INORGANIC CHEMISTRY

QUESTION 1

Define the following terms and phrases.

- i) Composition [5 marks]
- ii) Chemical symbol [5 marks]
- iii) Freezing point [5 marks]
- iv) Mixture [5 marks]
- v) Matter [5 marks]

[25marks]

QUESTION 2

- a) Calculate the formula mass of jarosite  $[\text{FeSiO}_3]$  given the following atomic masses: Fe = 55.847 amu, Si = 28.0855 amu, O = 15.994 amu. Allow four [4] decimal places for your answer. [10 marks]
- b) Determine the per cent [%] element composition of jarosite above. [15 marks]

[25 marks]

QUESTION 3

- a) Calculate the number of atoms of hematite  $\text{Fe}_2\text{O}_3$  if it weighs 10 g, given the following information. Atomic masses of Fe = 55.847 amu And that of O = 15.9994 amu. Avogadro's # =  $6.023 \times 10^{23}$  [15 marks]
- b) Use the product rule to determine the soil pH values given the following hydrogen concentrations:
  - i) 0.0001M [5 marks]
  - ii) 0.001 M [5 marks]

[25 marks]



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SECTION 2 : ORGANIC CHEMISTRY

QUESTION 4

a) Define the terms and phrases. Include a structural formula where possible.

- i) Hydrocarbon [5 marks]
- ii) A meta director [5 marks]
- iii) A saturated hydrocarbon [5 marks]
- iv) A phenol [5 marks]

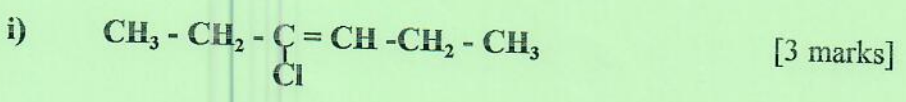
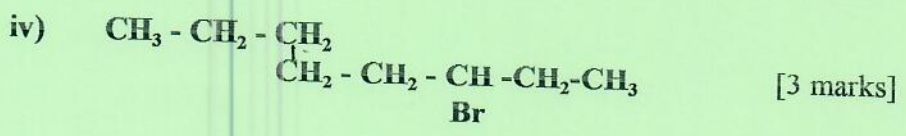
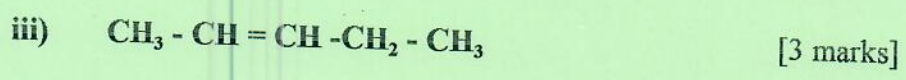
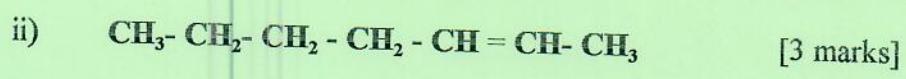
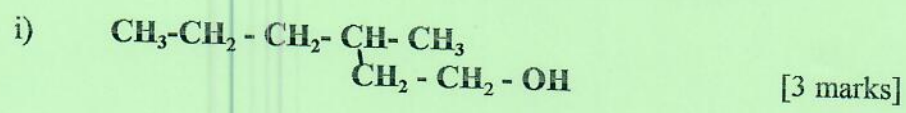
b) Determine the molecular formulae of the following statements :

- i) An alkane that has 4 carbon atoms [1 mark]
- ii) An alkane with 8 carbon atoms [2 marks]
- iii) An alkene that has 8 carbon atoms [2 marks]
- iv)

[25 marks]

QUESTION 5

a) Write the IUPAC names for the following organic compounds:



[15 marks]

b) Write condensed structural formulae for each of the following compounds :

- i) 3-methylhexane [2 marks]
- ii) Propanol [2 marks]

- i) Cyclohexane [2 marks]
- ii) 2-Hexanol [2 marks]
- iii) 3-Methyl-4-octene [2 marks]

[10 marks]

[25marks]

### QUESTION 6

Copy and complete the following half reaction equations:

- i)  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3 + \text{O}_2 =$  [5 marks]
- ii)  $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2 + \text{HBr} =$  [5 marks]
- iii)  $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2 + \text{Br}_2 =$  [5 marks]
- iv)  $\text{CH}_3\text{-CH=CH}_2 + \text{Cl}_2 =$  [5 marks]
- v)  $\text{CH}_3\text{-CH}_2\text{-CH}_3 + 5\text{O}_2 =$  [5 marks]

[25 marks]