



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya

Tel: +254(0) 799 529 958, +254(0) 799 529 959, + 254 (0) 712 524 293,

Website: [info@must.ac.ke](mailto:info@must.ac.ke) Email: [info@must.ac.ke](mailto:info@must.ac.ke)

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## University Examinations 2024/2025

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DIPLOMA IN ANIMAL  
HEALTH PRODUCTION AND DIPLOMA IN FOOD SCIENCE

### SCS 2100: CHEMISTRY

DATE: JANUARY 2025

TIME: 1½ HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

#### QUESTION ONE (30 MARKS)

- a) Define the following terms (4 marks)
- (i) Isotope
  - (ii) Molarity
  - (iii) Hydrocarbon
  - (iv) Alkene
- b) What is the element symbol for an atom that contains 6 protons and 7 neutrons? Explain your answer (2 marks)
- c) Write the formula of the compound formed between  $K^+$  and  $CrO_4^{2-}$  ions. What is the name of the compound? (2 marks)
- d) Draw, label and explain all parts of an electromagnetic wave (3 marks)
- e) Describe two applications of chemistry industries (2 marks)
- f) Differentiate homogenous and heterogeneous substances and give 2 examples in each (4 marks)

- g) Give the electronic configuration group and period of the following element. Sodium element (Na) (2 marks)
- h) Describe the three major subatomic particles of an atom (3 marks)
- i) The hydrocarbon propylene has a molar mass of 42.00g and contains 14.3% H and 85.7% C. what is its molecular formula? Given that C (12.01g) and H(1.008g) (3 marks)
- j) What is ionic product of water. Give its mathematical expression (3 marks)
- k) State the Faraday's law (2 marks)

**QUESTION TWO (15 MARKS)**

- a) Differentiate Cation and Anion, and give 2 examples in each (2 marks)
- b) Give the chemical names and chemical formulas of the following compounds (5 marks)

Common name	Chemical formula	Chemical name
Table salt		
Limestone/marble		
Acetylene		
Baking Soda		
Alumina		

- c) Differentiate between ionic bond and covalent bond (3 marks)
- d) What is the mass of 2.5 moles of water; Given that H (1g) and O (16g) (3 marks)
- e) List down four types of orbitals (2 marks)

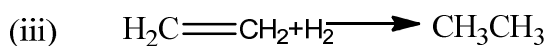
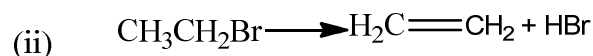
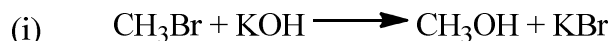
**QUESTION THREE (15 MARKS)**

- a) (i) Differentiate isotopes and isobars and give two examples in each (4 marks)
- (ii) The atomic number and mass number of element X are 17 and 35 respectively. Calculate the neutrons number of the element X (2 marks)
- b) Give three postulates of Daltons atomic theory (3 marks)

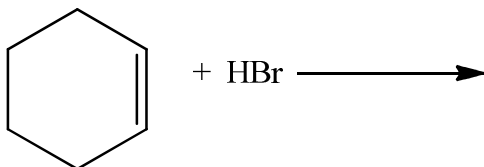
- c) Benzoic acid is a white, crystalline powder used as a food preservative. The compound contains 68.8% C, 5.0% H, and 26.2% O, by mass. What is its empirical formula? (4 marks)
- d) State the first law of thermodynamics (2 marks)

**QUESTION FOUR (15 MARKS)**

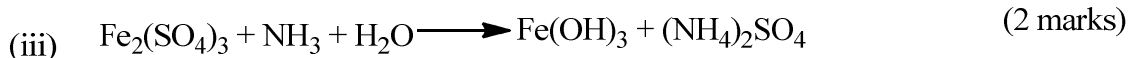
- a) Classify each of the following reactions as an addition, elimination, substitution, or rearrangement. (3 marks)



- b) What product would you expect from reaction of cyclohexene with HBr and HCl? (3 marks)



- c) Balance the following equations.



- d) Work out by balancing and write a net ionic equation for the following molecular equation

