



# THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

**A. M. E. C. E. A**

**MAIN EXAMINATION**

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**AUGUST – DECEMBER 2018 TRIMESTER**

**FACULTY OF SCIENCE**

**DEPARTMENT OF NATURAL SCIENCE (CHEMISTRY)**

**REGULAR PROGRAMME**

**CHEM 104: CHEMICAL BONDING AND STRUCTURE**

**Date: DECEMBER 2018**

**Duration: 2 Hours**

**INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions**

- Q1. a) i) Name four types of electromagnetic radiation **(4 marks)**
- ii) Explain and relate the measurable properties of electromagnetic radiation **(4 marks)**
- b) i) Discuss the Dalton's atomic theory **(5 marks)**
- ii) Explain the significance of the spin quantum number **(3 marks)**
- c) i) Discuss the experiment conducted by the Rutherford that led to discovery of the nucleus **(5 marks)**
- ii) Explain the three rules governing electron configuration of an atom **(6 marks)**
- d) Explain the formation a metallic bond **(3 marks)**
- Q2. a) Discuss the dual wave-particle nature of light **(10 marks)**
- b) The study of atomic structure and the nucleus produced a new field of medicine, nuclear. Discuss the use of radioactive tracers to detect and treat diseases. **(10 marks)**

- Q3. a) Discuss the use of the VSEPR theory, in predicting the shapes of molecules or polyatomic ions **(10 marks)**  
b) Explain the distinctive properties of ionic and molecular compounds **(10marks)**
- Q4. a) Compare the periodic variations of atomic radii, ionization energy, and electronegativity with reasons **(10 marks)**  
b) With examples discuss different types of intermolecular forces **(10 marks)**
- Q5. a) Using a well labeled diagram to illustrate, discuss the formation of a covalent bond. **(10 marks)**  
b) In general explain the different periodic properties of d-block elements and the main group elements. **(10 marks)**

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