



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

*Faculty of Applied & Health Sciences*

DEPARTMENT OF PURE AND APPLIED SCIENCES

**DIPLOMA IN SCIENCE INDUSTRIAL MICROBIOLOGY & BIOTECHNOLOGY  
(DIMBT 11M)**

ACH 2204: INORGANIC CHEMISTRY

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: FEBRUARY/MARCH 2012**

**TIME: 3 HOURS**

## **Instructions to Candidates:**

You should have the following for this examination

- *Answer booklet*

This paper consists of **TWO** sections **A & B**

Answer **ALL** questions in section A and **THREE** questions in section B.

Question **ONE** carries 30 marks while those in section **B** carry 15 marks each

This paper consist of **THREE** printed pages

## SECTION A (Answer all questions)

### Question One

- a) Define the following terms
- (i) Transition elements
  - (ii) Ligands (2 marks)
- b) Explain the relationship between the atomic size and the ionization energy of element (4 marks)
- c) An element Z has atomic number 20
- (i) Write the electronic configuration in spd notation of element “Z” (2 marks)
  - (ii) State with reasons the group/period in which element “Z” belongs (2 marks)
- d) State **FOUR** ways in which Lithium differ from other members of group 1A (4 marks)
- e) Explain the difference in bonding between sodium chloride and sodium metal (4 marks)
- f) State any **FOUR** chemical properties of Alkali metals, support each with a balanced equation (4 marks)
- g) List any **FOUR** properties of covalent compounds (4 marks)
- h) State **TWO** uses of copper and zinc metal (2 marks)

## SECTION B

### Question Two

Carbon is the first element in group IV of the periodic table with allotropes, graphite and diamond.

- a) Draw the structures of diamond and graphite (4 marks)
- b) From the drawn structures, explain why:
- (i) Diamond is very hard while graphite is soft (2 marks)
  - (ii) State **TWO** uses of diamond and graphite (4 marks)
- c) Using ammonia explain  $sp^3$  hybridization (3 marks)

### Question Three

Describe the periodic trend of: (12 marks)

- a) Electronegativity
- b) Ionization energy
- c) Melting point
- d) Atomic radius
  - (i) Across the period

- (ii) Down the group giving reasons for your answer
- e) Explain why group 1A elements;
- (i) Are good conductor of heat (1 ½ marks)
  - (ii) Have lower melting points than group 2A elements (1 ½ marks)

#### Question Four

- a) Using dots and cross illustrate formation of ethane and ammonia molecules (4 marks)
- b) State **SIX** types of chemical bonding (6 marks)
- c) Explain any **FIVE** diagonal relationship between beryllium in group (II) and Aluminum in group (III) (5 marks)

#### Question Five (15 marks)

- a) State **FIVE** characteristics of transition metals (5 marks)
- b) Using the equation given below identify
- (i) Oxidized species and reduced species (2 marks)
  - (ii) Reducing agent and oxidizing agent (2 marks)



- c) Explain **THREE** factors that influence ionization energy (6 marks)