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**KIBABII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**  
**2019/2020 ACADEMIC YEAR**  
**FIRST YEAR FIRST SEMESTER**  
**SUPPLEMENTARY EXAMINATIONS**  
**FOR THE DEGREE OF B.ED (SCIENCE)**

**COURSE CODE:** SCH 211\*

**COURSE TITLE:** INORGANIC CHEMISTRY

**DURATION:** 2 HOURS

**DATE:** 5/02/21 **TIME:** 2-4 Pm

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**INSTRUCTIONS TO CANDIDATES**

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of 4 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

**Question one (30 marks)**

**(a) State the difference between Beryllium and Other Group 2 Elements (4 marks)**

- (b) Explain the oxidation states exhibited by p-block element **(3marks)**
- (c) Non-metal and metalloids exist in p-block elements, the non-metallic character in p-block elements decreases down the group. Distinguish between metals and non-metals.

**(3 marks)**

- (d) Name the following compounds. **(3 marks)**



- (e) Briefly describe structure and bonding in Boranes **(4 marks)**
- (f) State three factors that are responsible for bond shortening in borontrihalide. **(3 marks)**
- (g) Boron is always a trivalent and never a monovalent explain. **(2 marks)**
- (h) Explain the trend in reactivity's of halogens. **(3 marks)**
- (i) Define the following terms: **(3 marks)**

Ionization energy

Electron affinity

Electronegativity

- (j)  $[SiF_4]^{2-}$  is known whereas  $[SiF_6]^{2-}$  is not. Give possible reasons. **(2 marks)**

(a) Elements in group (ii) of the periodic table are Barium (Ba), beryllium (Be) calcium (Ca), magnesium (Mg), radium and strontium (Sr)

(i) Arrange these elements in the order of their increasing atomic radius.

**(3marks)**

(ii) Using s,p,d, f notation write the electronic configuration of Ca and Mg.

**(2marks)**

(iii) Are the elements in group (ii) metals or non-metals? Explain. **(3 marks)**

(iv) It is easier to form  $Mg^+$  ion than  $Mg^{2+}$  ion from magnesium atom, in spite of these  $Mg^+$  is not found in Magnesium compounds. Explain. **(2 marks)**

(b) The halogens (F, Cl, Br, I) form well defined group of elements. Explain how the following supports this statement. **(6 marks)**

(i) electron structure

(ii) usual oxidation state

(iii) Redox behavior

(c) (i) What is electron affinity? **(1mark)**

(ii) How does electron affinity relate to the reactivity of halogens? **(3 marks)**

### Question Three (20 marks)

(a) Basing on the physical property, give two uses of

(i) Diamond **(2 marks)**

(ii) Graphite **(2 marks)**

**(4 marks)**

(b) Group four elements have four electrons in the outer shell, however none of the elements form  $M^{4+}$  cations in solid compounds. Explain. **(2marks)**



- (c) Carbon has ability to catenate, explain **(2marks)**
- (d) Using chemical equations explain how lead reacts with. **(8 marks)**
- (i) Air
  - (ii) Hard water
  - (iii) Soft water
  - (iv) Dilute nitric (v) acid
- (e) Explain the following in terms of atomic or electronic properties
- (i) Lead (ii) compounds are more stable than lead (iv) compounds. **(2 marks)**
  - (ii) Lead (iv) chloride has a simple molecular structure whereas lead (ii) chloride is an ionic compound. **(2 marks)**

**Question four (20 marks)**

- (a) (i)  $\text{BF}_3$  behaves like a lewis acid, Explain. **(3 marks )**
- (iii) With an aid of a chemical equation show how  $\text{BF}_3$  reacts with ammonia. **(2marks)**
- (b) Explain how Boron and Alluminium react with **(6 marks)**
- (i) air. **(2 marks)**
  - (ii) Dilute hydrochloric acid **(2 marks)**
  - (iii) Concentrated nitric (v) acid **(2 marks)**
- (c) Comment on the nature of the oxides of group 13 element. **(3 marks)**
- (d) State two uses of boron. **(2 marks)**