



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

OPEN DISTANCE AND e-LEARNING (ODEL)

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE**

SCH 100: FUNDAMENTAL OF INORGANIC CHEMISTRY

DATE: WEDNESDAY 14TH DECEMBER 2011

TIME: 8.00 A.M -10.00 A.M

INSTRUCTIONS: Do ALL Questions

1)

a. Briefly Explain the following theories

- i. The de-Broglie theory (3 marks)
- ii. Heisenberg uncertainty principle (3 marks)
- iii. State one experiments that support the de-Broglie theory (2 marks)

b. Elements X and Y have atomic numbers 38 and 51 respectively

- i. Write the electronic configuration of X and Y (4 marks)
- ii. Use the configuration to identify the group and period of X and Y in the IUPAC periodic table (4 marks)
- iii. Which of the two atoms, X and Y has a larger atomic radius, Explain your answer (4 marks)

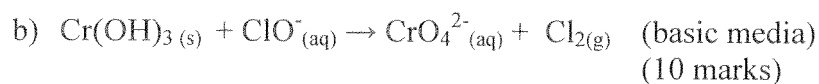
c. Derive all the atomic orbital present when the principle quantum number, $n = 2$. (3 marks)

2) Draw the Lewis structures of the following molecule and ions and clearly show your working. (The atomic numbers of B, C, O, F, and Cl are 5, 6, 8, 9 and 17 respectively)

- a. CO_3^{2-} (3 marks)
- b. COCl_2 (3 marks)
- c. BF_4^- (3 marks)

- d. Use the Lewis structures of 3a-c above to predict their molecular geometry (3 marks)
- e. Use the Lewis structures of 3a-c above to identify the hybridization on the central atom of the corresponding species. (3 marks)
- f. Use the Lewis structures of 3a-c above to predict their molecular geometry (3 marks)
- g. Use the Lewis structures of 3a-c above to identify the hybridization on the central atom of the corresponding species. (3 marks)
- h) Describe the four quantum numbers used to characterize an electron in an atom (6 marks)
- i) What type of orbital (i.e. 3s, 4p) is designated by the following quantum numbers?
- ($n=5, l=1, m_l=0$) (2 marks)
 - ($n=4, l=2, m_l=-2$) (2 marks)

3) Balance the following redox reaction



4) Briefly Explain the following decays that occur in nuclear reactions

- α -decay
- β^+ -decay (4 marks)

c. Complete the following equations

