



# QUAID-I-AZAM UNIVERSITY ISLAMABAD

B.Sc. Annual Examinations--2013  
(PART-I)

Roll No: \_\_\_\_\_

SUBJECT: **Chemistry**

PAPER: **B** (Inorganic Chemistry)

Time Allowed: **3 Hours**

**June 20, 2013**

Max Marks: **60**

## SECTION-I

**Note: Attempt any FOUR questions from Section-I. All the questions carry equal marks.**

### Q. No.1

- (a) Define electronegativity. Explain the term by the two advanced theories. (6)  
(b) Predict the geometric shapes of XeOF<sub>4</sub>, PF<sub>5</sub> and CH<sub>3</sub>O<sup>-</sup> and explain these structures with respect to the VSEPR theory. (6)

### Q. No.2

- (a) Discuss salient features of the Crystal Field Theory (CFT). Calculate crystal field stabilization energy for d<sup>7</sup> (low spin, octahedral) and d<sup>5</sup> tetrahedral systems. (6)  
(b) Define activity and activity coefficient and their significance in chemistry. (6)

### Q. No.3

- (a) Write a critical note on the soft and hard acid-base concept to explain reactivity and of stability compounds. (6)  
(b) The solubility product of Fe(OH)<sub>3</sub> is 1.1 x 10<sup>-36</sup>. Find solubility of the compound in: (6)  
i. mol·dm<sup>-3</sup>  
ii. g·dm<sup>-3</sup>

### Q. No.4

- (a) Write IUPAC names: (6)  
i. Co(NH<sub>3</sub>)<sub>5</sub>ONO]Cl<sub>2</sub>  
ii. Fe<sub>4</sub>[Fe(CN)<sub>6</sub>]  
iii. [Co(NH<sub>3</sub>)<sub>3</sub> [Fe(CN)<sub>5</sub>]Br  
iv. [Co(NH<sub>3</sub>)<sub>6</sub>]<sub>3</sub> [Fe(CN)<sub>5</sub> Br]  
v. [Cr(NH<sub>3</sub>)<sub>6</sub>] [Cr (C<sub>2</sub>O<sub>4</sub>)<sub>3</sub>]  
vi. [Co(en) (NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>]Cl  
(b) What are standard deviation and relative standard deviation? Describe with examples. (6)

### Q. No.5

- (a) Describe the Lowry-Bronsted concept of acid-base. How are the relative strengths of acids and bases determined? (6)  
(b) Write the metallurgy of Ni in detail starting from ore to the final product. (6)

### Q. No.6

- (a) Draw the Molecular Orbital (MO) diagrams for the formation of oxygen and nitrogen molecules. Also discuss their salient features in the light of the MO diagrams (6)  
(b) Define double salt and complex salt and differentiate between them (6)

**SECTION-II**

**Note: Attempt any SIX parts from Section-II. All parts carry equal marks.**

**Q. No.7 Do as required:**

**(2x6=12)**

- (i) Give relative strength of the halogen acids with justification.
- (ii) "Ionic compounds may be good conductors as well as bad conductors". Explain and justify the statement.
- (iii) What are bridge compounds? Write two examples giving their IUPAC names.
- (iv) Write Mullikan's scale for the measurement of electro negativity.
- (v) "Invisible ink is a transition element compound". Write its composition and reaction.
- (vi) Write IUPAC name and the 'structure formula' of  $[\text{Ni}(\text{DMG})_2]$ .
- (vii) Differentiate between precision and accuracy.
- (viii) "HCl is used for detection of the group-II basic radicals in salt analysis". Explain the reason.
- (ix) Write the Lewis dot formula for  $\text{N}_2\text{O}_4$  and CO.
- (x) Determine oxidation states of chlorine in perchloric acid and chloric acids.