



# UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig. ....

Roll No. in Words. ....

**PAPER: Inorganic Chemistry (Sp. Theory-I)**  
**Course Code: CHEM-406 Part-I (Compulsory)**

**MAX. TIME: 15 Min.**  
**MAX. MARKS: 10**

Signature of Supdt.: .....

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Division of marks is given in front of each question.**

**This Paper will be collected back after expiry of time limit mentioned above.**

**Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)**

- (1) An advantage of organic reagent in inorganic analysis is:  
(a) Ease of handling (b) Volatility (c) Presence of impurity (d) High molecular weight
- (2) Which is/are monodentate ligand(s)  
(a) Chloro (b) Aqua (c) Oxime (d) Both (a) and (b)
- (3) Which has a  $d\pi - p\pi$  bond:  
(a)  $PCl_5$  (b)  $(CH_3)_3PO$  (c)  $(CH_3)_3NO$  (d)  $SF_4$
- (4) 8-hydroxyquinoline is also known as  
(a) oxine (b) brine (c) Saline (d) Nessler's reagent
- (5) Lone pair occupies equatorial position rather than axial (apical) position in:  
(a) Tetrahedral (b) Square planar (c) Trigonal bipyramidal (d) Bent/angular
- (6) The element that can make trivalent positive ion is:  
(a) Boron from group IIIA (b) Tin from group IVA  
(c) Bismuth from group VA (d) Selenium from group VIA
- (7) The stretching frequency of  $C \equiv O$  in the bridging carbonyl ligands in metal carbonyls is approximately:  
(a)  $2155cm^{-1}$  (b)  $2125 - 1850cm^{-1}$  (c)  $1800cm^{-1}$  (d)  $2000cm^{-1}$
- (8) The strongest  $p\pi - p\pi$  is:  
(a)  $Si = Si$  (b)  $C = C$  (c)  $C = Si$  (d)  $Ge = Ge$
- (9) \_\_\_\_\_ explains geometries and electronic spectra of small molecules:  
(a) Walsh diagrams (b) Molecular Orbital theory (c) Valence bond theory (d) Multicentred bonding
- (10) The symmetry of  $BeCl_2$  is represented by the point group  
(a)  $C_{2v}$  (b)  $C_{3v}$  (c)  $D_{\infty h}$  (d)  $T_d$



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**PAPER: Inorganic Chemistry (Sp. Theory-I)**

**Course Code: CHEM-406 Part – II**

**MAX. TIME: 2 Hrs. 45 Min.**

**MAX. MARKS: 50**

**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

**Q. 2. Answer following short questions.**

**(2 × 10 = 20)**

- (i) Give two failures of Valence Bond theory.
- (ii) What are physical states of different halogens at room temperature and why these are different?
- (iii) Which type of bonding is stronger between  $p\pi - p\pi$  and  $d\pi - p\pi$  and why?
- (iv) Give the structure of diborane molecule. What type of a bond explains its structure?
- (v) What are amphoteric oxides? Give one example.
- (vi) What is s – inert pair effect?
- (vii) Name different organic reagents used as indicators in acid-base titrations?
- (viii) Name various types of organic reagents (other than indicators) used in analysis?
- (ix) How chelates can be classified?
- (x) What are complexometric titrations?

**Q. 3. Answer following questions.**

**(3 × 10 = 30)**

- (i) Discuss  $p\pi - p\pi$  bonding in the heavier congeners of group IVA. (10)
- (ii) Brief the role of organic reagents in different analytical techniques. (10)
- (iii) Explain use of “d” orbital in bonding by non-metals with few examples. (10)