

# BSC. PART - II EXAMINATION - 2011

## CHEMISTRY HONOURS INORGANIC

1. Choose the correct answers of the following :

(a) Which of the following is not an element of the second transition series ?

- (i) Molybdenum (ii) Silver (iii) Platinum (iv) Zirconium

(b) Which of the following is an element of 3rd transition series ?

- (i) Osmium (ii) Cerium (iii) Cadmium (iv) Francium

(c) The transition element used for filling thermometer is

- (i) platinum (ii) mercury (iii) palladium (iv) tungsten

(d) The lanthanides have the general configuration

- (i)  $4f^{1-14}5s^2p^66s^2$  (ii)  $(n-1)d^{1-10}ns^1$

- (iii)  $5f^{1-14}6s^2p^67s^2$  (iv)  $ns^2 - np^{1-6}$

(e) In the spectrochemical series, which ligand produces strong field ?

- (i)  $Cl^-$  (ii)  $H_2O$  (iii)  $NO_2^-$  (iv) CO

(f) Which of the following is a soft acid, according to Pearson's concept of hard and soft acids ?

- (i)  $Ag^+$  (ii)  $I^+$  (iii)  $Sr^{2+}$  (iv)  $Al^{3+}$

(g) In  $XeF_4$ , Xenon involves (i)  $sp^3$  hybridisation (ii)  $sp^3d$  hybridisation

- (iii)  $sp^3d^2$  hybridisation (iv)  $sp^3d^3$  hybridisation

(h) In which non-aqueous solvent sodium gives blue solution ?

- (i) Liquid  $NH_3$  (ii) Liquid  $SO_2$  (iii) Liquid  $HF$  (iv) Liquid  $N_2O_4$

(i) Oxidation numbers of oxygen in  $F_2O$  and  $H_2O_2$  are respectively

- (i) +2 and -1 (ii) -2 and +2 (iii) -2 in both (iv) +2 and -2

(j) Which of the following is not a hard base according to Pearson's concept of hard and soft bases ?

- (i)  $F^-$  (ii)  $I^-$  (iii)  $NO_2^-$  (iv)  $O^{2-}$

2. (a) What are lanthanides?  
 (b) Discuss chemistry of lanthanides with respect to -  
 (i) oxidation states and their stability: (ii) complex formation (iii) ionic radii.
3. Explain the following:  
 (a)  $[FeF_6]^{-3}$  is outer orbital complex. (b)  $[Fe(CN)_6]^{-3}$  is inner orbital complex.  
 (c)  $[Ni(CO)_4]$  is diamagnetic. (d)  $[CuCl_4]^{-2}$  is paramagnetic.
4. Find out structures and shapes of the following molecules:  
 (i)  $XeF_2$  (ii)  $XeF_4$  (iii)  $XeF_6$  (iv)  $XeO_3$ .
5. (a) Write down electronic configurations of the following:  
 (i) Mo (ii) Mercuric ion (iii) Stannic ion. [Mo(42), Sn(50) and Hg(80)]  
 (b) Discuss the chemistry of transition element with reference to second series of transition element  
 (i) Magnetic properties (ii) Colour of compounds
6. (a) Give two examples each of acidbase reaction, precipitation reaction, redox reaction and complex formation in liquid  $NH_3$   
 (b) The solution of alkali metals in liquid  $NH_3$  is blue. Why?
7. (a) What is meant by the term redox potential?  
 (b) How are positive and negative signs assigned to the redox potentials?  
 (c) Discuss the importance of redox potentials in the phenomenon of oxidation and reduction.
8. (a)  $Ag^+$  is stable and  $Ag^{2+}$  does not stable why?  
 (b)  $[CoF_6]^{3-}$  is more stable than  $[CoI_6]^{3-}$  ion. why?  
 (c)  $FeI_3$  is unstable. Why?  
 (d)  $HgS$  is more stable than  $Hg(OH)_2$  why?
9. Write the IUPAC names of any five of the following compounds:  
 (i)  $[Co(NH_3)_5Cl]Cl_3$  (ii)  $[Co(NH_3)_5Cl]^{2+}$   
 (iii)  $[Co(NO_3)_3(NH_3)_3]$  (iv)  $K_4[Fe(CN)_6]$   
 (v)  $K_3[Fe(CN)_5NO]$  (vi)  $[Cr(C_6H_6)_2]$   
 (vii)  $[CoSO_4(NH_3)_4]NO_3$  (viii)  $Na_2[ZnCl_4]$   
 (ix)  $[Fe(C_5H_5)_2]$  (x)  $[Cr(en)_3]Cl_3$