

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)  
BSc DEGREE EXAMINATION DECEMBER 2019  
(Fifth Semester)

Branch - CHEMISTRY

**INORGANIC CHEMISTRY !**

Time : Three Hours

Maximum : 75 Marks

**SECTION-A (20 Marks!)**

Answer ALL questions

ALL questions carry EQUAL marks (10 x 2 = 20)

- 1 Write name of one bidentate and tridentate ligand.
- 2 Transition metals are used as catalyst. Why?
- 3 Account:  $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$  is a high spin complex whereas  $[\text{Mn}(\text{CN})_6]^{2-}$  is a low-spin complex.
- 4 Account: Octahedral splitting energy,  $A_0$  is always higher than the tetrahedral splitting energy  $A_t$ .
- 5 Write the limitation of CFT.
- 6 Calculate the magnetic moment of the  $[\text{Fe}(\text{CN})_6]^{2-}$ .
- 7 What is the difference between hemoglobin and myoglobin?
- 8 Draw the structure of ferridoxin.
- 9 Write preparation of  $\text{Cr}(\text{CO})_6$ .
- 10 Draw the structure of one mononuclear and binuclear carbonyl of iron.

**SECTION - B (25 Marks)**

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 5 = 25)

- 11 a Define the following terms giving suitable examples:  
i) Ligand ii) Co-ordination sphere  
iii) Co-ordination number iv) Complex compounds  
OR  
b Discuss optical isomerism exhibited by complexes of co-ordination number 6.
- 12 a Using valence bond theory, predict the structure and magnetic properties of the following complex (2.5+2.5).  
i)  $[\text{NiCl}_4]^{2-}$  ii)  $[\text{Ni}(\text{CN})_4]^{2-}$  ion  
OR  
b Explain the various factors effecting the magnitude of crystal field splitting.
- 13 a How does crystal field theory explain the colour of the transition metal complexes.  
OR  
b Discuss the Jahn-Teller distortion in  $\text{Cu}^{2+}$  complexes.
- 14 a Highlight the structural feature and function of chlorophyll.  
OR  
b Outline the role of trace elements in biological systems.
- 15 a Write notes on classification of carbonyls.  
OR  
b Give the preparation and bonding of sodium nitroprusside.

Cont...

**SECTION - C 130 Marks!**Answer any **THREE** Questions**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 i) what is chelate. Give an example. (3)  
ii) Highlight applications of chelates. (7)
- 17 i) How do 'd' orbitals split when a transition metal ion is placed in octahedral field? (6)  
ii) Write the electronic distributions for both high spin and low spin complexes of  $d^4$  and  $d^6$ . (4) \*
- 18 i) What is trans effect? Give an example. (3)  
ii) Describe the pi-bonding theory of trans effect. (7)
- 19 i) Discuss the structure of hemoglobin. (4)  
ii) Explain mechanism of intake of oxygen by hemoglobin. (6)
- 20 Explain the preparation and structure of ferrocene. (2+8)

Z-Z-Z

END