

SEAT No. \_\_\_\_\_



No. of Printed Pages: 2

[A-28(B)]

**SARDAR PATEL UNIVERSITY**  
**B. Sc. Examination (Fourth Semester)**  
**US04CCHE01 (Inorganic Chemistry)**

Total Marks: 70

Note: (i) All questions are to be attempted. (ii) Figures to the right indicate marks.

**Q-1 Multiple choice questions.**

[10]

- d-block elements lie between elements.  
(a) s-and p-block (b) s-and f-block (c) p-and f-block (d) none of above
- is not  $\pi$ -acid ligand.  
(a)  $\text{NH}_3$  (b) CO (c) CNR (d)  $\text{PCl}_3$
- The primary oxidation state of metal in a complex compound always satisfy by \_\_\_\_\_.  
(a) anion (b) cation (c) ligand (d) non of above
- Which type of the following square planar complexes would exhibit cis and trans isomers?  
(a)  $\text{Ma}_3\text{b}$  (b)  $\text{Ma}_4$  (c)  $\text{Ma}_3\text{b}$  (d)  $\text{Ma}_2\text{b}_2$
- The number of ions present in  $\text{K}_3[\text{Fe}(\text{CN})_6]$  are \_\_\_\_\_.  
(a) 10 (b) 3 (c) 2 (d) 4
- The electronic configuration of Europium is \_\_\_\_\_.  
(a)  $[\text{Xe}] 4f^6 5d^1 6s^2$  (b)  $[\text{Xe}] 4f^7 5d^0 6s^2$  (c)  $[\text{Xe}] 4f^6 5d^2$  (d)  $[\text{Xe}] 4f^6 5d^0 6s^1$
- Which extractant is used in solvent extraction method?  
(a)  $\text{Al}(\text{NO}_3)_3$  (b)  $\text{K}_2\text{Cr}_2\text{O}_7$  (c) TBP (d)  $\text{BiPO}_4$
- In the metal carbonyls, \_\_\_\_\_ bond form between metal and carbonyl.  
(a)  $\text{M} \rightarrow \text{CO}$  (b)  $\text{M} \rightarrow \text{OC}$  (c)  $\text{M} \leftarrow \text{CO}$  (d)  $\text{M} \leftarrow \text{OC}$
- Which of the following metallic carbonyl is not diamagnetic?  
(a)  $[\text{Co}(\text{CO})_6]$  (b)  $[\text{V}(\text{CO})_6]$  (c)  $[\text{Fe}(\text{CO})_5]$  (d)  $[\text{Ni}(\text{CO})_4]$
- Sodium nitroprusside with sulphide give \_\_\_\_\_ colour.  
(a) red rose (b) violet (c) green (d) blue

**Q-2 Fill up the blanks & Write the True or False.**

[08]

- The atomic radii decrease gradually from Sc to Mn, but from \_\_\_\_\_ these values remain practically constant. (Fe to Zn / Fe to cu)
- \_\_\_\_\_ Complex ion whose central metal ion obey EAN rule.  
(  $[\text{Co}(\text{NH}_3)_6]^{3+} / [\text{Co}(\text{NH}_3)_6]^{2+}$  )
- The most characteristics oxidation state of lanthanide is \_\_\_\_\_. (+2 / +3)
- The oxidation state of metal in metal carbonyls is \_\_\_\_\_. (zero / positive)
- $[\text{Zn}(\text{NH}_3)_4]$  compound is not paramagnetic. ( True / False )
- Trans- $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$  complex ion is likely to show optical activity. ( True / False )
- Lanthanides are separated best by Ion exchange resins. ( True / False )
- The bridged carbonyls contained one metal atom. ( True / False )

**Q-3 Attempt any ten questions of following.**

[20]

1. Which d-block elements of 3d series show anomalous electronic configuration and give their correct configuration.
2. Why d-block elements show variable oxidation states?
3. Give application of magnetic moment value.
4. Draw all possible isomers of  $[\text{Pt}(\text{en})_2\text{Cl}_2]^{2+}$ .
5. Give the molecular formula of all the hydrate isomers of  $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$  and its physical properties.
6. Give the conditions for a molecule to show optical isomerism.
7. Define Lanthanides & Actinides.
8. Give use of Lanthanides in medical and agriculture fields.
9. List the modern methods used for the separation of lanthanides.
10. Classify the metallic carbonyls giving suitable examples.
11. Draw the structure of  $\text{Fe}_3(\text{CO})_{12}$ .
12. Calculate EAN of  $[\text{Fe}(\text{CO})_5]$  and  $[\text{Co}(\text{CO})_3(\text{NO})^+]$ .

**Q-4 Attempt any four questions of following.**

[32]

1. Give the name, symbol, complete and valence shell electronic configuration of 2<sup>nd</sup> transition series elements.
2. The purple colour of  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  ion attributed to d-d transition. Explain.
3. Explain the basic postulates of Werner's coordination theory.
4. Describe the chemical method (Grinberg's method) to distinguish between cis and trans isomers of the complex  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]^0$ .
5. Define Lanthanides. Give the name, symbol, atomic number and electronic configuration of Lanthanides.
6. Discuss the various oxidation states of actinides.
7. Give the general methods of preparation and chemical properties of metal carbonyls.
8. Discuss the preparation, properties, structure and hybridization in  $\text{Ni}(\text{CO})_4$ .

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(2)