

Group C

Answer any *two* questions

2×8 = 16

13. (i) Briefly discuss the temperature effect (above and below the Curie temperature) on ferromagnetic materials with the help of Weiss Theory. 3
(ii) Calculate the magnetic moment (saturated) in all oxidation state of Fe, Co and Ni systems (H.S and L.S). 5
14. (i) Define magnetic induction, relative permeability and magnetic susceptibility. How they are interrelated? 5
(ii) What is spin crossover? Explain with an example of iron(II) complex. 3
15. (i) What is Bohr magneton? (ii) Discuss Super exchange phenomena with an appropriate example. (iii) The μ_{exp} value is higher than μ_{s} value for tetrahedral Ni(II)- and octahedral Co(II) complexes. Explain. (2+2+4)
16. (i) The bond order in metal-metal linkage is different for $[\text{Mo}_2\text{Cl}_8]^{4-}$ and $[\text{Mo}_6\text{Cl}_8]^{4-}$ clusters- Explain. (ii) Discuss the structure of $[\text{Os}_5(\text{CO})_{19}]$ cluster. (iii) What do you mean by multiplet width? (iv) $[\text{Cr}_2\text{Cl}_9]^{3-}$ is paramagnetic while $[\text{W}_2\text{Cl}_9]^{3-}$ is diamagnetic. Explain. 2+2+2+2

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Internal Assessment-10

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PKC/PG/IVS/CEM-402/24

2024

M.Sc.

4thSemester Examination

CHEMISTRY

PAPER – CEM-402 (Inorganic Special)

Full Marks : 50

Time : 2 Hours

(CEM 402-Advanced Inorganic Chemistry-I)

Group A

Answer any *four* bits:

2×4 = 8

1. What do you mean by spin state equilibrium?
2. Write an example of each of four metal and five metal clusters.
3. What is meant by 'Interstitial carbide'?
4. 'Cu(OAc)₂.H₂O diamagnetic.' Explain.
5. What do you mean by naked cluster? Give an example.
6. Draw the structures of the following species using skeletal electron counting (i) $[\text{Rh}_6(\text{CO})_{16}]$ and (ii) Pb_7^{4+} .

Group B

Answer any *four* bits:

4×4 = 16

7. Discuss the structure of $[\text{Re}_2\text{Cl}_8]^{2-}$ in the light of molecular orbital diagram.
8. $\text{K}_3[\text{CoF}_6]$ is paramagnetic while $\text{K}_2[\text{NiF}_6]$ is diamagnetic in nature. Explain.
9. Explain the structures of $[\text{CpWIr}_3(\text{CO})_{11}]$ and $[\text{Re}_4(\text{CO})_{16}]^{2-}$
10. Calculate the magnetic moments of Tb^{3+} and Dy^{3+} ions.
11. Write two major importances of metal clusters. Write two examples of Π donor clusters.
12. What is meant by 'magnetic flux' and 'magnetic permeability'?

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