2025

M.Sc.

4th Semester Examination

CHEMISTRY

PAPER – CEM-402 (*Advanced Inorganic Chemistry-III*)

Full Marks: 50 Time: 2 Hours

Group A

Answer any ***four*** bits: **2×4 = 8**

1. What is Spin isomerism in magnetism? Explain.
2. What is Lande Interval rule?
3. Differentiate magnetic bodies with respect to magnetic permeability.
4. Describe Currie and Neel temperature.
5. Draw the structures of the following species using skeletal electron counting (i) $[Rh_6(CO)_{16}]$ and (ii) Pb_7^{4-}.
6. What do you mean by remnant zone in hysteresis loop?

Group B

Answer any ***four*** bits: **4×4 = 16**

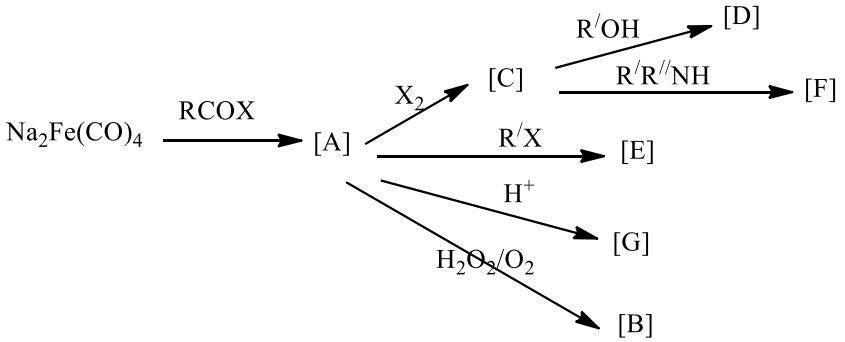
7. Draw a plot of χ_M Vs temperature T(K) for different magnetic substances and explain Curie and Neel temperature. (χ_M =Magnetic Susceptibility). (2+2)
8. Explain why magnetic moment follow the order $CoCl_4^{2-} < CoBr_4^{2-} < CoI_4^{2-}$.
9. Explain the Gauss law with all the significances.
10. What will be product when $Os(CO)_{12}$ is reacted with hydrogen sulphide? Give the structures.
11. What do you mean by 'magnetic flux' and 'magnetic permeability'?
12. Draw and explain the structure of $Re_2Cl_8^{2-}$.

Group C

Answer any ***two*** questions: **2×8 = 16**

13. Calculate the number of metal-metal bond in $M_4(CO)_{12}$ [M=Co, Rh, Ir] and explain the structures of the above clusters. Explain the metal- metal bonding in $[Os_2Cl_8]^{2-}$ cluster. $Re_2Cl_8^{2-}$ is eclipsed while $Os_2Cl_8^{2-}$ is staggered. Explain. (3+3+2)
14. Prove that $\mu_l = \sqrt{l(l+1)}.\beta$ where β=Bohr Magneton. Calculate the expected magnetic moment for Nd^{3+}. For Sm^{3+} (g=2/7) the calculated and experimental magnetic moment is different-Explain. (3+2+3)
15. (i) What is Bohr magneton? Calculate it. (ii) Describe Super exchange phenomena. (iii) μ_{exp} is higher the μ_s value for Td. Ni(II) and Oct. Co(II)-explain. (2+2+4)
16. Give a brief account on quintuple bond.

    Predict the products (A – G) (4+4)



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Internal Assessment-10

2025

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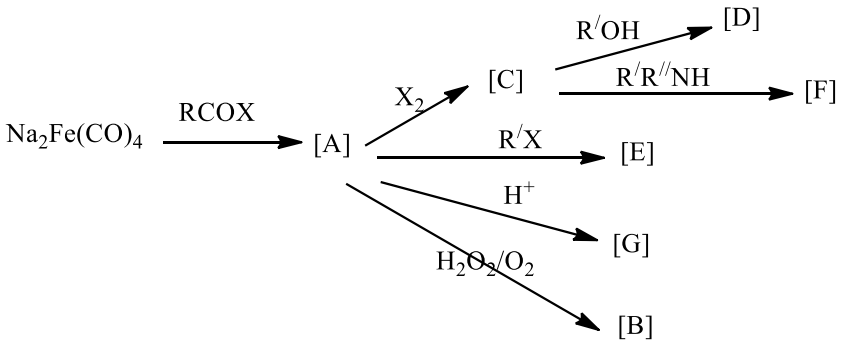

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Internal Assessment-10