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PG CBCS
M.Sc. Semester-IV Examination, 2022
CHEMISTRY
 PAPER: CEM 402 (SPL PAPER)
(ADVANCED INORGANIC CHEMISTRY-I)

Full Marks: 40

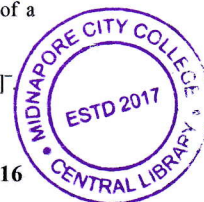
Time: 2 Hours

GROUP - A

1. Answer any **four** questions from the following questions: 2×4 = 8
- The number of f-electron in Eu^{3+} and Am^{3+} is same, but they have different magnetic moment value. Explain.
 - Discuss the magnetic property of $[\text{PdCl}_2(\text{PMe}_3)_2]$.
 - What is meant by magnetically concentrated substances? Give an example.
 - What is zero field splitting? Cite an example.
 - Graphically show the effect of temperature on paramagnetic susceptibility of a substance.
 - What are interstitial hydrides? Draw the structure of the cluster $[\text{HRu}_6(\text{CO})_{18}]$

GROUP - B

2. Answer any **four** questions from the following questions: 4×4 = 16
- Determine the magnetic susceptibility of dimeric copper(II) acetate dihydrate and relate this value to the number of unpaired electron per copper atom. Given: Molecular weight of $[\text{Cu}_2(\text{OAc})_4 \cdot 2\text{H}_2\text{O}]$ is 399.3 gm/mol; χ_{meas} of the sample is $1.30 \times 10^{-3} \text{ emu mol}^{-1}$ at temperature of 296.5K.
 - How will you synthesize $[\text{Mo}_6\text{Cl}_{14}]^{2-}$ ion starting from MoCl_5 ? Discuss the structure of $[\text{Mo}_6\text{Cl}_{14}]^{2-}$ anion. 2+2
 - Calculate the χ_D for bipy and PPh_3 compounds by using Pascal's constant.
 - $\chi_D(\text{C}_{\text{ring}}) = -6.24$; $\lambda(\text{benzene}) = -1.4$;
 - $\chi_D(\text{P}) = -6.3$; $\lambda(\text{pyridine})$ and $\lambda(\text{Ar-Ar}) = -0.5$;
 - $\chi_D(\text{N}_{\text{ring}}) = -4.61$; $\chi_D(\text{H}) = -2.93$; 2+2
 - Give an example of metal compound containing M-M quintuple bond and discuss its structure. Write down the synthesis procedure of the compound. 1+2+1
 - Between the given two complexes I and II which will show lower carbonyl stretching frequency? - Explain.



(P.T.O.)

