

S.NO: 22N1-PCH

Subject Code: PGQB

A.D.M.COLLEGE FOR WOMEN, NAGAPATTINAM

(AUTONOMOUS)

M. Sc. (CHEMISTRY) Degree Examination

I Semester – November 2022

CC II – INORGANIC CHEMISTRY I

Time: 3 hours

Maximum Marks: 75

Section –A

10X2=20

Answer ALL the Questions:

1. What are high T_C superconductors? Give an example.
2. Write the preparation and draw the structure of polythiazyl.
3. Give reason for the following order of stability.
(a) $\text{Ag}(\text{NH}_3)_2^+ > \text{Ag}(\text{NCl}_2)_2^+$
(b) $\text{Mg}(\text{edta})^{2-} < \text{Ca}(\text{edta})^{2-}$
4. What is meant by Irwin William series?
5. List the limitations of CFT.
6. Calculate the spin only magnetic moment of the following in the free gaseous state.
(a) V^{2+} (b) Cr^{6+}
7. What are labile and inert complexes? Give one example for each.
8. Give one example for the following reactions in complexes.
(a) Anation (b) Isomerisation
9. Bring out the differences between CFT state and LF state with suitable example.
10. What is Reinecke's salt actinometer? Give its usefulness.

Section -B

5X5=25

Answer **ALL** the Questions:

11. a) Devise a Born Haber cycle for the formation of crystalline Sodium chloride and derive an expression for its lattice energy.

(or)

b) Write a note on chlorocyclotriphosphazene.

12. a) Discuss the various methods of determination of stability of coordination compounds.

(or)

b) Explain chelate effect with suitable examples.

13. a) Describe the splitting of d- orbitals in octahedral crystal field and calculate the CFSE for d^1 and d^{10} configurations.

(or)

b) State and explain Jahn-Teller theorem with suitable example.

14. a) Explain the mechanism of base hydrolysis of octahedral complexes.

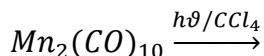
(or)

b) Write a note on electron transfer reactions.

15. a) Discuss the photolysis of water by Ruthenium bipyridyl complex.

(or)

b) (i) Predict the product(s) in the following reaction and suggest a mechanism.



(ii) With a suitable example explain photosubstitution reaction.

Section -C

3 X 10 = 30

Answer any **THREE** Questions:

16. Write notes on the following.
- (a) Chemistry of Borazine
 - (b) Solid state reactions
17. (a) Discuss stability of coordination compounds with suitable examples.
- (b) Derive the relation between stepwise stability constant and overall stability constant for a four coordinated ML_4 complex.
18. (a) Identify the complex with larger Δ in each of the following pair giving suitable reason for your choice.
- (i) $[Fe(H_2O)_6]^{2+}$, $[Fe(H_2O)_6]^{3+}$
 - (ii) $Pt(CN)_4^{2-}$, $Ni(CN)_4^{2-}$
 - (iii) $[Mn(Cl_6)]^{4-}$, $[Mn(CN)_6]^{4-}$
 - (iv) $CoCl_4^-$, $CoCl_6^{3-}$
- (b) Describe the MOT of $Ni(NH_3)_6^{2+}$ and comment on its magnetic property.
19. (a) Explain the theory and applications of trans effect.
- (b) Discuss template synthesis.
20. (a) Enumerate the various photophysical pathways using suitable diagram.
- (b) State and illustrate Adamson's rule.