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(FOR THE CANDIDATES ADMITTED

SUB CODE **24PCY204**

DURING THE ACADEMIC YEAR 20204 ONLY)

REG.NO.

**N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI**

**END-OF-SEMESTER EXAMINATIONS : MAY-2025**

**MSc CHEMISTRY**

**MAXIMUM MARKS: 75**

**SEMESTER-II**

**TIME : 3 HOURS**

**PART – III-24PCY204**

**INORGANIC CHEMISTRY-II-COORDINATION CHEMISTRY**

**SECTION – A**

**(10 X 1 = 10 MARKS)**

**ANSWER THE FOLLOWING QUESTIONS.(K1)**

1. In CFT, which of the following ligands will be treated as point dipoles? (K1)

(a) Cl (b) CN (c) NO<sub>2</sub> (d) NO

2.Which type of complexes applicable for Orgel correlation diagram? (K1)

(a) High spin (b) Low spin (c) Both high spin and low spin (d) None of these

3. How are the stepwise stability constants (K) related to the overall stability constant (β)? (K1)

(a)  $\beta_n = K_1 + K_2 + \dots + K_n$  (b)  $\beta_n = K_1 \times K_2 \times \dots \times K_n$

(c)  $\beta_n = \log K_1 + \log K_2 + \dots + \log K_n$  (d)  $\beta_n = 1/(K_1 + K_2 + \dots + K_n)$

4. What is an example of an inert complex? (K1)

(a)  $[\text{Co}(\text{NH}_3)_6]^{2+}$  (b)  $[\text{Co}(\text{NH}_3)_6]^{4+}$  (c)  $[\text{Co}(\text{NH}_3)_6]^{3+}$  (d) All the above

5. Which of the following theory explain the electron transfer reactions of complexes? (K1)

(a) Gabatin (b) Pauling's (c) Werner's (d) Marcus-Hush

**ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES**

**(K2)**

6. Define-Spectrochemical series.(K2)

7. What is Nephelauxetic series.(K2)

8. How to identify the most stable complex?.(K2)

9. Distinguish between inert and labile complexes. (K2)

10. What are the different types of electron transfer reactions?(K2)

**SECTION – B**

**(5 X 5 = 25 MARKS)**

**ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)**

11. a) List the consequences of John-Teller distortion in complexes . (K3)

(OR)

b) Describe the factors affecting crystal field splitting in complexes.(K3)

12. a) Compare Orgel correlation diagram and Sugano-Tanabe diagram.(K3)

(OR)

b) Describe the calculation of inter electronic repulsion parameter. (K3)

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13. a) Compare between-Stepwise stability constant and Overall stability constant (K3)  
(OR)  
b) Describe the factors affecting stability of complexes. (K3)
14. a) List and explain the binding of metal ions correlation to crystal field activation energy.  
(OR)  
b) Describe the substitution reactions in square planar complexes.(K3)
15. a) Compare between inner sphere electron transfer reactions and outer sphere electron transfer reactions of complexes (K3)  
(OR)  
b) Describe the photo-redox reactions of complexes.(K3)

**SECTION – C**

**(5 X 8 = 40 MARKS)**

**ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4K5)**

16. a) Analyze the molecular orbital theory of complexes.(K4)  
(OR)  
b) Defend the crystal field splitting of octahedral and tetrahedral complexes.(K5)
17. a) Discuss the Orgel correlation diagram of complexes.(K4)  
(OR)  
b) Summarize the selection rules for electronic spectra of complexes.(K5)
18. a) Point out the thermodynamic aspects of complex formation.(K4)  
(OR)  
b) Discuss the determination of stability constant by potentiometric method.(K4)
19. a) Outline the applications of trans effect of complexes.(K4)  
(OR)  
b) Analyze the associative and dissociative mechanism pathways for substitution reactions.(K4)
20. a) Discuss the electron transfer reactions of octahedral complexes.(K4)  
(OR)  
b) Defend the photo isomerization reactions in complexes and their applications.(K5)

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