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Reg. No. : .....

Code No. : 20064 E Sub. Code : AMCH 61

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Sixth Semester

Chemistry – Core

INORGANIC CHEMISTRY – III

(For those who joined in July 2020 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. It is the number of atoms, or molecules that a central atom or ion holds as its nearest neighbours in a complex
  - (a) coordination sphere
  - (b) coordination number
  - (c) tetrahedral
  - (d) octahedral

2. Which one of the following is not explaining the spectra (colour) of the complexes
  - (a) valance theory
  - (b) valance bond theory
  - (c) bonding theory
  - (d) cõordination number
3. \_\_\_\_\_ is a list of ligands based on the strength of their interaction with metal ions.
  - (a) Electrochemical series
  - (b) Spectrochemical series
  - (c) (a) and (b)
  - (d) None of the above
4. Which one of the following describes the net change in crystal energy of a metal ion due to the orientation of its d orbitals
  - (a) Crystal field theory
  - (b) Valance bond theory
  - (c) Molecular orbital theory
  - (d) None

5. The increased lability of ligands that are trans to certain other ligands is known as \_\_\_\_\_.
- (a) base hydrolysis (b) Trans effect  
(c) inner sphere (d) Outer sphere
6. The replacement of the ligand water by an anion in a coordination entity is known as
- (a) Anation reactions (b) Trans effect  
(c) cis effect (d) base hydrolysis
7. Ziegler natta catalyst is
- (a)  $TiCl_4 + Al(C_2H_5)_3$  (b)  $TiCl_4 + Al(C_2H_5)$   
(c)  $TiCl_2 + Al(C_2H_5)_3$  (d)  $TiCl_3 + Al(C_2H_5)_3$
8. Which one of the following process requires catalyst, since that process only occurs spontaneously at high temperatures
- (a) complex formation  
(b) hydrogenation  
(c) substitution reaction  
(d) addition reaction
9. Which one of the following is based on dilute solution with dye sensitized solar power for energy storage applications
- (a) photo galvanic cells (b) galvanic cells  
(c) photo cells (d) none
10. Excited states can be generated by
- (a) irradiation (b) photons  
(c) electrons (d) All the above

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) List out the important postulates of IUPAC nomenclature of coordination compounds.
- Or
- (b) What are the merits and limitations of VB theory?
12. (a) Discuss on the effects of crystal field splitting.
- Or
- (b) How will you determine the stability constants?

13. (a) Explain : Trans effect.

Or

(b) Explain: Mechanism of substitution reactions in coordination chemistry.

14. (a) Summarise the postulates of nomenclature of organometallic compounds.

Or

(b) Write a note on polymerisation of olefins.

15. (a) Write a note on bimolecular quenching.

Or

(b) Explain: Photoelectrochemical devices.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 600 words.

16. (a) Define the following :

(i) Monodentate ligands

(ii) Coordination number

(iii) Coordination sphere

(iv) Polydentate ligands

Or

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(b) List out the applications of valence bond theory to tetrahedral and square planar complexes.

17. (a) How the crystal field theory is applicable in octahedral and tetrahedral complexes?

Or

(b) Establish the crystal field stabilisation energy and their uses.

18. (a) Illustrate the concept of ligand substitution reactions in octahedral complexes.

Or

(b) Explain: Base hydrolysis and anation reactions.

19. (a) Explain : (i) EAN rule (ii) 18 electron rule.

Or

(b) How will you prepare the organometallic compounds of Mg, and Zn?

20. (a) Write down the properties of excited states.

Or

(b) List out the rules of adamson's.

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