

(7 pages)

Reg. No. :

Code No. : 20009 E Sub. Code : SMCH 61/
AMCH 61

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2023.

Sixth Semester

Chemistry – Core

INORGANIC CHEMISTRY – III

(For those who joined in July 2017 – 2020)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- Bidentate ligands are
 - Lewis acids
 - Lewis bases
 - Bronsted acid
 - Bronsted base
- The inert complex is
 - Thermodynamically stable
 - Thermodynamically unstable
 - Electrically stable
 - Electrically unstable
- The metal carbon bond possesses
 - Both sigma and pi character
 - Only sigma character
 - Only pi character
 - None of the above
- $TiCl_4 + AlEt_3$ is known as
 - Wilkinson catalyst
 - Ziegler Natta catalyst
 - Hydrogenation catalyst
 - Hydroformylation
- Human vitamin D production by sunlight exposure is a kind of
 - Chemical process
 - Photochemical process
 - Electrolytic process
 - Thermodynamic process

- Which theory is used to describe the formation of covalent bond?
 - Valence bond theory
 - Arrhenius concept
 - Bronsted lowry concept
 - EAN rule
- The arrangement of ligands in the increasing order of their
 - Crystal field splitting energy
 - Crystal field energy
 - Field emission
 - Crystal field
- EAN rule is
 - $Z-X+(2XY)$
 - $Z-X+Y$
 - $Z-X+2$
 - $Z+X+(2XY)$
- $[Co(NH_3)_6]^{2+}$ is an example for
 - Labile
 - Inert
 - Base hydrolysis
 - Trans effect

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- Which direct semi conductors are used in photo voltaics?
 - Crystalline silicon
 - Crystalline solid
 - Carbon
 - Ammonia

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

- (a) Define the following :
 - Coordination sphere
 - Coordination number.

Or

 - Explain. Stereoisomerism in tetrahedral complexes.
- (a) Describe on the stability of complexes.

Or

 - How will you determine the stability constants?

13. (a) Write a note on inert complexes.
Or
(b) Discuss in detail on the mechanism of redox reactions.
14. (a) Describe on metal nitrosyls.
Or
(b) Explain Polymerisation of olefins.
15. (a) Explain. Photosubstitution reactions of Cr (III) complexes.
Or
(b) Write in detail on bimolecular quenching.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) (i) Describe on stereo isomerism on square planar and (4)
(ii) octahedral complexes. (4)
Or
(b) (i) Write the merits and limitations of VB theory. (5)
(ii) Write on the applications of VB theory. (3)

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17. (a) Describe on the splitting of d orbitals in octahedral and tetrahedral complexes.
Or
(b) Explain :
(i) Spectrochemical series (4)
(ii) Write the applications of CFT. (4)
18. (a) (i) Write a note on ligand substitution reactions. (6)
(ii) Define Trans effect. (2)

Or

- (b) (i) Write in detail on base hydrolysis and (4)
(ii) Anation reactions. (4)
19. (a) (i) How hydroformylation is useful in organometallic chemistry? (6)
(ii) Write the structure of Ziegler natta catalyst. (2)

Or

- (b) Explain. Structure and nature of M-L bond in metal carbonyls.

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20. (a) Discuss on the photoredox reactions of Co(III) complexes.
Or
(b) (i) Write in detail on photoisomerisation in Pt (II) complexes. (5)
(ii) Write a short note on storage of solar energy. (3)