

Reg. No. :
Code No. : 30286 E Sub. Code : SMCH 61

CBCS) DEGREE EXAMINATION, APRIL 2022

Sixth Semester

Chemistry — Core

INORGANIC CHEMISTRY — III

For those who joined in July 2017 onwards)

Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

An example of a bidentate ligand is

- a) NO^- (b) en
c) NO_2^- (d) Cl^-

The coordination number of cobalt in $[\text{Co}(\text{OH}_2)_6]^{2+}$ is

- a) 2 (b) 12
c) 4 (d) 6

The Ziegler-Natta catalyst is formed between

- a) Triethyl aluminium and titanium halide
b) Triethyl aluminium and silver halide
c) Triethyl aluminium and platinum halide
d) Triethyl aluminium and carbon halide

The oxidation state of Rhodium in Wilkinson catalyst is

- (a) +3 (b) +2
(c) +1 (d) 0

When the source of light is not sun light then the photo voltaic cell is used as

- (a) Photo transmitter (b) Photo detector
(c) Photo diode (d) Photo

Which of the following are the principle laws of photochemistry?

- (a) Grotthus-Draper and Stark-Einstein law
(b) Lambert's and Raman's law
(c) Raoult and Henry law
(d) Beer law and Ohm law

3. Which of the following does not obey EAN rule?

- (a) $\text{Fe}(\text{CO})_5$ (b) $\text{V}(\text{CO})_6$
(c) $\text{K}_4[\text{Fe}(\text{CN})_6]$ (d) $\text{Mn}_2(\text{CO})_{10}$

4. $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{NiCl}_4]^{2-}$ complex ions are

- (a) Both paramagnetic
(b) Both diamagnetic
(c) Paramagnetic and diamagnetic
(d) Diamagnetic and paramagnetic

5. Anation is

- (a) The substitution of uncharged ligand by an anionic ligand
(b) The substitution of an uncharged by another uncharged ligand
(c) The substitution of an anionic ligand by an uncharged ligand
(d) The substitution of an anionic ligand by another anionic ligand

6. Which ion is kinetically inert?

- (a) Cr^{2+} (b) Co^{3+}
(c) Fe^{3+} (d) Co^{2+}

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PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) What are bidentate and tridentate ligands? Give two examples for each case.

Or

- (b) Discuss the salient features of VB theory.

12. (a) List out the salient features of CFT.

Or

- (b) How is the stability constant of metal complex determined by job's method?

13. (a) Differentiate labile and inert complexes.

Or

- (b) What is trans-effect? Write down any two of its applications.

14. (a) Describe briefly Monsanto acetic acid process.

Or

- (b) State (i) EAN rule and (ii) 18 electron rule.

15. (a) State Adamson's rules.

Or

(b) Write the photo substitution reaction of Cr(III) complex.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Discuss briefly the structural isomerism in octahedral and tetrahedral complexes.

Or

(b) Explain the postulates of VB theory. Give its merits and limitations.

17. (a) Explain the d-orbital splitting in octahedral and tetrahedral complexes.

Or

(b) Explain any two applications of CFT theory. What are the limitations of CFT?

18. (a) Explain the outer sphere and inner sphere electron transfer reactions with mechanism.

Or

(b) Discuss the factors affecting the rate of substitution of reaction in square planar.

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19. (a) Describe the mechanism of hydroformylation of alkene using co-based catalyst.

Or

(b) Discuss briefly the structure and bonding in metal carbonyls.

20. (a) Explain the

(i) photo redox reaction of Co(III) complexes and

(ii) Photo isomerisation in Pt(II) complexes.

Or

(b) Enumerate the photochemical conversion and storage of solar energy.

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