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AI—43—2017

FACULTY OF SCIENCE

M.Sc. (First Year) (Second Semester) EXAMINATION

OCTOBER/NOVEMBER, 2017

(CBCS Pattern)

CHEMISTRY

Paper CH-421

(Inorganic Chemistry—II)

(Saturday, 11-11-2017)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) Attempt All questions.

(ii) Use of calculator is allowed.

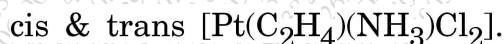
(iii) Figures to the right indicate full marks.

(iv) Solve MCQ ones only.

1. Solve any *three* out of given : 15

(a) Explain intrinsic semiconductors with suitable examples.

(b) Define trans-effect. Give its application for synthesis of :



(c) Discuss the role of Wilkinson's catalyst in alkene hydrogenation reaction.

(d) Explain importance of surface area and porosity in heterogeneous catalysis.

(e) What are essential elements in biological systems ? How they are classified ?

2. Solve any *three* : 15

(a) Distinguish between homogeneous and heterogeneous catalysts.

(b) Explain structure and function of ferritin.

(c) Discuss and compare the Hb—O₂ and Mb—O₂ bonding curves at different partial pressure of O₂.

P.T.O.

- (d) Explain the mechanism of ammonia synthesis using heterogeneous catalysis.
- (e) How is trans-effect useful in synthesis of :
 cis & trans $[\text{PtCl}_2(\text{NH}_3)_2]$ from $[\text{PtCl}_4]^{2-}$.
3. Solve the following :
- (a) Explain the role of Pd as catalyst in C—C bond forming reactions with suitable examples. 8
Or
 Give the mechanism of synthesis of acetaldehyde using $[\text{PdCl}_4]^{2-}$ as catalyst.
- (b) Give the evidences for $\text{S}_{\text{N}}2$ mechanism in square planar complexes. 7
Or
 Explain polarization theory of trans-effect.
4. Solve the following :
- (a) Discuss the structure of chlorophyll and explain the mechanism of photosynthesis. 8
Or
 Explain structure and function of cyanocobalamin.
- (b) Explain P-type and N-type semi-conductors with suitable examples. 7
Or
 (i) Discuss briefly the layer structure of CdI.
 (ii) Explain importance of polypeptide chain in hemoglobin.
5. (A) Select the *correct* answer from the given options : 5
 (i) What is oxidation state of iron in hemoglobin and myoglobin respectively ?
 (a) 3, 2
 (b) 2, 2
 (c) 2, 3
 (d) 3, 3

- (ii) A complex that shows antitumour activity is :
- cis-[PtCl₂(NH₃)₂]
 - trans-[PtCl₂(NH₃)₂]
 - cis-[PdCl₂(NH₃)₂]
 - trans-[PdCl₂(NH₃)₂]
- (iii) Trans-directing ability of OH⁻, Cl⁻, CO, CN⁻ is in the order :
- CN⁻ > Cl⁻ > CO > OH⁻
 - OH⁻ < Cl⁻ < CO < CN⁻
 - Cl⁻ < OH⁻ < CN⁻ < CO
 - Cl⁻ > OH⁻ > CN⁻ > CO
- (iv) Radius ratio r^+/r^- for ionic crystal with co-ordination number 3 is equal to :
- 0.1555
 - 0.225
 - 0.414
 - 0.732
- (v) Molten Potassium Vanadate supported on silica is used for :
- Oxidation of SO₂ to SO₃
 - Oxidation of NO to NO₂
 - Oxidation of CO to CO₂
 - Reduction of N₂ to NH₃
- (B) Write short notes on any two :
- Imaging agents
 - Use of Au-complexes as anti-arthritis drug
 - Tethered catalysts.

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