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**AG—43—2018**

**FACULTY OF SCIENCE**

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

**OCTOBER/NOVEMBER, 2018**

**(CBCS Pattern)**

**CHEMISTRY**

**Paper II (CH-421)**

**(Inorganic Chemistry)**

**(Tuesday, 27-11-2018)**

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

*Time—3 Hours*

*Maximum Marks—75*

*N.B. :— (i) Attempt All questions.*

*(ii) Log table and calculator are allowed.*

*(iii) Solve MCQ once only.*

1. Solve any *three* : 15
  - (a) What is intrinsic semiconductor ? Discuss the effect of addition of impurity on the conductivity of intrinsic semiconductor.
  - (b) Explain cis effect with suitable examples.
  - (c) Describe the role of heterogeneous catalysis in the synthesis of ammonia by Haber process.
  - (d) Explain Fischer-Tropsch synthesis of hydrocarbons.
  - (e) Explain the mechanism of Na<sup>+</sup>/K<sup>+</sup> pump.
  
2. Solve any *three* : 15
  - (a) Explain the language of catalysis with reference to catalytic cycles.
  - (b) Explain the role of polypeptide chain in transportation of O<sub>2</sub> by hemoglobin.
  - (c) What is the importance of surface area and porosity in heterogeneous catalysis.
  - (d) Discuss the structure and function of ferredoxin.
  - (e) Distinguish between cis and trans isomers of [Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>]<sup>0</sup> by Kurnakav's test.

P.T.O.

3. (a) Explain Wacker process for the synthesis of acetaldehyde. 8  
*Or*  
Draw and discuss the structure of vitamin B<sub>12</sub>.
- (b) How will you explain trans effect by associative mechanism with evidences. 7  
*Or*  
Discuss the polarization theory of trans effect.
4. (a) Distinguish between hemoglobin and myoglobin. 8  
*Or*  
Discuss the structure and function of chlorophyll.
- (b) What are nonstoichiometric defects ? Give their consequences. 7  
*Or*
- (i) Calculate limiting radius ratio for coordination number three. 4  
(ii) Explain biological significance of ferritin. 3
5. (a) Select the correct answer from the given options : 5  
(i) Osmotic balance of body is maintained by .....  
(a) Na/K pump  
(b) Ca/K pump  
(c) Ca/Mg pump  
(d) Na/Mg pump  
(ii) Trans directing ability of OH<sup>-</sup>, Cl<sup>-</sup>, CO and CN<sup>-</sup> ligands in the order .....  
(a) CN<sup>-</sup> < Cl<sup>-</sup> < CO < CN<sup>-</sup>  
(b) OH<sup>-</sup> < Cl<sup>-</sup> < CO < CN<sup>-</sup>  
(c) Cl<sup>-</sup> < OH<sup>-</sup> < CN<sup>-</sup> < CO  
(d) None of above

- (iii) Oxidation state of Rhodium in Wilkinson catalyst is .....
- (a) One
  - (b) Two
  - (c) Four
  - (d) Six
- (iv) The permitted coordination number in ionic crystal is six, the arrangement of anions around the cation will be :
- (a) Plane triangular
  - (b) Tetrahedral
  - (c) Octahedral
  - (d) Body centred cubic
- (v) Heme is porphyrine complex of .....
- (a) Fe (II)
  - (b) Fe (III)
  - (c) Mg (II)
  - (d) Co (III)
- (b) Write short notes on (any two) :
- (i) Anti-arthritis drug
  - (ii) Chelation therapy
  - (iii) Catalytic selectivity.

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