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**BR—64—2016**

**FACULTY OF SCIENCE**

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

**OCTOBER/NOVEMBER, 2016**

**(CBCS PATTERN)**

**CHEMISTRY**

Paper (CH-421)

(Inorganic Chemistry-II)

**(Thursday, 17-11-2016)**

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

*Time—Three Hours*

*Maximum Marks—75*

*N.B. :— (i) Attempt All questions.*

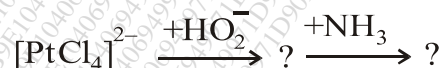
*(ii) Use of calculator is allowed.*

*(iii) Solve an MCQ ones only.*

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

(a) What is intrinsic semi-conductors ? Discuss the effect of addition of an impurity on the semi-conductivity of an intrinsic semiconductors.

(b) Show the stereochemistry of substitution in the following reaction :



(c) Explain alkene polymerisation by using Ziegler-Natta catalyst.

(d) How will you synthesize hydrocarbons by Fisher-Tropsch synthesis ?

(e) Describe the possible mechanism of conversion of  $\text{N}_2$  to  $\text{NH}_3$ .

2. Solve any *three* of the following : 15

(a) What is catalyst ? Explain the catalytic activity.

(b) Give the biological importance of iron and cobalt.

(c) Discuss the structure and function of Rubredoxin.

P.T.O.

- (d) Explain the importance of surface area and porosity in heterogeneous catalysis.
- (e) Explain the effect of learning group on the rate of substitution reactions in square planar complexes.
3. (a) Explain the role of Wilkinson's catalyst in the hydrogenation of alkenes. 8

*Or*

Explain the hydroformylation reaction for synthesis of aldehyde.

- (b) Explain  $\pi$ -bonding theory of trans effect. 7
- Or*
- How will you explain trans effect by associative mechanism with evidences.
4. (a) Explain cooperativity effect in haemoglobin. Discuss its mechanism. 8

*Or*

Explain the structure and function of cytochromes.

- (b) What is Schottky defect ? Give its consequences. 7
- Or*
- (i) Discuss in brief the rutile structure of  $\text{TiO}_2$ . 4
- (ii) Explain the importance of superoxide dismutase in biological process. 3
5. (A) Select the correct answer from the given options : 5

(i) In nitrogen fixation, nitrifying bacteria convert .....

- |  |                                     |
|--|-------------------------------------|
| (a) $\text{NO}_3^-$ to $\text{NH}_4^+$ | (b) $\text{N}_2$ to $\text{NH}_2^+$ |
| (c) $\text{NH}_4^+$ to $\text{NO}_3^-$ | (d) $\text{NH}_2^+$ to $\text{N}_2$ |

- (ii) Trans directing ability of  $\text{OH}^-$ ,  $\text{Cl}^-$ ,  $\text{CO}$  and  $\text{CN}^-$  ligands is in the order .....
- $\text{CN}^- < \text{Cl}^- < \text{CO} < \text{OH}^-$
  - $\text{OH}^- < \text{Cl}^- < \text{CO} < \text{CN}^-$
  - $\text{Cl}^- < \text{OH}^- < \text{CN}^- < \text{CO}$
  - None of the above
- (iii) Molten potassium vanadate supported on silica is used for .....
- Oxidation of  $\text{SO}_2$  to  $\text{SO}_3$
  - Oxidation of  $\text{NO}_2$  to  $\text{NO}_3$
  - Oxidation of  $\text{CO}$  to  $\text{CO}_2$
  - Reduction of  $\text{N}_2$  to  $\text{NH}_3$
- (iv) Limiting radius ratio of ionic crystal with coordination number six is .....
- |            |           |
|------------|-----------|
| (a) 0.1555 | (b) 0.225 |
| (c) 0.414  | (d) 0.732 |
- (v) Carboplatin is used as .....
- |                    |                   |
|--------------------|-------------------|
| (a) Anti-arthritis | (b) Anti-cancer   |
| (c) Imaging agent  | (d) None of these |

(B) Write short notes on any two :

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- Inhibition of DNA by cisplatin
- Complexes of Gadolinium in MRI
- Heck and Breslow mechanism.