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AY—43—2018

FACULTY OF SCIENCE

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

MARCH/APRIL, 2018

(CBCS Pattern)

CHEMISTRY

Paper II (CH-421)

(Inorganic Chemistry)

(Tuesday, 10-4-2018)

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

Time—Three Hours

Maximum Marks—75

N.B. :— (i) Attempt All questions.

(ii) Log tables and calculator are allowed.

(iii) Solve MCQs once only.

1. Solve any *three* : 15

(a) Draw and explain rutile structure of TiO_2 .

(b) What is trans effect ? Predict the products A and B in the following reaction :



(c) What is catalyst ? Give its classification.

(d) Describe the possible mechanism of conversion of N_2 to NH_3 .

(e) What are metalloporphyrines ? Draw the structure of heme.

2. Solve any *three* : 15

(a) Explain the language of catalysis with reference to catalytic cycles.

P.T.O.

- (b) Write a brief account of alkaline earth metal ions in biological systems.
- (c) Discuss the structure and function of transferrin.
- (d) Explain Fischer-Tropsch synthesis of hydrocarbons.
- (e) Explain S_N^2 mechanism for the substitution reactions of square planar complexes.
3. (a) Explain the role of Wilkinson's catalyst in hydrogenation of alkenes. 8

Or

What is Bohr's effect ? Comment on oxygen uptake and equilibrium in hemoglobin and myoglobin.

- (b) Explain π -bonding theory of trans effect. 7

Or

Explain, how the following factors affect the rate of substitution reactions in square planar complexes :

- (i) Steric effect
- (ii) Charge on complex.
4. (a) Explain cooperativity effect in hemoglobin. Discuss its mechanism. 8

Or

What is photosynthesis ? Describe PS-I and PS-II mechanism in photosynthesis.

- (b) What are stoichiometric defects. Give its consequences. 7

Or

(i) Define F-centre. Mention some properties of solid which have F-centres in the crystals. 4

(ii) Explain the role of Nitrogenase enzyme in N_2 -fixation. 3

5. (A) Select the correct answer from the given options : 5

- (i) The O_2 binding curve of hemoglobin is
- (a) Sigmoidal (b) Hyperbolic
(c) Parabolic (d) Circular
- (ii) The effect of a catalyst in a chemical reaction is to change the
- (a) Activation energy
(b) Equilibrium concentration
(c) Heat of reaction
(d) Final product
- (iii) The radius ratio in an ionic crystal lies between 0.732 – 1.000, the coordination number is
- (a) 3 (b) 4
(c) 5 (d) 6
- (iv) Which one of the following metals is used as antiarthritis drug ?
- (a) Au (b) Fe
(c) K (d) Ca
- (v) Oxymyoglobin contains :
- (a) O_2 at transposition to histidine chain
(b) O_2 in the hole of porphyrine
(c) O_2 bonded by coordinate bond to Mg(II)
(d) Does not contain O_2

P.T.O.

(B) Write notes on (any *two*) :

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- (a) Catalytic selectivity
- (b) Cis-platin as drug
- (c) Catalyst and activation energy.