

Total Pages: 2

PG CBCS

M.Sc. Semester-III Examination, 2020

CHEMISTRY

PAPER: CEM 303

(INORGANIC SPECIAL)

Full Marks: 40

Time: 2 Hours

Answer any four questions from the following:

4x10 =40

1. (a) How photodecomposition of $\text{Fe}(\text{C}_2\text{O}_4)_3^{3-}$ occur?
 (b) Give an example of linkage photo isomerisation.
 (c) Draw the active site structure of cytochrome.
 (d) In the presence of air $[\text{Fe}(\text{CN})_6]^{4-}$ in CHCl_3 is immediately oxidised to $[\text{Fe}(\text{CN})_6]^{3-}$ in the dark.-Why? 4x2.5
2. (a) Draw the active site structure of cobalamine.
 (b) Draw the active structure of ascorbic acid oxidase. Give mechanism of the oxidation of ascorbic acid by this enzyme.
 (c) Draw the active site structure of electron carrier protein cytochrome P-450.
 (d) Describe the role of metal ions in DNA structure and genetic information transfer. 4x2.5
3. (a) Describe the photochemistry of Cr(III) in solid state laser system.
 (b) What do mean by thexi state? Write the characteristic of this state.
 (b)What is catalytic converter? 4+4+2
4. (a) How can you distinguish between the static and dynamic quenching of fluorescence.
 (b) What will the photochemical products of $[\text{Cr}(\text{NH}_3)_5(\text{NCS})]^{2+}$ in 0.1(N) H_2SO_4 .
 (c) Write various photochemical process that occur in a molecule by unimolecular process.
 (d) Write down the criteria to be fulfilled by a compound for functioning as a good photosensitiser.. 2+2+4+2
5. (a) Briefly discuss the active site structure of superoxide dismutase and role of the enzyme.
 (b) Define quantum efficiency of a photochemical reaction.
 (c) Medicine bottles are often made with darkened glass.- Comment. 6+2+2
6. (a) Describe mechanistically the dismutation of superoxide by superoxide dismutase in human body.
 (b) What is the role of cerium salt in the process of photochemical splitting of water molecule?
 (c) Distinguish fluorescence and phosphorescence. 5+2+3

P.T.O.

(2)

7. (a) Discuss the active site structure of catalase and explain the disproportionation of H_2O_2 by this enzyme.
- (b) Which enzyme is playing a major role on the detoxification of sulphite compound? Draw its active site structure and indicate the steps involved in this conversion. 4+6
8. Describe the charge transfer to metal excited state photochemistry of $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ complex.
9. Draw Tanabe-Sugano diagram for Cr(III) octahedral complexes and describe associated photochemical process of $\text{NH}_4[\text{Cr}(\text{NCS})_4(\text{NH}_3)_2]$ complex. 3+7
10. Describe the photochemical reduction and oxidation of water molecule using $[\text{Ru}(\text{bpy})_3]^{2+}$ as photosensitiser. 10
