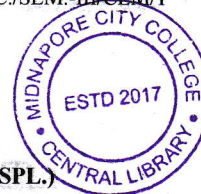


PG CBCS
M.Sc. Semester-III Examination, 2022
CHEMISTRY
PAPER: CEM-303
ADVANCED INORGANIC CHEMISTRY-II (INORGANIC SPL.)



Full Marks: 40

Time: 2 Hours

GROUP - A**1. Answer any FOUR questions from the following questions: 2×4 = 8**

- a) Discuss photosensitized reaction with proper example.
- b) What is static quenching?
- c) Draw the active site structure of cytochrome-c.
- d) In 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?
- e) What are the components of DNA and RNA?
- f) What is chemiluminescence? Give an example.
- g) Write down the criteria of a good photosensitiser.
- h) What is the role of zinc in CuZn SOD?

GROUP - B**2. Answer any FOUR questions from the following questions: 4×4 = 16**

- a) Describe the role of metal ions in DNA structure and genetic information transfer. (4)
- b) (i) Write various photochemical processes that occur in a molecule by unimolecular process.
(ii) What is photochromism? Give an example. (2+2)
- c) (i) What is THEXI state? Write the characteristic of this state.
(ii) Mention the role of cerium salt in the photochemical splitting of water molecules? (2+2)
- d) (i) Derive Stern -Volmer equation for the quenching phenomenon in fluorescence spectroscopy. (ii) What will be the photochemical products of $[\text{Cr}(\text{NH}_3)_5(\text{NCS})]^{2+}$ in 0.1(N) H_2SO_4 . (3+1)
- e) Discuss the photochemistry of Cr(III) in solid state laser system. (4)
- f) Briefly discuss the active site structure of superoxide dismutase and mention the role of this enzyme. (4)

(P.T.O.)

- g) Mechanistically describe the dismutation of superoxide ion in human body by superoxide dismutase enzyme. (4)
- h) Draw the active structure of ascorbic acid oxidase. Give mechanism of the oxidation of ascorbic acid by this enzyme. (2+2)

GROUP - C

3. Answer any TWO questions from the following questions: 8×2 = 16

- a) (i) Discuss the active site structure of catalase and explain the disproportionation of H_2O_2 by this enzyme. (2+3)
- (ii) Which enzyme plays a major role on the detoxification of sulphite compound? Draw its active site structure and indicate the steps involves in this conversion. (3)
- b) Describe the charge transfer to metal excited state photochemistry of $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$ complex.
- c) (i) Draw the active site structure of nitrate reductase (NR) and explain the mechanism of the reduction of nitrate (NO_3^-) to nitrite (NO_2^-) by NR.
- (ii) Describe the photochemical reaction of PS I and PS II in photosynthesis? (4+4)
- d) Discuss the photochemical reduction and oxidation of water molecule using $[\text{Ru}(\text{bpy})_3]^{2+}$ as photosensitiser.

