

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 6486

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Unique Paper Code : 2174001210

Name of the Paper : Role of Metals in Medicine

Name of the Course : **B.Sc. (Hons.)**

Semester : II/IV/VI/VIII

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **FOUR** questions in all.
3. Each question carries **15** marks.

1. a. Match the following

- | | |
|------------------------|--|
| (i) ^{99m}Tc | (a) MRI Contrast Agent |
| (ii) BaSO_4 | (b) Radioactive tracer for heart/bone imaging |
| (iii) Gd(III) | (c) Diagnostic agent for cancer imaging |
| (iv) Ga | (d) X-ray contrast agent |
| (v) Au | (e) Therapeutic agent for Rheumatoid arthritis |

b. Name a transition metal studied for its insulin mimetic properties. List its oxidation state relevant to diabetic therapy. Give its mechanism of action.

c. Why is zinc important for human health? Name any two zinc containing enzymes. Which zinc containing compound is used as an important constituent in a multivitamin.

(5, 5, 5)

2. a. Discuss the biochemical mechanism of action of melarsoprol in treatment of sleeping sickness.

b. Name any two alternatives to cis-platin. Discuss the mechanism of action of cis-platin as an antitumor drug.

c. Discuss in detail the function of sodium selenite in the biological system and adverse effects associated with it.

(5, 5, 5)

3. a. Define the following terms

- i. Phosphorylation

P.T.O.

- ii. Glycolysis
- iii. Trace elements
- iv. Metalloenzyme
- v. Diagnostic agents

b. Name the metal which plays an important role in the functioning of following enzymes

- i. Carbonic anhydrase
- ii. sodium potassium ATPase
- iii. Superoxide dismutase
- iv. Nitrogenase
- v. Pyruvate Kinase

c. Which metal plays a significant role in managing rheumatoid arthritis? Explain its mechanism of action in the biological system.

(5, 5, 5)

4. a. Enlist few properties of multivitamins. Explain the function of magnesium oxide and ferrous fumarate in the biological system.

b. Name an alkali based metal drug which is used for mental health treatment. Discuss its mode of action in the human body.

c. Compare and contrast the physical principles behind X-ray contrast agent and MRI contrast agent. Explain giving suitable examples.

(5, 5, 5)

5. a. "Metal ions play pivotal role in human health serving as structural components, catalysts and active therapeutic agents." Justify this statement giving suitable examples.

b. Name the disease/s caused by deficiency and excess of the following

- i. Iron ii. Copper iii. Chromium iv. Cobalt v. Magnesium

c. Name the metal which plays an important role in hemoglobin. Discuss the importance of hemoglobin in the biological system.

(5, 5, 5)

6. Write short notes on the following

- a. Gaviscon
- b. Bismuth subcitrate (De-nol)
- c. Essential and non essential elements.

(5, 5, 5)