

~~(b)~~ (i) Write a short note on iron and sodium in the human body, including health issues resulting from both deficiency and excess, as well as possible remedies.

OR

(ii) Suggest possible chelation therapies for the removal of toxicity of copper and plutonium. In each case write down the structural formula of the chelating agent to be used in therapy.

[(2+5) + 4]

☐ 2024, November

2. Na

• Importance :-

1. works with K to help muscle contract
  2. helps to regulate amount of water in and around cells.
  3. essential for nerve impulsive transmission
  4. maintains the amount of blood pressure.
- Source :- table salt, processed foods.

☐ Deficiency disease :-

- Addison's disease
- hyponatremia (Low BP)
- Stroker's Cramps

☐ Excessive problem :-

- hypernatremia (high BP)

»»» Important «««

## □ Iron :-

### • Functions :-

- 1) Key component of hemoglobin, which carries oxygen from lungs to rest of the body.
- 2) helps cells to generate energy from nutrients.
- 3) supports a healthy immune system
- 4) For children, Fe is essential for brain development.

### • Disease due to deficiency :-

1. iron-deficiency Anemia
2. Fatigue, weakness, pale skin

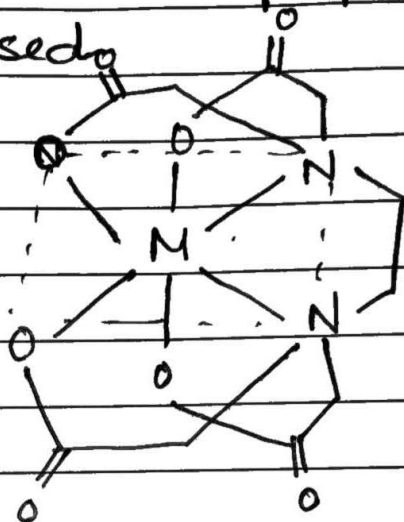
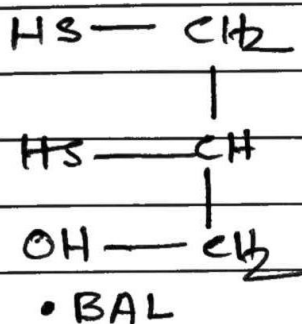
### • Excessive problem :-

1. hemochromatosis (bronze diabetes)
2. hemosiderosis

Important

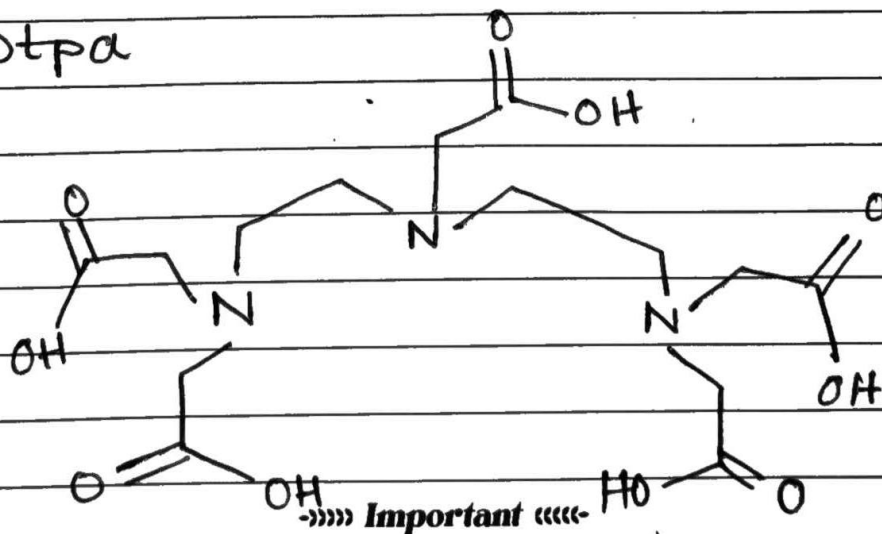
(ii) For Cu toxicity removal:-

→  $\text{Na}_2\text{Ca}(\text{edta})$ , 2,3 dimercaptopropan-1-ol (BAL) can be used.



For Plutonium removal

Ca-Dtpa



**Answer Q.2 and any one from Q.3 and Q.4**

2. (a) What are the prerequisites a chelating drug needs to fulfil for being used in chelation therapy?
- (b) Explain how does British anti-Lewisite (BAL) effectively remove 'As' from living systems. Give some disadvantages of BAL and give structure of a better chelating agent for removal of 'As'.
- (c) What diseases are likely to occur for the deficiency of Na and Ca in the body and what would happen if excess of them accumulate in the body?

[3+4+2]

3. (a) What are the basic requirements of radioactive elements in radiodiagnosis?
- (b) Give an example of radiodiagnosis for imaging brain tumour.
- (c) *Cis*-platin shows anti-cancer activity while *trans*-platin is highly toxic – Justify.

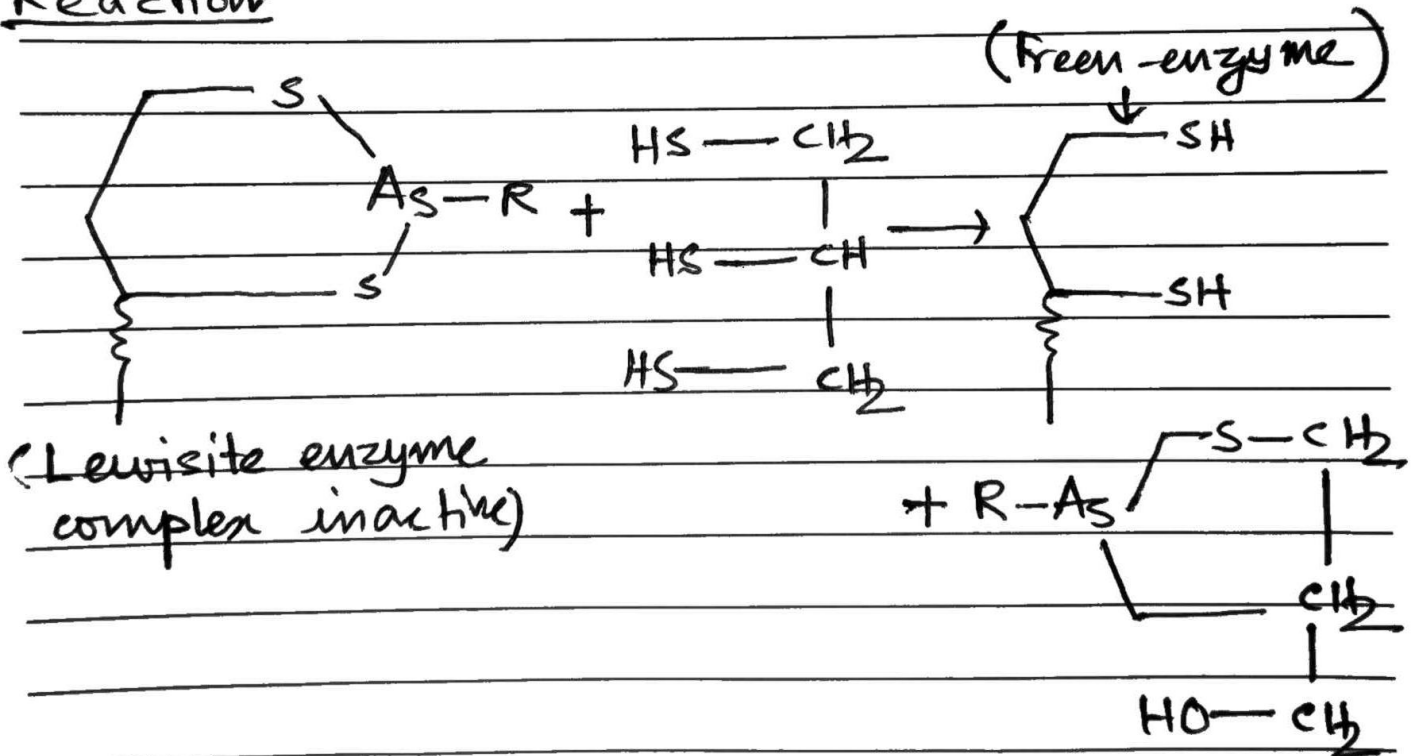
[ 3+2+3]

2024 April:-

2(a) criterias of a chelating drug  
 → refer my assignment.

(b) Process of removing As from Living system:-

Reaction



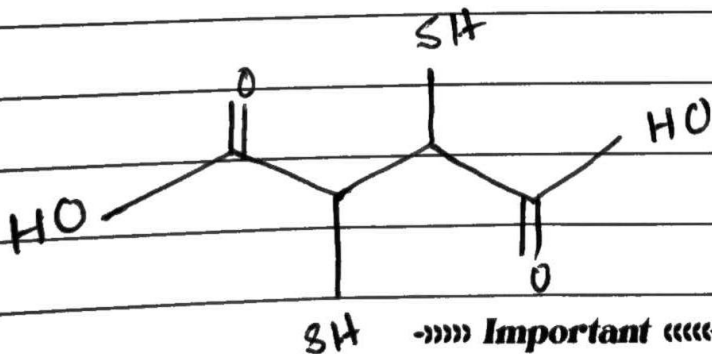
»»» Important «««

BAL can remove the enzyme bound arsenic compounds to restore the activity of the enzyme and As-BAL complex is excreted through urine.

### Disadvantages:-

1. It's aqueous sol<sup>n</sup> is unstable with respect to aerial oxidation.
2. It has objectionable odour and sight of injection experiences painful irritation. That's why local anaesthesia is required.
3. Sometimes it may lead to hypertension and vomiting.

### Better ligand :- dmsa



(C) Excess :-	Deficiency
Na <sup>+</sup> :- hypernatremia	Addison's disease, hyponatremia, stocker's cramps
Ca <sup>2+</sup> :- catracts, stone in gall bladder and kidney, hypercalcemia.	Abnormalities in bone, (ricket, osteoporosis), blood clotting, muscle contraction

3(a) assignment

(b) example of radiodiagnosis for imaging brain tumor :- MRI

(c) Assignment