[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1725 **L**

Unique Paper Code : 2172013601

Name of the Paper : DSC : Principles in qualitative analysis and bioinorganic chemistry

Name of the Course : **B.SC. (HONS) CHEMISTRY (UGCF-NEP)**

Semester : VI

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. All questions carry equal marks.

1. (a) Draw the percentage oxygen saturation curves for Haemoglobin. Explain how a change influences it?

(b) A test tube contains an aqueous solution of Cr(III) and Al(III) ions. Suggest reagent/reagents to separate the cations. Give confirmatory tests to detect the two cations with equations.

(c) Identify the ions that are detected by the following reagents. Also, write the chemical reactions involved.

(i) Dimethyl glyoxime

(ii) Zirconium nitrate

(5,5,5)

2. (a) Distinguish between essential and non-essential elements. Draw the dose-response curve for an essential element and a toxic element.

(b) How are nitrate and nitrite ions tested when present together in a mixture? Give equations to support your answer.

(c) Define Therapeutic Index. Why is cisplatin a preferred anti-cancer drug in contrast to transplatin? Explain the mechanism of action.

(5,5,5)

P.T.O.

3. (a) What are ionophores? How are they different from ion channels? Give one example.

(b) Which specialized proteins are used for the transport of iron in the bloodstream? Can free iron be transported in the bloodstream?

(c) A metal 'M' is capable of existing in two oxidation states, +III and +V. An aqueous solution of its salt in the lower oxidation state gives a white precipitate on the addition of concentrated ammonia, which, however, disappears on adding hydrochloric acid. 'X'is a compound of 'M' in the higher oxidation state. It is used to detect Mn(II). Identify 'M' and 'X' and give the reactions.

(5,5,5)

4. (a) Explain the mechanism of conduction of nerve impulses? Draw a well-labeled action potential graph.

(b) An aqueous solution of sodium sulphide cannot be used to separate Group IIA and Group IIB. Explain. Why are cadmium ions frequently missed in group II analysis?

(c) Why NH_4Cl is added with NH_4OH in Group III of Cation Analysis?

(d) Explain the role of cytochrome-C-oxidase in humans? Where is it present?

(5,2.5, 2.5,5)

5. (a) What do you understand by compartmentalization in the context of a living cell? Explain the calcium ion pump diagrammatically.

(b) Give confirmatory tests for Borate and Fluoride ions in a salt mixture. Why are they called interfering ions?

(c) What are the special properties of zinc that make it an excellent biocatalyst? What is the role of the enzyme carbonic anhydrase? What is the coordination number and geometry of zinc ions in carbonic anhydrase?

(5,5,5)

6. (a) Give the chemistry behind the flame test for cations? What colour do Ca(II) and Ba(II) ions show in the flame?

(b) What is chelation therapy? What special properties should a ligand possess so that it can be used in this therapy?

(c) Why do Pb(II) ions sometimes precipitate in Group I as well as Group II in qualitative mixture analysis for cations? Give one confirmatory test for the detection of Pb(II) ions in Group I?

(5,5,5)

(2000)