

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2952

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Unique Paper Code : 2173522005

Name of the Paper : Acids & Bases and Aqueous Chemistry of Metal Ions

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

Semester : IV / 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 **FOUR** questions in all . Each questions carry equal marks.

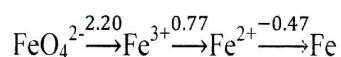
Q1(a) What are redox reactions? How are they used in quantitative estimation of a species through titrations? Give an example.

(b) Derive the Nernst equation and explain the terms involved.

(c) What is a half-cell reaction and an electrochemical series?

(5,5,5)

Q2a) Given below is the Latimer diagram for Fe in acidic medium:



Answer the following questions:

(i) Find the standard reduction potential for the reduction of FeO_4^{2-} to Fe^{2+} .

(ii) Is there any oxidation state of iron which undergoes disproportionation? Explain

(b) What is a standard electrode potential? Discuss Frost diagrams.

(c) Give the oxidation and reduction reactions along with the complete balanced equation for the iodometric redox titration of copper sulphate.

(5,5,5)

P.T.O.

- Q3 (a) Define pH. What is a buffer and buffer capacity? Give examples in each case.
- (b) State the significance of Henderson Hasselbalch equation with respect to the pH of a solution. Derive the equation also.
- (c) How does a boric acid and borate buffer act to maintain the pH of a solution.

(5,5,5)

- Q4(a) Explain the Lewis concept of acids and bases giving suitable examples.
- (b) How does solvent levelling effect help to understand the relative strength of acids and bases?
- (c) How does Arrhenius theory of acid and bases differ from the Bronsted Lowry theory of acids and bases. Explain giving examples.

(5,5,5)

- Q5 (a) Define cryptates giving examples.
- (b) Discuss how complexation helps Cu to get stabilised in an unusual oxidation state of +1.
- (c) Define metalloenzymes? Explain with an example.

(5,5,5)

Q6 Write short notes on the following (Any three):

- (i) Redox reactions in biological processes
- (ii) Diagram relating stability of oxidation state of an element with pH
- (iii) Hard & Soft Acids and Bases
- (iv) Role of hydroxide ion in metal ion qualitative analysis

(5,5,5)