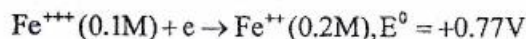


Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCE, BME, BGE	Pass Marks	32
Year / Part	1 / 1	Time	3 hrs.

Subject: - Engineering Chemistry (SH403)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Derive the equation required to calculate the emf of cell at non-standard condition. What are the factors that affect the single electrode potential value? Calculate the oxidation electrode potential of given half cell reaction at 20°C. [2+1+2]



2. What are the criteria for buffer system? Calculate the change in pH of buffer system having 200 cc of 0.1 M CH_3COOH and 0.1 M CH_3COONa when 1 millimole NaOH is added into it. ($K_a = 1.8 \times 10^{-5}$) [2+3]
3. What is autocatalysis? Explain the mechanism of adsorption theory of catalysis with example. [1+4]
4. What are the major pollutants responsible for water pollution? How do the oxides of sulphur and nitrogen make water acidic? [2+3]
5. What is meant by ozone depletion? Write its causes and consequences. [2+3]
6. a) What are chalcogenide glasses? Give an account of preparation and uses of chalcogenide glasses in the engineering field. [1+2+3]
b) Write down the preparation of cyclic silicones.
7. a) Give an account for the biodegradable and non-biodegradable polymers with suitable examples. [2.5×2]
b) What are fibers-reinforced plastics? Write down its applications.
8. Explain the origin of the adsorption spectra of transition elements with d to d transitions. [5]
9. Mention the main applications of 3d elements and give main causes of variable oxidation states shown by transition elements. [3+2]
10. a) Describe the simple test to distinguish between the following pairs of compounds on the basis of Werner's theory. $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$ [2+2+1]
b) Name the following complexes by IUPAC system.
i) $\text{K}_3[\text{AlF}_6]$
ii) $[\text{Co}(\text{en})_3]\text{Br}_3$
iii) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2$
iv) $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}_2$
c) State EAN rule.

11. Using VBT, predict the possible number of unpaired number in the following complex compounds. $K_4[Fe(CN)_6]$ and $[FeF_6]^{3-}$ [2.5+2.5]
12. Write the mechanism for the conversion of Bromomethane into methanol in presence of aqueous alkali. Also explain the stereochemistry of the reaction. [3+2]
13. What do you mean by Elimination reactions? Explain the reaction mechanism for the dehydrohalogenation of tertiary alkyl halide. [2+3]
14. Write down the possible geometrical isomer of but-2-ene-1, 4-dioic acid. Why does this compound exhibit geometrical isomerism? Explain the difference between enantiomer and diastereoisomer giving an example of 3-bromo-2-butanol. [1+1+3]
15. What is the requisite of good explosive? How can you prepare TNT from benzene? Why does detonator required for the explosion of TNT? [2+2+1]
16. a) Show your acquaintance with liquid and semi-liquid lubricants. Under what situations greases are used? [3+2]
b) What do you understand by paints? Mention the requisites of good paint.
