

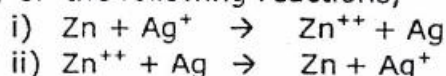
03 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BCE, BME, BGE	Pass Marks	32
Year / Part	I / I	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. Define a galvanic cell. What are functions of salt bridge in a galvanic cell?
Predict the feasibility of the following reactions,

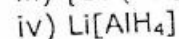
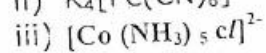
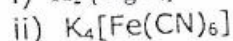
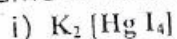


Given, $E^0_{\text{Zn}^{++}/\text{Zn}} = -0.76\text{V}$, $E^0_{\text{Ag}^+/\text{Ag}} = 0.80\text{V}$ [1+1+3]

2. What is a buffer solution? Discuss the mechanism of buffer action with suitable examples. [1+4]
3. What is meant by catalysis? Point out its importance. Discuss intermediate compound formation theory of catalysis. [1+1+3]
4. a) Point out the sources of radioactive substances responsible for environmental pollution. Give their adverse effects and protective measures. [2.5]
b) Briefly discuss any two sources of organic and inorganic substances responsible for water pollution. Point out their possible remedies. [2.5]
5. a) How do exhausts of internal combustion engine pollute air? Give the possible remedies. [3]
b) What is the photochemistry behind ozone layer depletion? [2]
6. a) What are Chalcogenide glasses? Give their uses. [2.5]
b) Give the preparation and applications of silicone rubbers. [2.5]
7. a) Give the preparation and applications of polystyrene and polyurethanes. [4]
b) What are the advantages of conducting polymers? [1]
8. Why do transition elements form complexes? List the industrial application of 3d transition elements in engineering. [3+2]
9. Explain the following features of transition elements with reference to 3d transition series; [2.5+2.5]
a) Variable oxidation state
b) Formation of colored compounds
10. Differentiate between complex salts and double salts. How does Werner's theory explain the bonding in complex salts? [1+4]

11. a) Write the IUPAC name of following;

[2]



b) How does valence bond theory explain the formation of $[Ni(NH_3)_6]^{2+}$? Predict its magnetic behaviour.

[3]

12. What are primary explosives, low explosives and plastic explosives? Give the preparation and applications 2,4,6-Trinitrotoluene (TNT).

[3+2]

13. a) Show your familiarity with liquid, semi solid and solid lubricants giving examples.

[3]

b) Discuss any two types of paints showing their applications in engineering works.

[2]

14. a) What are geometrical isomers? Give an example.

[2]

b) Show your familiarity with diastereomerism.

[2]

c) Draw the structure of 2-Chlorobutane specifying *R* and *S* configuration.

[1]

15. Discuss the unimolecular nucleophilic substitution reaction mechanism in alkyl halide showing the stereochemistry.

[5]

16. What is meant by elimination reaction? Discuss E1 and E2 reaction mechanism.

[1+4]
