Uka Tarsadia University (Diwaliba polytechnic)
Diploma in Environmental Engineering
Assignment (EC – CM1007)

Unit 1 Chemical Bonding and Catalysis

1. Differentiate between Ionic compounds and covalent compounds.

2. Explain homogeneous and heterogeneous catalysis.

3. Enlist types of catalyst and explain each with example.

4. Explain formation of hydrogen bond with the help of example.

5. Explain covalent bond in detail.

6. Write down significance of Hydrogen bond.

7. Explain about ionic bond.

8. Draw the structure of Phosphorus and Sulphur.

9. Differentiate between covalent bond and metallic bond.

10. Explain about metallic bond.

11. Explain Industrial application of catalyst.

12. Give characteristics of covalent compounds.

13. Differentiate between Ionic bond and Metallic bond.

14. Draw structure of Graphite and asbestos and explain.

15. Define catalyst and catalysis. Explain types of catalysis.

Unit 2 Concepts of Electrochemistry

1. Calculate the pH of a solution having 0.005 M concentration of H_3O^+ in aqueous solution.

2. Calculate the pH of 0.2 M HCL.

3. Write the importance of pH.

4. Calculate the pH of a solution having 0.004 M concentration of H_3O^+ in aqueous solution.

5. Calculate the pH of 0.5 M HCL.

6. Write the factors affecting on degree of ionisation.

7. 0.01M HCL solution is diluted to 100 times. Calculate the pH of diluted solution.

8. Calculate the pH of 0.00001 N HCL solution.

9. Write down application of buffer solution.

10. Explain Ionic equilibrium constant or k_w for water.

11. Discuss about electro plating with figure.

12. Calculate the pH of $4.9 * 10^{-4}$ N HCL solution.

13. Calculate the pH of 0.00005 N HCL solution.

14. Define ionisation. Write the factors affecting on degree of ionisation.

Unit 3 Corrosion of Metals and its Prevention

1. Explain any two methods to reduce the corrosion.

2. What is galvanising? Explain in detail.

3. Write down the factors affecting the rate of corrosion and explain in detail.

4. Explain Pitting corrosion.

5. Explain Metal cladding in detail.

6. Explain Electroplating in detail.

7. Discuss factors affecting on the rate of corrosion.

8. Enlist methods of prevention of corrosion and explain any two.

9. Explain metal spraying and metal cladding used as a protective coating.

10. Discuss about crevice corrosion.

11. Describe pitting corrosion.

12. What is tinning? Explain in detail.

13. Explain the water line corrosion.

14. Explain control of corrosion by modification of design and choice of material.

15. Explain about atmospheric corrosion with the help of diagram.

Unit 4 Water Treatment

1. A sample of water gave following results on analysis. Calculate temporary, permanent and total hardness of water.
   $Ca(HCO_3)_2$ = 81 mg/Lit, $Mg(HCO_3)_2$ = 14.6 mg/Lit, $CaCl_2$ = 77.7 mg/Lit., $MgCl_2$ = 19.0 mg/Lit, $MgSO_4$ = 6 mg/Lit, $CaSO_4$=6.8 mg/Lit.

2. Discuss about reverse osmosis process.

3. Discuss about caustic embrittlement.

4. Discuss about sedimentation.

5. A sample of water gave following results on analysis. Calculate temporary, permanent and total hardness of water.

   $Ca(HCO_3)_2$ = 8.1 mg/Lit, $Mg(HCO_3)_2$ = 29.2 mg/Lit, $CaCl_2$ = 11.1 mg/Lit., $MgSO_4$ = 6 mg/Lit.

6. Write down the problems due to the formation of scale and sludge in the boiler.

7. Explain Break-point chlorination.

8. Discuss ion exchange process.

9. A sample of water gave following results on analysis. Calculate temporary, permanent and total hardness of water.

   $Ca(HCO_3)_2$ = 81 mg/Lit, $Mg(HCO_3)_2$ = 73 mg/Lit, $CaCl_2$ = 11.1 mg/Lit., $MgCl_2$ = 47.5 mg/Lit, $MgSO_4$ = 6 mg/Lit, $CaSO_4$=6.8 mg/Lit.

10. Discuss about Electrodialysis process.

11. Write down the short note on chlorination of water.

12. Explain Priming, Foaming and its prevention.

13. Explain disadvantages of scale and sludge formation.

14. Define hard and soft water. Give types of hardness of water and explain.

15. A sample of water gave following results on analysis. Calculate total hardness of water and convert it into degree French.

    $Mg(HCO_3)_2$ = 14.6 mg/Lit, $CaCl_2$ = 33.3 mg/Lit., $MgCl_2$ = 38.0 mg/Lit.

Unit 5 Basic Concepts of Organic Chemistry:

1. Give examples of alkene with structural formula.

2. Discuss about unsaturated hydrocarbon.

3. What is isomerism? Explain about position isomerism.

4. Give examples of alkene with structural formula.

5. Explain π bond and σ bond in detail.

6. Differentiate between organic compound and inorganic compound.

7. What is hybridization and hybrid orbital?

8. Discuss about saturated hydrocarbon.

9. What is isomerism? Explain about position isomerism.

10. Classify organic compound.

Unit 6 Polymers, Elastomers and Insulating Material

1. What is polymer and polymerization?
2. Explain types of polymerisation depending on the type of chemical reaction in detail.
3. Based on the effect of temperature explain classification of Polymers (thermoplastics and thermosetting).
4. Based on the structure explain classification of Polymers.
5. Explain addition polymerisation and condensation polymerisation.
6. Differentiate between Natural rubber and Synthetic rubber.
7. Differentiate between thermoplastics and thermosetting.
8. Give properties and uses of Bakelite.
9. Explain Vulcanisation of rubber in detail.
10. Discuss uses of thermocol.
11. Give properties and uses of Epoxy resin.
12. Give properties and uses of Polyvinyl chloride(PVC).
13. Write down the properties of Natural Rubber.
14. Give properties and uses of Polyethylene.