Assignment questions

Module– 1

ELECTROPOTENTIAL&CELL

1. What is single electrode potential? Derive the Nernst equation for single electrode potential.
2. What are concentration cells? Deduce the expression for the EMF of a concentration cell.
3. Explain the construction and working of Ag/AgCl electrode.
4. Explain the construction and working of Calomel electrode.
5. What is an ion selective electrode? Explain its principle and working of glass electrode
6. Explain how glass electrode can be used in the determination of a PH of a solution.
7. What are reference electrodes? Explain the determination of electrode potential of an unknow electrode using calomel electrode.
8.What are concentration cells? the emf cell of the $Ag|AgNO_3(0.0083M0)||AgNO_3(xm)|Ag$ was found to be 0.074V at 298K. calculate the value of x and write cell reaction.
9. What are concentration cells?Give its type with example
10.Explain the determination of single electrode potential using calomel electrode

BATTERIES AND FUEL CELL

1. What is a galvanic cell ?
2. Explain the classification of batteries with example
3. Describe the following characteristics of a battery: cell potential, current, capacity, electricity storage density, energy efficiency,cycle life and shelf life
4. Describe the construction and reactions of zinc-air cell.
5.Describe the construction and reactions of a nickel-metal hydride battery.
6. Explain the construction and reactions of a Li-MnO2 cell.
7.Explain the construction and working of lithium ion battery.
8. Distinguish between a battery and a fuel cell and mention the limitation and advantages of fuel cells?
9. Mention the Classification of fuel cells based on temperature, fuel and electrolyte
10.Explain the construction and reactions of a methanol- oxygen fuel cell. OR Describe the construction and reactions of a MeOH – O2 fuel cell.

MODULE 2

CORROSION AND ITS CONTROL

1. Define corrosion Describe electrochemical theory of corrosion. OR Explain electrochemical theory ofcorrosion with iron as example.
2. Describe differential metal corrosion with example
3.Explain differential aeration corrosion with example(Pitting ,water line)
4. Explain stress corrosion with example(caustic embrittlement in boilers)
5. Describe the effect of following factors on the rate of corrosion:ratio of anodic to cathodic areas, ,nature of metal, nature of corrosion product, nature of medium – pH, conductivity, andtemperature.
6. What is Anodising? Explain the anodizing of aluminium. .
7. What is Cathodic protection ? Explain sacrificial anodic method and impressed method.
8. What is inorganic coatings? Explain Anodizing of Al and phosphating
9. What is metal coatings? Explain Galvanization.
10. What is metal coatings? Explain Tinning.

METAL FINISHING

1. What is metal finishing? OR Define metal finishing.
2. Give the technological importance of metal finishing.
3. Define the following terms: (i)Polarization, (ii) Decomposition potential, (iii) Over voltage
4. What is electroplating? Discuss the electroplating of nickel.
5. Describe the effect of following variables on the nature of electrodeposit: current density, concentration of metal salt, metal ion & electrolyte;pH, temperature & throwing power of plating bath, additives-complexing agents, brighteners,levellers, structure modifiers & wetting agents
6. Describe electrodeposition of chromium.
7. Why Cr metal is not used as anode in electrodeposition of chromium?
8. What is electroless plating? Write difference between electroplating and electrolessplating
9. Explain the process of electroless plating of copper with relevant reactions
10. Explain the process of electroless plating of copper and manufacture of double sided Printed Circuit Board with copper.

MODULE 3

CHEMICAL FUELS

1.What is a chemical fuel? Give complete classification of chemical fuels with examples.
2.Define calorific value ,gross calorific value and net calorific value of a fuel. Give the SI unit for thecalorific value.
3.Describe how the calorific value of a solid fuel is determined using bomb calorimeter
5.Describe fluidized bed catalytic cracking.
6. Describe synthesis of petrol by Fishcher-Tropsch process
7. What is reformation? Give any three reformation reactions.
8. What is knocking in petrol and diesel engines? Explain the probable mechanism of knocking in chemical terms.
9. What is octane number, cetane number , antiknocking agents & power alcohol.
10. Write a note on Biodiesel

SOLAR ENERGY

1)Discuss the production of solsr grade silicon by Union –Carbide process.
2)what are the advantages and disadvantages of PV –Cells?
3) Discuss the construcrtion and working of a PV –Cell.
4)What is doping ? Discuss the purification of silicon of zone –refining.
5)Write a note on Design: modules, panels & arrays of P.V cells
6)Explain doping of silicon by diffusion technique (n&p types)

MODULE 4

HIGH POLYMERS

1. What are polymers? Explain the free radical mechanism of addition polymerization by taking vinyl chloride as an example.
3. Define glass transition temperature. Explain the factors influencing the Tg valve.
4. Explain the structure-property relationship of a polymer..
6. Mention the synthesis and applications of PMMA
7. Mention the synthesis and applications of polyurethanes and polycarbonate
8. What are elastomers? Mention the synthesis, properties and applications of Silicone rubber
9. Define adhesive. Mention the synthesis, properties and applications of epoxy resin.
10. What are conducting polymers?
11. Explain the synthesis and applications of conducting polyaniline.
12. what are adhesives?explain the synthesis and applications of epoxy resin.
13. write the synthesis and applications of the following polymers :
    i) polymethyl methacrylate
14. what are polymer composites ? explain the preparation and uses of Kevlar fiber.
15. What is glass transition temperature?how is it affected by
    i) Intermolecular forces ii) flexibility.
16. What is conducting polymer? Explain the mechanism of conduction in polyaniline.
17. Give the synthesis and uses of the following polymers :
    i) Silicon rubber ii) Polycarbonates.

MODULE 5

WATER CHEMISTRY

1) Explain determination of DO by winklers method. Give the reaction involved
2) Write a note on reverse osmosis and Electrodialysis method of desalination of water
3) 25cm3 of a sample of COD analysis was reacted with 15cm3 of .2N K2Cr2O7 & the unreacted K2Cr2O7 requires 7.7cm3 0f .1N FAS .15cm3 of same K2Cr2O7 & 25cm3 of distilled water under the same condition requires 28cm3 0f .1N FAS.What is COD of water
4) Calculate the COD of the effleuent sample When 25cm3 of effluent sample requires 8.9cm3 of .001M K2Cr2O7 for complete oxidation
5) Define BOD Explain activated sludge process
6) Explain gravimetric method of determination of sulphate content in water
7)Explain the desalination of water by RO and electrodialysis method
8)What is boiler feed water ? explain the scale and sludge and sludge formation in boiler .mention their ill effects.
9) What is desalination ? explain the desalination of saline water by electro dialysis.
10) Discuss in detail the softening of water by ion—exchange process.

NANO MATERIALS

1) What are nano materials? Explain the synthesis of nano material by sol- gel method
2)Write a note on carbon nano tubes.
3)Explain the synthesis of nanomaterials by gas condensation
4)What are fullernes ? Explain the synthesis and uses of fullerence.
5) Explain the synthesis of nano material by CVC method.
6) Write a note on nano wires .