

M.PHIL (CHEMISTRY : SEM -I)
PAPER III – [Elective] PHYSICAL CHEMISTRY
[50 MARKS]

Corrosion (25Marks)

[25 Hours]

1. Basic principles of corrosion – thermodynamics and electrode kinetic considerations – acidic, basic and neutral solutions – corrosion by oxygen – corrosion by soils – Aerobic and anaerobic micro organisms – oxidation of metals and alloys – mechanism of various growth laws – study of oxide films.
2. Corrosion by acids – oxidizing and non oxidizing acids – hydrogen cracking. Atmospheric corrosion – Modern mechanism, passivity of metal alloys. Relative merits of material of construction for industries and their selection considerations. Corrosion characteristics of non ferrous metals and alloys – stainless steels.

References :

1. An introduction to metallic corrosion --By Ulick R. Evans
2. Corrosion – Corrosion of metals and alloys--Corrosion control – Vol: 1&2
--By L.L.Shreir {George Newness Ltd.}

2. Electrochemistry {25 marks }

[20 Hours]

1. The theory of electrolytic dissociation – the process of electrolytic dissociation and conductance – Electrolytic conductance of solutions – the migration of ions – Electrokinetic phenomena – structure and properties of double layer – electro osmosis – The rate of electro – osmotic flow – the pressure equation of Electro – electro stenolysis.
2. Electromotive force – Electro motive force of concentration cells – the potential difference at the liquid – liquid junction – flowing functions. Gas electrodes – Applications of potentiometric measurements – EMF of oxidation reduction cells – polarization and electrolysis – Decomposition voltage – over voltage – Electrolytic separation of metals – polarographic analysis – The Edison accumulator – De polarization and electrolysis.

References:

1. Principles and Applications of Electrochemistry
-- By H.Jermain Creighton. {John Wiley & Sons }

2. Comprehensive Treatise of Electrochemistry
-- Vol.:1&2-By J.O.M.Bockris, Brian. F. Conway & Ernest Yeager
3. Modern aspects of electrochemistry
-- By B.E.Conway and J.O'M.Bockris [Plenum press]