

CH 385: Material Science & Corrosion Engineering

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Time : 3 Hrs
Theory : 100 marks
Sessional : 50 marks

- 1. ATOMIC BONDING:** Class of engineering materials - engineering requirement of materials - selection of materials - level of structure - structure of atoms and molecules - bonding in solids - types of bonds and their energies.
- 2. STRUCTURE AND IMPERFECTIONS IN MATERIALS:** Crystal structure: Crystal geometry, structure of solids, methods of determining structures. Imperfections in crystals - types of imperfection. Point imperfection, diffusion in solids - Fick's law, self diffusion.
- 3. PROPERTIES AND CORROSION OF MATERIAL:** Electrical and magnetic properties of materials- Chemical, thermal and technological properties of materials - corrosion, theories of corrosion - control and prevention of corrosion.
- 4. METALS:** Engineering materials - ferrous metals - Iron and steel, Iron-carbon equilibrium diagram. Non ferrous metals and alloys - Aluminium, copper, zinc, lead, nickel and their alloys with special reference to the application in chemical industries.
- 5. NON METALS:** Inorganic materials : Ceramics, glass and refractories – organic materials : wood, plastics and rubber with special reference to the application in chemical industries.
- 6. NANO MATERIALS:** Introduction and their applications

TEXT BOOKS:

1. Montana, Corrosion engineering, McGraw Hill
2. V Raghavan, Materials Science and Engineering, 5th ed, Prentice Hall India
3. Lawrence H. Van Vlack, "Elements of Material Science and Engineering", 1971.
4. S.K. Hajra Choudhury, "Material Science and Processes", 1st Edn., 1977. India Book Distribution Co., Calcutta.

REFERENCE:

1. Manas Chanda, "Science of Engineering Materials", Vol. 1st Edn., 1979, McMillan. Co., India Ltd.
2. A K Bhargava, Engineering Materials-Polymers, ceramics and composites, Prentice Hall India