

SEMESTER-III
1. Material Science

Time: 3 Hrs.

M.M. 100 marks

Note: The paper will be divided into two sections.

Section-A M.C.Q.50 (10 from each section)

Total-50 marks

Section-B: Two questions are from each unit will be asked with internal choice and the candidate is required to attempt five questions.

Total-50 marks

Unit I

Latex: - NR Latex, stability, concentration and preservation, nitrile latex, latex foam rubber, latex adhesives

Outline Manufacturing, Vulcanization, and properties of NR/IR/SBR (Emulsion and solution type), BR/NBR/HNBR, and IIR, CR, CSM, and EPR/EPDM, EVA silicone, FKM, ACM and polysulfide rubbers.

Unit II

Compounding ingredients:-

Fillers: Reinforcing and extending fillers, carbon black and non-black fillers

Curing systems: conventional, EV and semi EV, metal oxide and resin curing

Protective System: Antioxidants, antioxidants and waxes

Miscellaneous : Peptiser, activator, accelerator, softener, retarder, blowing agent, Tackifier Mineral Rubbers, Reclaimed Rubber, Ground crum, Release agents.

Unit III

Textile/reinforcing materials :- textile terminology properties and outline Manufacturing of cotton, Rayon , Polyamides, polyesters, Glass Fiber, Aramid and Steel wire, their application in rubber products as a composite materials.

Unit IV

Adhesive and bonding :- solvent based, water based and other adhesives based on various polymers, epoxide resins and curing of epoxide resins. Diluents and other additives.

Unit V

Thermoplastic Rubbers: - Classification, Advantage over simple elastomers and application.

Composite Materials :- Introduction, advantage of composite materials over other polymeric materials, Basic principle of manufacturing, factors influencing the performance. Physical and functional properties of different composites, Fiber reinforced plastic and rubber their properties and application.

Recommended

- Books:** 1 .Rubber Technology and Manufacturing: C.M. Blow. 2. Rubber Technology Handbook: Hoffman.
3 Introduction of Polymer Sc. & Rubber Technology, Vol. I, Ed By Dr. R. Mukhopadhyay.
4. Rubber Engineering, Ed. By K.S. Logonathan. 5. Rubber Technology, Ed. By Maurice Morton.
6. Rubber Processing: An Introduction, Peter S. Johnson.