

Textile Engineering (Module 2)

Part II

10 Marks

Engineering Codes / Specifications (Textile)

Textile related Codes/Specifications and Test methods etc. covered under :

- # BIS-Codes and ISO-Codes
- # ASTM Codes
- # BS (British Standards) Codes
- # DIN (Deutsche Industries Norms) Standards.
- # Eco-Mark Scheme/Okò-Tex/Steillman/OTN-100 Standards
- # AATCC Standards
- # TAPPI Standards for estimation constituents Lignocelluloses fibres
- # Other relevant National and International standards for textiles.

Part III

50 Marks

Technical Knowledge (on Raw materials, Product Engineering, Production, Process and Techno-economical Aspects) Related to Textile Industry

(i) Product and Process Related Knowledge on :

- # Staple fibres, filaments and micro denier fibres
- # Fibre Dimension and Fibre Selection for Yarn/Fabric making
- # Yarn dimension and yarn structure
- # Sliver spun, Ring spun, Rotor spun and Friction Spun Yarns
- # Fancy Yarns, compact yarns and blended yarns
- # Texturised yarns and Bicomponent yarns
- # Woven and Non-woven fabrics and fabric structure
- # Knitted fabrics and garments
- # Technical Textiles (Geo-textiles, Agro-textiles, Automobile Textiles, Packaging Textiles, Industrial Textiles, Protective Textiles, Medical Textiles, Home Textiles and Eco-friendly Textiles)
- # Coated/Laminated Textiles
- # Jute Industry
- # Woolen Industry & Worsted Industry
- # Silk Industry
- # Synthetic fibre production plant
- # Cotton & Synthetic Fibre Processing Industry
- # Chemical Processing/Dye-house for Textiles
- # Handloom Industry
- # Knitting Industry
- # Garment Industry, Colour forecast and garment design
- # Fibre reinforced composite production
- # Textile yarn and fabric testing
- # Textile Product Design

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(ii) Techno-economic Knowledge (related to Textile Industry) on :

- Ø Trends of business in different textile sector
- Ø Planning and setting up of a textile spinning/weaving/chemical processing/garment production unit and relevant Project preparation
- Ø Techno-economical viability study of a textile mill and processes
- Ø Production Planning and Control in a textile mill: Spin Plan, Loom allocation and Ware House Management. Production Scheduling, Machine scheduling. and Product mix optimization
- Ø Process equipment design and modification related to high-speed production in mechanical and chemical processing of textiles
- Ø Calculations of Machine utilization index, Labour productivity Index and Total Productivity Index in a Textile Plant
- Ø Material handling and flowchart for material processing related to production, storage and sale of textiles. Plant lay out for textile units
- Ø Waste control and management in textile plants

(iii) Mechanical Processing of Textiles and Computer Applications

(a) Yarn Manufacture

Different types of natural and man-made fibres and their dimension, testing specification, and grading. Concept of different spinning systems: cotton and synthetic fibre spinning system (long and short staple), Jute Spinning System, Woolen and Worsted Spinning System. Process and machinery details of different types of yarn manufacturing system related to pre-carding preparation, carding, drawing, spinning and twisting. Different spinning technology including modern spinning technology and their yarn structure and properties. Testing of fibres and yarns. Quality control and process control in spinning. Testing of yarn dimension, irregularities and other textile related properties. Yarn fault analysis. Requirements for blending of different textile fibres for production of blended yarns. Production of different kinds of fancy and speciality yarns and technical yarns.

(b) Fabric Manufacture

Different warp and weft winding systems and their merits and demerits. Machinery details and process control parameters for different warp and weft winding systems. Different motions of shuttle looms and setting and tuning of looms with respect to assumed loom cycle for smooth running of the looms. Handloom vs. Power looms. Shuttle looms vs. shuttle less looms. Carpet looms and different types of carpets and floor mats. Woven-Design of different types of textile fabrics. Design of different types of carpets and mats.

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Different types of knitting machinery, process details and knitting design. Production technology of non-woven fabrics and their machinery, process details and process control parameters.

Testing of wovens, knitted, non-woven fabrics and carpets. Fabric faults analysis and their remedies. Testing of textile fabrics. Quality control and process control in fabric manufacture. Speciality fabrics for technical textiles including fabric manufacture for geo-textiles, agro-textiles, automotive textiles, protective textiles, medical textiles, packaging textiles etc. Testing of geo-textiles and technical textiles.

(c) Computer Application in Textile Engineering

Computer application in textiles for testing, production and process control measures. Practical aspects of computer-aided woven design and garment design. Computer aided print design. Computer aided colour measurement and colour matching of textiles.

(iv) Textile Fibres, Textile Chemical Processing and Garment Manufacture

(a) Natural and Man-made Textile Fibres

Different natural fibres and their quality specifications. Textile related important properties of cotton, wool, silk, flax and jute fibres. Manufacture Technology of common commodity synthetic fibres viz. polyester, Nylon-6, Nylon – 6,6, Acrylic, Viscose rayon, lyocell and polyolefin's. Properties of these synthetic fibres and filaments. False-twist and Airjet texturing. Properties of textured yarns and their testing. Testing of fibre dimensions and other property parameters for selection of different fibres as raw materials.

(b) Textile Chemical Processing

Common preparatory chemical processing viz. Brushing, Singeing, desizing, cleaning/scouring and bleaching and their developments for cotton, wool, silk, flax, jute, polyester, acrylic, viscose rayon and nylon etc. Defects in preparatory chemical processing. Process control for preparatory chemical processing. Dyeing and printing technology for different textiles and their blends using different class of dyes and pigments. Defects in dyeing and printing. Mechanical and chemical finishing of different textiles viz. softening and stiffening, antcrease finish, antimicrobial finish, water repellent finish, Flame retardant finish, Rot-resistance finish, Soil/stain resistant and soil release finish, Antistat finish etc. Speciality finishes – viz. weight reduction of polyester, weighting of silk, milling and shrink proofing of wool, preshrinking of cotton, etc.

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Finishing defects and process control in finishing. Testing of absorbency, degree of damage (fluidity/copper number), colour strength and colour difference, degree of whiteness/brightness/yellowness, dyeing uniformity, colour fastness to light, washing, rubbing and perspiration, etc. Colour science as applied to textiles and computer aided colour matching.

(c) Garment Manufacture Technology

Drafting and basic pattern making for garments. Standard Body measurements and allowances. Basics steps in garment making. Garment Design and computer-aided advanced pattern making. Cutting and sewing equipment and their maintenance. Trimmings and surface embellishment of garments. Buttoning, Zip-fastener, safety sewing. Washing and dyeing of garments. Different finishing of garments. Testing of garments. Colour forecast, contemporary fashion and fashion trends in garment industry. Process and quality control in garment Industry.