Tamil Nadu Public Service Commission
Syllabus
Textile Technology and Handloom Technology
(Degree Standard)

Code: 628

Unit I: Fibre Properties and Manufacture (20 Questions)

i) Requirements of fibre forming polymers
ii) Classification of fibres, production of natural fibres - cotton, jute, silk, wool
iii) Spinning of polymers – melt, wet, dry, dry-jet-wet and gel spinning
iv) Post spinning operations – drawing, crimping, heat setting, tow-to-top conversion, texturing methods.
v) Production, properties and application of aramid, carbon, glass, ultra high molecular weight polyethylene fibres
vi) Identification of fibres, blend analysis
vii) Characterization – density, crystallinity, crystalline / amorphous orientation, birefringence
viii) Mechanical properties – tensile, elastic recovery, thermal transitions, thermal decomposition, sonic modulus, loss modulus, functional group identification, creep, stress relaxation, fatigue.
ix) Moisture property, moisture content, regain, heat of sorption, conditioning
x) Electrical properties – dielectric, static electricity, electrical resistance

Unit II: Yarn Manufacture, Yarn Structure and Properties (30 Questions)

i) Pretreatments for ginning, ginning machines
ii) Blow room machines; principles of opening, cleaning and mixing / blending of fibrous materials; cleaning efficiency; process control; calculations – production, performance
iii) Carding machine; fundamentals of carding, card clothing, autoleveller; process control; calculations – draft, production, performance.
iv) Comber lap preparation, comber - combing cycle, mechanisms; process control; calculations– production, performance
v) Draw frame; theory of doubling and drafting, process control, autoleveller; calculations – production.
vi) Roving frame; theory and mechanism of drafting, twisting; bobbin building; process control; calculations - production, performance
vii) Ring frame; drafting, twisting; cop formation, forces acting on yarn and traveller; types of rings and traveller, compact yarn spinning; calculations – draft, twist, production.
viii) Ring doubler and Two for One Twister – principle, machine; single and folded yarn twist
ix) Alternate spinning systems – principle and working of rotor, two nozzle air-jet, air vortex, friction, core, wrap, twist-less spinning machines
x) Helical geometry, packing density, yarn diameter, yarn contraction, yarn twist and relation to yarn strength - staple fibre yarn and filament; mass irregularity of yarn; structure - property relations of ring, rotor, air-jet and friction spun yarns
xi) Yarn Numbering: direct & Indirect yarn numbering systems; single and plied yarns

Unit III: Fabric Manufacture, Structure and Properties (30 Questions)

i) Reeling; drum and precision winding, winding parameters, process control; calculations
ii) Yarn clearers and tensioners; yarn knotting, splicing
iii) Beam and sectional warping; pirn winding process; process control; calculations
iv) Size preparation for handlooms and powerloom warps, sizing of spun and filament yarns; drawing and denting; process control; calculations – production, performance.
v) Shedding– mechanism and types; reversing motions; treadles and lam setting, design of tappets, principle of operations of dobby, jacquard; harness building
vi) Principles of weft insertion in shuttle looms - handlooms, power looms; shuttleless looms - rapier, air-jet, projectile, water-jet, and multiphase.

vii) Beatup - types, sley motion, eccentricity, beatup force
viii) Design, draft and peg plan; fabric structure - plain, twill, satin and their derivatives; honeycomb, warp and weft figuring, warp and weft pile, backed fabrics, double cloth, triple cloth, multi-layer fabrics, damask, tappestry.
ix) Pierce's geometry of plain woven fabrics; structure – property relationship;
x) Calculation - preparatory and weaving machine production, reed count, reed width, heald calculation
xi) Fabric structure of various traditional / contemporary handloom fabrics – Kanchipuram sarees, Banaras brocades, Jamdhani, Paithani, Seiko sarees, soft silk,
xii) Traditional handloom weaving techniques; Petni, Jala, Adai, Kondi, Korvai, Ikats.

Unit IV: Knitting and Non-Woven Manufacture (10 Questions)

i) Basic weft and warp knitted structures and their properties
ii) Circular, flat and warp knitting machines -principles; calculations
iii) Geometry of plain knitted fabrics
iv) Nonwovens – needle punch, spun lace, spun bond, melt blown, thermal bond, methods of formation and applications
v) Finishing of nonwovens - mechanical, chemical

Unit V: Preparatory and Colouration (20 Questions)

i) Action of chemicals on various fibres
ii) Preparatory process for textile materials – degumming, carbonizing, singeing, bio-polishing, desizing scouring, mercerizing and bleaching
iii) Classification of dyes, auxiliaries and their properties
iv) Preparatory and dyeing machines – fibres, yarns and fabrics
v) Dyeing of fabrics using various dye classes.
vi) Styles and methods of printing, print paste formulation, fixation and after treatment process
vii) Colour parameters measurement, colour difference calculation of dyed fabrics, colour measurement for dye liquor
viii) Fastness to wash, perspiration, light and rub

Unit VI: Finishing and Sustainable Processing (15 Questions)

i) Mechanical finishing of textiles – shrink proof, raising and calendering
ii) Heat setting of synthetic and blended fabrics
iii) Chemical finishes - crease resistant, water proof, water repellant, flame retardant, soil release, UV resistant, anti-microbial, anti-static, softening, stiffening, elastomeric, self-cleaning
iv) Processing of denim fabrics and garments
v) Eco-friendly processing; eco standards and eco-labels
vi) Minimum application technique, waterless dyeing
vii) Characteristics of effluent and effluent treatment method; Zero Liquid Discharge (ZLD) system; sludge management
viii) Sustainability concepts – Life Cycle Assessment (LCA), carbon, water footprints, Reduce, Reuse Recycle (3R)

Unit VII: Quality Evaluation of Textiles (25 Questions)

i) Statistics – mean, median and mode; standard deviation, variance, coefficient of variation
ii) Hypothesis testing, regression and correlation
iii) Measurement of fibre properties - length, strength, fineness, maturity and trash, neps; High Volume Instrument (HVI); Advanced Fibre Information System (AFIS)
iv) Determination of yarn properties - count, twist, strength and elongation, unevenness and hairiness
v) Determination of fabric properties - construction parameters, tear, bursting strength,

tensile strength and elongation, modulus, work of rupture; air permeability, drape, bending, crease and wrinkle recovery, thickness, pilling, abrasion, shrinkage

vi) Low stress mechanical properties of fabrics

vii) Yarn - imperfection, classified faults; diagram, spectrogram, Variance Length (VL) curve, calculations – Index of irregularity

viii) Fabric defects analysis and testing of nonwovens

Unit VIII: Garment Manufacture and Special Finishes (10 Questions)

i) Pattern making, grading, marker planning, spreading and cutting – methods and machinery

ii) Stitches and seams - classes

iii) Types of sewing machines; mechanisms and accessories

iv) Sewing threads – manufacturing and numbering, trims and accessories

v) Pressing, packing, care labels

vi) Garment defects - causes; inspection system

Unit IX: Technical Textiles (15 Questions)

Fibre, yarn and fabric requirement for

i) Industrial textiles - belts, ropes, tyre-cords, coated abrasives

ii) Automotive textiles – filter fabrics, airbags, seatbelts

iii) Geotextiles – geo nets, geo grids, geo membranes

iv) Agriculture textiles – crop covers, birdnets, soil mats and sacks

v) Medical textiles – non-implantable, implantable, hygiene products

vi) Protective textiles - ballistic textiles, thermal protective clothing, UV protection, clean room garments

vii) Sports textiles

viii) Testing of technical textile products

Unit X: Management of Textile Industry (25 Questions)

i) Spinning – machine and labour productivity, spin plan; lighting, humidification, material handling, machine maintenance and safety measures

ii) Fabric manufacture – production plan, material handling, safety measures

iii) Garment manufacture – productivity concepts, Industrial engineering applications – method study, motion study, work measurement; line balancing; ergonomics

iv) Costing of yarn, fabric and garment; cost sheet; balance sheet, profit and loss account, ratio analysis

v) Depreciation, investment appraisal techniques

vi) Management Tools – Lean, Total Quality Management (TQM) tools, Total Productive Maintenance (TPM), 5S, Kaizen, six sigma, Failure Mode Effects Analysis (FMEA)

vii) Energy conservation in textile industry

viii) Compliance and certifications in textile industry

ix) Intellectual Property Rights (IPR)

Dated: 24.08.2026