

Tamil Nadu Public Service Commission
Syllabus
Handloom Technology, Textile Technology and
Textile Manufacture
(Diploma Standard)

Code: 445

Unit I: Fibre Properties and Man-Made Fibre Spinning (15 Questions)

- i) Definition of Textile Fibre, Properties required for an ideal Textile Fibre of textile fibres
- ii) Classification of Textile fibres – vegetable, animal, mineral, regenerated and synthetic fibre
- iii) Microscopic, physical and chemical test methods for fibre identification
- iv) Physical, Chemical properties and uses of Vegetable fibres – Cotton, Jute, linen
- v) Physical, Chemical properties and uses of Animal fibres – Wool, Silk
- vi) Physical, Chemical properties and uses of Regenerated Cellulosic fibres – Viscose Rayon, Uses of HT Rayon
- vii) Physical, Chemical properties and uses of Synthetic fibres – Polyester, Nylon 6,6 and Acrylic
- viii) Requirements of fibre forming polymers , Spinning of Polymers - Melt Spinning, Wet spinning, Dry spinning
- ix) Post Spinning Operations – Drawing, Crimping, Heat setting and Texturisation

Unit II: Spun Yarn Formation (20 Questions)

- i) Ginning – Objects and Principles – Types of Ginning machines
- ii) Objectives / Principles of opening, cleaning and mixing / blending machines
- iii) Blowroom, card – Objects and Principles
- iv) Draw frame, comber preparatory, comber, speed frame – Objects and Principles
- v) Ring spinning – Object and Principle
- vi) Doubling : Ring doubling, Two for One Twister (TFO) – Objects and Principles
- vii) Working principles and features of rotor, air jet, air vortex and compact spinning systems
- viii) Yarn conditioning, reeling, bundling and baling

Unit III : Fabric Formation (25 Questions)

- i) Objectives of weaving preparatory processes
- ii) Winding : Drum, precision and pirn winding - Yarn clearers, tensioners, knotters and splicers
- iii) Warping –Types of warping and Creels
- iv) Sizing –Ingredients, Size recipes for cotton and its blends with polyester and viscose.
- v) Principles of Drawing-in and Denting.
- vi) Primary, Secondary and Auxiliary motions of loom, Loom timing diagram.
- vii) Tappet, Dobby and Jacquard shedding,
- viii) Drop Box and Terry mechanism, Features of semi-automatic loom and automatic loom.
- ix) Principles of Shuttle-less Weft insertion systems – Projectile, Rapier, air jet and waterjet looms.
- x) Fabric defects – causes and remedies

Unit IV: Textile Calculations (20 Questions)

- i) Calculations of speed, draft, hank, production and efficiency in spinning machines.
- ii) Production and efficiency calculations in Winding, Warping, Sizing and Weaving
- iii) Yarn numbering system: Indirect count systems – English, Direct count systems – Tex and Denier.
- iv) Conversion of yarn count from one system to other.
- v) Resultant count of folded yarn, Average count
- vi) Reed, heald and fabric cover calculations
- vii) Ex. Mill price calculation of one Kg of yarn and One meter of fabric

Unit V: Fabric Structure (15 Questions)

- i) Elements of woven fabric design – Design, draft and peg plan – Colour and weave effect
- ii) Construction of Weaves - Plain weave and its derivatives, Twill weave and its derivatives, Sateen and Satin
- iii) Crepe, Honey comb, Brighton honey comb, Mock-leno, Huck-a-back, Bedford cords, Welt, pique,
- iv) Backed cloth, Double Cloth, Triple Cloth
- v) Extra warp and Extra weft figuring
- vi) Terry Pile: 3 pick, 4 pick terry weave - Velvets and Velveteens
- vii) Gauze and Leno structures

Unit VI: Chemical Processing (20 Questions)

- i) Singeing, Desizing, Scouring, Bleaching and Mercerization – Objectives, Machines and Methods
- ii) Dyes and their Classifications - Direct, Reactive, Vat, Acid, Basic and Disperse dyes.
- iii) Dyeing of cotton, silk, wool, polyester and blends
- iv) Dyeing machines – Winch, Jigger, HTHP, Soft-flow dyeing machine
- v) Styles of printing – Direct, Resist and Discharge.
- vi) Printing Methods – Roller, Rotary Screen, Flat bed
- vii) Mechanical and chemical finishing – calendering, anti-shrink, resin finish, water repellent finish, flame retardant finish, Anti-microbial and UV protective finish

Unit VII: Knitting, Garments & Modern Developments in Handlooms (20 Questions)

- i) Knitting - Objects , Comparison between knitting and weaving – Comparison between knitted and woven fabrics
- ii) Knitting elements and their functions – Terms and Definitions
- iii) Basic weft knitted structures and their properties – Plain, Rib, Interlock and Purl.
- iv) Basic warp knitted structures and their properties – Tricot, Lockknit and sharkskin
- v) Garments – Grey fabric inspection - Standard Body measurements - Pattern making and grading
- vi) Spreading, Cutting, Sewing and Merchandising
- vii) Developments in Handlooms – Solid border weaving, multiple putta weaving, Electronic Jacquard for handlooms.

Unit VIII: Testing and Quality Control (20 Questions)

- i) Definition – Mean, Median, Mode, SD, SE and CV %.
- ii) Calculations related to test of significance and control charts.
- iii) Sampling techniques – Objectives and types of sampling
- iv) Humidity control – Standard Testing atmosphere, Measurement of Relative Humidity.
- v) Measurement of fibre length, strength, fineness, maturity and trash
- vi) Determination of yarn count – twist per unit length –
Strength: CSP, RKM and Elongation
- vii) Evenness, Imperfections and Hairiness
- viii) Determination of fabric strength, stiffness, handle, drape, thickness, GSM
- ix) Crease resistance, abrasion resistance, pilling resistance, air / water permeability, dimensional stability.
- x) Determination of fastness to washing, rubbing, light.

Unit IX: Nonwovens, Technical Textiles and Handloom Fabrics (25 Questions)

- i) Classification of Nonwovens - Mechanical, Thermal and Chemical bonded fabrics
- ii) Technical Textiles – Medical textiles, sports textiles
- iii) Geo textiles, Agro textiles
- iv) Automotive textiles and protective textiles
- v) Quality Particulars of Handloom fabrics – Sarees, dhotis, bedsheets, towels, lungies
- vi) Traditional Handloom Sarees – Banaras, Kanchipuram, Arani and Sungudi

Unit X: Textile Mill Management (20 Questions)

- i) Plant location, Lay out, material handling in textile mills
- ii) Production, Planning & Control
- iii) Inventory control and its tools : ABC Analysis, Economic Ordering Quantity
- iv) Total Quality Management : 5S Concept, ISO 9000, ISO 14000, SA 8000 Certifications
- v) Human Resources Management – Selection, recruitment, training and placement
- vi) Factories Act 1948
- vii) Role of Bureau of Indian Standards (BIS), Apparel Export Promotion Council (AEPC), Handloom Export Promotion Council (HEPC), Weavers Service Centre (WSC) and Textile Committee
- viii) Export Pricing methods – Free On Board (FOB), Cost Insurance Freight (CIF)
- ix) Export Procedure - Letter of Credit (LC), Shipping Bill, Bill of Lading (BIL)
- x) Pollution Control: Types - Air, Water, Noise; Characteristics of Effluent and Effluent treatment of Wet Processing industry.

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