

## ANNEXURE-C

### **SYLLABUS OF TECHNICAL PAPER FOR MAIN WRITTEN EXAMINATION FOR THE POST OF WEAVING SUPERVISOR**

#### **A. FIBRE SCIENCE**

Classification, Manufacturing, Properties, Uses and Identification of both Natural and Synthetic Fibres. Melt, Wet and Dry Spinning

#### **B. YARN MANUFACTURE**

Objectives and Mechanism of Ginning, Carding, Drawing, Doubling, Drafting, Combing and Compact Spinning Machineries used and their functions, maintenance of machineries, Yarn defects with remedial measures.

#### **C. FABRIC MANUFACTURE**

Objectives of Warp & Weft Winding. Types, Features & Mechanism of different Winding Machines, Fabric Defects and remedial measures. Sizing, Parts of different looms and their functions with working principle. Fabric Designs, Drafting, Lifting and Denting.

#### **D. TEXTILE CHEMICAL PROCESSING:**

Objectives of various pre-treatment like Singeing, De sizing, Scouring, Souring, Bleaching, Mercerising and their Methodologies using different machineries. Classification of Dyestuffs. Dyeing & Printing. Dyeing Recipes, Working principles of Dyeing Machineries. Colour Fastness, Printing Pastes. Different Finishes like Calendaring, Heat Setting, Anti Crease, Water Proof, Flame Retardant, Softening, Stiffening, Moth Proof, Optical Whitening, Antimicrobial.

#### **E. TEXTILE TESTING:**

Factors influencing Testing of Fibre, Yarn and Fabric. Fibre. Yarn and Fabric Quality. Principle of Testing. Air & Water Permeability, Tensile, Tearing, Bursting Strength, Evenness, Fibre Maturity, Impurities, Abrasion Resistance and Pilling. Machineries used in Textile Testing and their functions.

#### **Syllabus for Textile Testing**

Brief idea on sampling, Explain Humidity and its Relation to Textile materials, processes & machines, Absolute and relative humidity, Standard atmospheric condition, Describe Moisture content and Moisture regain and their measurement, Moisture hysteresis curve analysis. Describe purpose of Measurement, uses and classification of different fibre dimensions, Explain different types of Length of fibres, State measurement of fibre length by Baer Sorter, Fibro-graph etc, Fibre fineness and maturity, State measurement of fibre fineness and maturity by Caustic Soda method and air flow method. Brief ideas on HVI (High Volume Instrument) & AFIS (Advance fibre Instruments System), Define the terms - stress, strain, tenacity, breaking length, elastic limit creep, crimp, initial modulus etc., Methods of measurement of strength of single fibre, Bundle fibre, Explain the working principle of Stelometer, Define yarn count & various yarn numbering system, Determination yarn count, State the twist in single and ply yarns, Explain factor and its relation to yarn structure, Describe yarn diameter measurement and its relation with yarn count, Brief idea on CRT, CRL & CRE. State & Explain different principles of Textile Testing, Discuss Short term, long term and medium

term variation and their causes, Define Index of irregularity, Nature and causes of irregularities, Explain methods of assessing yarn irregularity by Visual cutting and weighting, photoelectric and capacitance methods, Define Yarn Hairiness & Explain ASTM Yarn grading. Classimat yarn faults. Explain measurement of Dimensions and Physical Properties of Fabrics, Determination of fabric dimension properties like Thickness, weight, shrinkage, air permeability, water permeability, crimp, stiffness and crease recovery, drape, fabric handle, fabric cover. Determination of tensile strength(Strip & Grab test), Tearing strength, Bursting Strength of cloth, Explain abrasion resistance and pilling.

### **Syllabus for Textile Chemical Processing**

Pre-cleaning, Mending. Stamping, stitching, Shearing and cropping, Brief idea on Shearing and cropping M/c, Singeing. Different methods of singeing (Plate, Roller and Gas Singeing), drawbacks and advantages, Object, types, method details and mechanism of removal of starch. Efficiency of desizing Objectives, mechanism of removal of impurities, recipe and controlling parameters. Scouring of textiles, evaluation of scouring efficiency. Scouring of natural, man-made and blended textiles, Degumming of silk, Brief idea on Souring Objectives of bleaching, classification of bleaching agents, hypochlorite, peroxide and chlorite bleaching. Field of application - Bleaching of cotton, silk. wool, and man-made blended textiles by suitable bleaching agents. Controlling parameters and mechanism, Classify dyes and pigments used in textile industry, Compare between natural and synthetic dyes, Dyeing of textiles of natural fibres with suitable dyes. Working principles of Winch, Jet, Beam, Hank and Package Dyeing machine, Jigger, J-Box system, Dyes used for man made fibres, State Dyeing of polyester with disperse dyes by carrier, HTHP and Thermosol method, State the Dyeing of Polyester /Cotton and polyester/ Wool blended fabrics with suitable dyes, State the Dyeing of Nylon with acid ,State the Dyeing of Acrylic with basic dyes, State the Dyeing of acetate with disperse dyes. Discuss faults caused in dyeing and their remedies. Objects of printing, Differentiate between dyeing and printing, Preparation of printing paste, State the sequence of printing, Thickeners used in printing, Classify and state the functions and properties of thickeners, Discuss after treatments given to printed fabrics, Discuss Auxiliaries used in printing. Methods & Styles of printing, Differentiate between Dyes and printing, Discuss styles of printing - Direct, Discharge & Resist, Discuss Different methods of printing -Block printing, Screen Printing, Rotary screen Printing, Roller printing, Transfer printing. Brief idea about preparation of screens for printing. State the objects of finishing, Classify finishes, Discuss importance of mechanical finishes., State the objects of calendaring and working of different calendars, State

the objects of stentering and working of different stenters. Discuss principles of sanforizing, Objects and methods of heat setting, Discuss methods of application of soft finishes, stiff finishes, resin finish, water proof and water repellent finish, flame retardant finish, fire proof finish, anti pilling finish, carbonization, Moth proof finish, Optical whitening, anti mildew finishing, anti microbiale etc, objects of Mercerisation, Physical, Chemical & Structural Changes occurred after mercerization.

### **Syllabus for Fabric Manufacture**

Objects of warp and weft winding. Different types of yarn packages, Types of winding M/C (specially precession & non precession), Features of warp and weft winding machine (anti patterning device, knotters, splicers, electronic clearers, slub catchers, yarn tensioners, waxing, different types of traverse mechanisms) Classification of yarn faults, Package defects and their remedies, Modern developments in winding machine, Calculations related to winding (related to traverse ratio, winding angle, winding speed, yarn tensioner. production of machines). Objects of warping, Types of warping machine (direct and sectional), Explain passage of yarns through sectional & beam warping M/C, Features of high speed direct and sectional warper (types of creel, stop motions, tensioners etc.), Package defects and their remedies, Recent developments in warping machine, Calculations related to warping, Objects of sizing, Sizing ingredients- their properties and functions, Preparation of size paste- formulation, cooking equipment and storing, slasher sizing machine- general description, Different types of creel, Design of size box, heating and temperature control, level control, immersion rollers and squeeze rollers, wet splitting. Basic motions of loom, Brief idea on Handloom and its different parts. Idea on Dobby & Jacquard. Fabric faults, Modern shuttle less looms and its working mechanism. Different fabric designs (simple, complex and compound structures), drafting, lifting, denting etc.

### **Syllabus for Yarn Manufacture**

State the purpose of ginning: Describe working principles of roller & Saw Gin, Baling, objects of Mixing general consideration for preparation of cotton mixing, Methods of mixing and blending. Principal action in opening and cleaning. Study of various types of machinery arranged in the sequence of a single process Blowroom Line for the various type of mixing. Method of dust extraction in Blow Room. Study of lap forming unit and chute feed mechanism and their comparison. Process parameters of Blow Room. Waste control in Blow Room. Calculation relating to production and efficiency of machines. Maintenance schedules. Objects of Carding. Constructional Features of Carding Machine. Principles of carding & stripping actions, Study of different parts and function of a Carding Machine. Settings and gauging of different parts of Carding Machine. Mechanical and Actual draft. Mechanics of fibre entanglement and fibre transfer during carding, Mechanics of neps and hook formation and its effect on yarn quality. Card waste -types and control. Calculation of production, speed, draft etc related to carding machine. Maintenance schedules. Study of the function of Auto

leveller in Card. Explain the objects of Drawing, Discuss principles of doubling and drafting, Explain the passage of material and function of different parts, Study various modern drafting system, Roller settings, Drafting wave, Roller slip, Top roller weighting, Electronic stop motion, Discuss the technological design change in modern draw frame, Explain drafting roller arrangement, auto levelling, suction arrangement and auto doffing. Objects and importance of combing, Explain the need for comber lap preparation, Discuss silver doubling and ribbon lap M/C, unilap M/C, Degree of combing, Combing cycle types of feed, Discuss Cylinder clothing, clamping line distance, increase in nips/min, concentric nipper movement, Explain the performance affecting quality of combed cycle. Explain the objects of speed frame, Discuss passage of material through S/F and function of important parts, Explain modern drafting system, Discuss principles of twisting winding & package formation., Explain Differential motion used in modern speed frame. Discuss modern developments in speed frame; drafting –builder; twisting-driving system, other features-creel, package size roving tension control, flyer, suction etc. State the purpose and principles of Ring Spinning Machine, State the passage of Material and function of various parts of the machine, Explain Modern drafting systems on Ring Spinning machine, Top roller weighting system, top covering & mounting, roller setting and spinning triangle, cots & aprons, Describe Rings and Travellers, State Function of rings & travelers, types of rings, ring size and flange number, running in of rings, types of traveler, traveler number, selection of traveller, Explain Twisting & Winding, Twist multiplier, Describe Build of bobbin, building motion, Describe Drives of Ring spinning machine, Explain balloon control ring, State causes & end breakages, yarn defects & remedies, Describe information in ring spinning needs and possibilities, Explain End break Aspirators, Monitoring, Piecing devices, Ring data, Automatic doffing, Describe special attachment such as Automatic doffing and pneumatic waste extraction, Explain Gearing Diagram, Calculation of speed, production and efficiency in Ring spinning machine, State lubrication and maintenance of High speed Ring spinning machine, Brief idea on Compact spinning.

### **Syllabus for Fibre Science**

Basic concept on Polymer and classification, Degree of polymerization, Brief idea on different polymerization methods, Features of fibre forming polymers. Concept of fibre, Classification of textile grade fibres, Concept of staple fibre and filament, State the essential & desirable properties of Textile grade fibre. Brief idea of extraction of fibres from their natural resources like- cotton, silk, jute etc.; Morphological structure of Cotton, silk, wool and Jute fibres;

Physical, Chemical Properties of natural fibres like- Cotton, wool, Silk, jute, Flax etc. and end uses; Identification of natural fibres by physical & chemical processes. State the principles of Melt, Wet & Dry Spinning; Describe the manufacturing process & properties of Viscose rayon fibre from wood pulp. concept of high tenacity viscose rayon; Describe the manufacturing process of secondary & triacetate acetate rayon fibre; Describe manufacturing Process, Properties & end uses of – Nylon6, Nylon 66, Polyester, Acrylic & Mod-acrylic, etc.

## **SYLLABUS OF TECHNICAL PAPER FORMAIN WRITTEN EXAMINATION FOR THE POST OF TECHNICAL ASSISTANT**

**(Question Papers shall be of 10<sup>th</sup> standard passing the certificate course in Handloom, Weaving & Design)**

### **01. FABRIC STRUCTURE & CLOTH ANALYSIS**

- Classification of Textiles Design
- Study of Design, Draft and peg plan
- Preparation of Design for plain weave and Its derivatives
- Preparation of Design for Twill, Satin weaves & Its derivatives.
- Colour and weave effect.
- Towelling of cloth, Honey Comb, Huck a back, Terry weave
- Double cloth, Tubular cloth
- Leno weave, Mock leno weave
- Extra warp, Dobby, Jacquard
- Extra weft, Jalla Weave, Insertion of Buty
- Study on tradition product of Orissa, -Bomkoi, Habaspuri, Khandua, Dhalapathar Parada.
- Product diversification for export oriented
- Solid Border Design
- Property of Fibre.
- Natural and manmade fibre, staple length, TPI (Turn per inch), Twist, Moisturecontent, Strength, Single thread and lea, count

#### **Cloth Analysis**

- Equipment used for cloth analysis
- Various aspect of cloth analysis
- Quantity of yarn required per square meter of fabric

### **02. WEAVING MECHANISM:**

#### **Pre loom processing:**

- Winding, Warping, Type of warp, Different parts of warping machine, Denting, Drafting of threads

#### **Type of Loom:**

- Study of various types of looms in the country,
- Classification of loom.

### **Types of motion**

- Primary, Secondary, Auxiliary.
- Tie up arrangement
- Type of reed and heald and its uses
- Dobby- Types of Dobby- Tapped, Barrel, and lattice- Mounting of doobby
- Principle and working of Jacquard Machine-60 hooks, 100 Hooks, 200 hooks, Card cutting, lacing, harness building

### **03. TEXTILE CHEMISTRY**

#### **Use of water in handloom industry:**

- Hardness of water, boiling
- Scouring and bleaching of cotton yarn

#### **Various types of dyes: Direct, Azoic, Vat, Sulphur, Acid, Metal complex, Reactive, Disperse dyes**

- Selection of Azo free eco- friendly synthetic dyes
- Fibre suitable for various dye stuff
- Effect of mercerization on cotton yarn
- Degumming of silk and tassar yarn
- Different types of natural dyes and its application
- Different types of fastness properties
- Common defects in dyeing and improvement of dye fastness

#### **DIFFERENT TYPES OF FINISHES ON COTTON AND SILK:**

**Cotton:** Sizing, Calendering and anti crease

**Silk:** Scrooping and weightening

### **04. TEXTILES CALCULATION**

- Counting system of Yarn (Direct/ Indirect/ Universal)
- Conversion of count
- Average count and resultant
- Reed and Heald calculation
- Diameter of yarn- Fixation of ends/ inch & Picks /inch- cover factor
- Various aspects of yarn (Count, twist, strength etc)
- Warping calculation
- Take up motion calculation
- Costing of fabric

### **05. TIE & DYE (IKAT TECHNOLOGY)**

#### **Ornamentation of fabric**

- Different methods and comparative study on fabric ornamentation
- Printing, Extra warp, Extra Weft, Tie & Dye
- Fancy yarn, Colour and weave, Count Variation
- Variation of tension, use of different machines (dobby, jacquard, jalla etc.)

#### **Type of Ikat (Resist method)**

**Fabric-** Fold resist, stitch resist, wrap resist, tensile resist, wax resist ((Batic), Mordant resist

**Yarn Resist method** (Yarn Tie & Dye)

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**Preparatory process for yarn Tie & Dye)**  
**Preparation of yarn** (Scouring, bleaching), Winding, design & Colour selection, yarn set up for fabric.

- Weft Ikat preparation of sub group, preparation of group, tying and dyeing, washing and drying, untying, separation from groups to subgroups and subgroup to individual thread, winding of pirn
- Warp Ikat- Preparation of Yarn-set up for fabric, warping, selection of subgroups, selection of group, folding up to desired length, tying and dyeing, washing and drying, untying, separation of group to subgroup and subgroup to individual thread, fitting on loom.
- Double Ikat- Design selection- Yarn set up of formal process of warp and weft Ikat in repeat.
- Combined Ikat- Combination of warp/weft or double Ikat or any two selection of tied materials, design repeats, fabric set up, enlargement of paper design.
- Calculation of Raw material
- Weft yarn-Warp yarn-Boarder-Anchal-Extra warp-Extra weft- Yarn for the fabric
- Study of various traditional Tie & Dye Design of fabrics of Orissa
- Khundua, Tarabali, Nabakothari, Nabarangi, Saktapur, Bichitrapur, Bijayapuri, Aswani, Baghambari
- Comparative study of Ikat Fabric in India, Orissa Ikat, Puchamapalli, Ikat and Patola- Recent development in Tie & Dye.

#### **06. MADE UP GARMENTS (THEORY)**

- Basic tailoring, Cloth cutting, Stitching, Designing on patch work

#### **07. HANDLOOM ECONOMICS AND MANAGEMENT**

- Handloom Statistic of Orissa- Brief scenario of Indian Handloom Industry of Orissa
- Government Scheme policy for development of Handloom Industry in the state as well as the Country.
- Brief note on various Committee Reports on Handloom Industry.
- Various Important Handloom Clusters of India and its products.
- Various Important Handloom Clusters of Orissa and its products.
- Study on modern management.
- Total Quality Management (TQM)
- Economical Ordering Quantity (EOQ)
- Project Management-Constitution of S.H.Gs and S.M.Es
- Administration, Finance, Marketing Management related to S.H.Gs, S.M.E.s, Co-operatives etc.

#### **08. COMPUTER-AIDED-DESIGNS**

- Module 1- Computer Fundamental
- Module 2- Windows Xp
- Module 3-MS Words 2003
- Module 4-MS Excel-2003
- Preparation of Handloom Design and colour
- Computer aided Design
- Colour Cycle, Floral & all over Design, Colour Combination  
Designs for Dobby, Jacquard, Jalla weave with the help of computer

# **SYLLABUS FOR TECHNICAL PAPER FOR MAIN WRITTEN EXAMINATION FOR THE POST OF AMIN**

## **CONCEPTS OF GEOMETRY & MENSURATION**

- Introduction to Geometry  
2D Shapes: Line, Circle, Triangle, Quadrilateral, Rectangle, Square, Trapezium, Rhombus and Parallelogram  
3D Shapes: Sphere, Hemi-Sphere, Cylinder, Cone, Cube, Pyramid, Cuboid  
Important Theorems and Postulates
- Triangles:  
Different types of Triangles  
Various types of Centres  
Congruence  
Similarity  
Perimeter and Area
- Quadrilaterals:  
Different types of Quadrilaterals i.e. Rectangle, Square, Trapezium, Rhombus and Parallelogram  
Perimeter and Area
- Circle:  
Perimeter and Area  
Radius, Diameter, Secant, Sector and Chords  
Tangents
- Area tracing by using Coordinate Geometry  
Height and Distance calculation by using Trigonometric formulae
- Volume, Curved Surface Area (CSA), Lateral Surface Area (LSA), Total Surface Area (TSA) of 3D objects i.e. Sphere, Hemi-Sphere, Cylinder, Cone, Cube, Pyramid, Cuboid
- Units of area Measurement and their conversion

## **INTERPRETATION OF MAPS**

- Introduction to Maps.
- Map Scale and Ratio.
- Coordinates: Latitudes, Longitudes
- Types of Maps: Political maps, Physical maps, Topographical maps, Topological maps, nautical maps, thematic maps and Road maps.
- Properties of Maps: Distance, Symbol and Direction.
- Conventional Signs and symbols
- Interpretation of Topo-Sheets
- Index in maps



**SYLLABUS OF TECHNICAL PAPER FOR MAIN WRITTEN EXAMINATION  
FOR THE POST OF SOIL CONSERVATION EXTENSION WORKER**

Syllabus of Technical Paper (Paper-II)

Part-I:

Mathematics- Arithmetic, Algebra, Geometry, Mensuration, Trigonometry and Statistics

Part-II:

a) Physics

b) Chemistry

c) Biology

d) Field Crops- cereals, pulses, oilseeds, Fibre crops, Commercial crops Fruits, Vegetables, Plantation crops, Floriculture Pasture & Fodder cultivation

Major soil types of Odisha

Manures and Fertilizers

Farm implements & uses

Agro climatic zones of Odisha

Brief knowledge about hydrology cycle

Soil and Water Conservation

**SYLLABUS OF TECHNICAL PAPER FOR MAIN WRITTEN EXAMINATION  
FOR THE POST OF AYUSH ASSISTANT**

A. Physics

B. Chemistry

C. Biology

Questions shall be based on the (10+2) Science Syllabus of CHSE.