

TAMIL NADU PUBLIC SERVICE COMMISSION

Syllabus

Printing Technology (Diploma Standard)

CODE: 484

UNIT I: Imaging Technology (20 Questions)

Design – Concept, Typography, Graphic Design Layout – Stages in preparing a Layout; Imposition Schemes; Book work – Margin Calculations, Dummy. Various Designing Software used for Designing of Newspapers, Booklet, Magazines, Label Work, Book works – Text and Wrapper design, Font Style, Font Size. Digital Prepress – Image Acquisition – Digital Camera – Scanner. Screening – Frequency, Dot Structure, AM and FM Screening, Screen Angles and Resolution. File formats – OPI, PDF, TIFF, EPS, JPEG, GIF, PNG. Work flow – File preparation, Colour Management, Preflighting, Digital Imposition – Raster Image Processor. Type of Image – Bit map, Vector Image. Colour – Colour Separation – CMYK, Greyscale Mode, Additive and Subtractive colour Theory.

UNIT II: Image Preparation (15 Questions)

Image for Offset Process; Presensitized Plates (PS), Quality Control Aids – Star Target, Registration Mark, Line resolution target, Ink coverage target. Computer to plate and its architecture, Types of plates used –Computer to Plate Imaging – Laser, UV, Thermal Imaging. Plate Processor – Developing, Fixing, Washing, Gumming. Imaging for Gravure process: Electro Mechanical engraving, Laser Cutting of Gravure Cylinders, System Architecture workflow and quality control.

Imaging for Flexography: Plate types – Rubber and Photo Polymer plates and quality aspects.

Imaging for screen Printing: Stencil Preparation types and quality aspects.

Proof Reading Marks, Copy Editing and Checking print elements with originals.

UNIT III: Sheet-fed Offset Printing (25 Questions)

Sheet-fed Offset Printing Principles, Types of Offset Machines – Single Colour, Multi Colour, Prefecting Presses and Small Offset Presses; Feeding Unit – File board, Feeder Head, Feed Board, Sheet registering Devices - Front lay, Side lay – Sheet Detectors – Double Sheet Detectors, No Sheet Detector. Printing Unit – Plate Cylinder, Blanket Cylinder, Impression Cylinder, Inking System – Roller Setting, Dampening System – pH, Conductivity of Dampening, Drying System and Delivery System – Grippers, Safety Switches, Safety Guards. Print problem identification and

quality control. Green Printing – Water based inks, recycled papers and chemical free plates.

UNIT IV: Web Offset Printing (25 Questions)

Web offset Printing: Principle, Cut of Length, Web fed offset machines - In-line web offset, Blanket to Blanket Press, Stack Type Press, Satellite Presses, Common Impression Cylinder (CIC); Infeed: Types of Reel Stands, Automatic Pastors - Types, Web Control Devices; Dancing roller, Metering roller, Box Tilt, Turner Box, Web Break Detectors. Printing Unit design configuration, Inking and Dampening System, Drying, Chilling, Folding, Sheeting Units and Mail Room Operation. Make-ready Operations, Multi Colour Printing, Automatic Plate Fixing, Computer Controls in Printing, Automatic Blanket Washing Devices, Roller Washing Devices, Spot Coating, Varnishing and Accessories.

UNIT V: Gravure, Flexography, Screen Printing (15 Questions)

Gravure Principle, Press configuration, Corona treatment, Doctor Blade – types, Positioning; Impression rollers, inking and drying system. Proofing, Rewind Section, Unwind Section and converting operations.

Flexography Printing: Principle, press configuration, Corona treatment, Anilox roller, plate mounting, inking, drying and proofing. Feed in, feed out and converting operations.

Screen printing – Screen fabrics, frames and squeegees - types; screen printing machine- types.

UNIT VI: Book Binding and Finishing (25 Questions)

Production flow in print finishing, Folding – Sheet fed – Knife folding and Buckle folding, Web fed – Former fold, Jaw fold, Chopper fold. Cutting Machine – Parts, Types of Cutting Machine, Mechanism and Maintenance of Guillotines. Gathering, Collating, Stitching, Sewing – Types; Perfect binding, Miscellaneous Operations – Edge Decoration, Case Binding, Embossing, Foil Stamping, Die-Cutting, Indexing, Lamination, Shrink Wrapping, Comb Binding, Spiral Binding, UV Curing. Automation in finishing operations. Finishing problem – Improper wire pinning, Improper Wrapper scoring, Defective cutting, Defective size of book etc.

UNIT VII: Printing Materials (20 Questions)

Paper - Raw materials, Manufacturing, Paper making machine Operations, Paper coating methods. Paper Classification and sizes – ISO & British Size. Boards: Raw materials, manufacturing, machineries, classifications and sizes. Paper and Board

Properties and testing – GSM, Grain direction, Opacity, Folding endurance, Tensile Strength etc., - Printing Inks - Raw Materials, Manufacturing, Three roll mill, Types of inks, Ink properties of offset, flexography, gravure and screen printing. Coating materials, Varnish, Laminating films and adhesives. Corrugated Board – Types, Flutes and Number of plies - Board Properties and testing – Edge Crush test, Cobb Test, Bursting Strength, etc.,

UNIT VIII: Planning, Scheduling and Cost Estimation (20 Questions)

Planning, scheduling the work, Sequencing, Inventory Management, Materials and Capacity requirement. Cost Estimation - Basic concept of costing, Pricing and Estimation. Cost estimation for printing materials and for different printing process in respect to various print jobs.

Estimation Process – Obtain accurate Specifications – Job Sequence – Material Requirement – Time and labour – Fixed Cost and Variable Cost – Job card – Job Scheduling / Sequencing production control and Invoicing. Types of Papers and Boards – Coated and Uncoated paper – Raw Material Cost, Printing Cost – Text, Wrapper, Lamination Cost and Binding Cost. Paper Size, Board Sizes and Costing – Paper and Board requirement calculation - Reams / Weight of paper and Board.

UNIT IX: Quality Control in Printing (20 Questions)

Quality Circles, 5S, Kaizen. Process control: Visual inspection, Quality Systems and ISO 9000, Statistical Quality Control, and wastage management. Use of Testing Equipments; GSM, Tearing Strength, Cobb, Bursting Strength, Edge Crush Tester. Stiffness, Tensile Strength. Print Analysis: Solid Ink Density (SID), Dot gain, Print Contrast, Ink Trapping and Dot Area, CIE lab and Delta E. ISO 12647 for printing standards. Wastage minimization in printing industry, Press calibration. Quality Control Equipment – Densitometer, Spectrophotometer. ISO 14000, OSHA Standard. Ensuring the sustainability in Printing and Packaging. Printing problems – Scumming, Mottle, Ghosting, Hickeys, Set off, Pilling, Strike Through and Show Through.

Unit X: Digital printing (15 Questions)

Print on Demand, Variable data Printing, Personalized Printing, Digital Printing Technology: Definition, Non-impact Printing Technology (NIP), Basic principle; Electrophotography, Inkjet printing. Security Printing; Hologram, waterless offset, Hybrid printing and its application.

E-publishing Layout and Design preparation, eBook, eJournals, QR Code, Ebook converter, ISBN, Barcode, copyright certification, internet advertising and digital libraries. Web to print – Workflow, Optimization of print production using production monitoring system.

Dated: 23.12.2024