

राष्ट्रीय प्रौद्योगिकी संस्थान कालीकट
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT

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तारीख: 22 अप्रैल 2024
Date: 22 April 2024

Group B & C (02/2023) – NOTICE

SYLLABUS FOR THE WRITTEN EXAMINATION

In continuation of this Institute's notice of even number dated 23 March 2024, the tentative syllabus for the written examination for Group B & C positions is placed at Annexure – I to this notice.

2. Candidates are advised to visit the Institute website at regular intervals for further update.

Registrar

GROUP B & C (02/2023) – TENTATIVE SYLLABUS FOR WRITTEN EXAMINATION

POST: Technical Assistant (Chemical Engineering)

Fluid Flow and Mechanical Operations: Newton's law, fluid statics, fluid kinematics, flow through pipes, friction factor, Bernoulli's equation, continuity equation, Euler's Equation, flow passed immersed objects, filtration, particle size reduction, fluid-particle mechanics, fluidization.

Heat Transfer and Thermodynamics: Conduction, convection and radiation, natural and forced convection, heat exchangers (types and working), evaporators, laws of thermodynamics, solution thermodynamics, chemical thermodynamics and equilibrium thermodynamics.

Mass transfer and Separation Processes: Theory of mass transfer, Fick's law, convective mass transfer, distillation, drying, absorption, adsorption, ion exchange, liquid-liquid extraction, leaching.

Instrumentation and Process Dynamics and Control: Introduction to Instrumentation, Temperature Measuring Devices, Measurement of Pressure & Vacuum, Measurement of Head and Level, Process Recording Instruments, first and second order systems, P, PI, PID controls, control theory, tuning of controller, feedback control system, plant wide control.

Chemical Reaction Engineering: chemical kinetics, ideal reactors, residence time distribution, non-ideal reactors, recycle reactors, fluidized bed reactors, multiphase reactions and reactors.

Process Calculations: Introduction, Basic Chemical Calculations, Material Balance with and without chemical reaction, Energy Balance, Combustion, ideal gas law.

Computer Awareness: Applications of computers in Chemical Instrumentation and Process Control, Basic knowledge of Computer Applications, viz. MS Word, MS Excel, Power Point etc. Internet, Windows. 8. Communication Skills: English grammar, vocabulary, oral and written communication.

POST: Technical Assistant (Architecture)

Architectural graphics: Orthographic Projections-Principles and methods Projection of line, plane and solids. Development of surfaces of solids. Perspective projections of solids

History of Architecture: Architectural styles of different ages -Egyptian Mesopotamian, Greek, Mughal, Roman, Gothic, Renaissance, Indian Architecture and its evolution and different styles. Vedic and Buddhist Architecture, Hindu Architecture, Indo-Islamic Architecture, Colonial Architecture in India. Arts and Crafts movement, Modernism and Postmodernism. Contemporary Architectural styles. Vernacular architecture and its principles.

Architectural Design and drawing:

Fine Arts: History of Art - Art in prehistoric settlements. Influence of culture and religion on art. Expressions of religious beliefs. Common signs and symbols of culture. Contemporary developments. Folk art & traditional forms. Oriental art. - History of Western Art.

Drawing, Painting, design and Print making- principles and techniques Concept of Illustration and Different Illustrative Technique – Calligraphy- Optical Illusion. Lettering & Typography

Visual Arts: Elements and Principles of visual Design. Color Theory. Various media & materials for art. Visual properties of Two-dimensional forms. Techniques of rendering. Perspective views. Sciography. Different genres of applied art -Visual composition principles. Dimensional compositions in Architecture. Visual composition- elements and principles.3D Modelling

Rendering Techniques, classical and contemporary techniques of life drawings.

Architectural Design – Basic concepts. Elements and Principles of Design. Architectural Theory in Historical Perspective. Principles of visual design. Architectural programming principles. Design Process- Design approaches. Various stages of design development and construction of design. Concept of built environment and its application in planning, Recommendation of National building code, green building, Principle of Planning for differently abled publics. Design of various buildings- functional design standards. Building rules & bye laws.

Building Climatology: Climatic Information, Data and measurements, Thermal comfort factors Evaluation of thermal comfort indoors and outdoors, Comfort parameters and comfort indices - Thermal design of buildings - design of shading devices - theories and design principles for natural ventilation and daylighting.

Working Drawing: -Preparation of detailed drawing for layout of the building-Structural layout drawings. Architectural drawings of openings. Architectural drawings for landscape and site development. Building services drawings. Specifications of finishes

Computer Application in Architecture: Basics Programming and Computational Design in Architecture. Computer programming. Computer Aided Design in Architecture: Advanced Computer Application in Architecture.

Computer aided architectural design: Principles and methods for 2D and 3D CAD application in architecture - Application of software - Computer representation of graphics, Raster and Vector image manipulations and layout - Generating computer aided 3D models of architectural projects- principles and techniques - Types of 3D modelling, Animation basics.

IMDL: -Software for architectural visualization Application of videography in architecture. Techniques for video making, Application of software. Visual effects for movies. Multimedia presentations. Print Media preparation.

Design Theory and Process: Representation Techniques, Elements of Design, Cognitive & physical ergonomics, and anthropometry - Applied Science for Design, Principles of Visual Design, Visualization and Illustrations, Introduction to Computing.

Building materials: Construction Materials: - Natural materials- Stone, imber, Lime, Soil, Sand, Coarse aggregates - Processed materials- Brick, tiles, Cement, concrete, Glass, Fibers, Plaster of Paris, Paints- and Distempers, Oil Paints and Varnishes, Fly ash. - Properties, classification, uses, manufacturing process and treatment. Quality testing procedures. Non-Destructive Tests on concrete

Workshop: Carpentry, Electrical Wiring, Plumbing and Sanitation Services, Various tools and processes - Plumbing fixtures, Sanitary fittings, wiring systems, Architectural model making- tools, materials and techniques

Building Construction: Masonry, Arches, Trusses, Roofs, lintels, beams, floors, columns and Foundations, Doors, Windows, openings, - Types, materials and methods of construction. Reinforced Concrete and Steel frames. Cladding systems, false ceilings, wall paneling-materials, and construction details. Space structures in steel and concrete. Pre-stressed concrete construction- types and techniques, Bar bending schedule as per BIS, form work, Scaffolding, shoring, underpinning. Planning and detailing of various types of stairs, lifts, ramps and escalators. design standards and construction details - Damp proofing and Repair and retrofitting - Materials and Methods

Basic Surveying: Surveying - Principles of surveying, Types of surveying, survey techniques and Equipment used. Levelling and traversing, Errors and their adjustment, contours, Maps, Photogrammetry and Remote Sensing.

Structural analysis and design: - Fundamentals of mechanics. Computation of forces and analysis, SFD and BMD. Structural systems - Types of structures and their behavior under different loading conditions. Analysis and design of structures – Theory and code provisions. Statically Determinate and Indeterminate Structures. Methods of Analysis of trusses, arches, beams, cables and frames. Design philosophy in reinforced concrete design. Analysis and design of RCC structural members – Methods. BIS code specifications. Pre-stressed Concrete Fundamentals - Principles and design fundamentals for structural Steel Design - Design of bolted, riveted and welded steel connections. Design and detailing of roof trusses, girders and stanchions. Design of timber beams and columns, Analysis and Design of brick masonry

Building Services: Psychrometric properties - fundamentals of Heating Ventilation and Air Conditioning design - Principles of estimation of air-conditioning load – Systems and techniques for Heating - Ventilation and Air-conditioning-Types - Space Requirement, Dimension, Layouts: Machine Rooms - Fundamentals of water supply and sanitary engineering - Systems and techniques for plumbing services in buildings - Principles and techniques for waste management

Building Acoustics and Illumination: Phenomenon and principles relating to sound propagation - Auditorium and Studio Acoustics - Principles of noise control. Acoustic materials and construction- types, properties, installation - Acoustical defects - Acoustical measurements in the outdoors and indoors

Fundamentals of electrical engineering. Lighting – principles Natural and artificial lighting - Types of luminaires. Design of Lighting for buildings – principles and standard requirements. Illumination-concepts and techniques. Illumination indoors – natural and artificial, methods for measurement. Communication networks in buildings Design of distribution systems - BIS standards

Urban planning and design: Town planning in ancient medieval, renaissance, industrial and postindustrial age. Principles of planning of settlements. Process and procedures for Urban and Regional plans preparation. Acts, policies, norms and standards in planning - Urban Design-principles and theories. Behavioral aspects of urban design. Visual Dimensions of Urban Spaces: City. Functional and Implementation Aspects of Urban Design-Elements and principles of landscape design. Design process in landscape architecture. Interior landscape architecture. Design, development and details of landscapes for various functions

Construction Management- Different management techniques suitable for planning and scheduling of projects. Network planning methods. Cost Estimation methods. Value engineering concepts - Estimation, Costing, Valuation and Specifications. Methods of Estimates. Estimating steel for trusses and timber for wood work- Estimation for reinforcement

details for RCC works. Building Cost Analysis models. Valuation of Land and Buildings-
Methods of valuations

POST: Technical Assistant (Nursing)

Anatomy and Physiology: Structure and function of cells, tissues, muscles of body and joints. Structure and function of various systems of the human body for Nervous system, circulatory systems, Respiratory system, Excretory system, Reproductive system, Endocrine system, sensory organ.

Microbiology: Description and classifications of micro-organism with characteristics. Infection and its transmission, Immunity, Control and Methods destruction of Microbes, Practical microbiology.

Behavioural Science (Psychology and sociology): Psychology of human behaviour, Personality, Intelligence, Sociology

Nutrition: Introduction of food and Nutrition, Carbohydrates, Fats, Proteins, Vitamins, Minerals water and electrolytes, cookery rules and prevention of nutrients, Normal Nutrition / Balanced diet Therapeutic Nutrition.

Fundamentals of Nursing: Introduction to Nursing, Nursing care of the patient, Meeting the Basic needs of a patient, Assessment of patient / client, Infection control, Therapeutic Nursing care, Introduction top clinical pharmacology.

First Aid and Emergency care: Procedures and techniques in First Aid, Emergency care, Resuscitation

Community Health Nursing: Health determinants, Epidemiology and nursing management of common communicable diseases and non-communicable diseases, Family Health Nursing care, Health policy and planning, National Health and Family Welfare program, role and responsibility of community health nurse

Medical Surgical Nursing: Common symptoms and Nursing management of medical and surgical systemic disorders of the human body, management of patients. Nursing management of patients in emergency and disaster situations.

Midwifery and Obstetrical Nurse: Concept of midwifery and Obstetrical nursing, Management of antenatal, Intra-natal, post-natal period, Management of normal neonates, High – risk pregnancy, Abnormal labour, Obstetric operations, Drugs used in obstetrics.

Nursing Administration and Ward Management: Administration and management process. Administration of Hospital department, Units, Wards. Cost and financing of health care, Management of equipment supply.

Professional trends and Adjustment: Nursing as a profession, Professional ethics, Personal and professional development, legislation in Nursing, Profession and related organizations.

Child Health Nursing: Growth and Development of child, Disorders and health problem of a child, Immunization, Child welfare services.

POST: Senior Technician (Architecture)

Architectural Graphics: Orthographic projections - principles and methods, Projection of line, plane and solids, Development of surfaces of solids, Perspective projections of solids, Lettering, dimensioning and Scaling.

History of Architecture: Architectural styles of different ages- Egyptian Mesopotamian, Greek, Mughal, Roman, Gothic, Renaissance, Indian Architecture and its evolution and different styles. Vedic and Buddhist Architecture, Hindu Architecture, Indo-Islamic Architecture, Colonial Architecture in India. Arts and Crafts movement, Modernism and Postmodernism. Contemporary Architectural styles. Vernacular architecture and its principles.

Visual Arts: Fundamentals of Visual Arts & History of World Art Nature study (Drawing & Painting) - Compositional Drawing – concepts and techniques - Graphic Designing: Elements, principles and techniques Elements & Principles of Visual Art

Introduction to Visual Culture - Pre-Historic Art, Renaissance & Pre modern Art- Art Movements, History of Indian Art - Principles of Animation. Still Life, Life Study and Composition: materials and methods for Painting

Elements and Principles of visual Design. Color Theory. Various media and materials for art. Visual properties of Two-dimensional forms. Techniques of rendering. Perspective views. Sciography. Art in 3D- Form, texture, mass and volume. Additive and subtractive techniques and fabrication. Different genres of applied art. Visual composition principles. Dimensional compositions in Architecture. Visual composition- elements and principles

Architectural Design– Basic concepts: Elements and Principles of Design. Architectural Theory in Historical Perspective. Principles of visual design. Architectural programming principles. Design Process- Design approaches. Various stages of design development and construction of design. Concept of built environment and its application in planning, Recommendation of National Building Code, Green building, Principle of Planning for differently abled publics. Design of various buildings- functional design standards. Building rules & bye laws.

Building Climatology: Climatic Information, Data and measurements, Thermal comfort factors Evaluation of thermal comfort indoors and outdoors, Comfort parameters and comfort indices - Thermal design of buildings - design of shading devices - theories and design principles for natural ventilation and daylighting.

Working Drawing: -Preparation of detailed drawing – Site plan, service plan and submission drawings – Detailed architectural drawings - Structural drawings – Detailed drawings of openings, Architectural drawings for landscape and site development, Building services drawings,

Computer Application in Architecture: Basics programming and computational design in Architecture, Computer Aided Design in Architecture- Principles and techniques

Computer aided architectural design: Generating computer aided 3D models of architectural projects- principles and techniques. Application of software. Computer representation of graphics, Raster and Vector image manipulations and layout, Principles and methods for 2D and 3D CAD application in architecture. Types of 3D modelling, Animation basics.

Construction materials: Natural materials- Stone, Timber, Lime, Sand, Coarse aggregates - Processed Materials-Brick, tiles, Cement, concrete, Glass, Fibers, Plaster of Paris, Paints-

Distempers, Oil Paints and Varnishes, Fly ash- Properties, classification, uses, manufacturing process and treatment. Quality testing procedures, Non-Destructive Tests on concrete.

Workshop: Carpentry, Electrical Wiring, Plumbing and Sanitation Services, Various tools and processes - Plumbing fixtures, Sanitary fittings, wiring systems, Architectural model making- tools, materials and techniques

Building Construction: Masonry, Arches, Trusses, Roofs, lintels, beams, floors, columns and Foundations, Doors, Windows, openings, - Types, materials and methods of construction. Reinforced Concrete and Steel frames. Cladding systems, false ceilings, wall paneling- materials, and construction details. Space structures in steel and concrete. Pre-stressed concrete construction- types and techniques, Bar bending schedule as per BIS, form work, Scaffolding, shoring, underpinning. Planning and detailing of various types of stairs, lifts, ramps and escalators. design standards and construction details - Damp proofing and Repair and retrofitting - Materials and Methods

Basic Surveying: Surveying - Principles of surveying, Types of surveying, survey techniques and Equipment used. Levelling and traversing, Errors and their adjustment, contours, Maps, Photogrammetry and Remote Sensing.

Structural analysis and design: - Fundamentals of mechanics. Computation of forces and analysis, SFD and BMD. Structural systems - Types of structures and their behavior under different loading conditions. Analysis and design of structures – Theory and code provisions. Statically Determinate and Indeterminate Structures. Methods of Analysis of trusses, arches, beams, cables and frames. Design philosophy in reinforced concrete design. Analysis and design of RCC structural members – Methods. BIS code specifications. Pre-stressed Concrete Fundamentals - Principles and design fundamentals for structural Steel Design - Design of bolted, riveted and welded steel connections. Design and detailing of roof trusses, girders and stanchions. Design of timber beams and columns, Analysis and Design of brick masonry

Building Services: Psychrometric properties - fundamentals of Heating Ventilation and Air Conditioning design - Principles of estimation of air-conditioning load – Systems and techniques for Heating - Ventilation and Air-Conditioning-Types - Space Requirement, Dimension, Layouts: Machine Rooms - Fundamentals of water supply and sanitary engineering - Systems and techniques for plumbing services in buildings - Principles and techniques for waste management

Estimate and cost analysis: Estimation, Costing, Valuation and Specifications. Methods of Estimates. Estimating steel for trusses and timber for wood work- Estimation for reinforcement details for RCC works. Building Cost Analysis models. Valuation of Land and Buildings- Methods of valuations.

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POST: Technician (Architecture)

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