

**FURTHER DETAILS REGARDING MAIN TOPICS OF
PROGRAMME NO. 04/2017 (Item No. 19)**

DRAFTSMAN(CAD)ARCHITECTURE

TECHNICAL EDUCATION

(CATEGORY No.421/14)

PART -I : General Knowledge and Current Affairs& Renaissance in Kerala

Salient Features of Indian Constitution

Salient features of the Constitution - Preamble- Its significance and its place in the interpretation of the Constitution.

Fundamental Rights - Directive Principles of State Policy - Relation between Fundamental Rights and Directive Principles - Fundamental Duties.

Executive - Legislature - Judiciary - Both at Union and State Level. - Other Constitutional Authorities.

Centre-State Relations - Legislative - Administrative and Financial.

Services under the Union and the States.

Emergency Provisions.

Amendment Provisions of the Constitution.

Social Welfare Legislations and Programmes

Social Service Legislations like Right to Information Act, Prevention of atrocities against

Women & Children, Food Security Act, Environmental Acts etc. and Social Welfare Programmes like Employment Guarantee Programme, Organ and Blood Donation etc.

RENAISSANCE IN KERALA

Towards A New Society

Introduction to English education - various missionary organisations and their functioning- founding of educational institutions, factories,printing press etc.

Efforts To Reform The Society

(A) Socio-Religious reform Movements

SNDP Yogam, Nair Service Society, Yogakshema Sabha, Sadhu Jana Paripalana Sangham, Vaala Samudaya Parishkarani Sabha, Samathwa Samajam, Islam Dharma Paripalana Sangham, Prathyaksha Raksha Daiva Sabha, Sahodara Prasthanam etc.

(B) Struggles and Social Revolts

Upper cloth revolts.Channar agitation, Vaikom Sathyagraha, Guruvayoor Sathyagraha, Paliyam Sathyagraha. Kuttamkulam Sathyagraha, Temple Entry Proclamation, Temple Entry Act .Malyalee Memorial, Ezhava Memorial etc.

Malabar riots, Civil Disobedience Movement, Abstention movement etc.

Role Of Press In Renaissance

Malayalee, Swadeshabhimani, Vivekodayam, Mithavadi, Swaraj, Malayala Manorama, Bhashaposhini, Mathnubhoomi, Kerala Kaumudi, Samadarsi, Kesari, AI-Ameen, Prabhatham, Yukthivadi, etc

Awakening Through Literature

Novel, Drama, Poetry, *Purogamana Sahithya Prasthanam, Nataka Prashtanam*, Library movement etc

Women And Social Change

Parvathi Nenmenimangalam, Arya Pallam, A V Kuttimalu Amma, Lalitha Prabhu. Akkamma Cheriyan, Anna Chandi, Lalithambika Antharjanam and others

Leaders Of Renaissance

Thycaud Ayya Vaikundar, Sree Narayana Guru, Ayyan Kali. Chattampi Swamikal, Brahmananda Sivayogi, Vagbhadananda, Poikayil Yohannan (Kumara Guru) Dr Palpu, Palakkunnath Abraham Malpan, Mampuram Thangal, Sahodaran Ayyappan, Pandit K P Karuppan, Pampadi John Joseph, Mannathu Padmanabhan, V T Bhattathirippad, Vakkom Abdul Khadar Maulavi, Makthi Thangal, Blessed Elias Kuriakose Chavara, Barrister G P Pillai, TK Madhavan, Moorkoth Kumaran, C. Krishnan, K P Kesava Menon, Dr. Ayyathan Gopalan, C V Kunjuraman, Kuroor Neelakantan Namboothiripad,

Velukkutty Arayan, K P Vellon, P K Chathan Master, K Kelappan, P. Krishna Pillai, A K Gopalan, T R Krishnaswami Iyer, C Kesavan. Swami Ananda Theerthan, M C Joseph, Kuttippuzha Krishnapillai and others

Literary Figures

Kodungallur Kunhikkuttan Thampuram, KeralaVarma Valiyakoyi Thampuram, Kandathil Varghese Mappila. Kumaran Asan, Vallathol Narayana Menon, Ulloor S Parameswara Iyer, G Sankara Kurup, Changampuzha Krishna Pillai, Chandu Menon, Vaikom Muhammad Basheer. Kesav Dev, Thakazhi Sivasankara Pillai, Ponkunnam Varky, S K Pottakkad and others

GENERAL KNOWLEDGE AND CURRENT AFFAIRS

General Knowledge and Current Affairs

Part II (a): Technical Mathematics

- I. Matrices – Identification of Matrices, matrix operations, adjoint and inverse.
- II. Determinants – Evaluation of second and third order, minors and cofactors, solutions of simultaneous linear equation in three unknown using Cramer's rule.
- III. Binomial Series – Expansions using Binomial theorem.
- IV. Trigonometric functions – Signs of functions in each quadrant. Trigonometric values of angles, properties of trigonometric functions, applications of the identities $\sin(A \pm B)$, $\cos(A \pm B)$ and $\tan(A \pm B)$.
- V. Coordinate geometry – Equations to a straight line – slope-intercept form, intercept form, Angle between two lines, condition for two lines to be perpendicular, parallel.

- VI. Differentiation – Limits and continuity, derivatives of functions, equation to tangents and normals. Maxima and minima of functions of one variable.
- VII. Integration of functions – Integration of different types of functions.
- VIII. Applications of integration – Area bounded by a curve and X or Y axis, solutions of differential equations using the method of variable separable, solutions of linear differential equations of first order.

Part II (b): Basic Civil Engineering

Materials: Brick – varieties and strength, characteristics of good brick. Cement – varieties and grade of cement and its uses. Steel – types of steel for reinforcement bars, steel structural sections. Aggregates – types & requirements of good aggregates. Concrete – grades of concrete as per IS code, water cement ratio. Workability, mixing, batching, compaction and curing.

Construction: Parts of building – foundation – types of foundations – spread footing, isolated footing, combined footing, Raft, pile and well foundations. Masonry – types rubble masonry, brick masonry, English bond and Flemish bond. (One brick wall).

Surveying: Chain surveying – principles, instruments, ranging, and chaining survey lines, field work and field book, selection of survey stations, units of land area.

Levelling: Levelling instruments, different types, bench mark, reduced level of points, booking of field notes, reduction of levels by height of collimation method (simple problem). Modern survey – instruments – Total station, Electronics theodolite, Distomat.

Part II (c): Basic Mechanical Engineering

The importance of IC Engines: Definition, classification – two stroke engines, four stroke engines, working of two stroke engines and four stroke engines with the help of line sketches, comparison between two stroke and four stroke engines, comparison between petrol and diesel engines, function of fly wheel, clutch, gearbox, propeller shaft and differential in power transmission, explain with sketch the working of differential, briefly explain power transmission of 4 wheel vehicle with line diagram.

The importance of Power Plants: Introduction, classification of power plants – working of hydroelectric power plant with schematic sketches – working of thermal (Steam and Diesel) power plant with schematic sketches – working of nuclear power plant with schematic sketches.

Part II (d): Basic Electrical Engineering

Review with discussion of electric current, potential difference, power, EMF, resistance and its laws, Ohms law and series parallel circuit, electromagnetism, generation of AC and DC supply.

Idea of Basic electrical circuit: Electrical supply and load and its functioning, division of voltage and current in a parallel and series circuit – simple problems, units of power and energy, solution of DC circuit with calculation of energy consumption in an installation.

Circuit parameters: Resistance, Capacitance and inductance. AC circuit with R, L, C. Simple solution of typical AC circuit with resistance, impedance, power and power factor.

Electrical circuit of an installation: Earthing, lightning protection.

Part II (e): Essentials of Electronics Engineering

Active and passive devices – review only. LED – working, applications, comparison of LED lighting and CFL lighting. Full wave rectifier – diagram and explanation, 5 V power supply – with bridge rectifier and 7805. SMPS – block diagram and advantages. Integrated circuits. SMDs – advantages. Static electricity – precautions in handling electronic circuits.

Switches: ON / OFF, push to ON, push to OFF, push to ON / OFF, SPST, SPDT, DPDT. Working and application of limit switches, proximity switches, relays.

Microcontrollers: Simple block diagram of 8 bit microcontrollers – application.

Mobile technology: CDMA and GSM. Compare – 2G and 3G technologies.

Inverter & UPS: Block diagram. Compare – inverter and UPS. Online and off line UPS – differentiate. Battery selection for UPS and inverter.

E-waste: Health hazards of e-waste.

Part III :

Definition of force – Resolution of force - moments - Centre of gravity of plane figures. Moment of inertia – Polar moment of inertia. Parallel axis theorem – Radius of gyration, laws of friction, Co-efficient of friction, Angle of repose

Stress and strain – Young's modulus. Poissons Ratio, simple shear – yield stress. Factor of safety, support reaction. Bending moment and shear force, Point of contraflexure

Theory of simple bending – Position of Neutral axis slope and deflection – Deflection of cantilever and simply supported beam with point load and uniformly distributed load. Fixed beams – advantages – short column and long column – slenderness ratio – Euler's formula – Rankine formula – Eccentric loading of Symmetrical columns – limit of eccentricity.

Grades of concrete – types of reinforcing steel. Position of neutral axis - Determination of moment of resistance. Doubly reinforced beams – Design aspect of singly reinforced beams, effective span – area of tension reinforcement, cover, spacing development length – T beams – M. R. lintels of different loading conditions. Shear in beams, Shearing reinforcement – one way and two way slab. Columns – slenderness limit – longitudinal & Transverse reinforce – Riveted and welded joint –

strength of Joint. Effective sectional area of angles. Permissible stress in direct compression. Strength of compression members. Lateral buckling of beam – limiting deflection.

Module IV :

Classification of stones – characteristics of good building stone. Bricks – qualities. Cement – types, uses – Test on cement. Mortar – type – mix. Plastering. Concrete – use – Pre-cast concrete. Ferrous metals – use properties. Timber – seasoning Defects – wood based products. Ingredients of paint. Commercial form of plastic. Properties of glass. Classification of glass. Insulating materials – gypsum, Bearing capacity of soil. Ultimate and safe bearing capacity – factor of safety. Brick masonry – type of bonds. Types of doors and windows. Different types of Arches. Pitched roof – types of truss. Stairs types – standards. Lift - parts of lift - escalators – definition. Ramps – definition – gradient of ramps. Distribution of water – Method of distribution. Hot and cold water supply system. Accessory fittings sanitary arrangements in building. Fire lighting systems – general principles concerning life safety. Emergency lighting, alarm systems. Illumination – levels of illumination required. Acoustic terminology – Properties of sound – Acoustical defects and remedies – Acoustical requirements of hall.

Approximate estimate – types – Plinth areas, cube rate service unit. Units of measurements as per KPWD Rate analysis – standard data book. Schedule of rates. Abstract of estimate earth work computation – Trapezoidal and prismoidal formula. Lump sum lead and lift.

Module V :

Different operations in chain surveying. Ranging, Chaining on sloping ground, obstacles in chaining, calculation of area. Trapezoidal rule – Simpson’s rule. Types of bearing – calculation of included angles. Local attraction. Dip and declination. Method of Plane table surveying.

Concept of line of collimation – Reduction of levels – height of collimation and rise and fall method Contouring. Characteristics. Theodolite – Transit and non-transit. Horizontal angle repetition and reiteration method. Types of traverse – deflection angles – Balancing of consecutive co-ordinates by Bowditch and transit rules. Gates traverse table. Curves – different types. Geometric of vertical curve. Remote sensing – Definition GPS fundamentals. GIS – uses and application.

Climatic elements – characteristics of different types of tropical climate – hot-dry, warm-humid – composite and Tropical upland climate – Human body’s heat production, heat loss and thermal balance – subjective variables – thermal indices – ET, CET, and bio-climatic chart – thermal properties of materials – absorptivity, conductivity, thermal capacity, resistance, transmittance, time-lag, decrement factor, insulation – site climate – local factors, temperature, humidity, air movement, radiation, vegetation, sky condition, urban climate – means of thermal control – ventilation and air movement, mechanical controls, structural controls – shelters suitable for (1) Warm-humid climate (2) Hot-dry climate.

Principles and objectives of town planning – origin of town – neighbourhood unit – zoning aspects – objectives, uses, advantages – classification of roads, ring roads, bye-pass and through roads, freeway, express way – layout and details of street systems – different types of junctions, interchanges, different types of interchanges – road signals – road signs – parking – lighting – arboriculture housing – agencies of housing – National Housing Policy – slum – slum clearance programmes – parks and

playgrounds – classification, different systems of parks, facilities to be provided in playgrounds for children of different age groups – Building bye-laws – study of local bye-laws – laws published in NBC – clarification of buildings – laws framed in KBR related to each building type – fire fighting requirements.

Module VI :

Indus Valley Civilization – characteristics – Buddhist architecture – characteristics – stambha, stupa, chaitya, vihara – Hindu – North Indian – South Indian – Central Indian – Islamic architecture – Imperial, Provincial – Mughal – Egyptian – characteristics, tomb architecture & temple architecture – Greek architecture – characteristics, orders of architecture, temple architecture, Theatres, Agora, Acropolis, Parthenon and Erechtheion – Roman – characteristics, orders, temple architecture, thermae, Forum, Amphitheatre – Gothic Architecture – characteristics – stained glass, buttresses, vaults, Renaissance period – characteristics – Influence of steel, concrete and glass an architecture in post industrial revolution period – new concepts, great exhibitions, bridges, factory buildings – Arts and crafts movement – De stijl movement – Art Nouveau – Eclecticism – Expressionism, Rationalism – Functionalism – organic architecture – Contributions of Louis Sullivan, Walter Gropius, Peter Behrens, Antonio Gandi, Robert Maillart, Pier Luigi Nervi, Richard Neutra, John Urtzon, Louis Kahn, Philip Johnson, Oscar Neymer, Kenzo Tange, Geoffrey Bawa – Works and Principles of design of F. L. Wright, Le Corbusier, Mies Vander Rohe, Charles Correa, Achyut P. Kanvinde, Laurie Baker – Kerala Architecture – characteristics – Ekasala, Dwisala, Trisala, Catussala (Nalukettu) – Temple Architecture – materials of construction – construction techniques used – Influence of climate, topography and materials on architecture – Elements of architecture – Principles of architecture.

Entrepreneurial development – characteristics of a successful entrepreneur. Structure of Architect's office format of agreement and importance of agreement concepts and definitions of SSI. Tender – quotation – Earnest Money Deposit – security deposit – Work order letter. Contract – types. Arbitration. Project management. Need and functions. CMP & PERT Bar Chart – Principles of safety in construction.

Module VII :

Objectives of landscaping – Elements – aesthetic Natural and artificial – visual elements – softscaping – plants, their classification, function of plants in landscaping, shady trees, flowery trees, avenue trees, deciduous, evergreen – examples for each – botanical and common names of commonly used trees – shrubs and ground covers – their nature of growth and use – basic means of propagation of plants – grafting, budding, layering, separation – indoor landscaping – function, examples – lawn – its construction and maintenance – Terrarium – green house – bonsai – water in landscape – its function and different effects – garden furniture, lighting, fences – grading principles – water supply fixtures and drainage of landscaped area.

Elements of Interior Design – Principles – space modulation – furniture – different materials used – Evolution of furniture – Ergonomics – barrier – free design – colour theory – qualities, colour schemes, psychological effects of colours – colour and light, selection of colours – lighting – artificial and natural – general lighting, task lighting, accent lighting – quantity of lighting – fixtures – dimmer switches – Decorative materials that can be used for ceiling, wall and floor – method of application / fixing – curtains – carpets – role of fabrics – accessories – Indoor landscaping.

Application of different lines in drawings – different scale to different drawings – conventions used in building drawings – orientation of buildings – Data regarding to the design of Residential building, Educational building, recreational building, commercial building, Health building – Rules in KBR related to the design of above buildings.

Colour wheels – primary, secondary, tertiary colours – tints and shades colours – Perspective drawing – terminology

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.