

Lecturer in WOOD AND PAPER TECHNOLOGY

Module I : General Knowledge and Current Affairs

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, Swadeshbhimani, 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 Chaavra, 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

Module 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.

Module 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.

Module 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.

Module 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.

Module 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.

Module III : Wood Chemistry and Wood Processing

Wood Chemistry – Wood – Cell – structure of cell – cellulose – hemicellulose – lignin – properties and structure – comparison – alpha, beta & gamma. Cellulose – hollow cellulose – cross & Bevan cellulose.

Wood Extractives – methods of extraction – effect of extractives on durability – gluing – characteristics.

Destructive distillation of wood – distillation products.

Wood hydrolysis – wood analysis – determination of moisture content of wood by oven-dry method by moisture meter – determination of wood extractives and Lignin.

Wood processing – Forest and forestry – Forest products – Logging – felling – exogenous and endogenous tress – softwood and hardwood – natural defects.

Wood seasoning – Fibre saturation point – equilibrium moisture content – free moisture and bound moisture.

Seasoning methods – air seasoning, kila seasoning, chemical seasoning, solar seasoning – stacking methods – seasoning defects – twist, cup, bow, split, check, honey combing, collapse.

Biological determination of wood – causes – classification of fungus, insects, marine borers and termites.

Wood preservation – need of wood preservation – types of preservatives – oil type, organic solvent type and water soluble type – preservation methods – pressure processes and non-pressure processes

Module IV : Wood Products

Plywood – definition, veneer – definition – peeling – slicing. Preparation of wood for peeling and slicing. Veneer drying – dryers – Jet dryer, Band dryer, roller dryer. Splicing – jointing – matching – pressing – cold press and hot press – sanding – Drum sander – wide belt sander – Trimming – grading, particle board – raw materials – classification and uses.

Fiber board – raw materials – types – uses.

Oriented strand board – Wafier board – Wood-wool boards – MDF – edge banding.

Adhesives – adhesion – adherents – cohesion – glue – thermosetting resins – thermoplastic resins (definition only). Natural glues – synthetic glues – urea formaldehyde resin – Phenol formaldehyde resin – Resorcinol formaldehyde resin – melamine formaldehyde resin – epoxy resin – properties uses and ingredients of each.

Module V : Pulp Technology

Pulp Technology – definition of pulp – raw materials – wood based – waste paper based – agro based – preparation of raw materials for pulping – debarking – chipping – screening – chip storage.

Classification of pulping process – chemical pulping – mechanical pulping – semi-chemical pulping - comparison and properties of each.

Secondary fibres – importance of recycling – deinking – advantages of deinked pulp.

Bagasse pulping – depithing methods – Wet, dry and moist depithing – washing – screening and cleaning of pulp – conveyors – Belt conveyor – Roller conveyor and screw conveyer.

Flat screen – rotary screen – pressure screen and centrifugal cleaners.

Bleaching – bleaching chemicals – chlorine, chlorine dioxide, peroxide, TCF, ECF, oxygen and ozone.

Module VI : Paper, Paper Boards & Speciality Papers

Paper definition – types.

Stock preparation – re-pulping – beating – refining – stock preparation.

Kappa number, consistency, freeness (definitions only).

Sizing of paper – sizing chemicals – Rosin paraffin wax – starch – alum.

Sizing methods – size presses – tub size.

Filling and fillers – need of filling.

Fillers – clay, titanium dioxide, magnesium carbonate.

Paper machine – types – twin wire machine – open wire machine.

Pressing – Trinip press – ventanip press – reverse – inverse – extended nip press.

Drying – Dryers – MG, MF dryers.

Calendaring and reeling – coating – need – coating equipments – air knife coater – brush coater – cast coater – cascade coater swimming roll,

Finishing and converting of paper.

Paper boards – types of paper – speciality papers – grease proof paper – glacing paper – currency – cigarette, newsprint, Bible paper.

Properties – basis weight, porosity, whiteness, opacity – Cobb sizing – stretch.

Effluent treatment – COD, BOD, TOD, colour, suspended solids, dissolved solids, total solids.

Raw materials for furniture – Machines used in furniture section.

Circular saw – band saw – turning lathe – surface planer – thickness planer – Jig saw – radial saw – router – tenoning machine – mortising machine – sanding machine – portable machines.

Hand tools

Carpentry joints – lengthening, widening, corner and box joints.

Furniture finishing – sanding – abrasive materials – staining – stains – ingredients of stain – oil finish – French polish – lacquering – rubbing & finishing – Filling types – Interior decoration – need – balance – colour – rhythm – unity – proportion – harmony – efficiency – appearance – design symbols

Module VII : Mechanical Engineering

Fluid Mechanics - Newtonian and Non-Newtonian fluid – Density – specific weight – specific gravity – specific volume, compressibility, surface tension, capillarity, viscosity, Kinematic – viscosity – Determination of fluid pressure by Piezometer tube, U tube Manometer.

Laminar flow - turbulent flow – critical velocity – Reynold's number – Bernoulli's equation – Venturi meter – Orifice Meter – Pitot tube – centrifugal pumps – reciprocating pumps – Gear pump – Vane pump, Screw pump – single stage – Multistage pumps.

Belt - Gear - Chain Drives: Advantages, Disadvantages, Application – Spur gear nomenclature, Simple gear train – compound gear train – reverted gear train – epicyclic gear train – properties of steam – wet – dry – superheated steam – properties of steam.

Boiler – Boiler Mountings & Accessories.

Classification of boiler – Fire tube – water tube – comparison – Advantages – Disadvantages – Cochran boiler – Babcock and Wilcox boiler – LaMont boiler – Locomotive boiler

Boiler Mounting & Accessories

Stop valve – Safety valve – Water level indicator – Fusible plug – pressure gauge – feed pump – Economiser – super heater.