

**FURTHER DETAILS REGARDING MAIN TOPICS OF
PROGRAMME NO. 05/2016 (Item No. 23)**

INSPECTOR

LEGAL METROLOGY

(CATEGORY No. 4/2015)

Part I: General Knowledge, 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, Swadeshabhmani, 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 Cherian, 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 Thampuran, KeralaVarma Valiyakoyi Thampuran, 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: Physics

Module I

Measurement, Units, Systems of Units – CGS , MKS, SI Units.

Physical quantities – fundamental and derived types, Dimensions of physical quantities, Dimensional analysis, Order of magnitude, Significant figures,

Uncertainties in measurements-Types of errors, random and systematic errors, absolute, relative and percentage errors, combination of errors, Fitting data to curves, Least-square fit.

Common devices used to measure physical quantities – screw gauge, vernier calipers, common balance, spherometer, barometer.

Module II

Light propagation, Reflection, Mirrors – different types, Focus, Focal length, Mirror equation,

Refraction, Lenses – different types, Lens equation, Dispersion – prism,

Microscope – Simple and Compound, Telescope – Reflecting and Refracting types, Aberration – Spherical and Chromatic.

Superposition principle, Interference, Newton's rings, Michelson interferometer,

Diffraction- Fresnel and Fraunhofer diffraction, Grating, Resolving power microscopes, telescopes and grating.

Scattering – Rayleigh and Raman scattering, Color of sky, color of sun during sunrise and sunset.

Polarisation of light – Polarised and unpolarised waves, polaroids, Malus's law, Polarisation by scattering, optical activity.

Atomic structure – Bohr model, Energy levels and Atomic spectra, Spectral Series- Balmer, Paschen, Brackett, Pfund Series.

Laser – electromagnetic radiation, induced and spontaneous emission, induced absorption, population inversion, optical pumping, Ruby Laser, He-Ne Laser.

Photoelectric effect – work function, Einstein's explanation.

Module III

Electricity - Charge, Coulomb's law, Field, Gauss's theorem and applications, Potential, distribution of charges, Poisson and Laplace's equation.

Fields in matter- dielectric polarization, polarizability, capacitors.

Steady current- Ohm's law, Resistance and Resistivity.

Magnetism- magnetic field, Biot-Savart law, Lorentz force, Ampere's circuital theorem and applications.

Electromagnetic Induction- Faraday's law, Self induction and Mutual induction, Inductors, Transformer.

Alternating current – Peak, average and RMS values, impedance, inductive, capacitive and series LCR circuits.

Circuits- Voltage and current sources, Kirchhoff's laws, Thevenin's and Norton's theorems, Maximum power transfer theorem, Wheatstone's principle and applications.

Galvanometer, ammeter, voltmeter, multimeter, potentiometer.

Electronics – conductors, insulators and semiconductors, intrinsic and extrinsic semiconductors, pn junction, Diodes- Types, Rectifiers using semiconductor diodes, Zener diode and voltage regulation.

Transistor – types, transistor action, different transistor configurations- CE and CB configurations - characteristics, biasing and operating point, Amplifiers – current, voltage and power amplifiers, Oscillators – Hartley, Colpitts and RC phase shift oscillator.

Digital Electronics – binary number system, boolean algebra, D' Morgan's theorem, logic gates. basic and universal gates.

Module IV

Motion in 1-, 2- and 3-dimensions, displacement, velocity, speed, uniform and non-uniform motion, acceleration, Equations of motion for uniformly accelerated bodies, projectile motion, circular motion

Newtons laws of motion, mass, force, work, energy, power.

Gravitation law, gravitational and inertial mass, Kepler's law, acceleration due to gravity, satellites- types, orbital velocity, escape velocity, time period.

Rotational motion, angular momentum, torque, couple.

Rigid body dynamics – center of mass, moment of inertia, centre of gravity.

Mechanical equilibrium – concurrent forces, translational and rotational equilibrium, moment bar.

Elasticity, stress, strain, Hooke's law, modulus of elasticity - types and applications, Bending of beams, torsion, torsional oscillations.

Fluids – Fluid pressure, buoyancy, Archimide's principle, Equation of continuity, Bernouille's principle and applications.

Surface tension, capillarity, viscosity, Newton's law, Stoke's fomula, Poiseuille's equation – applications.

Heat – temperature, temperature scales, heat transport- conduction, convection and radiation. Black body, emissivity, Wein's displacement law, Stefan's law.

Ideal gases- gas laws, Charle's law, Boyle's law, ideal gas equation, Avogadro's law.

Thermodynamic processes – isothermal, adiabatic, isobaric, isochoric, Laws of thermodynamics- first and second laws, entropy.

Phase transitions- first and second order tansitions, latent heat, specific heat.

Part II b:Chemistry

Module I: Chemistry of Materials

Fuels-Calorific value, Determination of calorific value of solid and liquid fuel by Bomb Calorimeter.

Polymers- Preparation and applications of Bakelite, Polythene, PVC, PMMA, Nylon-66, Neoprene. Conducting Polymers- mechanism and applications, polyaniline, polypyrrole.

Nanomaterials- Definition, Classification, Synthesis-Sol gel method, Hydrothermal technique, Properties of Nanomaterials - optical, magnetic and thermal properties with examples, Carbon Nanotubes-synthesis, properties and applications.

Module II :Instrumental Methods of Analysis

Beer-Lambert's Law, UV-visible spectroscopy-principle and applications.

Proton NMR spectroscopy-Principle, Chemical Shift and applications

Thermal Analysis-TGA, DTA-principle and applications.

Chromatographic Methods- Basic principles of column chromatography, thin layer chromatography, Gas Chromatography and HPLC.

Elementary idea of XRD, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM).

Part II c: Mathematics

Module I – MENTAL ABILITY, TEST OF REASONING & QUANTITATIVE APTITUDE

Coding and Decoding, Classification, Letter and Number Series, order and Sequence, Clock and Calendar

Numbers, Simplification, Percentage, Interest, Profit and Loss, Work and Time, Time and Distance, Mensuration

Module II – MATHEMATICAL THEORY AND APPLICATIONS

Matrices, Determinants and Systems of Linear Equations, Permutations and Combinations

Applications of Differentiation: - Derivative as Rate of change, velocity and acceleration, Related Rates, Maxima and Minima

Applications of Integration: - Area and Volume

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.