

FURTHER DETAILS REGARDING MAIN TOPICS OF

PROGRAMME NO. 01/2016 (Item No. 8)

ASSISTANT ENGINEER

UNITED ELECTRICAL INDUSTRIES LIMITED

(CATEGORY No. 73/2013)

PART I

Module I

Kirchhoff's laws-solution of series-parallel circuits –Magnetic circuits- mmf, flux, reluctance-comparison of magnetic and electric circuits- Faraday's laws Lenz's law-statically and dynamically induced emf-self and mutual inductance-coefficient of coupling-single phase AC circuits-generation of sinusoidal emf- cycle, frequency, Time period-average and rms values-Form factor and peak factor of sine wave only-analysis of simple RLC circuits-reactance and impedance-active reactive and apparent power-powerfactor.3 phase circuits-generation of three phase AC voltage-star-delta connection-voltage ¤t relationships in star and delta, Basic principle of operation of Transformers ,DC generators &motors

Module II

Indicating instruments-Moving coil, moving iron, Dynamometer type wattmeter-principle &torque equation-classification of errors-errors in indicating instruments and compensation-wattmeter and energy meters-principle of working of ampere hour meter-single and three phase energy meter-principle-torque equation-errors and compensation-static wattmeter and energy meters

Module III

Basic Circuit Components: *Diode:* Germanium, Silicon, Zener, LEDs (working principle only). Forward and reverse characteristics. *Rectifiers:* Half wave, full wave, Bridge circuits, DC Power supply: Capacitor filter, Zener regulator. *Transistors:* Different configurations - CE characteristics- β and α , concept of Amplifiers: Common emitter RC coupled amplifier, Frequency response, Bandwidth. Comparison of BJT, FET, MOSFET, IGBT.

Module IV

Integrated circuits: Advantages, classification of Linear and Digital ICs. Logic Gates, realization of logic functions, Basics of Op-amps, inverting and non-inverting amplifiers

Basic communication engineering: Frequency bands: RF, VHF, UHF, Modulation – need for modulation, basic principles of AM, FM. Satellite Communication-Earth station, transponder and receiver. Mobile Communication: basic principles of cellular communications, concepts of cells, frequency reuse, principle and block diagram of GSM.

Module V

Thermodynamics-systems, properties, processes and cycles, zeroth, first and second laws-Carnot cycle- Efficiency of engine, COP of refrigerator. Two stroke and four stroke IC engines-working, comparison and applications- simple gas turbine unit- vapour compression refrigeration system, window and split air conditioning. Hydraulic pumps and turbines.

Power transmission elements- rope, chain and belt drives. Gears and gear trains

Module VI

Materials and their properties.

Elementary ideas on manufacturing processes- casting, rolling, forging, extrusion, joining processes

Elementary ideas on Machine tools- Lathe, shaper, planer, milling machine, drilling machine, grinding machine, CNC machines

Functions of management- types of organizations, role of managers, planning process, productivity and inventory management, quality control, cost control.

MODULE VII - ENGINEERING MECHANICS

Basic Dimensions and Units. Vector and Scalar quantities. Principles of Statics – Force Systems – Coplanar, Collinear, Concurrent and Parallel. Equilibrium of rigid bodies-free body diagrams. Forces in space: Equations of equilibrium. Friction: Laws of friction-angle of friction- cone of friction. Principle of Virtual Work: Equilibrium of ideal systems, stable and unstable equilibrium. – Different types of supports, loads and beams – Reactions at supports. Shear force and Bending moment in beams. Kinetics: Newton's laws of translatory motion. Equation of motion. Work, Power and Energy- Work-Energy principle- Impulse, Momentum, Collision of elastic bodies- Law of conservation of momentum. Centrifugal and Centripetal Forces. Simple Harmonic Motion. Free Vibration. Oscillations. Applications.

MODULE VIII - BASIC CIVIL ENGINEERING

Objectives, Principles & Types of Surveying. Levelling- Instruments & Principles. Computation of Areas: various rules. Basic principles of total station, remote sensing, GPS and GIS. Site Selection, Types Of Buildings. Components of buildings. Foundation: Different types. Super structure: Stone & Brick Masonry. Partition, Doors, Windows & Ventilators. Plastering & Painting- Types & Materials. Flooring & Roofing- Types & Materials. Concrete: Ingredients- cement, aggregate and water. Tests on Cement & Aggregates. Plain Cement Concrete (PCC), Reinforced Cement Concrete (RCC): -IS Specifications. Steel: Common types used in construction. Air, Soil and Water Pollution. Waste management. Concept of Sustainable Buildings: Green buildings, Intelligent buildings. Classification of Roads- Basics of Traffic Engineering.

PART II: 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, Al-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 Chandu, 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 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

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.