

**FURTHER DETAILS REGARDING MAIN TOPICS OF
PROGRAMME NO. 12/2015 (Item No. 20)**

**VOCATIONAL TEACHER – MAINTENANCE &
REPAIRS OF DOMESTIC APPLIANCES**

VOCATIONAL HIGHER SECONDARY EDUCATION

(CATEGORY Nos. 393/2013)

Part I - BASIC ELECTRICAL ENGINEERING

Ohm's law, Kirchoff's laws- solution of series and parallel circuits with .Magnetic circuits: MMF, field strength, flux density, reluctance, electromagnetic induction, Faraday's laws, Lenz's law, statically and dynamically induced emfs, self and mutual induction, co-efficient of coupling. Principle of generation of alternating current -waveforms -frequency, period, average and rms values, form factor. Generation of 3 phase ac voltage, star and delta connections, voltage & current relationships in star and delta (balanced system only).

Part II - INSTRUMENTATION

Principles of PMMC, moving iron, and electro-dynamometer type instruments, error analysis, measurement of voltage, current, power, energy and power factor. Induction type watt-hour meter, DC bridges and AC bridges, magnetic measurements, Instrument transformers, digital voltmeters and multimeters, digital measurements of frequency, phase angle, time interval. Electronic energy meter, high voltage measurements, oscilloscopes, Data acquisition systems, Transducers for temperature, flow and pressure. Measurement of insulation resistance - loss of charge method, insulation megger. Measurement of earth resistance using earth megger, determination of resistivity of earth.

Part III - ANALOG and DIGITAL ELECTRONICS

BJT amplifiers - biasing circuits, types of amplifiers,. Oscillators and feedback amplifiers, operational amplifier circuits and applications - simple active filters. Voltage regulators using linear IC's, combinational and sequential logic circuits - flip flops, counters, shift registers, TTL & CMOS logic families, memories - ROM, PROM, EPROM & RAM. Schmitt trigger, multivibrators, sample and hold circuits, A to D and D to A converters. 8 bit and 16 bit microprocessor basics, architecture, programming and interfacing. Thyristors, triacs, GTO's MOSFETS & IGBTs- principles of operation, triggering circuits, phase control rectifiers, bridge converters - fully controlled and half controlled, Inverters and choppers. Review of basic gates. Universality of NAND and NOR gates. Realization of logic functions

using multiplexers and decoders. Commercially available logic gates in 7400/5400 and 4000 series of IC's. :

Flip flops - SR, clocked SR, D, JK, master slave and T flip flops. Counters - ripple counter, synchronous counter, modulo N counter - ring counter - Johnson counter, up-down counter- 555 Timer

Part IV - ELECTRONIC INSTRUMENTATION

Review of operational Amplifier circuits - precision rectifier, ZCD, current to voltage converter, phasemifter, Instrumentation amplifier using three Op-Amps, isolation amplifier using opto-coupler. Digital multimeters - resolution in digital meters. Digital measurement of frequency, phase angle, time interval-electronic energy meter. Principle of digital storage oscilloscope - block schematic, sampling and storage

Part V - CONTROL SYSTEM

Open loop-and closed loop control systems: Transfer function -Transfer function of simple, Mechanical and Electromechanical systems - Force voltage and force current analogy - block diagram representation - block diagram reduction - signal flow graph - Mason's gain formula - characteristics equation. Control system components: DC and AC servo motor.

Part VI - ELECTRICAL SYSTEM DESIGN

National Electric Code (NEC)- scope and safety aspects applicable to low and medium (domestic) voltage installations, Electric services in buildings. General aspects of the design of electrical installations for domestic dwellings. Classification of voltages, standards and specifications .. Design of distribution systems with light power and motor loads. Design of earthing system - Pipe, plate and mat earthing. Design of illumination systems - Yard lighting, street lighting and flood lighting. Different methods of wiring for LT installations. Schematic layout of LT switchboards. Earthing of installations - necessity of earthing - plate and pipe earthing. Protective fuses, MCBs, ELCBs and switches. Working of incandescent lamps, -fluorescent lamps, energy efficient lamps.

Part VII - ELECTRICAL MACHINES

Single phase Transformer - leakage reactance, equivalent circuit, losses and efficiency, voltage regulation, OC, SC and Sumpner's tests, Distribution transformer, all day efficiency, autotransformer - saving of copper. Three phase transformer -connections, vector groupings, parallel operation.

DC machines-Types of excitation, constructional features. DC generator- Emf equation, armature reaction & commutation, characteristics, voltage build up, applications. DC motor - Torque equation, characteristics of shunt, series & compound motors, necessity & types of starters, speed control, applications, Swinburne's test, Hopkinson's test. Synchronous machines: - constructional features, winding factor, Synchronizing. Three phase induction motor - constructional features, types, slip rotor frequency, power flow, Torque - slip curve, effect of rotor resistance, starting methods, speed control.

Single phase induction motor - double field revolving theory, starting methods. Basic concepts of ac and dc drives.

Part VIII - Power System

Basic Concepts in Power Systems- Power in single phase AC circuits -Complex Power Powertriangle Power in balanced 3 phase ac circuits. Conventional and non-conventional systems of power generation, power plant economics, load factor, demand factor, diversity factor, Economic aspects - Cost of generation - significance of diversity factor, load factor - plant factor. Power factor considerations - Methods of power factor improvement. Tariffs - different types of LT and HT consumers - tariff schemes - uniform tariff and differential tariff

PART IX - 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, Swadeshabhimani, 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 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 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.