

Syllabus for Technical / Professional Knowledge – Maintenance Technician - Electrical	
Topics	Sub-topics
Basic Electrical and Circuit Theory	Ohm's Law, kirchhoff's law, Series and parallel Resistances, Energy Stored in Inductor and capacitor, Units of basic electrical quantities
	The venin's, Norton's and Maximum power transfer Theorems
	Form factor, Peak factor, Power and Power factor, Apparent, active and reactive power, Relation between line voltage and phase voltage/ line current and Phase current of Star/ Delta connected circuits
Electrical Machines - I (DC machines and transformers)	Construction and Principle of DC Generators, Lap & Wave Winding , EMF Equation, Compensation of Armature Reaction, Types of Motors, Armature Torque, Speed of DC Motors, Load Test, Swinburne's Test, Application of DC Motors and DC Generators
	Battery Rating , Constant Current and Constant Voltage System - Trickle Charging - Maintenance of Lead Acid Cell, Nickel Iron and Edison Batteries
	Working Principle - Construction, EMF Equation , Voltage Transformation Ratio of transformer, Transformer Rating - Problems, OC and SC Test - Regulation, Condition for Max Efficiency - All Day Efficiency
Electronic Devices and Circuits	PN junction diode, Zener diode, Half wave rectifier Full wave rectifier- Bridge rectifier, Ripple factor, Transistor biasing – Fixed bias, Collector base bias, Self bias – CB, CE, CC Configurations
	SCR , TRIAC, DIAC, MOSFET, IGBT
	Solar cell , LDR, LED, Photo Diode, Schmitt Trigger, Opto Coupler
Electrical Machines - II (AC Machines)	Basic Principle - Construction - Salient Pole Type and Cylindrical Type, Advantages Rotating Type (Stationary Armature) - Damper Winding - Turbo Alternator, EMF equation, - Determination of Voltage regulation by Synchronous Impedance Method, Ampere Turn Method
	Construction of three phase induction motor - Comparison of Cage and Slipping. Induction Motor - Principle of operation - Slip - Frequency of Rotor Current - Torque -Starting Torque Derivation - Condition for Max Starting Torque, Starting and speed control methods.
	Principle of Working and Application of Split Phase Motor, Capacitor Type Motors (Capacitor -Start and Capacitor Start and Run Motor), Methods of starting synchronous motor, applications of synchronous motor
Measurements And Instruments	Moving Coil, Moving iron, Dynamometer type instruments, CT and PT, Kelvin and Wheatstone Bridges
	Three phase power measurements and Energy meter
	CRO, Schering Bridge, Anderson's Bridge
Digital Electronics	Number System, Boolean Algebra and Logic gates

Transducers And Signal Conditioners	Classification of transducers, Strain Gauge, Capacitive and inductive transducers, Thermocouple, Piezo electric transducers
	Analog to Digital Converters, Zero Crossing Detector, Operational Amplifiers
Generation, Transmission And Distribution	Basic Power plants, Load factor, diversity factor, plant capacity factor, Maximum Demand factor
	HVAC and HVDC transmission, Skin effect
Microcontroller	8051 Controller - Architecture, Timer, instruction set, Interrupt and serial communication
Special Electrical Machines	Switched reluctance motor, stepper motor, linear induction motor, Brushless DC motor, AC and DC Servomotors
Control Of Electrical Machines	AC and DC Motor Control Circuits, Industrial Control Circuits
Programmable Logic Controller	Principle of operation, Input, output modules, Timer/Counter, instructions, TCP/IP protocol, Data Loggers, data Acquisition Systems
Power Systems and Utilization Of Electric Power	Substation Equipments, Distribution schemes, Electric Braking, Illumination, Types of lamps, Electric heating, Electric furnace and welding
Electrical Estimation	Installation, earthing, HT and LT cables, Cable fault location, Domestic and industrial installation
Computer Hardware And Networks	Processors, Bus standards, removable storage, Printers, MODEM, UPS, SMPS, Servo Stabilizers, Graphic cards, Laptop Components
Protection And Switch Gear	Line Insulators, over voltage protection, apparatus protection (Merz-price and others), Protective relays, Circuit breakers, Power system Grounding, equipment earthing
SCADA	Data Acquisition System, Control of plant