

MAHADISCOM Deputy Executive Engineer/ Additional Executive Engineer/ EE Exam pattern 2018

Test	Section	Subject	Questions	Marks	Duration
Written Test	Test of Professional Knowledge	Engineering Relevant Stream (Electrical Engineering)	50	110	120 Minutes
	Test of General Aptitude	Test of Reasoning	40	20	
		Test of Quantitative Aptitude	20	10	
		Test of Marathi Language	20	10	
Total			130	150	

MAHADISCOM DEE/AEE/EE Syllabus 2018

Electrical Engineering Section Topics

Electric Circuits:

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of dc and ac networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in ac circuits.

Electromagnetic Fields:

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

Signals and Systems:

Representation of continuous and discrete-time signals; shifting and scaling operations; linear, time-invariant and causal systems; Fourier series representation of continuous periodic signals; sampling theorem; Fourier, Laplace and Z transforms.

Electrical Machines:

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections, parallel operation; Auto-transformer, Electromechanical energy conversion principles, DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of dc motors; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Operating principle of single phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines.

Power Systems:

Power generation concepts, ac and dc transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Gauss-Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

Control Systems:

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, State transition matrix.

Electrical and Electronic Measurements:

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

Analog and Digital Electronics:

Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback, amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers, Combinational and Sequential logic circuits, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.

Power Electronics:

Characteristics of semiconductor power devices: Diode, Thyristor, Triac, GTO, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost converters; Single and three phase configuration of uncontrolled rectifiers, Line commutated thyristor based converters, Bidirectional ac to dc voltage source converters, Issues of line current harmonics, Power factor,

Distortion factor of ac to dc converters, Single phase and three phase inverters, Sinusoidal pulse width modulation.

Reasoning Topics

- Number Series.
- Alphabet Series.
- Data Sufficiency.
- Analogies.
- Classification.
- Statements.
- Analytical Reasoning.
- Arrangements.
- Directions.
- Symbols and Notations.
- Nonverbal Reasoning.
- Symmetry.
- Blood Relationships.
- Similarities and Differences.
- Coding-Decoding.
- Syllogisms.

Quantitative Aptitude Topics

- Average.
- Time and Distance.
- Problems on Ages.
- Mensuration.
- Number Systems.
- Percentages.
- Ratio and Proportion.
- Simplification.
- H.C.F. and L.C.M.
- Mixture and Alligation.
- Pipes and Cisterns.
- Data Interpretation.
- Simple & Compound Interest.
- Partnership.
- Discounts
- Boats and Streams.
- Time and Work.
- Profit and Loss.

Marathi Language Topics

- Vocabulary
- Grammar
- Parts Of Speech
- Transaction Of Sentences
- Usage Of Word
- Idioms And Phrases
- Comprehension
- Fill In The Blanks.

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