

**सहायक अभियंता (विद्युत), श्रेणी-२,
महाराष्ट्र विद्युत अभियांत्रिकी सेवा, गट-ब (पूर्व) व (मुख्य) परीक्षा
Assistant Engineer (Electrical), Grade-2, Maharashtra Electrical
Engineering Services, Group-B (Pre) & (Main) Exam.**

परीक्षेचे टप्पे : १) पूर्व परीक्षा - १०० गुण
२) मुख्य परीक्षा - ५५० गुण
३) मुलाखत - ७५ गुण

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महाराष्ट्र विद्युत अभियांत्रिकी सेवा, गट - ब (पूर्व) परीक्षा.**

परीक्षा योजना

विषय व संकेतांक	गुण / प्रश्नसंख्या	कालावधी	दर्जा	माध्यम	प्रश्नपत्रिकेचे स्वरूप
विद्युत अभियांत्रिकी	१००/१००	दोन तास	पदवी	इंग्रजी	वस्तुनिष्ठ बहुपर्यायी

अभ्यासक्रम

विद्युत अभियांत्रिकी या विषयामध्ये खालील घटकांचा समावेश असेल.

Sr. No.	Topics
01	Fundamental of Electrical Engineering: Fundamentals of electrical engineering, DC and AC network theorems, Behavior of R-L, R-C and R-L-C circuits, Basics of Electromagnetism and electrostatics, AC circuits, Three phase circuits, power and energy in single phase and three phase circuits and its measurement.
02	Electrical Machines: Single phase and three phase transformers, Distribution and Power Transformers, Instrument transformers, Basics of energy conversion, Construction, Working, Performance of DC machine, Induction machine and Synchronous machine, Characteristics of these machines in motoring and generating modes, starting, braking and speed control of induction and DC machine, Parallel operation of transformers and Alternators.
03	Power System: Power Generation scenario of the country and Maharashtra, P.U. Systems, Power Generation and transmission, Symmetrical and asymmetrical fault calculations, Load flow, Selection of switchgear and protection devices, Relaying and coordination, Substation components, Earthing, grounding and lightning protection.

04	Power Electronics and Drives: Power Devices, AC-DC, DC-DC, DC-AC power converters, Power Quality issues, Reactive power compensation, Fundamentals of AC and DC drives, Energy saving using VSD's.
05	Measurement and Testing of Equipment and Standards: Measurement of electrical parameters for sinusoidal and non sinusoidal systems. Field instruments such as digital multimeter, megger, lux meter, power analyzer, clamp on meters, earth tester, etc. Type and routine tests, field tests for electrical equipment such as transformers, motors, switchgear, insulators, cables, batteries etc. and the relevant Indian Standards. Codes of electrification of buildings, DG, UPS selection, Basics of illumination systems, types of bulbs, lamps, CFL and LED lighting. Codes for electrical safety, and Fire-fighting equipment and systems.
06	Non conventional energy sources: Non conventional energy sources, Economics of solar-thermal, solar-electrical systems, Energy conservation opportunities in fans, pumps, compressors, HVAC etc.

Date : 16/06/2015

Place : Mumbai

C. V. Pawar
Under Secretary
M.P.S.C.

For Mains syllabus see next page.

सहायक अभियंता (विद्युत), श्रेणी-२, महाराष्ट्र विद्युत अभियांत्रिकी सेवा, गट - ब (मुख्य) परीक्षा

परीक्षेचे टप्पे :- लेखी परीक्षा - ५५० गुण,

मुलाखत - ७५ गुण.

प्रश्नपत्रिकांची संख्या:- तीन

-: परीक्षा योजना :-

पेपर क्रमांक व संकेतांक	विषय	माध्यम	दर्जा	गुण/प्रश्नसंख्या	कालावधी	प्रश्नपत्रिकेचे स्वरूप
१ (अनिवार्य) संकेतांक (०१४)	मराठी इंग्रजी सामान्य अध्ययन	मराठी इंग्रजी मराठी व इंग्रजी	बारावी } पदवी	१५०/१५०	दीड तास	वस्तुनिष्ठ बहुपर्यायी
२ (अनिवार्य) संकेतांक (०२२)	विद्युत अभियांत्रिकी (पेपर - १)	इंग्रजी	बी.ई (विद्युत)	२००/१००	दोन तास	वस्तुनिष्ठ बहुपर्यायी
३ (अनिवार्य) संकेतांक (०२३)	विद्युत अभियांत्रिकी (पेपर - २)	इंग्रजी	बी.ई (विद्युत)	२००/१००	दोन तास	वस्तुनिष्ठ बहुपर्यायी

-: अभ्यासक्रम :-

मराठी, इंग्रजी, सामान्य अध्ययन या विषयामध्ये खालील घटक व उपघटकांचा समावेश असेल.

अ.क्र.	घटक
१.	मराठी सर्व सामान्य शब्दसमूह, वाक्यरचना, व्याकरण, म्हणी व वाक्प्रचार यांचा अर्थ व उपयोग तसेच उताऱ्यावरील प्रश्नांची उत्तरे .
२.	इंग्रजी Common Vocabulary, Sentence structure, Grammar, Use of Idioms & phrases and their meaning and comprehension of passage
३.	सामान्य अध्ययन
	(१) भारताचा विशेषतः महाराष्ट्राचा इतिहास (१८५७ ते १९९०)

	<p>(२) भारतीय अर्थव्यवस्था</p> <p>१. भारतीय आयात – निर्यात</p> <p>२. राष्ट्रीय विकासात सरकारी, सहकारी, ग्रामीण बँकांची भूमिका</p> <p>३. शासकीय अर्थव्यवस्था - अर्थसंकल्प, लेखा, लेखापरीक्षण, इत्यादी.</p> <p>४. पंचवार्षिक योजना</p> <p>५. किंमती वाढण्याची कारणे व उपाय.</p>
	<p>(३) भारताचा विशेषतः महाराष्ट्राचा भूगोल</p>
	<p>(४) पर्यावरण :- मानवी विकास व पर्यावरण, पर्यावरण-पूरक विकास, नैसर्गिक साधनसंपत्तीचे संधारण विशेषतः वनसंधारण, विविध प्रकारची प्रदूषणे व पर्यावरणीय आपत्ती, पर्यावरण संवर्धनात कार्यरत असलेल्या राज्य / राष्ट्र/ जागतिक पातळीवरील संघटना / संस्था.</p>
	<p>(५) भारतीय राज्यव्यवस्था</p>
	<p>(६) जागतिक तसेच भारतातील चालू घडामोडी :- राजकीय, औद्योगिक, आर्थिक, सामाजिक, शैक्षणिक, भौगोलिक, खगोलशास्त्रीय, सांस्कृतिक, वैज्ञानिक, इत्यादी</p>

Electrical Engineering- Paper - I

Standard:	Degree in Electrical Engineering	Total Marks :	200
Medium:	English	No. of Questions:	100
Nature of Paper:	Objective Type	Duration :	2 Hours

Sr. No	Topics
1.	Work, Power and Energy, Resistance, capacitance and inductance, DC circuits, KCL, KVL, Network theorems, fundamentals, RL, RC and RLC circuits, Steady state and transient responses. Series and parallel AC circuits, Three phase circuits, Power calculation in balanced and unbalanced circuits, Linear and non linear loads.
2.	Basics of electromagnetic and electro static, series and parallel magnetic circuits, energy stored in fields, types, construction, operation of single and three phase transformers, equivalent circuit and phasor, diagrams, OC and SC tests, regulation and efficiency calculation, parallel operation, field tests before commissioning.
3.	Fundamentals of energy conversion, Construction and theory of DC machine, DC generator characteristics, Starting, braking and speed control of DC motors, Application of DC machines.
4.	Principle, types, performance characteristics, starting and speed control of single phase and three phase induction motors, Equivalent circuits, phasor diagrams, applications. VFD for induction motors. Energy saving opportunities in using VFD.
5.	Principle, types of synchronous motors, performance characteristics, starting and speed control of single phase and three phase synchronous motors, Equivalent circuits, phasor diagrams, applications. VFD for synchronous motors.
6.	Analog and Digital electronics fundamentals, devices and characteristics, amplifier and oscillator circuit Operational amplifier, Gates, flip-flops, Combinational and sequential circuits, ADC and DACs.

7.	Sensors and transducers, Performance characteristics of measuring instruments, instrument transformers, measurement of physical parameters such as pressure, force, temperature, flow, vibration, torque, etc. Principles of feedback, transfer function, block diagram, steady state error, Steady state and transient specifications, Bode plot, Nyquist plot and Root locus, Relative and absolute Stability considerations.
8.	Power Devices- types, Characteristics of various power electronic devices, Triggering and protection circuits, Controlled and uncontrolled rectification, DC to DC converters, DC to AC conversion, modulation techniques, SPWM. Fundamentals of electric drives, 4 quadrant operation, theory and analysis of DC drives, converter and chopper fed DC drives, Voltage, frequency and V/F controlled drives, slip power recovery schemes, fundamentals of wind power generation and grid interface.
9.	Power generation in India and Maharashtra, Renewable Generation, Various types of power plant, major equipment in power plants, Major issues with wind and solar power generation and grid interface. Steady state performance of overhead transmission lines and cables, per unit quantities, Bus admittance and impedance matrices, symmetrical components.
10.	Calculation of sag and tension in transmission of lines, Analysis symmetrical and unsymmetrical faults, principle of active and reactive power transfer and distribution. Load flow studies, steady state and transient stability, voltage stability, voltage control, economic load dispatch, load frequency control in power systems.

***** Electrical Engineering - Paper - II

Standard :	Degree in Electrical Engineering	Total Marks :	200
Medium:	English	No. of Questions:	100
Nature of Paper:	Objective Type	Duration :	2 Hours

Sr. No.	Topics
1.	Principle of circuit breaking, arc extinction and arc interruption for AC and DC breaker, Various types of circuit breakers and their applications, Ratings of breakers, isolators and major HV switchgear.
2.	Principle of over current, earth fault, differential, and distance protection. Concepts of solid state and numeric relays. Protection of generator, transformer, transmission lines, substation, busbar, induction motors. Various LT switchgear devices such as MCCB, ELCB.
3.	Specification of impulse wave, multistage impulse generator, insulation coordination, Routine and type tests for cables and transformers, Lightning protection, Early emission arrestors. Power quality issues, Reactive and harmonic compensation, FT devices and their applications, Passive and Active filters, HVDC transmission.
4.	Energy scenario in India, Energy policies, pricing and reforms, Energy conservation Act, 2001, Electricity Act, 2003. Energy management objectives, Electricity billing, electrical load management and MD control, Tariffs, PF improvements and benefits.
5.	Basic terms in lighting systems and features, lamp types and their features, Recommended illumination levels for various tasks, methodology of lighting system energy efficiency study, Illumination system design for residential, commercial, industrial categories. Solar powered illumination and economics associated.
6.	DG set selection and installation factors, Operational features, Energy performance assessment of DG sets, Energy saving majors for DG sets, Synchronization of DGs with utility supply. Parallel operation. UPS technology, types and specifications, Performance assessment.
7.	Pump types and characteristics, Pump curves, Factors affecting pump performance, Efficient pumping system operation, Energy conservation in pumping systems. Fan and compressor types, Fan and compressor performance evaluation and efficient system operation, Compressor capacity assessment, Energy saving opportunities in fans and compressors.
8.	HVAC and refrigeration system, Types of refrigeration system, Common refrigerants and properties, Compressor type and applications, Selection of suitable refrigeration system, Factors affecting performance and energy efficiency of refrigeration plants, Energy saving opportunities.

9.	Underground cable and cable accessories, cable in underground structure, cable installation in conduit, cable joints, cable fault detection, over-current protection and lightning protection of underground systems, operation and maintenance of underground system. Grounding systems, Equipment, Ground fault protection, Isolated neutral grounding, Grounding for hazardous locations, substation, tower grounding.
10.	Substation design, bus designs, substation layout, grounding and ground grid design, substation structures, major substation equipment, auxiliary equipment, substation automation, Commissioning and start up. Industrial, residential and commercial wiring, electrical system design, design and audio and video systems, Lifts and Elevator systems, safety norms and codes. Fire fighting apparatus and systems.

Date : 16/06/2015

Place : Mumbai

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