



**ACE**<sup>®</sup>  
Engineering Academy  
Leading Institute for ESE/GATE/PSUs



**TELANGANA STATE POWER GENERATION  
CORPORATION LIMITED  
ASSISTANT ENGINEER**

***Online* Test Series**

**Electrical Engineering - Schedule**

<b>No.of Tests : 20</b>	
<b>Subject Wise Tests</b>	<b>15</b>
<b>Full Length Mock Tests</b>	<b>5</b>

**Note:**

★ The Syllabus considered as per Notification of TSGENCO. ACE Engineering Academy does not take any responsibility for deviations in syllabus in the final exam. As per Notification of TSGENCO each question carries '1' mark.

★ The Dates of Tests may Change according to the TSGENCO-AE Exam schedule.

★ All Tests will be active till TSGENCO-AE Examination.

★ Tests will be activated at 06:00 pm on the scheduled day.

## Subject-wise Tests

**(No. of Questions: 30, Time duration: 30 Minutes and Max Marks: 30 M)**

Test No	Name of the Test	Date of Activation
Test-01	Electric Circuits and Fields	14-10-2023
Test-02	Systems and Signal Processing	16-10-2023
Test-03	Electrical Machines	18-10-2023
Test-04	Power Systems	20-10-2023
Test-05	Analog and Digital Electronics	22-10-2023
Test-06	Control Systems	24-10-2023
Test-07	Power Electronics and Drives	26-10-2023
Test-08	Thermodynamics	28-10-2023
Test-09	Electrical Materials	30-10-2023
Test-10	Heat-Transfer	01-11-2023
Test-11	Electrical and Electronics Measurements	03-11-2023
Test-12	Power Plant Engineering	05-11-2023
Test-13	Telangana Culture, Movement. Post formation development of Telangana State.	06-11-2023
Test-14	General Awareness and English	07-11-2023
Test-15	Analytical & Numerical Ability and Basic knowledge of Computer for handling office works such as MS Office etc	08-11-2023

## Full Length Mock Test Series

**(No. of Questions: 100, Time duration: 100 Minutes and Max Marks: 100)**

Test-16	Full Length Mock Test-01	09-11-2023
Test-17	Full Length Mock Test-02	13-11-2023
Test-18	Full Length Mock Test-03	17-11-2023
Test-19	Full Length Mock Test-04	21-11-2023
Test-20	Full Length Mock Test-05	25-11-2023

# SYLLABUS

## ELECTRICAL ENGINEERING

### Section –A Total 80 Marks

#### **1. Electrical Materials :**

Electrical Engineering Materials, crystal structures and defects, ceramic materials, insulating materials, magnetic materials– basics, properties and applications; ferrites, ferro-magnetic materials and components; basics of solid state physics, conductors; Photo-conductivity; Basics of Nano materials and Superconductors.

#### **2. Electric Circuits and Fields:**

Circuit elements, network graph, KCL, KVL, Node and Mesh analysis, ideal current and voltage sources, Thevenin's, Norton's, Superposition and Maximum Power Transfer theorems, transient response of DC and AC networks, Sinusoidal steady state analysis, basic filter concepts, two-port networks, three phase circuits, resonance, Magnetically coupled circuits, Gauss Theorem, electric field and potential due to point, line, plane and spherical charge distributions, Ampere's and Biot-Savart's laws; inductance, dielectrics, capacitance; Maxwell's equations.

#### **3. Electrical and Electronics Measurements:**

Principles of measurement, accuracy, precision and standards; Bridges and potentiometers; moving coil, moving iron, dynamometer and induction type instruments, measurement of voltage, current, power, energy and power factor, instrument transformers, digital voltmeters and multi-meters, phase, time and frequency measurement, Q-meters, oscilloscopes, potentiometric recorders, error analysis, Basics of sensors, Transducers, basics of data acquisition systems.

#### **4. Analog and Digital Electronics:**

Operational amplifiers – characteristics and applications, combinational and sequential logic circuits, multiplexers, multi-vibrators, sample and hold circuits, A/D and D/A converters, basics of filter circuits and applications, simple active filters; Microprocessor basics- interfaces and applications, basics of linear integrated circuits; Analog communication basics, Modulation and de-modulation, noise and bandwidth, transmitters and receivers, signal to noise ratio, digital communication basics, sampling, quantizing, coding, frequency and time domain multiplexing, power line carrier communication systems.

## **5. Systems and Signal Processing:**

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 and Laplace transforms, Z transforms, Discrete Fourier transform, FFT, linear convolution, discrete cosine transform, FIR filter, IIR filter, bilinear transformation.

## **6. Control Systems:**

Modeling of physical systems, Principles of feedback, transfer function, block diagrams and signal flow graphs, steady-state errors, transforms and their applications; Routh-hurwitz criterion, Nyquist techniques, Bode plots, root loci, lag, lead and lead-lag compensation, stability analysis, transient and frequency response analysis, state space model, state transition matrix, controllability and observability, linear state variable feedback, PID and industrial controllers.

## **7. Electrical Machines:**

Single phase transformers, three phase transformers - connections, parallel operation, auto-transformer, energy conversion principles, DC machines - types, windings, generator characteristics, armature reaction and commutation, methods of excitation, starting and speed control of motors, Induction motors - principles, types, performance characteristics, starting and speed control, Synchronous machines - performance, regulation, parallel operation of generators, motor starting, characteristics and applications, servo and stepper motors.

## **8. Power Systems:**

AC and DC transmission concepts, transmission line models and performance, cable performance, insulation, corona and radio interference, power factor correction, Per unit quantities, symmetrical components, analysis of symmetrical and unsymmetrical faults, Switchgear Protection: Principles of over current, differential and distance protections, various types of circuit breakers and their functions, Relays, Protection for Generator, Transformers, feeder and Bus bars, Grounding, Protection against Over Voltages. functions of Radial and ring-main distribution systems, concept of power system stability, swing curves and equal area criterion. Power System Operation & Control, Matrix representation of power systems, load flow analysis, voltage control and economic operation, HVDC transmission and FACTS concepts, Concepts of power system dynamics, smart grid concepts. Batteries and battery chargers.

## **09. Power Plant Engineering:**

Basic power generation concepts, Steam Power Plants with Sub- critical, critical and super critical technology, Combustion Process, Gas Turbine Plant, Direct Energy Conservation, Hydro Electric Power Plant , nuclear & Power from Non-conventional sources, Introduction to Quality management and Environmental protection. Power plant economics-Capital cost, Investment of fixed charges, operating cost, arrangements for power distribution, load curves, connected load, maximum demand, demand factor, average load, load factor, diversity factor, Environmental considerations- Effluents from Power Plants and impact of environment, Pollution and pollution standards-Methods of pollution control , Power plant components-their theory and design, types and applications.

## **10. Power Electronics and Drives:**

Basics of Semiconductor diodes and transistors and characteristics, Junction and field effect transistors (BJT, FET and MOSFETS), Triacs, GTOs and IGBTs - static characteristics and principles of operation, triggering circuits, phase control rectifiers, bridge converters - fully controlled and half controlled, principles of choppers and inverters, basic concepts of adjustable speed DC and AC drives, DC-DC switched mode converters, DC-AC switched mode converters, resonant converters, high frequency inductors and transformers, power supplies.

## **11. Thermodynamics:**

Thermodynamic systems and processes; properties of pure substance; Zeroth, First and Second Laws of Thermodynamics; Entropy, Irreversibility and availability; analysis of thermodynamic cycles related to energy conversion: Rankine, modified Rankine, Otto, Diesel and Dual Cycles; ideal and real gases; compressibility factor; Gas mixtures.

## **12. Heat-Transfer:**

Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan- Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

### **Section –B Total 20 Marks.**

#### **General Awareness and Numerical Ability:**

- i) Analytical & Numerical Ability
- ii) General Awareness
- iii) English
- iv) Telangana Culture, Movement. Post formation development of Telangana State.
- v) Basic knowledge of Computer for handling office works such as MS Office etc.