

NOTE:

Residence certificate will not be accepted, if a candidate has studied in any Educational Institution up to 7th Class or equivalent examination, such candidates have to produce study certificates invariably.

PARA-VII - SCHEME OF EXAMINATION :

The written test shall comprise 100 marks consisting of 100 multiple choice questions and each question carrying 1 mark. The section A consisting of 80 questions on core technical subject and the section B consisting of 20 questions on General Awareness and Numerical Ability and History related to Telangana Culture & Movement.

The duration of the written examination will be 2 hrs. (120 minutes).

Details of Written Examination:

i) **Syllabus:** The syllabus for the written examination for AE(Electrical) is placed at Annexure-II.

ii) **Hall Tickets:** The Hall tickets will be made available on the website on the scheduled date prior to the date of examination. The candidate has to download the Hall ticket from the website only. Hall tickets will not be sent to the candidates by post. The Hall Ticket has to be preserved till the final selection.

iii) **Date of examination:** The written examination for Assistant Engineer/Elect. will be held on **14-08-2022**.

Note: Any change in the scheduled date of written examination will be published in the website.

iv) **Examination Centres:** The written examination for recruitment of Assistant Engineer (Electrical) will be held at different centres located in GHMC area.

v) Instructions to Candidates at the time of Written Examination:

1. The examination is of two hours duration. The date, time and venue will be indicated on the Hall ticket. Candidates should reach the test centre in time. The candidates have to report 60 Minutes before the examination time at the examination venue. Candidates will not be allowed into the examination hall after the exam has started and will not be permitted to leave examination hall before the closure of examination time under any circumstances. The candidates shall appear for written examination at their own cost.

2. The test will be of objective type with multiple-choice questions with only one answer being correct among the four alternatives suggested.

3. A separate O M R (Optical mark Reader) answer sheet will be provided to the candidates. The candidate has to indicate his/her response to each question by darkening the appropriate bubble with a **Black Ball Point pen**. No corrections with **white fluid or any** will be permitted.

4. The candidate has to bring a good quality **Black Ball Point pen** to the examination hall.

ANNEXURE-II
Syllabus – Assistant Engineer(Elecl.)

Section-A: 80 Marks.

I Engineering Mathematics

Linear Algebra: Matrix Algebra, Systems of linear equations, Eigen values, Eigenvectors.

Calculus: Mean value theorems, Theorems of integral calculus, Evaluation of definite and improper integrals, Partial Derivatives, Maxima and minima, Multiple integrals, Fourier series, Vector identities, Directional derivatives, Line integral, Surface integral, Volume integral, Stokes's theorem, Gauss's theorem, Green's theorem.

Differential equations: First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's equation, Euler's equation, Initial and boundary value problems, Partial Differential Equations, Method of separation of variables.

Complex variables: Analytic functions, Cauchy's integral theorem, Cauchy's integral formula, Taylor series, Laurent series, Residue theorem, Solution integrals.

Probability and Statistics: Sampling theorems, Conditional probability, Mean, Median, Mode, Standard Deviation, Random variables, Discrete and Continuous distributions, Poisson distribution, Normal distribution, Binomial distribution, Correlation analysis, Regression analysis.

Numerical Methods: Solutions of nonlinear algebraic equations, Single and Multi-step methods for differential equations.

Transform Theory: Fourier Transform, Laplace Transform, z-Transform.

II. Electrical Engineering

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, Applications of Fourier Transform, Laplace Transform and z-Transform.

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.

Section-B: 20 Marks.

General Awareness and Numerical Ability :

- i) Analytical & Numerical Ability
- ii) General Awareness
- iii) English
- iv) Related to Telangana Culture & Movement and v) Computer Knowledge