SR University, Warangal

PhD Entrance Syllabus

Structure of the PhD Entrance Test (100 Marks)
Section A: Aptitude and Reasoning – Common to all candidates (50 Marks) Section B: Subject/Domain(EEE)-Specific (50 Marks)

Section A: APTITUDE & REASONING (Common to ALL)

Unit–1: Verbal Reasoning

Navigating Directions and Mastering Distances, Blood Relations, Logical Puzzles and Problem Solving- Floor Based, Month and Year Based. Seating Arrangements - Circular, Linear, Decoding the Code- Letter Coding, Number Coding, Letter and Number Coding.

Unit-2: Number System

Mastering Quick Calculations, BODMAS Simplified, Exploring Numbers and Division Rule, Unit Digits Decoded, Unlocking Divisibility and Counting Zeroes, "Mastering LCM and HCF: Foundations of Factorization, Uncovering Factors, Exploring Remainders.

Unit-3: Arithmetic Ability-1

Percentages - Fraction, Decimal, Percentage Change, Concept of 'By' and 'To', Product Constancy, All About Averages, Profit & Loss Essentials, Articles, False Weight, and Discount Insights - Discount, Simple Interest: Calculations and Applications, Compound Interest: Calculations and Applications, Relationship between SI and CI.

Unit–4: Arithmetic Ability-2

Ratio, Proportion, Partnership, Problems on Ages, Time and Work - Concept of Efficiency, Smart Work with Time and work, Negative Work, Chain Rule, Pipes and Cisterns, Time, Speed & Distance, Problems based on Trains, Problems based on Boats and Streams.

Unit-5: Critical Reasoning

Analogy and Classification, Sequence and Series Logic, Syllogisms - Types of statements, Venn diagrams using statements, Method to solve problems Two Statements and Two Conclusions, EITHER-OR Conclusions, Four Statements and Two Conclusions.

SRU

Department of Electricaland Electronics Engineering

Syllabus for Ph.D. Admission Eligibility Test

Section B: Subjects Specific Syllabus

Section1:Electric Circuits

Network elements: ideal voltage and current sources, dependent sources, R, L, C, M elements; Network solution methods: KCL, KVL, Node and Mesh analysis; Network Theorems: Thevenin's, Norton's, Superposition and MaximumPower Transfer theorem;Transient response ofdcandacnetworks,sinusoidal steady-state analysis,resonance,twoportnetworks,balanced three phase circuits, star-deltatransformation,complex power and power factor in ac circuits.

Section2:ElectricalMachines

Single phase transformer: Equivalent circuit, phasordiagram, opencircuit and short circuit tests, regulation and efficiency; Three-phase transformers: connections, vector groups, parallel operation; Auto-transformer, Electromechanical energy conversion principles; DC machines: separately excited, series and shunt, motoring andgeneratingmodeof operation and their characteristics,speedcontrolofdcmotors;Three-phaseinductionmachines:principleofoperation, types, performance, torque-speedcharacteristics,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 and characteristics, regulation and parallel operation of generators, starting of synchronous motors; Types of losses and efficiency calculations of electric machines

Section3:PowerSystems

Basic concepts of electrical power generation, ac and dctransmissionconcepts,Modelsand 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 andunsymmetricalfaultanalysis, Principlesof over-current,differential,directionalanddistanceprotection;Circuit breakers, System stability concepts, Equal area criterion, Economic Load Dispatch (with and without considering transmission losses).

Section4:ControlSystems

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, Stabilityanalysis using Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, SolutionofstateequationsofLTIsystems,R.M.S.value,averagevaluecalculationforanygeneral periodic waveform.

Section5:PowerElectronics

Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET, IGBT; DC to DC conversion:Buck, Boost and Buck-Boost Converters; Single and three-phaseconfiguration of uncontrolledrectifiers;VoltageandCurrentcommutatedThyristorbasedconverters;Bidirectional ac to dc voltage source converters; Magnitude and Phase of line current harmonics for uncontrolled and thyristor based converters; Power factor and Distortion Factor of ac to dc converters; Single-phase and three-phase voltage and current source inverters, sinusoidal pulse width modulation.