GITAM SCHOOL OF TECHNOLOGY

PhD Entrance Test Syllabus

PhD in Engineering: Electrical & Electronics Engineering

Networks: D.C. and A.C. circuits - loop and nodal analysis, source transformation, star-delta transformation, Superposition, Reciprocity, Thevenin's, Norton's, Maximum power transfer theorems, time response of circuits, complex power, resonance, two port networks, solution of balanced and unbalanced 3-ϕ circuits.

Electrical Measurements: Bridges and potentiometers; indicating instruments - PMMC, moving iron, dynamometer, electrostatic and induction type meters, ammeters and voltmeters, errors in indicating instruments; wattmeter, energy meter and other measuring instruments - measurement of power, energy and power factor and frequency, errors and compensation.

Control Systems: Transfer function, block diagrams, servo and stepper motors, error constants, stability, Routh and Nyquist criterion, Bode plots, root loci, lag, lead and lead-lag compensation, PD, PI & PID controllers, state space model, state transition matrix, controllability and observability.

Electrical Machines: Energy conversion principles; DC machines - types, generator characteristics, armature reaction and commutation, testing and speed control of dc motors; three phase induction motors - principles, types, performance characteristics, starting testing and speed control, single phase induction motors; synchronous machines - performance, regulation and parallel operation of generators, synchronous motor starting, characteristics and applications; single phase transformer - equivalent circuit, phasor diagram, testing, regulation and efficiency; three phase transformers.

Power Systems: Generation of electrical Power; transmission line parameters; sag calculations; insulators and cables; economic operation; symmetrical components and fault analysis; load flow analysis; steady-state and transient stability analysis; load frequency control; circuit breakers and protective relays; basics of HVDC transmission and FACTS; power quality.

Power Electronics and Drives: Semiconductor power diodes and power transistors; thyristors family – SCR, Triac, GTO, MOSFET and IGBTs; SCRs – gate characteristics, static and dynamic characteristics, triggering circuits, phase control rectifiers, choppers, inverters, ac to ac converters; basis concepts and control of dc and ac drives; electrical traction.

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Reference Books:

1. Engineering Circuit Analysis by HAYT, Tata McGraw Hill Education Private Limited.
2. A course in Electrical and Electronic Measurements and Instrumentation by A.K. Sawhney,
   Puneet Sawhney, Dhanpat Rai publications.
3. Control Systems Engineering by I J Nagarth and M Gopal, New Age International Pvt Ltd Publishers.
4. Electrical Machinery by P.S Bimbra, Khanna publishers.
5. Electrical Power Systems by C L Wadhva, New Age International Pvt Ltd Publishers.
6. Power Electronics book by P.S Bimbra, Khanna publishers.