

ANNEXURE - I

Syllabus for Written Test of AP Transco Assistant Engineer (Electrical) 2011-12

Electric Circuits: Network graph, KCL, KVL, node and mesh analysis, star/ delta transformation; electromagnetic induction; mutual induction; ac fundamentals; harmonics, transient response of dc and ac networks; sinusoidal steady-state analysis, resonance, ideal current and voltage sources, Thevenin's, Norton's, Superposition and Maximum Power Transfer theorems, two-port networks, three phase circuits, power measurement .

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

Power Systems: Basic power generation concepts; transmission line models and performance; underground cable, string insulators; corona; distribution systems; per-unit quantities; bus impedance and admittance matrices; load flow; voltage control; power factor correction; economic operation; symmetrical components; fault analysis; principles of over-current, differential and distance protection; protection of alternator, transformer, transmission lines neutral earthing, solid state relays and digital protection; circuit breakers; system stability concepts, swing curves and equal area criterion

Utilization & Control Systems: Principles of feedback; transfer function; block diagrams; steady-state errors; Routh and Nyquist techniques; Bode plots; root loci; lag, lead and lead-lag compensation; Heating - resistance, induction, dielectric; Welding - spot, seam and butt; Electric traction - speed-time curves, tractive effort;

Measurements: Bridges and potentiometers; PMMC, moving iron, dynamometer and induction type instruments; measurement of voltage, current, power, energy and power factor; digital voltmeters and multi-meters; phase, time and frequency measurement; Q-meters; oscilloscopes;

Analog and Digital Electronics: Characteristics of diodes, BJT, FET; amplifiers - biasing, equivalent circuit and frequency response; oscillators and feedback amplifiers; Combinational and sequential logic circuits; multiplexer; Schmitt trigger; A/D and D/A converters; 8-bit microprocessor basics, architecture, programming and interfacing.

Power Electronics and Drives: Semiconductor power diodes, transistors, thyristors, triacs, GTOs, MOSFETs 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.

Model Question Paper

The question paper consists of **one hundred** multiple choice objective type questions to be answered on the OMR answer sheet using HB pencil in **2 hours**. A few questions are given as a model below. **Note:** *Calculators are not allowed into the Examination Hall. Candidates have to bring their own pencils and erasers.*

1.The armature of a d.c machine is made of (A) Silicon steel (B) Wrought iron (C) Cast steel (D) Soft iron	A ●	B ○	C ○	D ○
2.The main drawbacks of d.c shunt generator is that (A)Shunt circuit has high resistance (B) Generator voltage is small (C) Terminal voltage drops considerably with load (D) It is expensive	○	○	●	○
3.Transformers usually transfer electrical energy from primary to secondary with change in (A) Frequency (B) Voltage (C) Power (D) Time period	A	B	C	D

Syllabus for Written Test of AP Transco Assistant Engineer (Telecom) 2011-12

Network Analysis : Kirchoff's Laws, RC, RL & RLC Circuits, Initial conditions, Energy, Power, Instantaneous, max, average, RMS values of alternating currents, Phasor representation, transient and steady state analysis, Total response. Network analysis using Laplace Transforms, properties of Laplace transforms.

Fourier Series: Continuous and discrete Fourier Transforms, z-transforms. Applications to signal Analysis.

Convolution. Network Theorems and Applications. Two Port Parameters, Series, Parallel and Cascade connections of two port networks, Z, Y, ABCD Parameters, Network Functions, Poles and Zeros. Driving point and Transfer Functions, Image Parameters, Conventional LP, HP, BP, Band Stop Filters. Composite Filters, T, π & Lattice Networks, Attenuators and Equalizers.

Electronic Devices & Circuits: PN Junction, PNP, NPN Transistors. Biasing, Tunnel Diode, FET, UJT, SCR Characteristics, Various CB, CE, CC transistor Amplifiers – Analysis & Performance. RC coupled and push pull amplifiers, compensation techniques, Feedback, Negative feedback, oscillator Circuits, Phase Shift Oscillator.

Digital Circuits: Wave Shaping, multivibrators, Sweep Generators, Counters, logic Gates and Circuits, Number Systems, Codes, Error Detection and Correction. Sequential Circuits, Integrated Circuits OP Amps-Applications, IC Comparator Circuits, A/D, D/A Converters.

Linear Control System: Open loop, Closed loop system, Signal Flow Graphs, Stability, Routh – Hurwitz and Nyquist Criterion, Bode plots, Gain-phase Margin, Lead-Lag compensation Techniques.

Transmission Lines & Antennas: Transmission line equation, Primary and Secondary Parameters, Propagation constants, Open and Short Circuited Lines, Standing Waves, Reflection Coefficient, VSWR, Line as Circuit element, Impedance Matching.

Maxwell's equations and Field Theory: Various Laws & Theorems in Electromagnetism, Plane Waves, Boundary Conditions, Concept of Radiation, Half wave Dipole, Antenna Arrays, Communication Antennas – performance Characteristics.

Wave guides and Components: Reciprocal & non Reciprocal Wave guide components, Couplers, Tees, Microwave Sources, Microwave Communication, Link Design.

Basics of Micro Processors & Micro Controllers: Architecture and Assemblers, memory Devices.

Communication systems: Modulation, All types of Modulation techniques, SNR, Analog & Digital Communication techniques, multiplexes, Demodulators, Radio Receivers & Transmitters – Characteristics & Basics of Fibre Optics Communication and Satellite Communication Systems.

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1. For reciprocal network, ABCD parameters are related as (A) $A = D$ (B) $B = C$ (C) $AD - BC = 1$ (D) $AD + BC = 1$	A O	B O	C •	D O
2. For a short circuited transmission line, reflection coefficient is equal to (A) zero (B) infinity (C) -1 (D) $+1$	A O	B O	C •	D O