ELECTRONICS AND TELECOMMUNICATION ENGINEERING (For both objective and conventional type papers)
PAPER I

1. Materials and components

Structure and properties of Electrical Engineering materials Conductors, Semi-conductors and Insulators, Magnetic, Ferroelectric, piezoelectric Ceramic, Optical and Superconducting materials. Passive components and characteristics Resistors, Capacitors and Inductors : Ferrites, Quartz crystal. Ceramic resonators, Electromagnetic and electro-mechanical components.

2. Physical Electronics, Electron Devices and ICs

Electrons and holes in semi-conductors. Carrier Statistics, Mechanism of current flow in a semi-conductor, Hall effect. Junction theory; Different types of diodes and their characteristics; Bipolar Junction transistor; Field effect transistors; Power switching devices like SCRs. CTOs, power MOSFETs; Basics of ICs-bipolar, MOS and CMOS types; Basics of Opto-Electronics.

3. Signals and Systems

Classification of signals and systems; System modelling in terms of differential and difference equations; State variable representation; Fourier series; Fourier transforms and their application to system analysis; Laplace transforms and their application to system analysis; Convolution and superposition integrals and their applications; Z-transforms and their applications to the analysis and characterisation of discrete time systems; Random signals and probability. Correlation functions; Spectral density; Response of linear system to random inputs.

4. Network Theory

Network analysis techniques: Network theorems, transient response steady state sipusoidal response; Network graphs and their applications in network analysis; Tellegen's theorem. Two port networks : Z, Y, h and transmission parameters. Combination of two ports analysis of common two ports. Network functions; parts of network functions; obtaining a network function from a given part. Transmission criterion : dalcy and rise time. Elmorc's and other definition effect of cascading Elements of network synthesis.

5. Electromagnetic Theory

Analysis of electrostatic and magnetostatic fields; Laplace's and Potson's equations; Boundary value problems and their solutions; Maxwell's equations : application to wave propagation in bounded and unbounded media; Transmission lines : basic theory, standing wave, matching applications microstrip lines; basics of waveguides and resonators; Elements of antenna theory.

6. Electronic Measurement and Instrumentation

Basic concepts standards and error analysis; Measurements of basic electrical quantities and parameters; Electronic measuring instruments and their principles of working, analog and digital, comparison characteristics, applications Transducers; Electronic measurements of non-electrical quantities like temperature, pressure, humidity etc. Basics of telemetry for industrial use.

PAPER II

1. Analog Electronic Circuits

Transistor biasing and stabilization small signal analysis. Power amplifiers Frequency response. Wide banding techniques Feedback amplifiers Tuned amplifier? Oscillators, Rectifiers and power; supplies Op Amp PLL other linear integrated circuits and applications Pulse shaping circuits and waveform generator.

2. Digital Electronic Circuits

Transistor as a switching element; Boolean algebra simplification of Boolean functions, Karnaugh man and applications' IC Logic gates and their characteristics : IC logic families : DTL, TTL, ECL, NMOS PMOS and CMOS gates, and their comparison Combinational logic circuits; Half adder Full adder. Digital compartor. Multiplexer. Demultiplexer; ROM and their applications, Flipflops, R-S, J. K., D and T np-nops; Different types of counters and resisters; Waveform generators. A/D and D/A conveners. Semi-conductor memories.

3. Control Systems

Transient and steady state response of control systems, Effect of feedback on stability and sensitivity; Root locus techniques; Frequency response analysis Concepts of gain and phase margins; constant-M and Consta. N Nichols's Chart; Approximation of transient response from Constant-N nichols Chart; Approximation of transient response from closed loop frequency response; Design of Control systems Compensators; Industrial controllers.

4. Communication Systems

Basic information theory. Modulation and detection in analogue and digital systems; Sampling and data reconstruction Quantization & Coding; Time division and frequency division multiplexing, Equalisation; Optical Communication in free space and fibre optic; Propagation of signals at HF, VHP, UHF and microwave frequency; Satellite Communication.

5. Microwave Engineering

Microwave Tubes and solid state devices, Microwave generation and amplifiers, Waveguides and other Microwave Components and Circuits Microstrip circuits, Microwave Antennas, Microwave Measurements, Masers Lasers; Microwave propagation. Microwave Communication systems-terrestrial and Satellite based.

6. Computer Engineering

Number Systems; Data representation; Programming; Elements of a high level programming language PASCAL/ C. Use of basic data structures; Fundamentals of computer architecture; Processor design; Control unit design; Memory organisation. I/o System Organisation, Micro-processors : Architecture and instruction set of micro-processors 8085 and 8086. Assembly language programming. Micro-processor based system design : typical examples. Personal computers and their typical uses.