

BLOCK 1: Network Theorems and Power Supplies

Unit-1: Network analysis: Network definitions, Kirchhoff's current and loop laws, Reduction of a complicated network, Superposition theorem, Reciprocity theorem, Thevenin's theorem, Norton's theorem, Maximum Power Transfer theorem.

Unit-2: Network's Passive elements: Types of Resistors, variable resistors, potentiometers and rheostats, resistor colour coding, power rating of resistors, combination of resistors, Inductors and types of Inductors, mutual inductance, variable inductance, stray inductance, combination of Inductors, Energy stored in an inductor, Capacitor and its types, Combination of Capacitors, Energy in electrostatic field of a capacitor.

UNIT 3: Filter Circuits: Filter circuits, Types of filters, low-pass and high-pass filters, Shunt capacitor filter, Series inductor filter, L-section and π -section filters and their load characteristics

Unit-4: Rectifiers and Power Supplies: Half wave and full wave rectifiers, ripple factor, Bridge rectifiers, Zener diode as voltage regulator, unregulated and regulated power supplies.

BLOCK 2: Semiconductors and Semiconductor devices

Unit-5: Semiconductors: Classification of Metals, Conductors and Semiconductors, Semiconductor types, P type and N type semiconductors, energy bands and charge carriers, drift of carriers in electric and magnetic fields.

Unit 6: Semiconductor Devices: p-n junction diodes, p-n junction fabrication (basic idea) and its characteristics, junction breakdown- Zener and avalanche breakdowns, Zener diode, tunnel diode, varactor diode, photo diode and LED.

Unit-7: Transistors: Junction transistor, bipolar transistor and its types, operation and characteristics of BJT, Transistor-configurations and constants, Transistor biasing, D.C. and A.C. load lines, Hybrid equivalent circuit.

Unit-8: JFETs and MOSFETs: JFET- types, construction, biasing and characteristics, JFET parameters and its applications (as amplifier and switch), Types of MOSFET and their characteristics.

BLOCK 3: Amplifiers and Oscillators

Unit-9: Amplifiers: Classification of amplifier on different basis, single stage and multistage transistor amplifiers, RC coupled amplifier-operation and frequency response, Transformer coupled amplifier-operation and frequency response, Distortion in amplifiers.

Unit-10: Feedback Amplifiers: Basic principle and types of feedback, Negative feedback and its advantages, Feedback amplifiers (voltage and current), Positive feedback and its advantages, Advantages of negative feedback.

Unit 11: Oscillators: Oscillator fundamentals and classification, Barkhausen criterion for oscillations, Hartley Oscillator, Colpitts Oscillator, Wein bridge oscillator, RC phase shift oscillator, Stability of an oscillator-Crystal oscillator, Relaxation oscillators, Astable, monostable and bistable multivibrators.