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| ECL-100-A | BASIC ELECTRONICS | L | T | P | Cr |
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Objective: The objective of the course is to provide fundamental knowledge of electronic components, devices and circuits. It covers basic principle of operations and usefulness of some of the electronic measuring instruments that help us in trouble shooting of electronic circuits. It is also helpful to design electronic circuits using Operational amplifier.

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: Semiconductors and Diodes

Introduction of semiconductors (Si and Ge), Types of semiconductors Mobility and Conductivity, Mass action Law, Diffusion and Drift currents, PN junction Diode, diode operation under no bias, reverse bias and forward-bias conditions, Zener and Avalanche breakdown in diodes, Ideal diode, and its V-I characteristics, introduction of different types of diodes; symbolic representations and application areas.

UNIT 2: BJT and Its Applications

Introduction of BJT , its types and operations, different operation modes of BJT, transistor CB, CE & CC configurations and its I/O characteristics, transistor as switch and amplifier, transistor biasing and its stabilization-The operating Point, stability factor.

UNIT 3: Oscillators

Criteria for oscillations, Barkhausen criterion, types of Oscillators: Hartley Oscillator, Colpitt Oscillator, RC Phase shift Oscillator, Wein Bridge Oscillators, crystal oscillator

SECTION – B

UNIT 4 Digital Electronics

Introduction to different number systems and its conversions, Boolean algebra and simplification of Boolean functions, canonical forms, Basic logic gates (AND, OR, NOT), universal gates (NAND, NOR), Introduction to Microprocessors and memories.

UNIT 5: Electronics Instruments

Introduction of Electronic instruments, Role, importance and applications of general-purpose test instruments viz voltmeter, Digital Multimeter, Cathode Ray Oscilloscope (CRO), Function Generator and Power supplies, displays.

UNIT 6: Operational Amplifiers

Introduction of Op-Amps, Pin configuration of LM 741 IC, its ideal characteristics, inverting, non- inverting, differential configuration of OP-Amps, Op-Amp applications as adder, subtractor, differentiator and integrator etc.

Text Books:

1. Sedra A S and Smith K C, “Microelectronic Circuits” 4th Ed., New York, Oxford University Press, New York (1997).
2. Millman and Halkias, “Electronics Devices and Circuits” 2nd Ed., Tata McGraw-Hill, New Delhi (2008).

Reference Books:

1. Cooper and Helfrick, “Modern Electronic Instrumentation and Measuring Techniques”, 4th print Prentice Hall of India, New Delhi (1996).
2. Boylestad and Nashelsky, “Electronic Devices and Circuit Theory”, 8th Ed, Pearson Education India, New Delhi (2002).
3. Millman and Grabel, “Microelectronics”, 2nd Ed. Tata McGraw-Hill (1999).
4. NN Bhargave, “Basic Electronics & Linear Circuits” Tata McGraw Hill(2007).