

**MP-08 (D)**  
**DIGITAL ELECTRONICS**

(Questions will be set from each unit/section with internal choice)

Units	Topics
I	<p><b>Number Systems:</b> Binary, Octal and Hexadecimal number systems and their inter conversions. Binary arithmetic, 2's complement, 2's complement arithmetic.</p> <p><b>Boolean Algebra and Logic Circuits:</b> Theorems of Boolean algebra, AND, OR, NAND, NOR, XOR and XNOR gates, minimization techniques, Karnaugh map and combinational logic circuits. Arithmetic circuits, Half adder, Full adder, Half subtractor and Full subtractor, Carry look ahead generator, faster method of implementing adder/subtractor, multiplier.</p> <p><b>Binary Codes:</b> CD, Excess-3, Gray, Binary to Gray and Gray to Binary conversions, Parity check codes, ASCII, EBCDIC and Hollerith codes.</p>
II	<p>Switching behaviour of diode, transistor and other semiconductor devices.</p> <p><b>Bipolar Logic Families:</b> RTL, DTL, DCTL, TTL, Schottky TTL, HTL, ECL, I<sup>2</sup>L.</p> <p><b>MOS Families:</b> PMOS p-channel MOSFETs, NMOS n-channel MOSFETs and CMOS complementary MOSFETs. TTL to CMOS and vice versa interface.</p> <p><b>Multivibrators and Waveform Generators:</b> Astable, monostable and bistable Multivibrators, Schmitt trigger, Miller and Bootstrap time base generators, blocking oscillator, staircase generator.</p>
III	<p><b>Flip-Flops</b> - RSFF, Clocked RSFF, TFF, DFF, JKFF, Master Slave JKFF.</p> <p><b>Registers:</b> Serial and Parallel Shift Registers. Multiplexers and its applications, Demultiplexers, Decoders: 3 to 8 line decoder, BCD to decimal decoder BCD to seven-segment decoder. Encoder, Priority Encoder, Decimal to BCD encoder, parity checkers.</p> <p><b>Counters:</b> Binary ripple counter, parallel or synchronous counters, BCD counter, up-down counter, ring counter, shift counter (Johnson counter) &amp; counter applications - frequency counter and digital clock.</p>
IV	<p><b>Active Filters:</b> low pass, high pass Butterworth filters, Bandpass filters, Band reject filters and all pass filters switched capacitor filter.</p> <p><b>Oscillators:</b> Principles, oscillator types, frequency stability, phase shift oscillator, Wien Bridge oscillator, Quadrature oscillator, square wave generator, triangular wave generator, sawtooth wave generator.</p> <p>Switching mode voltage regulators.</p> <p><b>Data Converters:</b> Binary weighted and R - 2R D/A converters, counter type, successive approximations and dual slope A/D converters. Practical A/D and D/A converter ICs and their specifications.</p>
V	<p><b>Introduction to Digital Computer and Microprocessor:</b> Basic building blocks of digital computers, semiconductor and magnetic memories, cache memory, real and virtual memory, memory organisation and memory address map, Input - Output devices, Data, Address and Control buses.</p> <p><b>Microprocessor Architecture of Intel 8085:</b> ALU, timing and control unit, Registers, Pin configuration, Instruction set for 8085, addressing modes and status flags. Assembly language programme for data manipulation, arithmetic/logic operation; delay loop.</p>