

University of Mysore

Syllabus of Entrance Examination for PG Admission, 2014-15.

Program: M.Sc. in Electronics

Subject: Electronics

Unit 1 - Analog Electronics

PN junction diode and its characteristics, half-wave and full-wave rectifiers, Zener diode and its characteristics, Zener voltage regulators, power supplies, BJT and its characteristics, fixed and voltage divider biasing of BJT, h-parameters, single stage CE amplifier, RC and transformer coupled CE amplifiers, class A and class B power amplifiers, junction FET and its characteristics, feedback amplifiers, Barkhausen criterion, RC phase shift, wein bridge, Hartley and Colpits oscillators.

Unit 2 - Digital Electronics

Laws of Boolean algebra, De-Morgan's theorems, simplification of Boolean expressions, NAND and NOR gates, simplification of Boolean expression using Karnaugh maps, multiplexers, de-multiplexers, encoders, decoders, Flip flops – RS, D, T, JK flip flops, race around condition, shift registers-SISO, SIPO, PISO, PIPO, counters – binary, mod 3, mod 5 and decade counters, 8421 and 2421, Gray and excess 3 codes.

Unit 3 - Linear ICs

The ideal op-amp, equivalent circuit and parameters of an op-amp, inverting and non-inverting amplifiers, summing, subtracting, scaling, averaging and instrumentation amplifiers, voltage to current and current to voltage converters, integrator, differentiator, first and second order Butterworth filters, comparators, Schmitt trigger, square and triangular wave generators, R-2R DAC, successive approximation ADC, 555 Timer and its applications, clippers and clampers.

Unit 4 - Transducers and Instrumentation

Transducers - Resistive, capacitive, magnetic, Hall effect, piezoelectric, piezo-resistive, optical, ultrasonic, nuclear and thermoelectric effect transducers;

strain gauges, measurement of temperature, pressure, mass flow rate and volume flow rate, radiation thermometers, diaphragms, capacitive and optical fiber pressure sensors, low and high pressure measurements, manometers, resonant wire devices.

Unit 5 - Microcontroller – 8051

Salient features of RISC, CISC, Harvard and Van-Neumann architecture. The 8051 architecture, its I/O pins and ports, addressing modes, logical, arithmetic and jump operations, programming timers/counters, 8051 interrupts.

Unit 6 - Transmission Lines and Antennas

Basic principles of transmission lines, losses in transmission lines, standing waves, quarter and half wavelength lines, electromagnetic radiations, EM waves, propagation of ground, sky and space waves, resonant and non-resonant antennas, antenna gain, effective radiated power, field intensity, antenna resistance, band width, beam width, polarization.

Unit 7 - Analog Communication Systems

Need for modulation, principles of modulation system, principles of amplitude modulation (AM), spectrum of AM wave, AM power and current relations, principles of single side band AM, suppression of carrier and sideband, balanced modulator, vestigial sideband modulation, principles of frequency modulation (FM), spectrum and bandwidth of FM, principles of phase modulation.

Unit 8 - Pulse Modulation and Satellite Communications

Principles of PAM, PWM, PPM and PCM, noises in PCM, advantages and applications of PCM, principles of satellite communication system, orbits, station keeping, transmission paths, path loss and noise in satellite communication, multiple access methods, SPADE, TDMA.

Unit 9 - Signals and Systems

Basic continuous- and discrete-time signals, operations on signals, discrete-time systems, convolution sum; the Z transform, ROC and its properties, Z transform of sequences, inverse Z transform using partial fraction expansion method; DFT and its properties, IDFT.

Unit 10 - VHDL and Memory

Basic language elements, behavioural modelling, dataflow modelling, structural modelling; diode matrix ROM, RAM, memory addressing, programmable logic devices- PROM, PAL, PLA, PLD.
