DEVI AHILYA VISHWAVIDYALAYA ,INDORE
INSTITUTE OF ENGINEERING AND TECHNOLOGY
ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SYLLABUS FOR DOCTORAL ENTRANCE TEST (DET)

(Effective from 1st March 2018)

SECTION- A

Section-A shall consist of 50 objective type compulsory questions of (01) mark each based on research aptitude. It shall be of generic nature, intended to assess the research aptitude of the candidate. It will primarily be designed to test reasoning ability, data interpretation and quantitative aptitude of the candidate.

SECTION-B

Section-B shall consist of 50 objective type compulsory questions of (01) mark each based on the syllabus of the subject as follows:

UNIT 1- ANALOG AND DIGITAL ELECTRONICS

Binary arithmetic, Logic families, Combinational logic design, Sequential logic design, Multivibrators, Programmable logic devices, Digital design using VHDL.

Types of diodes and their applications, BJT current components, Transistor as amplifier, Eber Moll's model, CB,CE and CC configuration, transistor at low frequency, Two port devices and hybrid model, Feedback amplifier, classification of amplifiers, Operational amplifier, Basic op-amp circuits, Oscillators and signal generators, ,Active filters, IC voltage Regulators. Types of MOSFETS, Structure and operation of MOS transistor, CS and CD amplifier, PMOS,NMOS and CMOS, Transfer characteristics, CMOS Inverter, CMOS based low power digital circuit design

UNIT II- SIGNALS AND SYSTEMS, CONTROL SYSTEM

LTI systems and their properties, continuous and discrete time systems, Laplace transform, Z-transform and their properties, Inverse Z-transform, Discrete Fourier transform, FFT, IIR and FIR systems.

Basic control system, Block Diagrams and their reduction,Open loop and closed loop systems and stability analysis,Signal flow graphs , transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci, Routh-Hurwitz criterion, Bode and Nyquist plots. Control system compensators lead and lag compensation, elements of Proportional-Integral-Derivative (PID) control. State variable representation and solution of state equation of LTI control systems.

UNIT III- MICROPROCESSOR, MICROCONTROLLER AND EMBEDDED SYSTEMS

Comparison among microprocessors, micro controller and computer, 8085 microprocessor its architecture, Instruction set, Addressing modes, Counter and time delay, Stack and subroutine, code conversion, Basic interfacing concept, memory interfacing, Memory mapped and peripheral mapped I/O techniques.

Microcontroller, 8051 architecture, input/output ports and circuits, data transfer, arithmetic, logical, branch instructions, bit-related instructions, Addressing modes, assembly language programming, Interrupts, Counter and timers, Serial data transmission, Interfacing with keyboard and display devices, A/D and D/A converters, waveform generation , frequency and pulse width measurement, stepper motor control.

Definition of Embedded System, Embedded Systems Vs General Computing Systems, Major Application Areas, Purpose and characteristics of Embedded Systems, Core of the Embedded System: General Purpose and Domain Specific Processors, Embedded system architecture: RISC and CISC.

UNIT IV -PROBABILITY AND COMMUNICATION ENGINEERING

Random signals and noise: probability, random variables and Processes, Mean , variance and moments, CDF & PDF, autocorrelation, Fourier analysis, ESD and PSD , Amplitude Modulation and its types, Frequency Modulation, their frequency domain analysis, generation and reception, noise in communication systems, sampling theorem, various digital encoding techniques, digital modulation techniques, source coding, channel encoding techniques, Information theory, Error and Complimentary Error Function, Optimum detection of matched filters, Cellular system concept, Multiple access Techniques, GSM and CDMA system, Introduction to optical fiber communication system, Switching systems- basics of switching systems, Telecommunication Traffic- unit of traffic, network traffic load and parameters, grade of service and blocking probability, Telephone Networks (PSTN), Integrated Services Digital Networks.

UNIT V- ELECTROMAGNETICS AND NETWORKING

Electrostatics; Maxwell's equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector; Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media , skin depth ; Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S-parameters, Smith chart; Waveguides: modes, boundary conditions, cut-off frequencies, dispersion relations;

Antennas: antenna types, radiation pattern, gain and directivity, return loss, antenna arrays; Basics of radar; Light propagation in optical fibers.

OSI and TCP/IP Model, Data rate Limitations, Transmission Media, Data link layer Protocols, MAC Protocols, Connecting Devices, Addressing Modes, Routing Protocols, IPv4 and IPv6, UDP and TCP Protocols, QoS and Congestion control, ETHERNET, WLAN, BLUETOOTH and WIMAX.