P.G. Department of Electronics, University of Jammu

DETAILED SYLLABUS

PhD Entrance Examination in Electronics (2023)

Duration: 3 Hrs

Max. Marks: 100
Min. Marks: 50

Nodal and Mesh analysis, Thevenin, Norton, Superposition and Maximum Power transfer theorems, Time domain analysis, Two port network parameters, Poles and zeros.

Canonical and Standard forms, Karanaugh Map: SOP & POS minimization, Combinational & Sequential circuits, Memories, Programmable logic devices.

Direct and indirect band semiconductors, Carrier concentration, extrinsic semiconductors, donors, acceptors, degenerate semiconductors, carrier drift, mobility, resistivity, Hall effect, diffusion process, Einstein relation, current density equations, generation & recombination processes, continuity equation, high held effects, transferred electron effect, quantum mechanical tunneling, hot electron effect, emission in semiconductors, optical absorption, spontaneous and stimulated emission, Tunnel, Gunn, IMPATT and BARITT diodes, LEDs, LASER, Photoconductor, Photodiodes, PV effect and Solar cell.

BJT, FET, MOSFET, CMOS circuits, SCR, TRIAC, DIAC, Power MOSFET, UJT, Op-amps circuits, Active filters, Differential amplifier, Cascade and Cascode connections.

Complex algebra, Cauchy-Riemann equations, Cauchy integral theorem, Cauchy residual theorem, Bisection, Newton-Raphson's and Secant methods, Lagrange and Newton polynomials approximation, Gauss elimination, Gauss Jordon, Gauss Seidal and Jacobi methods, Eigen value concepts.

Microprocessors and Microcontrollers (8086 and 8051): Architecture and programming, CISC & RISC processors, Peripheral devices: 8255, 8259, 8251.

Maxwell equations, Transmission lines, Waveguides, Antennas and Microwave tubes.

Analog and Digital modulation, Random process and noise, Information theory, Optical fibers, Satellite and Radar communication.

Open and closed loop systems, Laplace Transforms, PID controller, stability of control systems, Routh & Nyquist criterion and Root locus technique.

Transducers, Bio-potential amplifiers, Blood pressure measurements, MRI, ECG, EEG, EMG, Digital signals & processing, IoT.

Z transform, Discrete transform, Digital filter design, Architecture & programming of TMS 32OC54xx DSP processors.

Crystal growth and Epitaxy, Impurity doping, Oxidation, Film deposition, Lithography and Etching.

Scheme for Question Paper:

The question paper would consist of two sections. Section A will be compulsory comprising of 50 multiple choice questions carrying 1 mark each. Section B shall comprise of 8 descriptive type questions each carrying l0 marks. The candidates have to attempt any 5 questions.