RANI DURGAVATI VISHWAVIDYALAYA, JABALPUR

SYLLABUS
M. Phil and Ph. D. Entrance Test (w.e.f. 2018-19)
In accordance with Revised M. Phil. and Ph.D. Ordinances

ELECTRONICS

The Question paper of the Entrance test will have two sections A and B, each consisting of 50 objective type compulsory questions. The section A will represent a component of “Research Methodology” whereas section B shall be “Subject Specific”. Each question will carry one mark.

i. There will be no negative marks
ii. The duration of the Entrance test will be Two hours.
iii. The candidate must score minimum 50% marks in the Entrance test to qualify for the interview.

(Time 2 Hours) PART –A & B (Max Marks 100)

PART –A

Part –A shall consist of 50 objective type compulsory questions of 1 mark each based on Research Methodology. 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.

PART –B

UNIT –I

Electronic Transport in semiconductor, PN Junction, Diode equation and diode equivalent circuit. Breakdown in diodes, Zener diodes, Tunnel diode, Semiconductor diodes, characteristics and equivalent circuits of BJT, JFET, MOSFET, IC, fabrication – crystal growth, epitaxy, oxidation, lithography, doping, etching, isolation methods, metallization, bonding, Thin film active and passive devices.

UNIT -II

UNIT-III

Rectifiers, Voltage regulated ICs and regulated power supply, Biasing of Bipolar junction transistors and JFET. Single stage amplifier, Multistage amplifiers, Feedback in amplifiers, oscillators , function generators, multivibrators, Operational Amplifiers (OPAMP) – characteristics and Applications, Computational Applications, Integrator, Differentiator, Wave shaping circuits, F to V and V to F converters. Active filters, Schmitt trigger, Phase locked loop.

UNIT-IV

Logic families, flip –flops, Gates, Boolean algebra and minimization techniques, Multivibrators and clock circuits, Counters-Ring, Ripple. Synchronous, Asynchronous, Up and down shift registers, multiplexers and demultiplexers, Arithmetic circuits Memories, A/D and D/A converters.

UNIT-V

Architecture of 8085 and 8086 Microprocessors, Addressing modes,8085 instruction set,8085 interrupts,Programming, Memory and I/O interfacing, Interfacing 8155, 8255, 8279, 8253, 8257, 8259, 8251,with 8085 Microprocessors Serial communication protocols, Introduction of Microcontrollers (8 bit)-8031/8051 and 8048.

UNIT-VI


UNIT-VII

Maxwell’s equations, Time varying fields, Wave equation and its solution, Rectangular waveguide, Propagation of wave in ionosphere, Poynting vector, Antenna

**UNIT- VIII**

Basic principle of amplitude, frequency and phase modulation, Demodulation, Intermediate frequency and principle of super heterodyne receiver, Spectral analysis and signal transmission through linear systems, Random signals and noise, Noise temperature and noise figure. Basic concepts of information theory, Digital modulation and Demodulation: PM, PCM, ASK, FSK, PSK, Time –division Multiplexing, Frequency-Division Multiplexing, Data Communications- Circuits, Codes and Modems. Basic concepts of signal processing and digital filters.

**UNIT-IX(a)**

Characteristics of solid state power devices –SCR, Triac, UJT, Triggering circuits, choppers, inverters, converters. AC-regulators, speed control of A.C. and D.C motors. Stepper and synchronous motors; Three phase controlled rectifier; Switch mode power supply; Uninterrupted power supply.

**UNIT-IX (b)**

Optical sources –LED, Spontaneous emission, Stimulated emission, Semiconductor Diode LASER, Photodetectors- p-n photodiode. PIN photodiode, Phototransistors, Optocouplers, Solar cells, Display devices, Optical Fibres-Light propagation in fibre, Types of fibre, Characteristic parameters, Modes, Fibre splicing, Fibre optic communication systems –coupling to and from the fibre, Modulation, Multiplexing and coding, Repeaters, Bandwidth and Rise time budgets.

**UNIT-X (a)**

Transducers- Resistance, Inductance Capacitance, Peizoelectric, Thermoelectric, Hall effect, Photoelectric, Techogenerators, Measurement of displacement, velocity, acceleration, force, torque, strain, speed and sound temperature, pressure, flow humidity, thickness, pH, position.


UNIT- X (b)