

## Syllabus for Electronics and Communication Engineering

### ELECTRONICS AND COMMUNICATION ENGINEERING (100 Marks)

#### **Unit-I: ELECTRONIC DEVICES AND CIRCUITS**

Semiconductor diodes – Varactor diode – Zener diode – Clippers and Clampers-Transistors– FETs – UJT (characteristics only) – Power supplies – Rectifiers and Filters – Half wave, Full Wave and Bridge type – Shunt capacitor, LC and CLC & CRC filters – Series and Shunt regulators, RC regulators – Transistor amplifiers – CE, CC and CB configurations – Biasing techniques – Stabilization in amplifiers, Stability factor-RC coupled amplifiers, Differential amplifier – Feedback, Power and Tuned amplifiers - LC and Crystal oscillators – Operational amplifiers – Characteristics and applications – Astable and Monostable Multi vibrators using 555 timers- Schmitt Trigger – Sweep circuits – Miller and Bootstrap circuits, VCO, PLL- Fabrication of ICs.

#### **Unit-II: CIRCUIT THEORY**

Ohms' Law, KCL & KVL-Mesh current and Node voltage analysis – Cramer's Rule – Concept of graph-nodes, junctions, loops - Constant K LPF & HPF – T type &  $\pi$  type Attenuator – Network theorems – Thevenin's, Norton's, Maximum Power transfer, Superposition and Reciprocity theorems– Star to Delta and Delta to Star transformations. Series and Parallel Resonance – Q factor – Selectivity – Bandwidth- Transient analysis-RC and RL, Linear wave shaping circuits. Transmission Lines – Characteristic Impedance – Reflection Coefficient – SWR – Transmission Line losses and Impedance matching.

#### **Unit-III: INDUSTRIAL ELECTRONICS**

Thyristor family – SCR, DIAC & TRIAC – Off Line and On Line UPS – Working & Applications of SMPS – Working of Servo stabilizer - Opto electronic devices – LDR (characteristics and applications) – Transducers – LVDT – Strain Gauge, Working of RTD - Thermocouple - Pulsed echo ultrasonic flaw detector – Industrial heating methods-Induction and dielectric heating- Types of electrical welding-Resistive welding- Applications of Transducer in servo motor - Architecture of PLCs - Ladder symbols – diagram, working- PLCs types - Features of Siemen's, Allenbradly- Applications of PLCs – Importance of SCADA.

#### **Unit-IV: COMMUNICATION SYSTEMS**

Analog modulation– Need for modulation – Types of modulation – AM, FM , PM, SSB, VSB – Modulation Index in AM & FM– Bandwidth in AM & FM – Frequency deviation in FM – Need for pre-emphasis and de-emphasis– Transmitters – Low level and High level – Receivers– Block diagram of TRF Receiver and its limitations-Super heterodyne Receiver – Need for AVC-Fading- AM and FM receivers - choice of IF - Foster-Seely discriminator –

Wave Propagation – Ground, Sky and Space wave.

Pulse modulation, Sampling, PAM,PWM,PPM– PCM, Delta modulation – RZ and NRZ line coding – Error detection and correction - Digital modulation – ASK, FSK, PSK and QAM – Generation and detection – Multiplexing – TDM , FDM- Multiple access – TDMA, FDMA, CDMA – Internet Telephony- Antennas – Radiation resistance – Beam width – Polarization – Directivity – Efficiency – Bandwidth – Gain – Front to back ratio – Folded dipole – Arrays – Broadside – End fire – Yagi Uda antenna-Turnstile antennas-loop antenna-horn antenna-helical antenna -Binomial antenna –

Rhombic antenna – Log periodic antenna – Parabolic reflectors - Cassegrain feed arrangement – Beam width, gain and applications..

Wave Guides – Rectangular – Dominant mode – Phase and Group velocity – Cut off wavelength – Microwave components – E&H plane Tee-Need for isolator and circulator, Directional coupler - Applications of Magnetron – Working principle and application of Klystron and TWT, Reflex Klystron oscillator – Radar – Range equation – Pulsed radar – Radar displays – Duplexer – CW radar and MTI radar - Satellite communication – Uplink and Downlink frequencies – Definitions of Perigee, Apogee, Azimuth and elevation angles – Types of satellites – Types of transponders – Satellite on board –Earth station system

### **Unit-V: DIGITAL ELECTRONICS**

Number systems – Logic gates – Boolean algebra – Digital IC logic families TTL , CMOS IC's – Adders and Subtractors, Multiplexers, De multiplexers-Encoders-Decoders, Comparators – Flip-flops– Registers and Counters – Memories – RAM, ROM, Applications of Flash ROM – D/A converters – Binary weighted,R-2R Ladder, A/D Converter – Counter Ramp and Successive approximation types.

### **Unit-VI: MICROCONTROLLERS, PROGRAMMING, INTERFACING & APPLICATIONS**

Block diagram of 8051 architecture – Pin diagram of 8051 – Instruction Set of 8051 – Addressing modes of 8051 – Subroutines – Use of input and output machine related statements – Time delay program – Internal memory organization – Interrupts of 8051 – Peripheral ICs – 8255 - Interfacing of push button switch - Interfacing of 7 Segment display – Interfacing of LED-LCD pins and interfacing of LCD- Interfacing of 4 X 4 matrix key board –RS 232 – Block diagram of 8251 and 8257 - Pin diagram of 8251 and 8257 - DB25 & DB9 connector.

### **Unit-VII: CONSUMER ELECTRONICS**

Television Picture elements – Scanning and synchronization – Blanking and interlacing – composite video signal, flicker, CCIR standards – Positive and Negative modulation – Color TV – Additive and subtractive mixing – Types of color TV systems – NTSC, PAL and SECAM – Block diagram of color TV transmitter – Block diagram of Color TV receiver – PAL system processing – DTH system – Features of HDTV and Smart TV.

### **Unit-VIII: DATA COMMUNICATIONS AND COMPUTER NETWORKS**

Transmission Media – Twisted pair – UTP – STP – Coaxial cable – Optical fiber – Comparison of transmission media- Shannon Capacity theorem – Network Topologies – BUS, STAR, RING – Switching – Packet and Circuit switching – OSI 7 layer model and functions – CSMA and token ring – Properties and operations – Wireless LAN – Bluetooth technology – WAN architecture – Packet transmission – ARPANET – ISP and ISDN architectures – WAN Protocols – TCP / IP features and comparison – Ports and Sockets – Domain Name System – Email – File transfer protocol – Proxy server and Web server architecture-List HTTP commands – security services-Message confidentiality-Message integrity – Message authentication – Entity authentication – Web Browser Architecture-Key management-Digital signature – Firewalls in securing networks.

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