

ANNEXURE I
ELECTRONICS AND COMMUNICATION ENGINEERING

1. ELECTRONIC DEVICES AND CIRCUITS: Semiconductor diodes – varactor diode – zener diode – Clippers and clampers-Transistors– FETs – UJT (characteristics only) – Power supplies – Rectifiers and Filters – HW, FW and Bridge type – RC , LC and CLC filters – Series and Shunt regulators – Transistor amplifiers – CE,CC and CB configurations – Biasing techniques-RC coupled – Transformer coupled amplifiers Differential amplifiers – Feedback, Power and Tuned amplifiers – Operational amplifiers – characteristics and applications – RC , LC and Crystal oscillators – Astable , Bistable and Monostable Multivibrators using Transistors and 555 timers- Schmitt Trigger – Sweep circuits – Miller and Bootstrap circuits.

2. CIRCUIT THEORY: Mesh current and Node voltage analysis – Cramer’s Rule – Network theorems – Thevenin’s, Norton’s, Maximum Power transfer, Superposition and Reciprocity theorems– Series and Parallel Resonance – Q- factor – Selectivity – Bandwidth – Linear wave shaping circuits. Transmission Lines – Characteristic Impedance –Reflection Coefficient – SWR – Transmission Line losses and Impedance matching.

3. ELECTRONIC MEASURING INSTRUMENTS:

Analog Instruments – Extension of range of Ammeter, Voltmeter and Ohmmeter – FET voltmeter – Differential voltmeter – Digital instruments – Ramp –Dual Slope integration – successive approximation – digital frequency meter-digital LCR meter- CRO – CRT – time base generator – deflection sensitivity – triggered sweep circuits – CRO applications, AF Oscillator – RF Signal generator – AF and RF Power meters – Q meter – Distortion Factor Meter – Digital IC tester

4. INDUSTRIAL AND POWER ELECTRONICS: Thyristor family – SCR ,TRIAC, Power BJT –IGBT (characteristics, working principle and applications) – Converters – Single phase HW , FW fully controlled - Choppers – modes of operation – Inverters and Cycloconverters – Series and Parallel Inverters– PWM inverters, Sinusoidal three phase inverters – Single phase center tapped cycloconverters – Speed control of AC / DC motors using converters and choppers. – SMPS – Off Line and On Line UPS – Opto electronic devices – LDR, Photo diode and transistor and Photo voltaic cell (characteristics and applications) – Transducers – LVDT – Strain Gauge, Thermistor, Thermocouple - Ultrasonics - Pulse echo flaw detector.

5. COMMUNICATION SYSTEMS: Analog – Need for modulation – Types of modulation – AM , FM , PM – Modulation Index – Bandwidth – Power requirements – Transmitters – Low level , High level and SSB types – Receivers – Super heterodyne – AM and FM receivers – characteristics – Sensitivity , Selectivity , Fidelity – IMRR and choice of IF – Wave Propagation – Ground , Sky and Space waves – Properties. Digital – Pulse modulation – PCM , Delta modulation – Data codes – Synchronous and Asynchronous transmission – error detection and correction - digital modulation – ASK ,FSK, PSK and QAM – generation and detection – Multiplexing – TDM , FDM – Multiple Access – TDMA.

6. ADVANCED COMMUNICATION SYSTEMS: Antennas– radiation resistance – beam width – polarization – directivity – efficiency – bandwidth – gain – front to back ratio – folded dipole – arrays – broadside – end fire – Yagi , Log periodic , Turnstile antennas – Parabolic reflectors – beam width, gain and applications. Wave Guides – Rectangular – Dominant mode – Phase and Group velocity – Cut off wavelength - working principle and applications of Magnetron , Klystron ,TWT – Radar – range equation – Pulsed radars – indicators – duplexers – CW radars and MTI radars – Satellite communication – UP link and DOWN link frequencies – types of satellites – satellite on board – earth station systems – satellite applications – Fiber Optic communication – types of fibers – couplers, splices, connectors, switches , optical emitters and detectors – optical repeaters – Wave length

Division multiplexing – Mobile Communication – cellular concept – AMPS , GSM , CDMA systems.

7. DIGITAL ELECTRONICS: Number systems – Logic gates – Boolean algebra – Adders and Subtractors – Flip-flops – Registers and Counters – Memories – RAM, ROM, Flash ROM, NVROM – D/A converters – binary weighted – R-2R Ladder, A /D Converter - Counter and Successive approximation types.

8. MICROCONTROLLERS AND MICROPROCESSORS: 8051 Architecture – Instruction Set – subroutines – use of input and output machine related statements – time delay programme – assembler directives - peripheral ICs – 8251, 8255, and 8257– 8086 Architecture – Instruction Set – Features of Pentium and its Derivatives.

9. AUDIO VIDEO SYSTEMS: Recording and Reproduction of Sound using Magnetic and Optical methods – Television Picture elements – scanning and synchronization – blanking and interlacing – composite video signal , flicker – camera tubes – Image Orthicon – Silicon Diode array – TV receivers – Tuner, IF , Sync separator , deflection circuits , EHT and sound circuits – Color TV – Additive and subtractive mixing – Color Picture tubes – degaussing – types of color TV systems – NTSC , PAL and SECAM – PAL system processing – DTH system.

10. DATA COMMUNICATIONS AND COMPUTER NETWORKS: Transmission Media – twisted pair – UTP –STP –Coaxial cable – Optical fibre – comparison – Shannon Capacity theorem – Network Topologies – BUS, STAR , RING – switching – Packet and Message switching – OSI architecture and functions – CSMA , CDMA and token ring – properties and operations – Wireless LAN – Blue tooth technology – WAN architecture – Packet transmission – ARPA Net – ISP and ISDN architectures – WAN Protocols – X .25 , Frame Relay , ATM ,TCP / IP features and comparison –Ports and Sockets – Domain Name System – POP and SMTP server – File transfer protocol – Proxy server and Web server architecture.

ANNEXURE II

Number of Questions to be Set Unit Wise

ELECTRONICS AND COMMUNICATION ENGINEERING

UNIT NO	TOPICS	MARKS
I	ELECTRONIC DEVICES AND CIRCUITS	15
II	CIRCUIT THEORY	08
III	ELECTRONIC MEASURING INSTRUMENTS	10
IV	INDUSTRIAL AND POWER ELECTRONICS	10
V	COMMUNICATION SYSTEMS	15
VI	ADVANCED COMMUNICATION SYSTEMS	10
VII	DIGITAL ELECTRONICS	10
VIII	MICROCONTROLLERS AND MICROPROCESSORS	10
IX	AUDIO VIDEO SYSTEMS	05
X	DATA COMMUNICATIONS AND COMPUTER NETWORKS	07
	Total	100

ANNEXURE III

MODEL QUESTIONS FOR ELECTRONICS AND COMMUNICATION ENGINEERING

1. The largest unsigned decimal number that can be represented in binary using 6 bits is
 1. 63
 2. 64
 3. 127
 4. 128

2. A 0-10mA Ammeter with 30Ω internal resistance is to be extended to measure up to 20mA . What value of Shunt resistance is to be connected?
 1. 10Ω
 2. 20Ω
 3. 30Ω
 4. 60Ω

3. The maximum value of modulation index in amplitude modulation is
 1. 10
 2. 5
 3. Infinite
 4. 1