<u>**ANNEXURE I**</u>
<u>**ELECTRONICS AND COMMUNICATION ENGINEERING**</u>

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 – Crammer'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 ELECTRONICS: Power Electronic Devices- Transducers and Ultrasonics-Industrial Heating and Welding – PLC and Programming-Control Engineering.

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-Fiber Drawing Process and Cabling-Fibre Optic Devices- WDM and Optical Networks-Wireless Communication Systems-Cellular system Design Fundamentals-Multiple Access Techniques- Digital Cellular Mobile Systems- Modern Wireless Communication System.

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: Introduction to 8085 Architecture-Timing Diagrams-Architecture of 8051-Instruction Set of 8051-Programming Concepts of 8051-Hardware Interfacing for 8051- PIC- Microcontrollers-Arm Controllers

9. CONSUMER ELECTRONICS AND ELECTRONIC PRODUCT DESIGN: Recording and Reproduction of Sound using Magnetic and Optical methods – Television Picture elements – scanning and synchronization – blanking and interlacing – composite video signal , flicker –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 – Cable, Satellite and Digital TV- Electronic Product Design and Development Stages- PCB Design-Hardware Design and Testing-Product Testing-Documentation.

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.

11.EMBEDDED SYSTEMS AND DIGITAL CIRCUIT DESIGN THROUGH VERILOG HDL: Introduction to Embedded Systems-Basics of VLSI-VLSI Design using Verilog HDL-Verilog HDL Modelling-Modelling of Combinational and Sequential Logic Circuits-System Design Concepts-Functional Verification of Verilog Modules.

12.PROGRAMMING IN C AND COMPUTER HARDWARE: C Programming Basics-Decisions and Loop Control Statements-Arrays and Strings-Functions and Pointers-Structures,Unions and Preprocessor Derivatives-Mother Board-Computer Peripherals-Computer Accessories-Windows OS-PC assembly and Software Installation.

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**	06
IV	**INDUSTRIAL ELECTRONICS**	05
V	**COMMUNICATION SYSTEMS**	10
VI	**ADVANCED COMMUNICATION SYSTEMS**	15
VII	**DIGITAL ELECTRONICS**	10
VIII	**MICROCONTROLLERS AND MICROPROCESSORS**	10
IX	**CONSUMER ELECTRONICS AND ELECTRONIC PRODUCT DESIGN**	05
X	**DATA COMMUNICATIONS AND**	07

	COMPUTER NETWORKS	
XI	EMBEDDED SYSTEMS AND DIGITAL CIRCUIT DESIGN THROUGH VERILOG HDL	05
XII	PROGRAMMING IN C AND COMPUTER HARDWARE	04
	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. 10 Ω
   2. 20 Ω
   3. 30 Ω
   4. 60Ω
3. The maximum value of modulation index in amplitude modulation is
   1. 10
   2. 5
   3. Infinite
   4. 1