Data Communication lab

S.no.	Name of item	Specification	Qty	
01.	To study Different types of Transmission media, & serial & Parallel interface	Data Communication Trainer : Pin to pin study of serial and parallel port Different methods of serial & Parallel communication Wireless communication (IR/RF) Full duplex fiber optics communication FSK modem communication PC-PC Serial Communication using RS-232 cable Software & hardware based data flow controls Study of Protocols of parallel port & Serial Port High speed data transmission Visual indication by LED's for displaying data, status & control pins of port Printer interface ;Windows based operating software Switch faults in both hardware & software Serial Communication : Two RS 232 ports Parallel Communication : Two 25 pin LPT ports Transmitter : Two numbers. Fiber optic LED's having Peak wave length of emission 660nm Receiver : Two numbers. Fiber Optic photo detector Core type : Step indexed multimode PMMA plastic cable Baud rate : 115200 bps ; Fiber length : 0.5 & 1m Infrared Transmitter : IR LED Infrared Receiver : Direct TTL output Baud rate : 2400 bps Carrier Frequency **:** 38 KHz/40KHz Modem Communication : Modem type : Data ; Interface type : Serial-RJ 11 Connector RJ 11 Connector : Two ; Modulation : FSK Modulation Mark Frequency : 340 KHz ; Space Frequency : 280 KHz Demodulation : PLL Detector Mark Frequency : 340 KHz ; Space Frequency : 280 KHz Baud Rate : 57600 bps ; Test Points : 74 nos Accessories to be supplied : RS 232 Serial cable-2nos. ; DB25 Parallel Port cable-2nos. RJ11 - RJ11 Connector cable-1no. ;Plastic Fiber cable-2nos. Power Supply-1no. ;Patch cords16" (2mm)-18nos. Patch cords8" (2mm)-10nos.;Mains cord-1no. Should be supplied with : 70 MHz /IGs/s RTS/50 GS/s ETS 2 Channel Digital Storage oscilloscope ;Memory: 2 Mpts Display : 7 inches wide Colour TFT LCD Interface: USB Host & USB Device& RS 232 interface. 32 automatic measurements ,FFT & Math & Pass Fail function;20 setups & 20 waveforms storage Triggering Modes : Alternate / Edge /Pulse / Slope / Video. Split screen for FFT, Alternate & Delayed time base. 3 3.4 Digit DMM with embedded holster, Micro Ampere AC & DC current range ;Capacitance : 40nF to 100μF Frequency 10 HZ to 10 MHz ;Duty Cycle : 01. to 99 %. Display : LCD 63X31mm Backlit Accessories :Test leads, Test clips & manuals. Other Functions : Diode test, continuity ,relative measurement Data hold, sleep mode, low battery Indication	01	

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02	To study To Study !6 Quadrature Amplitude Modulation/Demodulation	**<u>16 QAM Trainer .</u>** Modulation: 16-QAM Modulation with I & Q Channel Constellation (Vector / XY) View User Selectable Hardware / Real-Time Software Mode With Real-time Software, User should be able to control as well as analyze Digital signals, Analog signals, Mixed signals and XY mode Provision for User selectable step variable clock frequency Provision for User Selectable 8 / 16 / 32 / 64 bit Data Digitally Synthesized Sine & Cosine Wave of Maximum 19.2KHz. External Trigger Out ; More than 25 Test Points On board Digitally Synthesized Sine and Cosine wave Generator with Variable Step Frequencies On board Clock Generator with Step Variable Frequencies (150Hz, 300Hz, 600Hz, 1.2 KHz, 2.4 KHz, 4.8 KHz and 9.6 KHz and 19.2 KHz). On board Data generator with Step Variable data length (8, 16, 32, 64bits) Encoding Technique (4 bits encoding with Symbol Mapper, Gray to Binary Encoder) Modulation Technique (16QAM Modulation with I & Q Channel) Numerical Control Oscillator (on board NCO for demodulator) Decoding Techniques (4 bits decoding with Symbol Demapper, Binary to Gray Decoder) Power Supply : 110-220 V ±10%, 50 Hz Parallel Port Mode: Standard Port Type Accessories: Software CD ;Parallel Port Cable with two 25 pin male to male connectors Cabinet Housing : Enclosed on a plastic box with a cover No components on the top of the Trainer only block diagram to be provided Should be supplied with : 70 MHz /IGs/s RTS/50 GS/s ETS 2 Channel Digital Storage oscilloscope ;Memory: 2 Mpts Display : 7 inches wide Colour TFT LCD Interface: USB Host & USB Device& RS 232 interface. 32 automatic measurements ,FFT & Math & Pass Fail function;20 setups & 20 waveforms storage Triggering Modes : Alternate / Edge /Pulse / Slope / Video. Split screen for FFT, Alternate & Delayed time base. 3 3.4 Digit DMM with embedded holster, Micro Ampere AC & DC current range ;Capacitance : 40nF to 100µF Frequency 10 HZ to 10 MHz ;Duty Cycle : 01. to 99 %. Display : LCD 63X31mm Backlit Accessories :Test leads, Test clips & manuals. Other Functions : Diode test, continuity ,relative measurement Data hold, sleep mode, low battery Indication	01	

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03	**Wireless LAN Trainer**	PC to PC communication with IEEE 802.3 Peer to Peer network ,Client - Server network Design of Star topology using 100Base-Tx Design of Bus topology using 10Base-2 Design of Ring topology using DB9 Simulation of Distance Vectors and Link State Algorithms Socket Programming exercise for LINUX; Encryption/Decryption Technique ;Facility to send any file over LAN. Detailed introduction to TCP/IP Model (4 Layer Model) Video Tutorials for software operation Network design using RJ45 & DB9 connectors Socket programming and processing Wireless LAN with 803.11b/g Various LAN Protocols ; Data rate up to 100Mbps Variable packet size & Variable packet delay Error generation (Manual and Auto) Color coded real time graphical representation of entire transmission & reception Graphical Analysis of LAN performance with various parameters and protocols Save / Print option for graphs ,User friendly software Switch faults in both hardware & software Exhaustive course material & references Hardware : PC to PC using RJ-45 Connector ,Star topology using RJ45 Connector ,Bus topology by using end terminator Ring topology using DB9 Connector Data transmission speed: 10/100 Mbps 4 wireless Nodes Software: Star, Bus & Ring selection Protocols: CSMA/CD, CSMA/CA, Stop N Wait, Go back to N, Selective repeat, Sliding Window, Token Bus, Token Ring Packet size: 128, 256, 512, 1024, 2048, 4096, 8192, 16384 Inter Packet delay: 1000 – 5000 ms Error generation: Acknowledgment lost, bad packet, auto error generation Graphical Representation: Real time Graphic representation of data on s/w screen with packet details Network details: Indication of computer name, IP address, MAC address, Port number, status of network. Network & protocol analysis: Indication of packet serial number, file name, file size, file number, receiver name, receiver IP address , total packets, packet length, time out, protocol, topology, receiver, MAC address, port number, file send start time, file sent completion time, transmission time data rate(Mbps),percentage error. Trainer should have no components on the top of the board & should be encased in a plastic moulded case with cover on the top. Should be supplied with : 70 MHz /IGs/s RTS/50 GS/s ETS 2 Channel Digital Storage oscilloscope ;Memory: 2 Mpts Display : 7 inches wide Colour TFT LCD Interface: USB Host & USB Device& RS 232 interface. 32 automatic measurements ,FFT & Math & Pass Fail function;20 setups & 20 waveforms storage Triggering Modes : Alternate / Edge /Pulse / Slope / Video. Split screen for FFT, Alternate & Delayed time base. 3 3.4 Digit DMM with embedded holster, Micro Ampere AC & DC current range ;Capacitance : 40nF to 100µF Frequency 10 HZ to 10 MHz ;Duty Cycle : 01. to 99 %. Display : LCD 63X31mm Backlit ;Accessories :Test leads, Test clips & manuals. Other Functions : Diode test, continuity ,relative measurement Data hold, sleep mode, low battery Indication	01	

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04	QPSK Modulation & demodulation Trainer	**Data Formatting and Carrier Mod/Transmitter Trainer** On-board Unipolar to Bipolar conversion.& data inverter. On-board 8-bit Data Source & Clock Source Data formats : NRZ (L), NRZ (M), RZ, AMI, RB, Biphase(Manchester), Biphase (Mark). Carrier modulation : ASK, FSK, PSK, DPSK, QPSK On-board carrier : Sine waves synchronized to transmitted data at 1.6 MHz, 960 KHz, (0 deg. phase) 960 KHz, (90 deg. phase) Test Points : 43 or more ; Interconnection: 2 mm ; Sufficient Nos of stackable patch cords . Mains Supply : : 110-220 V AC ±10%, 50Hz Accessories : e Manual, Set of patch cord, Power supply. **Data Reformatting and Carrier Demodulation Receiver Trainer** On - Board Biphase Clock recovery , data squaring & Differential decoder circuit.On - Board 4th Order Butterworth filters & 8 bit Data Receiver Input : From Data Formatting and Carrier Modulation/Transmitter Trainer Data formats: 7 different data reconditioning formats NRZ (M), NRZ(L) ,RZ, AMI, RB, Biphase (Manchester), Biphase (Mark). Carrier Demodulation : ASK - Rectifier Diode ,FSK PLL Detector PSK /DPSK- Square Loop Detector QPSK -Fourth Power Loop Detector Biphase Clock Recovery : By PLL Test points: 35Nos ; Interconnection: 2 mm sockets & Sufficient Nos of stackable patch cords Mains Supply : : 110-220 V AC ±10%, 50Hz Accessories : e Manual, Set of patch cord, Power cord. Cabinet Housing : Enclosed on a plastic box with a cover No components on the top of the Trainer only block diagram to be provided Software : Should be supplied with teaching & simulation software for digital communication. Theory Part on digital communication should also be covered in software. Software should be a licensed version & should be supplied with hardware lock. Should be supplied with : 70 MHz /IGs/s RTS/50 GS/s ETS 2 Channel Digital Storage oscilloscope ;Memory: 2 Mpts Display : 7 inches wide Colour TFT LCD Interface: USB Host & USB Device& RS 232 interface. 32 automatic measurements ,FFT & Math & Pass Fail function;20 setups & 20 waveforms storage Triggering Modes : Alternate / Edge /Pulse / Slope / Video. Split screen for FFT, Alternate & Delayed time base. 3 3.4 Digit DMM with embedded holster, Micro Ampere AC & DC current range ;Capacitance : 40nF to 100μF Frequency 10 HZ to 10 MHz ;Duty Cycle : 01. to 99 %. Display : LCD 63X31mm Backlit ;Accessories :Test leads, Test clips & manuals. Other Functions : Diode test, continuity ,relative measurement Data hold, sleep mode, low battery Indication	01	