

**KARAIKAL POLYTECHNIC COLLEGE
(PIPMATE - A GOVERNMENT OF PONDICHERRY UNDER TAKING)
VARICHIKUDY, KARAIKAL – 609 609.**

**TENDER SCHEDULE–VI: Supply of Equipment/ Machineries for
Department of Electronics and Communication Engineering under Up-
gradation of Polytechnics Scheme of MHRD.**

TERMS AND CONDITIONS

Bidders intending to offer rates for **Supply of Equipments/ Machineries** to Karaikal Polytechnic College, Karaikal should observe the Terms and Conditions given below:

1. Each Bidder must go through the Terms and Conditions containing the Description and Specification of the items/ equipment/ machineries, carefully and understand them before submitting their tender on-line. No excuse that the conditions have not been read or understood will be entertained later.
2. The Bidders shall be either the Manufacturer of the quoted equipment or an Authorized dealer / Supplier.
3. The Bidders shall submit their Tenders for the items/ equipment/ machineries as per the specifications required, supported with necessary technical details/ pamphlets/ catalogues. The technical details/ pamphlets/ catalogues shall be submitted along with other documents required for Technical Bid.
4. The Bidders shall submit the Tenders on-line before the last date for submission. Bidders are requested to stick to the date and time limit specified in the e-Tender notice. Tenders will be accepted only if submitted in the prescribed manner.
5. Each tender must be accompanied by an Earnest Money Deposit (E.M.D.) of **₹11,000/- (Rupees Eleven thousand only)** as mentioned in the e-Tender notice. Otherwise, the tender will be rejected without notice. The E.M.D. should be in the form of Demand Draft drawn on any of the Nationalized Banks, in favour of “The Principal, Karaikal Polytechnic College, Karaikal”, payable at Karaikal. Bank guarantee or payment in any other form will not be accepted.
6. The tenders submitted without the requisite E.M.D. will be summarily rejected and no request for exemption will be entertained except from the firms registered as Industrial Co-operative Society / Small Scale Industries with Government of Puducherry / N.S.I.C./

D.G.S. & D. as applicable. In such cases, Photostat copy of the valid certificate for exemption of E.M.D. should be furnished along with the tender.

7. The E.M.D. amount will be returned to the unsuccessful bidders, but retained in the case of successful bidders and refunded after execution of the supply order.
8. The bidder withdrawing the tender once submitted / not executing the supply orders will lose the entire E.M.D. amount paid.
9. The rates should be quoted in whole Rupee and paise only. The rates for each item should be independent of other items/ equipment/ machineries.
10. The rates should be inclusive of all taxes and duties and for free delivery, inclusive of all incidental charges such as loading, unloading, packing, forwarding, installation, insurance and stocking charges etc.
11. If artificially low rates are tendered, this institution will not consider any subsequent claim for compensation. The Bidders are advised to satisfy themselves that the rates quoted by them are for the items/ equipment/ machineries, for which the tenders have been invited and shall quote only for the readily available items/ equipment/ machineries for supply.
12. No representation toward upward revision of rates will be allowed. Ex-Godown rates offered by the firm are not acceptable and such tenders will be summarily rejected. The rates should be quoted FOR destination basis, the destination being the Karaikal Polytechnic College, Karaikal.
13. The rates quoted should be in Indian currency only for the units specified against the items/ equipment/ machineries and payment will be made in Indian currency only.
14. Government of India, DGS&D and Government of Puducherry rate contracts have to be compared with lowest price offered by the supplier through tender.
15. Installation and demonstration should be done by the successful bidder at Institution premises at free of cost. Technical Reference and User Manuals are to be supplied for the items/ equipment/ machineries, on free of cost.
16. The materials/stores shall be guaranteed for satisfactory performance/working for a period of at least 12 months from the date of supply/commissioning. Any defects noticed during this period shall be rectified at free of cost to the satisfaction of the Institution. If the damage is more and the equipment/ machinery is not functioning properly at the time of installation, then the entire equipment/ machinery must be replaced with a new one.

17. The requirements found in this Tender Schedule are only approximate. The bidder should undertake to supply those requirements in excess or lesser to those specified in the schedule, as per the actual requirement of the Institution.
18. The order will be placed with the successful bidders for the supply of items/ equipment/ machineries. The supply should be made at the supplier's own risk. Damages and breakages, if found in transit, the items/ equipment/ machineries, thereof should be replaced.
19. Acceptance of the tender will rest with the Principal, Karaikal Polytechnic College, Karaikal, who does not bind himself to accept the lowest tender and reserves to himself the authority to reject any or all of the tenders received without assigning any reasons. The Principal has the power to accept the items/ equipment/ machineries of higher cost, if they are of reputed make and are as per the specifications. The decision of the Principal, Karaikal Polytechnic College, Karaikal in all matters relating to this Tender Schedule shall be final and conclusive. In case of any dispute, Puducherry shall be the place of jurisdiction.
20. The tender shall be submitted only if the bidder is agreeable to all the Terms and Conditions of this Tender Schedule, which includes the Description and Specifications of the items/ equipment/ machineries mentioned therein. Irrespective of the Terms and Conditions that may have been specified by the bidder, only the Terms and Conditions specified in this Tender Document will be binding on the Bidder and the Tendering Authority.
21. The Technical Bid Cover, is to be submitted to "The Principal, Karaikal Polytechnic College, Karaikal", with the following documents:
- Annexure-I**, as per the format enclosed.
 - Demand Drafts towards Tender fee of **₹525/-** and E.M.D. amount of **₹11,000/-** drawn in favour of the Principal, Karaikal Polytechnic College, Karaikal.
 - Declaration as given in the next para 22.
 - Technical details of item/ equipments/ machineries with Make/ Model No., supported by pamphlets and catalogues etc.

The Bidder shall also upload the scanned copies of the above documents.

22. The bidders shall furnish a declaration as given below in token of acceptance of all the Terms and Conditions of this tender. Otherwise, the tender will be rejected.

*“I/We[Name of the firm / proprietor], the undersigned hereby solemnly declare that the Terms and Conditions of **Tender Schedule-VI: Supply of Equipment/ Machineries for Department of Electronics and Communication Engineering under Up-gradation of Polytechnics Scheme of MHRD** are accepted and that in the event of selection of my / our rates, the Equipment/ Machineries will be supplied within the stipulated period.”*

**SIGNATURE OF THE BIDDER
(AUTHORIZED SIGNATORY)**

23. The Financial Bid shall contain the Tender offer form (BOQ). This bid shall contain only the price list. Any discrepancy in this regard will cause the rejection of the price list.
24. No column in the BOQ shall be left blank. If rate for any item is not offered, then “NOT QUOTED” may be mentioned in the appropriate column. BOQ of the qualified bidders in Financial Bid will be opened on the prescribed date. The qualified bidders in Technical bid will be informed through e-mail.
25. The rates quoted should be only as per the unit printed in the schedule and should be valid for a period of one year from the date of opening of the tender.
26. The bid validity period is 180 days and the successful bidder will have to supply the materials within a period of 3 months from the date of the supply order.
27. In case any items/ equipment/ machineries present in the list are found to be covered under DGS&D rate contract or in the quoting of the Government of India/ Government of India Undertaking firms, such items/ equipment/ machineries will not be considered through this tender.
28. Copies of any document produced with tender including Xerox copies, should be clear and legible, otherwise it will not be considered. If the required certificates are in the language other than English, attested copy of English version should be furnished for verification and record.
29. Entry to participate in the Tender Opening Committee Meeting is restricted only to bonafide bidders or one of their authorized representatives. The bidders or their Authorized Representative who are present shall produce the authorization letter and sign in the Attendance register evidencing their presence during the opening of the tenders.
30. The bidder or their Authorized Representative who are present shall not bring mobile phones to the venue of tender opening.

31. In the event that the date of opening of tender, being declared as a holiday for the office of the tendering authority, the due date for submission of tender and opening of tender will be the following working day at the same time.
32. The bidder shall bear all costs associated with the preparation and submission of his tender and this institution will in no case be responsible or liable for these costs, regardless of the conduct outcome of the tendering process.
33. Specification and requirements of items/ equipment/ machineries is available in **Annexure-II**. The quantity of stores indicated in the schedule is only tentative and approximate. This institution has the right to increase or decrease the quantity required of any item/ equipment/ machineries.
34. The Principal, Karaikal Polytechnic College, Karaikal is vested with powers to cancel or revoke the Supply order without assigning any reason therefor, if the Supplier fails to effect the supply in conformity with the contracted terms and conditions.
35. The items/ equipment/ machineries should be delivered to Karaikal Polytechnic College, Karaikal on receipt of supply order or as per the delivery schedule in the supply order. The Bidder/ Supplier shall take back rejected items/ equipment/ machineries within 7 days from the date of communication. If the Bidder/ Supplier fails to remove the rejected stores within the specified period, the same will be disposed off by the Principal, Karaikal Polytechnic College, Karaikal.
36. The bidder shall submit the bill of cost in triplicate along with an advanced stamped receipt immediately after execution of the supply order for arranging payment. The payment will be made on receipt of said items/ equipment/ machineries at site, in good condition subject to fulfillment of all other terms and conditions.
37. The Institution will issue form 'D' applicable to Government Departments as per the Central Sales Tax (Registration and Turnover) Rules, 1957 .
38. Payment shall be made only after executing the supply order to the entire satisfaction of the Institution. No advance payment will be made under any circumstances.
39. The Bidder shall mention the Address for Communication with Landline/ Mobile Phone number and E-mail I.D. for informing the status of Technical bid.

D. SANDANASAMY
PRINCIPAL

ANNEXURE-I
TECHNICAL BID

From

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Landline Phone:

Mobile Phone No.:

E-mail I.D.....

To

The Principal,
Karaikal Polytechnic College,
Varichikudy,
Karaikal – 609 609.

Sir,

Sub: Technical Bid for the "**Tender Schedule-VI: Supply of Equipment/ Machineries for Department of Electronics and Communication Engineering under Up-gradation of Polytechnics Scheme of MHRD**" – Submitted – Reg.

I/ We submit herewith the Technical Bid through on-line for the "**Tender Schedule-VI: Supply of Equipment/ Machineries for Department of Electronics and Communication Engineering under Up-gradation of Polytechnics Scheme of MHRD**" of Karaikal Polytechnic College, Karaikal, with the following documents for consideration.

1. Scanned copy of the D.D towards tender fee for ₹525/-.
2. Scanned copy of the D.D. towards E.M.D. amount for ₹11,000/-.
3. Declaration of the Bidder.
4. Scanned copies of Brochures/ Technical pamphlets of items to be supplied with make and model details.

Yours faithfully.

(AUTHORIZED SIGNATORY)

Encl. as above.

[N.B. The Bidder should submit the copy of the Technical Bid as per Annexure-I and Original Demand Drafts for Tender fee and E.M.D. etc to the Principal, Karaikal Polytechnic College, Karaikal, before the due date.]

ANNEXURE-II

Tender Schedule-VI: Supply of Equipment/ Machineries for Department of Electronics and Communication Engineering under Up-gradation of Polytechnics Scheme of MHRD TO KARAIKAL POLYTECHNIC COLLEGE, KARAIKAL.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
1	<p>CATHODE RAY OSCILLOSCOPE (30 MHz DUAL CHANNEL): Specifications: 140mm rectangular screen with internal graticule and 8 X 10 cm phosphor display; Z modulation; calibration signal; front panel trace adjustment; operating on 230V ac; Vertical Deflection coefficient (CH1 and CH2) of 1mV/div to 20V/div & 5mV/div to 20V/div in 12 calibrated steps of 1-2-5 sequence; X5 magnification to increase the sensitivity to 1mV/div and 2mV/div; Accuracy of $\pm 3\%$; Bandwidth: dc to 30MHz, dc coupled; 10Hz - 30MHz, ac coupled; 20MHz in X5 MAG; CH1, CH2, CH1 and CH2 Alternate or Chop mode, Algebraic addition CH1+CH2, Algebraic subtraction CH1-CH2, CH2 invert X -Y display modes; Input impedance of $1M\Omega$ in parallel with 25pF; Maximum input voltage of 400V (dc + peak ac) of ; CH1 or CH2 internal trigger signal; Time base sweep speed variation from 0.5μS/div to 0.2s/div in 1, 2 and 5 sequence; X5 magnification to extend the sweep speed to 100 ns/div with LED indication and accuracy of $\pm 3\%$; Un-calibrated sweep speed variable control between steps extends the sweep speed to 40ns/div; with hold off time of 4:1 variable control; Automatic or normal with level control triggering mode with either CH1/ CH2/ MAINS/ EXT as source on positive or negative slopes; ac/ dc coupling; Internal trigger sensitivity: Auto mode 1div at 30Hz-30MHz, NORM mode 1div 3Hz-30MHz; Horizontal Deflection coefficient same as CH2 with bandwidth DC - 1MHz and input impedance of $1M\Omega$ in parallel with 25pF(approx.); With dual component tester to compare the VI characteristics of a devices under test; Should be supplied with instruction manual, 2 nos. of input BNC leads and component test lead.</p>	10	Nos.
2	<p>REGULATED DUAL POWER SUPPLY (0-32V, 0-2A): Should be Compact, rugged and thermally protected with the following features: Output voltages: 0-32V @ 0-2A with two 3digit DPM meters to read V/A of each output with a selector switch. Regulation at Constant voltage mode: Line regulation $\leq 0.01\% \pm 3mV$ for $\pm 10\%$ change in line; Load regulation $\leq 0.01\% \pm 3mV$ for load change from zero to full load; ripple and noise $\leq 1mV_{rms}$ max; with indication for constant voltage mode of operation. Regulation at Constant current mode: Line regulation $\leq 0.1\% \pm 1mA$ for $\pm 10\%$ line change; Load regulation $\leq 0.1\% \pm 1mA$ for load change in output voltage from 0V to max. output voltage with ripple $\leq 2mA$ rms max; with indication for constant current mode of operation. Automatic overload and short circuit protection; Operating on 230Vac, single phase.</p>	10	Nos.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
3	<p>MULTIPLE OUTPUT DC POWER SUPPLY [0-32V,0-2A, 0-32V,0-2A, 2.8-5.5V,2A]:</p> <p>Specifications: Should be Compact, rugged and thermally protected with the following features:</p> <p>Triple output voltages (a) 0-32V @ 0-2A, (b) 0-32V @ 0-2A (c) 2.8-5.5V @2A with two 3digit DPM meters to read V/A of each output with a selector switch.</p> <p>Regulation at Constant voltage mode: Line regulation $\leq 0.01\% \pm 3mV$ for 10% change in line; Load regulation $\leq 0.01\% \pm 3mV$ for load change from zero to full load; ripple and noise $\leq 1mVrms$ max; with indication for constant voltage mode of operation.</p> <p>Regulation at Constant current mode: Line regulation $\leq 0.1\% \pm 1mA$ for $\pm 10\%$ line change; Load regulation $\leq 0.1\% \pm 1mA$ for load change in output voltage from 0V to max. output voltage with ripple $\leq 2mA$ rms max; with indication for constant current mode of operation; Automatic overload and short circuit protection; Operating on 230Vac, single phase.</p>	10	Nos.
4	<p>FUNCTION GENERATOR:</p> <p>Specifications: Low distortion; Wide frequency range through coarse and fine controls; Sine, triangle, square, ramp, pulse, TTL (sync) and DC outputs; Output attenuation up to 80 dB with variable DC offset control and 4 digit digital display with indication for Hz, KHz, MHz / Amplitude display; 0.01Hz to 1MHz frequency range in 8 decades with output impedance of 50Ω; Sine wave distortion less than 1%; square wave rise/ fall time less than 75ns and variable duty cycle of 10% to 90%; 10Vpp maximum output voltage into 50Ω and 20Vpp maximum output voltage under open circuit; Amplitude indication using 3-digit seven segment display $V_{pp} \pm 5\%$ and amplitude flatness of $\pm 0.5dB$ up to 100KHz range and ± 1 dB for 1MHz range;</p> <p>Two step attenuators of 20dB and 40dB and fine attenuation of 20dB through vernier control for a total attenuation of 80dB; Operating on 230V ac; Should be supplied with instruction manual, BNC to alligator clip and required accessories.</p>	10	Nos.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
5	<p>LCR Q METER (DIGITAL): Specifications: Should be microprocessor based and fully automatic to measure L, R, C and Q; Auto-ranging facility; Series or parallel equivalent measurement modes; User selectable measurement frequency of 100Hz or 1 KHz with accuracy of $\pm 0.25\%$; Maximum voltage across component 0.285Vrms; Measurement update rate of 2 per second; Maximum time for valid reading after connecting components to be 1 second; Should have 4 digit, 7 segment LEDs display; 4 terminal integral test jig; Inductance measurement range 0.1μH to 9999H with resolution 0.10.1μH; Capacitance measurement range 0.1pF to 9999pF with resolution of 0.1pF; Resistance measurement range 0.001 ohm to 100Mohm with resolution of 0.001 ohm; Quality factor measurement range 0.1 to 99 with resolution of 0.01; Input protection against connection of capacitors of up to 10mF charged to not more than 50V; Operating on 230V ac; Should be provided with instruction manual, remote probe and other required accessories.</p>	5	Nos.
6	<p>PROGRAMMABLE LOGIC CONTROLLER (PLC) KIT WITH LIFT CONTROL MODULE AND CONVEYOR CONTROL MODULE: <u>The trainer should be suitable for studying the programming concepts of a PLC. The trainer kit should be suitable for obtaining the ladder diagram for any application and download it to PLC for checking the result; The PLC trainer kit should be compatible for interfacing with Lift control module (Spec. as detailed below) and Conveyor Control Module (Spec. as detailed below). The unit shall consist of (A) PLC Trainer Kit - 1 No.; (B) Lift Control Module - 1 No.; and (C) Conveyor Control Module - 1 No.</u> Specifications (PLC trainer kit): Allen Bradley Make PLC; Built in power supply +24V DC; 6 digital inputs for input interface and 4 relay outputs for output interface; Contacts AC/ DC 230V; Short circuit protection to protect the PLC; Demonstration panel with 6 SPDT switches for simulating digital inputs, 4 LEDs with fuse protection to simulate digital outputs, one PWM connector, one 24V DC source for internal patching, One HSC counter, Connectors for external interface application and all components mounted on panel with a mimic diagram; PLC programming software should be windows based; Should be complete in all respects and supplied with instruction manual, sufficient number of patch chords and required accessories. Specifications (Lift Control Module): Should have three floors with lead screw mechanism to move the lift up/ down vertically; Stepper motor to rotate the gear mechanism with MOSFET based driver; Provision for simulating the user request by using 3 switches; Status of the lift indication through LED's; With built in switched mode power supply; Should be supplied with instruction manual and required accessories. Specifications (Conveyor Control Module): One stepper motor (2Kg) for conveyor control; proximity sensor switch to detect the presence of material; Belt for conveyor movement; 3 digital inputs, 4 digital outputs are available with trainer; Should be supplied with instruction manual and required accessories.</p>	2	Sets

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
7	<p>PROGRAMMABLE LOGIC CONTROLLER (PLC) KIT: Same as above: The trainer should be suitable for studying the programming concepts of a PLC. The trainer kit should be suitable for obtaining the ladder diagram for any application and download it to PLC for checking the result; <u>The PLC trainer kit should be compatible for interfacing with Lift control module and Conveyor Control Module supplied with the item at serial no. 6 of this tender schedule.</u></p> <p>Specifications (PLC trainer kit): Allen Bradley Make PLC; Built in power supply +24V DC; 6 digital inputs for input interface and 4 relay outputs for output interface; Contacts AC/ DC 230V; Short circuit protection to protect the PLC; Demonstration panel with 6 SPDT switches for simulating digital inputs, 4 LEDs with fuse protection to simulate digital outputs, one PWM connector, one 24V DC source for internal patching, One HSC counter, Connectors for external interface application and all components mounted on panel with a mimic diagram; PLC programming software should be windows based; Should be complete in all respects and supplied with instruction manual, sufficient number of patch chords and required accessories.</p>	3	Nos.
8	<p>SIGNAL GENERATOR WITH AM AND FM FACILITY:</p> <p>Specifications: Should be suitable for testing communication equipments with frequency range of 100KHz to 260MHz in 8 ranges with indication using 4 digit LED display; sine wave output with output voltage of 100mV max into 75 ohms with output control; Selectable modulation frequencies of 1KHz and 400Hz generated internally; upto 80% adjustable AM modulation and 0-100KHz adjustable FM deviation at 260MHz;</p> <p>External modulation frequency range of 50Hz to 20KHz with 0-80% AM modulation and 0-100KHz FM modulation; Should be supplied with standard accessories and instruction manual.</p>	5	Nos.
9	<p>PSK MODULATION AND DEMODULATION TRAINER:</p> <p>Should be suitable for study of PSK modulation and demodulation; should operate on 230V ac mains; should be supplied with instruction manual and suitable number of connectors to plug into the test points with the following specifications.</p> <p>On board Programmable Data Generator of 8-bit data length with 50KHz clock frequency; On board carrier generator of 200KHz frequency and 2Vpp amplitude with level conversion from unipolar to bipolar; Schematic Diagram on the front panel; Balanced Modulator; Balanced Demodulator; on board regulated dc power supply of $\pm 12V$ and +5V.</p>	3	Nos.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
10	<p>FSK MODULATION AND DEMODULATION TRAINER: Should be suitable for study of FSK modulation and demodulation; should operate on 230V ac mains; should be supplied with instruction manual and suitable number of connectors to plug into the test points, with the following specifications. Inbuilt power supply; square wave generator of frequency 22Hz and 5V amplitude and de-bounce logic; Carrier generator of 1070Hz and 1270Hz of amplitude 5Vpp for FSK modulation; PLL based FM demodulator; LED indication for Data transmission; 9 pin serial port provision for serial data transmission.</p>	3	Nos.
11	<p>ASK MODULATION AND DEMODULATION TRAINER KIT: Should be suitable for study of ASK modulation and demodulation; should operate on 230V ac mains; should be supplied with instruction manual and suitable number of connectors to plug into the test points, with the following specifications. On board carrier oscillator with frequency of 17KHz and amplitude of 3Vpp; Data generator with auto/ manual options with max. data frequency of 2000 Hz, min. data frequency of 830Hz and amplitude of 3V; Variable frequency option for auto mode; user input provision using 2-way on-off switch with LED indication; Demodulated output LED indication; on-board dc regulated voltage of $\pm 12V$ and +5V.</p>	3	Nos.
12	<p>PULSE WIDTH MODULATION AND DEMODULATION TRAINER KIT: Should be suitable for study of pulse width modulation and demodulation; should be supplied with instruction manual and suitable number of connectors to plug into the test points, with the following specifications. On board sine wave source of frequency 1KHz and adjustable amplitude of 0 to 5V; On board triangular wave generator of frequency 21KHz and adjustable amplitude 6-12V; Op-amp based pulse width modulator; gain adjustable on board amplifier; 4th order butter worth filter with a cut off frequency of 3 KHz; on-board regulated power supply of +5V and $\pm 12V$.</p>	3	Nos.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
13	<p>ANALOG TRANSMITTER AND RECEIVER TRAINER KIT: Should be suitable for study of analog transmission using frequency modulation and demodulation; should be supplied with instruction manual and suitable number of connectors to plug into test points with the following specifications.</p> <p>Transmitter: On-board sine wave generator with frequency variable from 250Hz to 5KHz and adjustable amplitude from 0 to 3V; Transistor based Microphone pre-amplifier for voice communication with a gain of 10; Transistor based audio amplifier; VCO based Frequency modulator with frequency range of 80MHz to 130MHz with variable RF level from -47dBm to +3dBm; VCO tuning voltage from 0 to 5V Receiver: On board whip antenna; FM receiver frequency range 88-108MHz with IF of 10.7MHz; CXA1619BS chip based FM receiver; On-board 7watt audio power amplifier based on TBA810 IC; Audio Volume adjustable; FM Receiver section with RF Amplifier, Mixer, IF Amplifier, FM Detector and Audio Power amplifier with required number of test points; 4", 4 ohms output speaker.</p>	3	Nos.
14	<p>FIBRE OPTIC COMMUNICATION TRAINER KIT: Specification: Should be suitable to study the concepts of fibre optic communications with Analog and Digital signal transmission, TDM, Data coding/ decoding and serial data transmission; should be suitable for study of TDM, measurement of losses in optical fibre, measurement of numerical aperture, Manchester coding and decoding etc;</p> <p>Onboard programmable odd / even marker generator for synchronization; On board programmable 8-bit data generator; 16 channel TDM system; 2.048 kbps data rate for Manchester coding; 4 nos. of Expansion Channel; Onboard Optical Analog & Digital Transmitter and Receiver; Reset switch; on panel Mimic diagram; All relevant test points provided on board; On-board voice link with two telephone sets; Transmitter optical wave length : 660 nm & 950 nm; Intensity modulation with analog bandwidth of 150 KHz and digital bandwidth of 2MHz; Self locking cap and screw type optical connectors at transmitter and receiver; PIN photodiode operating at 660 nm & 950 nm optical wavelength; provision for clock recovery; Should operate on 230 V ac mains; Should be supplied with 1000 micron plastic step index multimode PMMA fibre of lengths 1m and 3m; refractive index of the core 1.492 and cladding 1.406 with numerical aperture better than 0.5 and Acceptance angle of 60°. The trainer kit should be supplied with Numerical aperture measurement set up, patch chords, with all required accessories and instruction manual.</p>	2	Nos.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
15	<p>LED COLOUR TV SET WITH DTH RECEIVER:</p> <p>Specification: Should be suitable for studying about DTH technology and DTH installation procedure. Should be supplied with Ku-band antenna with LNB-1 No., Antenna fixing base plate, DTH Receiver box, 25 meter RF Co-axial cable, 20 ' LED TV.</p>	2	Nos.
16	<p>VLSI SYSTEM DEVELOPMENT BOARD WITH ACCESSORIES:</p> <p>Specifications: Xilinx XC3S250E – PQ208 Spartan 3E FPGA, 250K gates, 5 508 Logic cells, 216K bits of block RAM & 12 dedicated multipliers; 16 Nos. of digital input using slide switches with LED indication; 16Nos. Of digital outputs using discrete LEDs; 16 x 2 LCD is provided for display the text message; One Reset Switch; One switch is provided for giving manual clock; FPGA configuration through USB to JTAG port and On board Flash Prom XCFO2S (Programmable through USB to JTAG port); Cashew jacket for 5V power supply; Total 158 I/O pins: 124 pins used for integrating peripheral like LED, Switches etc., balance pins available to user in 20 pin header (3.3V compatible); 1No of 26pin header to interface VLIM cards like Traffic Light Controller (5V compatible); On board programmable PLL oscillator from 3 MHz to 100 MHz using jumpers; 4 Nos. of 7 segment LED display; One relay and Buzzer provided; 4 * 4 matrix key provided; On-board DC motor interface driver provided with dc motor; On-board Stepper motor interface driver provided with stepper motor; Should be housed in a sleek plastic cabinet with built in SMPS 5V/2A; Should be compatible with Xilinx ISE Foundation / Web PACK Software; On board USB to JTAG is available for configure FPGA; Should be provided with Traffic Light controller system add-on board with 32 LEDs to simulate traffic control system; Buffers for individual LEDs</p>	10	Nos.

Sl. No.	Item Description	Qty	Units
(1)	(2)	(3)	(4)
17	<p>ARM PROCESSOR LPC 2148 SYSTEM DEVELOPMENT BOARD WITH ACCESSORIES:</p> <p>Specifications: On Chip Features such as 16/32-bit ARM7TDMI-S Core at 60 MHz, 40 KB of on-chip static RAM and 512 KB of on-chip flash program memory, In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software, USB 2.0 Full Speed compliant Device Controller, 10 bit ADC , Single 10-bit D/A converter provides variable analog output, Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog, Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus (400 Kbps), SPI and SSP with buffering and variable data length capabilities and Up to 45 of 5V tolerant fast general purpose I/O pins in a tiny LQFP64 package;</p> <p>Off Chip Features: 8 Bit Digital output (LED Interface), 8 Bit Digital Input (Switch Interface), 4 x 4 Matrix Keypad Interface, Buzzer Interface, Relay Interface, 16 x 2 Character LCD, 128 x 64 Pixels Graphics LCD, Two ADC Trimmer, # I2C Devices : EEPROM and RTC; Seven segment; Onboard Stepper Motor driver, Temperature Sensor, One UART Port, PWM Signals are terminated at RMC Header, GPIO Lines are terminated at Expansion Header, 0.5Kg Stepper Motor and USB to Serial Converter.</p>	10	Nos.

FOR REFERENCE ONLY