

**UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY (UIET)
KURUKSHETRA UNIVERSITY KURUKSHETRA**

**TENDER DOCUMENTS
FOR
SUPPLY AND INSTALLATION
OF
ELECTRONICS & COMMUNICATION
ENGG. (ECE) LAB EQUIPMENT**

LAST DATE FOR SALE OF TENDER DOCUMENT : 08-11-2010, 16.00 Hrs
LAST DATE AND TIME FOR RECEIPT OF TENDER : 12-11-2010, 16.00 Hrs
DATE AND TIME OF TENDER OPENING : 16-11-2010, 10.00 Hrs

ADDRESS FOR COMMUNICATION

**Director
University Institute of Engineering & Technology (UIET)
Kurukshetra University, Kurukshetra,
Haryana-136 199 (India)**

**Ph. No: 01744-239525, 01744-233700-231,
Fax No: 01744-239155, 238967,**

**Web Site: www.uietkuk.org, www.kukinfo.com,
Email: E- mail: tripathiuiet@gmail.com**

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(Including schedule of requirement & EMD)
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Invitation of Tender

(Part-I)

(Open Tenders Only-Non-Transferable)

University Institute of Engineering & Technology (UIET)
Kurukshetra University, Kurukshetra, 136119

Due: 12 /11/2010 Due Time: 16:00 hrs

Opening Date: 16/11/2010 Opening Time: 10:00 hrs

1. The Supplies/services noted at Schedule of Requirements in Techno-Commercial Bid (Part III) are required.
2. The bidding document may be obtained from the office of **Director, University Institute of Engineering & Technology (UIET) Kurukshetra University, Kurukshetra, Haryana-136 199 (India)** either in person or by post by paying the Rs 500/- (in the form of draft in the favor of **Director, UIET, Kurukshetra** or same may also be obtained from web site www.uietkuk.org. In case of internet downloaded document, draft of Rs 500/- should be attached.
3. The Tender should be sent as follow, in two separate envelops
 - (a) **Techno-Commercial Bid:** Part II, Part III and Part IV in one envelop marked as “Techno-Commercial Bid”.
 - (b) **Price Bid:** Part V in second envelop marked as “Price Bid”.Both envelops are to be sealed and should bear the tender reference no, due date and time. The two envelopes should be placed in a good quality single envelop securely fastened, sealed and distinctly marked “**TENDER FOR SUPPLY, NOT TO BE OPENED BEFORE 16:00Hrs, 12/11/2010**” and addressed to Director, University Institute of Engineering & Technology (UIET), Kurukshetra University, Kurukshetra-136119, Haryana. Tender should be sent by Registered Post/Speed post. **No personal/Hand delivery will be accepted.**
- 4 Each tender duly completed must be sent along with Earnest Money @2% of supply value in shape of Draft in favour of **Director/UIET, Kurukshetra University payable at Kurukshetra**. EMD for the product quoted must be enclosed with the **TECHNO-COMMERCIAL BID**. Tenders without Earnest money will not be considered.

Yours Sincerely,

Director
University Institute of Engineering & Technology (UIET)
Kurukshetra University, Kurukshetra,
Haryana-136 199 (India)

Tender

(Part-II)

To
Director,
University Institute of Engineering & Technology (UIET),
Kurukshetra University, Kurukshetra, 136119.
Haryana.

I/We agree to furnish required supplies/services as detailed in the Techno-Commercial Bid (Part IV) or such portions thereof as you may specify in the Acceptance of Tender/Supply Order at the prices given in the Price Bid (Part V) in accordance with the General Terms and Conditions (Part III) governing the contract/supply order enclosed hereto duly accepted on receipt of order for the same.

I/We agree to hold this offer open until 31-03-2011 and shall be bound to supply/commission/erect the equipment and dispatch the same within the specified period.

I/We agree to supply and commission/erect the equipment and complete the whole of the work and hand over to the purchaser within the period of 8 to 12 weeks, from the date of receipt of intimation from you regarding acceptance of this tender/receipt of supply order.

Station:

Signature of Tenderer
(With Office Stamp)

Date:

Name & Address:

Station:

Signature Witness:
Name & Address:

Techno-Commercial Bid (Part-III)

a) General

(To be filled by the Vendor)

1. Tender No.
2. Name of Tender:
3. Due date & Due Time: **12/11/2010 & 16:00 hrs**
4. Opening Date & Time: **16/11/2010 & 10:00 hrs**
5. The tender shall remain valid **until 31-03-2011**.
6. All the potential bidders are required to submit earnest money deposit (EMD) @ 2% in the form of demand draft in the name of Director, UIET, Kurukshetra.
7. EMD for the product quoted must be enclosed with the **TECHNICAL BID**.
The vendors will certify in the Price bid that the EMD amount as applicable has been enclosed with the **TECHNICAL BID**. However, if EMD is not found Enclosed with the **TECHNICAL BID**, such offers will not be entertained and tender shall be treated as technically rejected bid.
8. Place & dates on which delivery is to be made: **University Institute of Engineering & Technology (UIET), Kurukshetra University.**
9. Schedule of Requirements:

Sr. No.	Description & Nature of Supplies/Services	Qty. EMD (in Rs)	Quoted/ Not quoted	Specifications (Attach Additional sheets, Drawings etc. if Necessary	Remarks

b) OTHER CONDITIONS FOR TECHNO-COMMERCIAL BIDS

TECHNICAL

1. Give brief description of item/equipment/material with accessories. Items offered should conform to specification, or as explicitly stated. Any product brief, test certificates available may be enclosed.
2. List of spares, if applicable should be attached.
3. Any optional, if offered, be provided with their full technical details including their use and advantage.
4. All the offers should include the detailed technical literature/catalogue of the product quoted.

COMMERCIAL

1. The normal payment terms are 100% within 30 days after receipt, acceptance and satisfactory installation of stores/equipment in good condition or the date of receipt of the bill whichever is later.
2. Give details of installation and commissioning except price which will be only in price bid (if applicable).

3. Warranty/guarantee required is for one year unless otherwise specified. Indicate warranty/guarantee duration offered. In case of any problem in functioning of equipment during warranty/guarantee period, the same will be sent to you for repair/ replacement. For this, you have to bear all charges including custom and handing at the port of delivery, air freight, i.e. to and fro, insurance etc
4. Delivery desired is within 8 -12 Weeks unless otherwise specified. Specify your delivery period.
5. In case of delayed supplies, liquidated damages at the rate of 0.5 percent per week for one month maximum.
6. **Delivery:** Free delivery at University Institute of Engineering & Technology (UIET), Kurukshetra University, Kurukshetra, 136119, Haryana.
7. Mode of Dispatch: By Road for indigenous stores and by Air for foreign stores, unless otherwise specified.

(Signature of Tender issuing authority)

Director, University Institute of Engineering & Technology (UIET), Kurukshetra University.

Tender Reference No. :

Fax No. :

Full Address of Tenderer:

Station:

Signature of Tenderer:

Name in Block Letters:

Date:

General Terms & Conditions

(Part-IV)

1. Preparation of Tender:

- (i) The complete tender form duly stamped and signed should be deposited with technical bid. Items not quoted shall be clearly marked/ written "NOTQUOTED" in front of the item mentioned.
- (ii) In the event of space on the tender form being insufficient for the required purpose additional pages may be added. Each such additional page must be numbered consecutively should bear the tender reference number and be fully signed by the vender. In such cases reference to the additional pages must be made in the tender form.
- (iii) If any modification of the tender form is considered necessary, you (supplier) should communicate the same by means of a separate letter sent with the tender.

2. Signing of Tender:

- (a) The tender is liable to be ignored if complete information is not given therein regarding the particulars, data, specifications asked for in the techno-commercial offer (Part III) at Schedule of requirements, Specific attention must be paid to the delivery dates, technical specification, and also the general conditions of contract at Part IV and other conditions mentioned at Part III and Part V.
- (b) Individual signing the tender or other documents connected with a contract must specify whether he signs as:
 - (i) A 'sole proprietor' of the firm or constituted attorney of such sole proprietor.
 - (ii) A partner of the firm if it be a partnership, in which case he must have authority to refer to arbitration disputes concerning the business of the partnership either by virtue of the partnership agreement or a power of attorney.
 - (iii) Constituted attorney of the firm if it is a Company.
- (c) The tenderer should sign each page of the tender form and annexures, if any.

3. The bidder must have supplied at least 2 such equipment in last two financial years to any Govt. / Pvt. Institute in India.

4. The Bidder must submit Performance Certificate from at least two purchasers regarding the quoted equipment during last two financial years.

5. The bidder must have valid Sale Tax registration No (documentary evidence needed).

6. The bidder must be either Manufacturer or Authorized representative of Manufacturer and shall also attach the documents confirming to it

7. Delivery of Tender: The tender should be sent as follow, in two separate envelopes

- (a) **Techno-Commercial Bid:** Part II, Part III and Part IV in one envelop marked as "Techno-Commercial Bid".
- (b) **Price Bid:** Part V in second envelop marked as "Price Bid". Both envelopes are to be sealed and should bear the tender reference no, due date and time. The two envelopes should be placed in a good quality single envelop securely fastened, sealed and distinctly marked "TENDER FOR SUPPLY, NOT TO BE OPENED BEFORE 16.00Hrs, 12/11/2010" and addressed to **Director, University Institute of Engineering & Technology (UIET), Kurukshetra University, Kurukshetra, 136119, Haryana.** Tender enquiry reference, due date of opening and name of the vendor must be marked boldly on the envelope. Tender should be sent by Registered Post/Speed post. No personal/Hand delivery/courier will be accepted.

8. Opening of Tenders: The firm shall be at liberty to be present or authorize a representative to be present at the opening of the tender at the time and date as specified in the schedule. The name and address of the representative who would be attending the opening of the tender on behalf of the firm should be indicated in the tender. Please also state the name and address of firm's permanent representative, if any. Generally the techno-commercial offer will be opened on the day specified for opening.

9. Right of Acceptance: This office does not pledge itself and reserves to itself the right of accepting the whole or any part of the tender or portion of the quantity offered and the firm shall supply the same at the rate quoted. The firm shall be at liberty to tender for the whole or any portion or to state in the tender that the rate quoted shall apply only if the entire quantity is taken from the firm.

10. If demonstration of any equipment is required that will be arranged by the supplier within India in some Government R&D Lab or universities at the cost of the supplier.
11. Negotiations if required will be held and the Director decision will be binding on suppliers'. Director can reject or accept any tender without assigning any reason.
12. Items supplied are subject to inspection and acceptance and the supplier should collect/replace the rejected items at his cost and risk.
13. Expenses on the packaging/forwarding including custom and handling charges at port of delivery for the repair/replacement of the defective items/parts during the warranty/guarantee period shall be born by the supplier
14. Delayed Suppliers: In case of delayed suppliers, liquidated damages at the rate of 0.5 percent per week of delay will be levied up to four weeks. If still the firm is not able to supply the items, the institute will be at liberty to make purchase from the second lowest bidder at the risk and cost of the defaulting firm, and the earnest money of the firm will be forfeited.
15. No correspondence/ discussions/visits what so ever will be entertained on the subject unless specifically called by this office after opening the tenders for technical discussions/price negotiations. Any violation of this will render the quotations invalid and the firm is liable to be blacklisted.
16. Director, University Institute of Engineering & Technology (UIET) reserves the right to call for techno-commercial/ price negotiations. The company should depute competent representative for such discussion/negotiations whenever called for and he shall be competent to take on the spot decisions.
17. **SECURITY:** Any information/material/document supplied in connection with this inquiry/likely order is classified and should not be disclosed/copied to jeopardize security of the department/university.
18. Office stamps of vendors must be affixed below their signatures.
19. All disputes are subject to the jurisdiction of Kurukshetra.

(Signature of Tender issuing authority)

**Director, University Institute of Engineering & Technology (UIET), Kurukshetra
University. Kurukshetra**

Tender Reference No.:
Full Address of Tenderer:
Fax No.:
Telephone No.:
Signature of Tenderer:
Name in Block Letters:
Office Stamp:
Station

Price Bid

(Part-V)

1. Tender reference No:
2. Name of tenderer/Vendor:
3. **Due Date & Time: 12/11/2010& 16:00 hrs**
Opening date & time: 16/11/2010& 10:00 hrs
4. The tender shall remain valid for the schedule mentioned in the tender documents.
5. Rates for items given in Techno-commercial offer at Schedule of Requirements are as follows.
Adhering to the Format given below is a Pre-requisite for considering your quotations:
Sr. No. Description A/U Qty offered U nit Price Total Cost
 - (i) Price quoted should be inclusive of all Including the Equipment/Item/Material with all accessories, Packing & Forwarding charges (if any), Excise Duty, Custom Duty (if any), Freight up to Kurukshetra University, Transit Insurance, Total delivery cost at Kurukshetra University, Installation & Commissioning cost (if any), Warranty duration and cost (if any)
 - (ii) VAT
6. Separate list should be attached where required in the same format giving details of each item and cost.
7. **Other conditions for price bids** as attached in the tender document will be binding on the supplier.

Signature of the Supplier with stamp

OTHER CONDITIONS FOR PRICE BIDS

1. No unilateral revision in price will be admissible.
2. Rates should only be quoted in the accounting unit (A/U) mentioned in this enquiry. Rates must be quoted clearly on free delivery basis at Kurukshetra University, unless otherwise specified and also to be indicated in words.
3. In case any of the subheads are included in the total cost, the same should be specified. Any exemption of duties/taxes required should be indicated.
4. Any optional indicated in techno-commercial bids must be priced separately.
5. (a) In case spares/accessories are applicable, their list and price should be clearly indicated separately.
(b) In case equipment offered required maintenance after the expiry of the warranty, please indicate approximate cost of comprehensive and on call basis maintenance and also availability of local support or otherwise.
6. **Price:**
 - (i) The prices quoted must be net per unit shown in the schedule and must include all packing and delivery charges. Refunds on account of returnable packages (if any) are to be separately specified. Prices and refunds must be clearly shown in figures and words in Indian currency.
 - (ii) The price must be stated for each item separately. The percentage of reduction, in the total price for the entire demand should also be quoted; should an order to that extent be placed with you.
7. Any other

(Signature of Tender Issuing Authority)

**Director,
University Institute of Engineering & Technology (UIET),
Kurukshetra University.**

Tender Reference No.:
Full Address of Tenderer:
Fax No.:
Telephone No.:
Signature of Tenderer:
Name in Block Letters:
Office Stamp:
Station:
Date:

**Technical Specifications
of
Equipment/Hardware/Software
& other miscellaneous items
(Part-VI)**

Equipment Specifications

REQUIREMENTS OF ELECTRONICS & COMMUNICATION ENGG. DEPARTMENT

Sr. No.	Laboratory Name	SPECIFICATIONS	QUANTITY	Brand (if any)	Total Price (in Rupees) inclusive of all i.e. taxes installation, commissioning training etc.
01.	ICT/ Multimedia Equipment	LCD Projector around 4000 ANSI Lumens with one additional lamp for each projector to be supplied Preferred brands: Sony, Panasonic, Hitachi etc.	01	Nil	
		Wall Mount Kit for LCD Projector	02	Nil	
		Wall mount Projection Screen: 5' x 7'	03		
		Tripod mount projection Screen: 5' x 7'	02		
		1. Interactive Board (Diagonal Size(mm):1700, Aspect Ratio: 4:3) with Bluetooth and Wi-Fi adaptor	01	Nil	
		2.Sound System for classrooms, JBL control series FOH Speakers 4no.s, Studiomaster/Beyerdynamic 1 handheld wireless microphone, 2 collar microphone,2 gooseneck microphone, Amplifier Beyerdynamic /Studiomaster powerpack 400, Media presentation switcher(extron /kramer mps 112)with necessary VGA / audio patch panels, cables and connectors, One cable cubby,24 U rack, Lutron & Dynalite - Lighting control with 4 zones (400-500 lux day light color temp 3000 kelvin).Philips & Crestron, One Touch panel for integration of lighting, HVAC,AV servers and AV components.	1 set		
		Electronic Pen with pad for use in Projection Mode	03	Nil	
		Visual Presenter (Imported) Resolution: XGA, Video frame rate (fps):20, Optical zoom: 4x	02	Nil	
		Laser Printers: 1200 DPI, HP LaserJet 1022 or equivalent	08	Nil	
		12V -7AH SMF Rechargeable Battery for 600VA UPS Type: Sealed Maintenance Free Nominal Voltage: 12 Volts DC, Float Voltage: 13.5 Volts DC Battery Ampere Hour Capacity: 7 AH Warranty: 1 year onsite comprehensive	10	Nil	
		Desktop Computer*	04	Ni	
		6U wall mount Rack (with power management facility)	01	Nil	
		Switch (Make: D-link) , unmanaged 24 port 10/100 Mbps with 1 slot for 100 fx	01	Nil	
Switch (Make: D-link), unmanaged 16 port 10/100 Mbps	02	Nil			
24 port jack panel with cable manager	01	Nil			

		Patch Cord (2 Mtr) (Make: D-link)	35	Nil	
		Patch Cord (1 Mtr) (Make: D-link)	35	Nil	
		Single I/O with SMB	35	Nil	
		CAT 6 UTP Cable roll (305 meter)	02	Ni	
		UNIVERSAL IC Tester (Digital and Analog) 1. Test most of the Digital IC's, Microprocessors, Static & dynamic RAM & peripheral IC'S. 2. Automatic testing of IC. No wiring or reference IC. 3. 40 pin ZIF to test IC's in DIP package. 4. Protection Against wrong insertion. 5. Repeated testing of same IC without re-entering the IC no. 6. Auto find the number of Digital IC's up to 20 pins or more. 7. Display the probable equivalents of Digital IC's. 8. LCD Display & 16 keys Keyboard. 9. Audible sound for bad IC. 10. Inbuilt Power supply. TEST LIBRARY : • CMOS ICs (40 Series). • CMOS ICs (45 Series). • Opto Couplers. • TTL 74/54 Series. • Microprocessor, EPROM, RAM & other digital ICs. • Transistor Arrays. Analog IC's most of used in laboratory.	01	Nil	
	Total Amount				
02.	Simulation of Communication Systems Lab (M.Tech.)	NI Multisim Academic Site License, Latest version, Circuits Option Consist of : (20-25 User) Multisim , Multisim MCU Module, Ulti-board Engage students and reinforce theory with a hands-on approach using NI Multisim, an easy-to-use interactive circuit teaching and student learning environment. Developed for academia, Multisim contains specific features that assist educators with delivering course content and provides students an interactive learning environment to visualize and investigate circuit behavior. 1) Ability to Reinforce Theory with Interactive Circuit Simulation 2) Exploration with Simulation-Driven Instruments 3) Data Visualization Data with 20 Powerful Analyses 4) Ability to Compare Simulated Data and Real Measurements from NI ELVIS inside Multisim 5) Simplification of the Teaching of Digital Circuits with the PLD Schematic 6) Ability to Easily Find the Components You Need 7) Powerful Teaching Options for Educators 8) Risk-Free Prototype in 3D Breadboarding Environment 9) Customization with NI LabVIEW 10) Professional Functionality for Advanced Designs 11) Related Resources	01	National Instruments	

		RF Impedance/Material Analyzer Basic Accuracy: +/- 0.8 % basic accuracy Sweep Parameters: Frequency: 1 MHz to 3 GHz Oscillator level: Up to 1 dBm/0.5 Vrms/10 mArms DC bias level (Option E4991A-001): +/- 40V or +/- 50 mA More Features: Windows-styled user interface Built-in VBA programming function Data transfer through LAN interface Versatile Measurement Options: Dielectric/magnetic material measurement (Option E4991A-002) Reliable on-wafer measurement (Option E4991A-010) Temperature characteristic measurement (Option E4991A-007)	01	Nil	
		Desktop Computer*	04	Nil	
		XUP Virtex II Pro Board with USB cable and PCI interface	01	Nil	
		Spartan 3E Starter Kit , Digilent make	01	Nil	
	Total Amount				
03.	VHDL/VLSI Design Lab (B.Tech./ M.Tech.)	Xilinx ISE Design Suite System Edition (12.1) or latest version	(25 users license)	Nil	
		Cadence Tool Software Specifications ANALOG & MIXED SIGNAL DESIGN <u>FRONT END TOOLS</u> Virtuoso(R) Spectre(R) Simulator REL MMSIM 7.1 Virtuoso(R) Spectre(R)-RF Option for 38500REL MMSIM 7.1 Cadence(R) Design Framework II REL IC 5.1.41 Virtuoso(R) Schematic Editor XL REL IC 6.1.0 Virtuoso(R) Analog Design Environment XL REL IC 6.1.0 AMS Designer with Flexible Analog Simulation REL IUS 8.2 Virtuoso(R) AMS Designer Environment REL IC 5.1.41 <u>ANALOG BACK END TOOL</u> Virtuoso(R) Layout Suite XL REL IC 6.1.0 DIGITAL DESIGN <u>FRONT END SIMULATION AND VERIFICATION</u> Incisive Enterprise Simulator - XL REL IES 8.2 <u>SYNTHESIS</u> Encounter RTL Compiler - XL REL RC 9.1 <u>PHYSICAL DOMAIN</u> SOC Encounter -XL (aka Cadence (R) SOC Encounter-GPS) REL SOC 8.1 TOOLS COMMON TO DIGITAL AND AMS DESIGNS	20 users license for 3 years	Nil	

		Assura(TM) Design Rule Checker REL ASSURA 4.1 Assura(TM) Layout Vs. Schematic Verifier REL ASSURA 4.1 Virtuoso QRC Extraction - L REL EXT 6.2 Note: Installation and a training covering examples demonstrating the entire package along with its applications should be provided at client's site. All Licenses, upgrade, updates and support should be provided for 3 years.			
		Desktop Computer*	04	Nil	
	Total Amount				
04.	Analog & Digital Communication Lab (B.Tech.)	FM , Modulation and Demodulation Kit Technical Specifications : <ul style="list-style-type: none"> • On-board Audio Oscillator, Modulators, Detectors, amplitude Limiter & Filter • Audio Oscillator: With adjustable Amplitude & Frequency (300 Hz-3.4 kHz) • FM Modulator: 2 nos. <ol style="list-style-type: none"> 1. Reactance Modulator (with carrier frequency adjustment) 2. Varactor Modulator (with carrier freq. adjustment) • Mixer Amplifier: 1 no. (with Gain adjustment) • Allows FM input signal to be amplitude modulated by a noise input prior demodulation • Transmitter output Freq. : 455 KHz • FM Demodulator: 5 nos. <ol style="list-style-type: none"> 1. Detuned Resonant Detector 2. Quadrature Detector 3. Foster : Seeley Detector 4. Ratio : Detector 5. Phase Locked Loop Detector • Low pass Filter: 3.4 KHz, Cut off frequency Amplifier (with adjustable gain) • Amplitude Limiter: 1 no. • Switched Faults: 8 nos. • Interconnections: 4mm banana sockets • Test Points: 74 • Power: 220V ± 10%, 50/60 Hz, 3VA • Accessories: Line cord, Manual, Set of patch cords • Cabinet for kit 	04	Nil	
		DSB/SSB AM Receiver Trainer Technical specifications: Construction: Super-Hetrodyne Freq. Range: 980 KHz to 2060 KHz Intermediate frequency: 455 KHz Input Circuits: <ol style="list-style-type: none"> 1) RF Amplifier 2) Mixer 3) Local Oscillator 4) Beat frequency Oscillator 5) IF Amplifier 1 6) IF Amplifier 2 Tuning: With variable capacitor (ganged) Dial marking on board	04	Nil	

	<p>Receiving media: Telescopic Antenna/Cable</p> <p>Detectors:</p> <ol style="list-style-type: none"> 1) Diode Detector (For DSB) 2) Product Detector (SSB) <p>Audio Output: Amplifier with speaker</p> <p>Automatic Gain control: Switchable</p> <p>Switchable faults: 8 nos.</p> <p>Interconnections: 4mm banana sockets</p> <p>Test Points: 50</p> <p>Power : $220 \leq 10\%$, 50/60 Hz, 3VA</p> <p>Accessories: Line cord, Manual, set of patch cords.</p> <ul style="list-style-type: none"> • On-board LO, BFO, RF Amp, Mixer, IF Amps, Detectors, Audio output receiving Antenna, AGC & Speaker. • Cabinet for kit 			
	<p>DSB/SSB AM Transmitter Trainer</p> <p>Technical Specifications:</p> <p>Audio Oscillator: With adjustable Amplitude & Frequency (300 Hz-3.4 kHz)</p> <p>Audio Output : Amplifier with speaker</p> <p>Modulators: Balanced Modulator with Band pass Filter (1 MHz)-2 nos. Balanced Modulator (455 kHz)-1no. Ceramic Band pass Filter – 1 no</p> <p>Carrier Frequency: 1 MHz (Crystal controlled)</p> <p>Transmitter Amplifier Output: (Gain adjustable) DSB (1MHz), SSB (1.445MHz) connected to Antenna/cable</p> <p>Switched Faults: 8 nos.</p> <p>Interconnections: 4mm Banana socket</p> <p>Test Points: 27</p> <p>Power: $220V \pm 10\%$, 50/60 Hz, 4VA</p> <p>Accessories: Line cord, Manual, set of patch cords.</p> <ul style="list-style-type: none"> • On board BP Filters, 455 kHz Generator, Transmitting Antenna and speaker • Cabinet for kit 	04	Nil	
	<p>PAM-PPM-PWM Modulation and Demodulation Trainer</p> <p>Technical Specifications</p> <ul style="list-style-type: none"> • Pulse Modulation Techniques using natural & Flat-top sampling: <ol style="list-style-type: none"> 1. Pulse Amplitude Modulation 2. Pulse Width Modulation 3. Pulse Position Modulation <ul style="list-style-type: none"> • On-board sampling frequencies (Pulse): 8kHz, 16kHz, 32kHz, 64kHz • On-board Filter and AC Amplifier <p>On-board Generator :</p> <ul style="list-style-type: none"> • Sine wave : 1kHz & 2kHz (Gain adjustable) • Square wave : 1 kHz & 2kHz • Low Pass Filter : 4th order BW Filter • Voice Communication : Voice Link using dynamic microphone & speaker • AC Amplifier : With adjustable Gain control • Switched faults : 8 nos. • Interconnections : 4mm Banana sockets • Test points : 29 	04	Nil	

		<ul style="list-style-type: none"> • Power : 220V± 10%, 50/60 Hz, 3A(approx.) • Accessories: Manual, set of patch cord, Line cord, Microphone, Headphone. • Cabinet for kit 			
		Sampling and Reconstruction Kit	04	Nil	
		Active Filters Trainer(Low Pass, High Pass, Band Pass & Notch Filter)	04	Nil	
		Soldering Iron rod with stand	10	Nil	
		Tweezers	05	Nil	
		Single Strand Wire (300 meter)	04	Nil	
		Wire stripper, cutter	10	Nil	
		Desktop Computer*	04	Ni	
	Total Amount				
05.	Audio Visual Lab (B.Tech.)	Color T.V. Trainer Kit with remote	01	Nil	
		VCD Player	01	Nil	
		Stereo Tape Recorder	01	Nil	
	Total Amount				
06.	Antenna Design Lab (M.Tech.)	HFSS Antenna Software & Hardware(Academic & teaching) -HFSS (Including IE Solver) -- Latest version, 12.1 or advanced 1. ANSOFT HFSS version 12.1 or advanced 2. Q3D Extractor version 9.0 or advanced 3. ANSOFT Designer version 6.1 or advanced 4. SIWave version 4.0 or advanced 5. Optrimetrics or advanced -ECAD Translators (Ansolft -Links) -MCAD Translators -Parallel (multiprocessing)	05 user	HFSS	
		Desktop Computer*	04	Nil	
		10KVA online UPS**	02	Nil	
	Total Amount				
07.	Electronics Design Lab (B.Tech.)	555,Timer IC	500	Nil	
		Digital Oscilloscope, 100 MHz - 1 GHz, 4 Channel An ultra-fast update rate of up to 100,000 waveforms per second, fast and responsive always-on Mega Zoom III deep memory, and a big, bright XGA screen for quick capture and analyze analog, digital, and serial signals in real time. Key Features 100 MHz to 1GHz bandwidth, up to 4 GSa/sec sample rate	02	Nil	

		<ul style="list-style-type: none"> Update rate: up to 100,000 waveforms/sec 12.1-inch; XGA display with 256 levels of intensity grading - easily see subtle details Broad set of automated measurements and application options 			
		<p>Spectrum Analyzer, 3 Hz - 26.5 GHz</p> <p>Performance</p> <ul style="list-style-type: none"> +/-0.19 dB absolute amplitude accuracy -155 dBm (-169 dBm w/preamp) displayed average noise level (DANL) -118 dBc/Hz phase noise at 10 kHz offset 81 dB W-CDMA ACLR dynamic range <p>Analysis bandwidth</p> <ul style="list-style-type: none"> 10 MHz analysis bandwidth (option B7J for the Basic mode) Optional 40 or 80 MHz analysis bandwidth to capture and measure complex signals. -78 dB (nominal) third orders inter modulation for 40 or 80 MHz analysis bandwidth. Up to 300 MHz analysis bandwidth for calibrated VSA measurements. <p>Flexibility</p> <ul style="list-style-type: none"> Flexible platform with 16 optional, easy-to-use built-in measurement personalities and hardware options. PowerSuite enables one-button power measurements for over 20 radio formats 	01	Nil	
		Xilinx Spartan 3AN Starter Kit with USB programming cable	01	Nil	
		Spartan-6 FPGA SP605 Evaluation Kit with USB cable	01	Nil	
	Total Amount				
08.	DSP Lab (B.Tech & M.Tech)	SPEEDY-33 DSP, 150mhz VC33 TI DSP	02		
		<p>Toolboxes & Block sets mentioned below should be compatible with MATLAB 7.6 with followings features:</p> <p>Filter Design Toolbox Signal Processing Toolbox Signal Processing Block set Communication Toolbox Communication Block set Fuzzy-logic Toolbox Image Processing Toolbox Mapping Toolbox Genetic Algorithm & Direct Search Toolbox Optimization Toolbox Image Acquisition Toolbox Video & Image Processing Blockset VLSI Toolbox</p>	Each Toolbox & Blockset of single user License & the total cost of all the Toolboxes & Block sets is approx.		
		Xilinx Xtreme DSP Starter Kit –Spartan 3A 1800A	01	Nil	
	Total Amount				

09.	M.Tech. (ECE) Research & Dissertation Lab	<p>DESIGN, MANUFACTURE, SUPPLY and INSTALLATION of Clean Room Class : 10,000 CLEAN infrastructure LABORATORY : QTY : TWO ROOMS ROOM OF SIZE: 30 FT X 22 FT X 9 FEET HEIGHT Approx.</p> <p>Required Temperature: 20+-4 Degree C, Humidity: 40 +- 5%. Considering these factors, total air flow required in the room works out to 8,920 CFM. We recommend</p> <p>a) 5 Nos. Ceiling Suspended type Vertical Flow Filtration Unit each of 1800CFM , Unit constructed out of 1.2 mm thick Powder Coated MS CRCA and each complete with -</p> <p>i) 3 Nos. Blower Motor Assemblies with Crompton make 0.25 HP single Ph. , 1300 RPM,double shaft electric motors, 6 No Dynamically balanced Aluminum Impellers with 6 Nos FRP Blowers mounted on a base frame with anti vibration mountings for vibration free operation.</p> <p>ii) 3 Nos. Mini pleat Hepa Filters of 99.97% down to 0.3 micron efficiency. Filters constructed out of aluminum casing with imported fiber glass media. Size of Filters 610 mm x 610 mm x 75 mm</p> <p>iii) 3 Nos. HDP Pre filters of 90% down to 10 Micron efficiency, constructed out of MS Casing with HDP Media. Size : 910 mm x 410 mm x 100 mm</p> <p>iv) Sponge Rubber Gasketing for gap sealing between doors.</p> <p>v) Heater Assembly with Humidity Controller for controlling humidity.</p> <p>vi) 1 No. in built Air Conditioner of 2.0 TR Capacity, complete with Cooling Coil, Condensing Unit with Kirloskar Copeland make Compressor, Insulated Inlet and Outlet copper piping (15 feet long), Fre-on gas charging, etc</p> <p>b) 8 Nos. Return Air Risers made out of 24 SWG Powder Coated GI. Size of Riser : 15" x 6" x 9 feet long complete with Powder Coated aluminum grill and Volume Control Damper with prefilter for air circulation</p> <p>c) GI Ducting between Return Air Risers and Filtration Units</p> <p>d) 5 Nos. Digital type Electronic Control Panel, remote operated.</p> <p>e) 2 Nos HDP Pre filter for fresh air. Size : 610 mm x 305 mm x 100 mm</p> <p>f) 1 Nos. Magnehelic Gauge for checking room air pressure. Range 0-6 mm WG</p> <p>Note: Promising vendors may visit the laboratory to inspect the scope of work/ equipment capacity required on any working day before offering the tender/quote.</p>	One Set	
		<p>Supply, installation, Testing and commissioning of Air shower (one- two person):</p> <p>Internal work space 76x132x183Cm approx. (WxDxH), , Flow: Multidirectional, Stainless steel construction, fitted with filters, Pre-stage filter: 10micron with 95% efficiency, Final Filter :0.3 micron with 99.9 efficiency ; Size of Pre and Final stage fitters 61x31x10Cm and 61x31x31 Cm respectively to protect clean room environment from contamination, dust, dirt etc. along with fitted interlocking of doors using microprocessor, Two door Sensor System with Timer, Electrical Switch Plate Assemblies, etc, Air flow rate 5000-6000FPM, fitted with GE make 1 HP, two motors, Noiseless & vibration free operation-One Set</p> <p>Note: Promising vendors may visit the laboratory to inspect the scope of work/ equipment capacity required on any working day before offering the tender/quote.</p>	One Set	
		<p>Supply, installation, Testing and commissioning of Air Curtain: Stainless steel construction -4' wide-- One Set</p>	One Set	
		<p>GARMENT CABINET: To keep Garments for personnel Overall Dimensions : 1000 mm width x 550 mm depth x 2200 mm height, constructed out of 1.2 mm thick Powder Coated MS CRCA, complete with Blower Motor Assembly, Hepa Filter, Pre filter, Aluminum Sliding Door Assembly, Ultra Violet Tube light, SS Rod with hangers, Castor Wheels, etc.</p>	One Set	

	<p>Water Purification System (ANALYTICAL GRADE WATER SYSTEM): Millipore's Elix-5 or equivalent:</p> <ol style="list-style-type: none"> System should withstand with the following feed water specification even if pretreatment is not working Fouling Index greater than 11 <ul style="list-style-type: none"> Total Chlorine greater than 2ppm. Feed water conductivity more than 1900 microS/cm Three stage purification process: Primary purification by a prefilter (with anti scaling and activated carbon for bacteriostasis) <ul style="list-style-type: none"> Secondary purification through RO membrane to remove impurities Third purification should be done with 2nd generation self regenerating Electro de-ionisation module (for consistent water quality) without any additional softener before EDI and should have activated carbon beads to avoid scaling inside EDI. Conductivity meter present before and after the RO cartridge to monitor RO cartridge efficiency. Outlet water quality: Resistivity: >10 Megohm up to 15 Megohm-cm TOC:<30ppb, Flow rate : 5 L/hr, Silicate Removal > 99.9% All specification claimed has to be supported with supporting technical documents. <p>RESERVOIR A 50 liter reservoir should be provided to store the water from first stage system.</p> <p>* All prefiltration kit , tank and other accessories should be of same brand and should have more than sufficient proof of installation base in govt/semi govt/Universities etc. with in the country. Note: The company should have direct sales and service support in India dedicated to water system for better after sales service and provide three years trouble free guarantee.</p>	<p>One Set</p>	
	<p>Programmable Spin Coater: Rotating Speed: 500 RPM to 6000 RPM Speed Accuracy: <1% error across the full range No. of steps and setting: Can be programmed to multiple no. of steps. Acceleration / deceleration rate: Programmable in every step. Limiting acceleration / deceleration value: 1000 RPM / sec. Display: Real-time display of RPM Real-time display of all program functions in the computer monitor. Spinning Time: Any time can be programmed. Instrument calibration: Automatic. User friendly Microsoft® Windows based software. Power Supply: 230V AC / 50 Hz Wattage: 250 W Slide Mounting: Vacuum suction facility Substrate Holder Size: up to 2" diameter Dimension (LXBXH): 17"X10"X10"</p>	<p>One</p>	
	<p>Monolayer Film Deposition and Surface pressure Measurement System, Model: LB-2007DC The system has the facilities to:</p> <ul style="list-style-type: none"> ❖ Record Compression Isotherm ❖ Surface Pressure Vs. Time ❖ Deposit Langmuir-Blodgett film on solid substrate <p>Primary Specifications:</p>	<p>01</p>	

	<ul style="list-style-type: none"> -Pressure Range :0 – 100 mN/m -Film balance resolution 0.05 N/m -Sensitivity Better than 0.05 mN/m -Accuracy: ± 0.1 mN/m -Barrier type : Double -Automatic Dipping Speed : 0.3 mm/min (minimum) (lifting & dipper head speed can be different) Barrier Speed : 0.5 – 90 mm/min. -Deposition Speed: 0.5 – 60 mm/min. -Operating Voltage :AC 200 – 230 V, 50/60 Hz -Speed Adjustment :0.1 mm/min. increments -Deposition Cycle :Unlimited -Depth of Dipping Area:60 mm -Working Area :1176cm² -Trough Dimension :600mm x 196mm -Trough Material :Total Teflon -Barrier Material :Total Teflon -Barrier Movement Resolution: 0.01 mm -Dipper Movement Resolution: 0.005 mm -External water circulation bath incorporated in Teflon trough, Suction Pump for cleaning the floating impurities, Computer – Compatible , A semi micro-balance, -Win LB software FREE OF COST -User friendly Windows 9x based software to run this Computer-controlled equipment -Cost inclusive of on side training of staff. 		
	<p>Laminar Flow Bench: Clean Work Station for non dust working area. Unit comprising of HEPA / Pre filter, Motor blowing assembly, Manometer, Tube Light. Horizontal type, CRCA Powder Coated or Full S. Steel, Standard Model – 2X 3 X 2 ft. With Electronic Switch Panel, Pressure Gauge manometer, Front Acrylic door / PVC Strip Curtain, Satin finish S.S. working table top and Castor Wheel for easy movement</p>	02	
	<p>Fume Hood/ Chamber with under Bench Storing: Double skin sandwich construction. A sash made of toughened / laminated safety glass of 5mm thick dully framed which is concealed counter balanced operated by Steel String / Cable. Baffle at inside rear designed suitably provided as per applications. Metallic Outer Prime GI / CRCA Epoxy Powder Coated. Wooden Genuine Marine Plywood & seasoned teakwood framing with exterior laminated. PVC / PP Table top, Small Size & suitable for hazardous materials / organic, solvents etc.</p> <p>Lining Inside Lining of PPGL / PPFPR / S.STEEL (316 / 316L / 304) ORAC, Cement sheet dully epoxy coated as acid / alkali / solvent resistance. Work Space Table work space provided with Acid / Alkali resistance Tiles made of PP FRP / PP GL surface. Electrical points of 5 / 15 Amp. Socket, Sandwich for illumination. Remote Control Knobs for Water / LPG / Vacuum lines as optional.</p> <p>Exhaust Exhaust system comprising of centrifugal blower made of PPGL with FRP lining with dynamically balanced impeller of polypropylene (Directly / Pulley</p>	02	

	<p>driven) driven by either Single Phase / Three Phase Standard make electric motors. Exhaust blower is of suitable capacity as per Fume Chamber size etc.</p> <p>Duct & Fittings Generally 3MM thick plain or 6 mm thick PPGL Lined ducting of suitable size for inlet & outlet provided with various fitting accessories like Bend, Reducers, Flanges, Canopy, Motor guard etc... Services PVC Sink, Water Line with Swan neck tap, gas / vacuum line etc</p>		
	<p>PID Temperature Indicator cum Controller: Front window Size: 90x90mm approx. PID auto-tuning, Dual bright LED displays, Alarms with 6 options. Programmer operation, Sleeve mounting for easy maintenance, RS232/485 Option, easy to wire</p>	02	
	<p>Thermocouples: Various types: One meter length each with end connectors 1) Platinum 30% Rhodium / Platinum 6% Rhodium, Temp. Range: 1370 to 1700 °C 2) Nickel-chromium / Nickel-aluminum, Temp. Range: 0 to 1260 °C 3) Copper / Constantan, Temp. Range: -59 to +370°C 4) PT100 sensor temperature Range: -196°C to +300°C</p>	05 Set	
	<p>Photo plotter -Maximum film size: 400 mm x 320 mm -Maximum plotting area: 380 x 300 mm -Resolution X: 8 selections from 508 to 8192 dpi -Resolution Y: 8000 dpi -Plotting speed: 10 mm of film width / minute for 1016 dpi -Source of light: Laser diode 670 nm (red) -Data input: Gerber (RS 274D, RS 274 X), high resolution BMP -Photoplotter software, included on CD: -Gerber viewer; Automatic aperture converter for all known Electronic CAD layout systems D-code editing, output preview & print -Interactive, absolute or relative image positioning, film and drill penalization -Negative plotting, image mirroring -Control software for-Windows 98 ... XP included, USB connection required -Unit dimensions LxWxH): 700x350x200 mm Complete with K- series Photoplot Film 457x 350mm, 50 sheets pack and K-series Photoplot developer 5 Liter makes 15 Liters and K- series Photoplot Fixer 5 Liter makes 20 liter and Green safe Light 600mm, 18 Watt one set each. Inclusive of on site training of staff.</p>	One	
	<p>Chemical and Consumables: Spin-on dopant's : B, P, Please quote for Lowest packet/volume sizes Qty:02 Packs/ volume each BD-40 or any other Boron Disc sources, 50 x 2.0 mm, Qty:02 Nos.</p>	02	
	<p>Coating materials, granules, Sheet (vacuum grade): Ta, Ti, W, Mo for filaments, sputter target (vacuum grade): Al, Cu, Zr, Hf, Ti, Ta, W</p>		
	<p>Reactive Ion Etching Machine: Repair, maintenance & servicing , testing and operation of Indigenous RIE, including the replacement of non-functional parts, power supply, valves, connectors (exclusive of pump) Note: Promising vendors may visit the laboratory to inspect the status of equipment on any working day before offering the tender/quote.</p>	One set	
	<p>Si-Wafers, various: Diameter: 50mm approx., One side polished, Thickness:250-400micron 1) Silicon 2"N (100), Resistivity 20-50 Ohm/Cm2, scratch dig-50-60, Pack of 25 pcs, 2) Silicon 2"P (100), Resistivity: 1- 20 Ohm/Cm2,Scratch dig-50-60, Pack of 25 pcs</p>	02	

	3) Fused silica disc/ square: 25mm, Th:2.0mm, Qty:25 Nos., 4) Pyrex disc/ square : 25mm, Th:2.0mm, Qty:25 Nos., ,		
	High Voltage variable DC Power Supply: Voltage Range:0-2 kV, Watt: 2-6 W; Low ripple, High Stability, Compact bench top units, Reversible polarity available, with front panel fitted Voltmeter and Current meter for reading, provision of short circuit and over current protection.	02	
	Photo resist 1)SU-8 3000 Photo-resist, pack of 500ml Packet 2) PMMA (polymethyl methacrylate) pack of 500ml Packet 3) AZ® ECI 3027 +ve photoresist series, pack of 500ml Packet 4)AZ® 15 nXT, -Ve photoresist series, pack of 500ml Packet	One set	
	NIL		
	UV Lamp Housing Assembly: Fitted in suitable housing, properly forced air cooled, suitable for contact printing: Special device for exposing diazo film to be used in making circuit boards where precision is required. Equipped with high-power 500-1000W mercury high pressure UV lamp, with standard wavelength of 365nm mounted with in a reflector. With Power supply and manual/ programmable time & Intensity control. The light source is strong and has a life of many hours and the exposure is steady and even.	One set	
	1) Digital / analog Vacuum Gauge Pirani Type: table top model with sensor to measure Vacuum in the range of 0.5 Mbar to 1 x 10-3 Mbar and 10-3 to 10-6 Mbar) with spare assembly, fittings, flanges, connectors etc. , complete set. 2) Digital / analog Vacuum Gauge Penning type: Table top model with sensor to measure Vacuum in the range of 10 ⁻³ to 10 ⁻⁶ Mbar) with spare assembly, fittings, flanges, connectors etc. , complete set. Note: Please quote separately for digital and Analog type.	1Nos each	
	3) Laboratory Grade Nitrogen gas cylinder with ISI marked regulator and fittings/ and other accessories , complete set 4) Laboratory Grade Oxygen gas Cylinder- with ISI marked regulator and fittings/ and other accessories , complete set 5) Laboratory Grade Argon gas Cylinder- with ISI marked regulator and fittings/ and other accessories , complete set	2 Nos. Each	
	Compressed Air Plant: with all electrical accessories, complete set, Air cooled, heavy duty, Operating Pressure: 8.5 Kg / cm ² , Tank capacity: 40-60Liters with Moisture Separator, air receiver and all standard electrical accessories, including installation and commissioning so as to ready to use.		
	Water Chilling plant: 200Liter capacity, with provision for temperature setting between -5 to 25 Degree C and display along with all standard electrical accessories, including installation and commissioning so as to ready to use.		
	Polyurethane (with fabric) Tubing: Pressure Range 28.5 in Hg / -0.95 bar to maximum pressure at 150 psi / 10 bar at 35 degree, Type : PU-9-SW,ID:9.0mm, OD:11.4mm, Qty: 400 meters, packed in 50 meters roll. To be Supplied with Suitable QS, CN and CK Fittings 12 Nos each		
	High temperature Annealing Furnace: Temperature: 1200 ⁰ C+ ⁻¹ 0 ⁰ C, programmable, with Quartz Tube assembly 4” diameter, and provision for gas inlet/outlet, Suitable substrate loading system with substrate holder-02 Sets.	01	
	Four Probe measurement systems: 1) Four probe set-up for measuring the resistivity of very low to highly resistive samples at temperatures up to 200 Degree with PID controlled oven, consisting of , four probe arrangement with built in RTD sensors and PID controlled Oven. DC Microvoltmeter, Constant Current Source: Rang:0-20mA and 0-200mA. Low current source: Range: 0-2micro amp-0-2MAmp for highly resistive	01 set	

	samples.		
	2) Four-Probe Resistivity and Hall Voltage Measurements with the Keithley Model 4200-SCS (Imported)	01 set	
	3) Four-Probe set-up: Fitted with X-Y-Z micromanipulator, Tungsten/Mo carbide tips (10micron) and Microscope for visualization while tips position on silicon wafers, Suitable to handle wafer up 100mm diameter.	01 set	
	Temperature controlled hot plate: Hot Plate With temperature controller & indicator, Temp. Range-30- 370°C , Size: 300 x 450 mm approx.	02	
	Air Conditioner window type 1.5 ton Capacity fitted with Reciprocating Compressor with voltage stabilizer (with copper wiring). Preferred brands: LG/Hitachi/Voltas Cooling Capacity Nominal (kcal/hr): 4500, Cooling Cap(Min) Guaranteed (kcal/hr): 4275, Min. Room Discharge Air Flow (cub.m/h): 700, EER(W/W): 2.7 - 2.89, Star Rating: 3	02	
	Total Amount		
	Grand Total		

Desktop Computer*

OS : Red Hat Enterprise Linux Wktn Ed*: version 5

*RHEL 5 or later should be installed and configured for graphics and LAN interface

Processor: Intel core 2 Duo E8400@3.0 GHz, 6 MB L2, 1333 MHz FSB

Motherboard: Intel G31 Express Chipset

Memory: 4 GB DDR 3, 800 MHz

Hard Disk Drive: 250 GB 7200 rpm SATA HDD

Optical Drive: Internal 22x DVD R/W

Graphics : NVIDIA® GeForce® GT 330 1GB graphics card

Network Controller: Dual Gigabit (10/1000/1000Mbps) Ethernet

Bays: 5 Nos. (2 Nos 5.25 inches for optical media drivers and 3 Nos 3.5 inches for hard disk drivers)

Ports : 6 USB (with 2 in front) 1 Serial port, 1 Parallel port, 1 PS-2 Keyboard and 1 PS-2 Mouse port, 1 line in, 1 line out, 1 Mic in

Expansion Slots : 2 PCI, 1 PCI Express x 1 and 1 PCI Express 16

Keyboard : Multimedia Internet Ready Keyboard

Mouse : Optical Scrolling mouse with Mouse pad.

Monitor : 19" wide LCD/TFT monitor

Compliance : DMZ 2.0, PCI & ACPI, AOHS

Warranty: For a period of three years onsite Comprehensive from the date of the installation of the system.

Preferred brands: Dell, HP, IBM etc.

10KVA online UPS**

	Capacity	10KVA
	Technology	IGBT based PWM type using microprocessor / DSP for control
Input	Voltage	230VAC ±1%, 1 phase, 2 wire
	Frequency range	45 – 55 Hz
	Power factor	0.85
	Current harmonic distortion	< 14%
	Voltage	230VAC ±1%, 1 phase, 2 wire
	Frequency	50Hz ± 0.01% in async mode
	Crest factor	3: 1

Output	Transient response for 100% step load variation	Voltage dip/rise less than -4% / +2% and recovery within 20 milliseconds
	Overload	150% for 1 min
	Overall AC to AC efficiency	85%
	Harmonic distortion	< 3% on linear load
	Isolation	Inbuilt double wound isolation transformer with class "H" insulation
Battery	Type	Lead acid sealed maintenance free
	Nominal voltage	As per manufacturer
	Minimum VAH rating	For 10KVA : 8112 (24AH, no. of batteries between 26 to 32.
	Back up time	30 minutes
	Battery makes	Global-Yuasa/ Amara Raja/ Exide
	Additional Facility	On Line Battery testing facility
General	Protections	Input Over / Under voltage Output Over/ Under voltage Battery over/ under voltage Low battery Output overload / short circuit Over temperature , Manual bypass switch
	Indications	LED indications for Line ON, Battery ON, Mains abnormal, Load on battery, load on bypass & Inverter trip.
	Metering	LCD display on front panel to monitor : Input voltage, battery voltage, output voltage, balance battery autonomy, output frequency & load power %
Communication	Computer interface	SNMP ready with RJ45 port alongwith software for remote monitoring on WAN. Soft ware should facilitate shutdown of multiple servers in LAN using Windows, Unix, Linux, and Novell operating systems and must be user programmable.
Environment	Audible noise	< 50dBA at 1 m distance from panel.
	Operating temperature	0 – 40 ° X
	Relative humidity	95% non condensing
	Standards	EN50091-1 for safety EN50091-2 for EMC
	Protection class	IP-31
	Manual Bypass switch	