

**NATIONAL INSTITUTE OF TECHNOLOGY
(DEEMED UNIVERSITY)
KURUKSHETRA-136119**

Ref.No.NIT/TEQIP/2005/5

Dated: 8.8.2005

INVITATION OF QUOTATIONS/TENDERS

This Institute has received funds from the Government of India under Technical Education Quality Improvement Programme funded by the World Bank and Plan Grants. The Institute invites Sealed Quotations for items from Sr.No.1 to 6 and Tenders for the items from Sr.No.7 to 10 given below:

Sr. No.	Name of Item	Qty.	Approx. Cost	Earnest Money Rs.
1.	Automatic Compression Testing Machine, 300t.	1 No.	15.00 Lacs	—
2.	Beam Deflection and Bending Stress Equipment	1 No.	9.00 Lacs	—
3.	PC Based UV-VIS-IR Spectrophotometer	1 No.	10.00 Lacs	—
4.	IR Thermal Imager	1 No.	6.00 Lacs	—
5.	Personal Computers	40 Nos.	16.00 Lacs	—
6.	PLC System with application modules	1 No.	9.00 Lacs	—
7.	Single Stage 100 KV HVAC test set. with PD measuring equip.	1 No.	22.00 Lacs	44,000/-
8.	Two Stage 280 KV,1.96 kj, HV Impulse generator test set	1 No.	28.00 Lacs	56,000/-
9.	Single Stage 140 KV, 13 mA HVDC test set	1 No.	9.00 Lacs	18,000/-
10.	Digital Storage oscilloscope, 500 Mega Hertz, 2Gs/s. 4 channel with HV Measuring cables/probes	1 No.	7.00 Lacs	14,000/-

Quotation/Tender Documents alongwith detailed specifications of above items may be obtained from the Stores Section of this Institute. The Quotation documents will be provided free of cost. However, the cost of Tender documents is Rs.400/-. The Quotation/Tender documents may also be downloaded from the website of the Institute www.nitkkr.ac.in for submission of Quotations/Tenders. If the Tender documents are downloaded from the website the Tender document fee of Rs.400/- should be deposited alongwith the Tenders. The Tenders submitted without Earnest Money and Tender document fee, if downloaded from website, will be rejected.

The Quotations addressed to the Stores Officer will be received upto 2.30 PM on 15.9.2005 and opened on same day at 3.00 PM. The Tenders will be received upto 2.30 P.M. on 16.9.2005 and opened on same day at 3.00 P.M.

STORES OFFICER

Continued.....

**NATIONAL INSTITUTE OF TECHNOLOGY
(DEEMED UNIVERSITY)
KURUKSHETRA – 136 119**

Tel.No. 01744 - 238470 Ext. 328 Fax. No. 01744 - 238050

No.NIT/TEQIP/2005/04

Dated : _____

**INVITATION FOR QUOTATIONS FOR SUPPLY OF
EQUIPMENTS from Sr. No. 1 to 6**

1. You are invited to submit your most competitive quotation for the following goods:

Sr.No.	Brief Description of the Goods	Specific-ations	Qty.	Delivery Period	Place of Delivery	Instalation Requirement if any
1.	Automatic Compression Testing Machine 300 t Capacity with test Navigator Standard Software and Flexural Test attachment	Detailed Specifications and Terms & Conditions of the equipments are attached as Annexure	1 No.	8 weeks or as suitable to the suppliers	NIT Kurukshetra	Yes
2.	Beam Deflection and Bending Stress Equip.		1 No.			
3.	PC Based UV-VIS-IR Spectrophotometer		1 No.			
4.	IR Thermal Imager		1 No.			
5.	Personal Computers P-4		40 Nos.			
6.	PLC System with application modules		1 No.			

2. Government of India has received a credit from the International Development Association (IDA) towards the cost of TEQIP Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

3. **Bid Price**

- a) The contract shall be for the full quantity as described above. Corrections, if any, shall be made by crossing out, initialing, dating and re writing.
- b) All duties, taxes and other levies payable by the contractor under the contract shall be included in the total price.
- c) The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

d) The Prices should be quoted in Indian Rupees only.

4. Each bidder shall submit only one quotation.

5. Validity of Quotation

Quotation shall remain valid for a period not less than 60 days after the deadline date specified for submission.

6. Evaluation of Quotations

The Purchaser will evaluate and compare the quotations determined to be substantially responsive i.e. which

- (a) are properly signed; and
- (b) conform to the terms and conditions, and specifications.

7. Award of contract

The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

7.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.

7.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be incorporated in the purchase order.

8. Payment shall be made immediately after delivery of the goods.

9. Normal commercial warranty/ guarantee of One Year or as required in the detailed specifications shall be applicable to the supplied goods.

10. The successful supplier will furnish the performance security for an amount of 2% of the total value of the equipment in shape of Bank Guarantee in favour the Director, NIT Kurukshetra valid upto 60 days after the completion of warranty period.

11. The equipment must be delivered within the delivery period or the period extended by the Director on the request of supplier otherwise a penalty @ 0.5% per week of the quoted price of the equipment shall be deducted. The maximum deduction will be 10%.

12. You are requested to provide your offer latest by 15.9.2005 upto 2.30 P.M. The quotations will be opened on same day at 3.00 P.M. Please quote on the top of envelop our Reference No., Date and Name of Equipment.

13. We look forward for receiving your quotation and thank you for your interest in this project.

STORES OFFICER

Detailed Specifications of
Automatic Compression Testing Machine-300t capacity

Sr.No.1

Quantity : 1 No.

1. Loading unit and pumping module: closed loop feedback machined control of load/strain/position. Loading range 0.1 – 300t., Load hold facility, Two speed hydraulic motor driven pump, bonded strain gauge based pressure transducer, Graphical off line display of data.
2. Flexural Test Attachment to be used with machine for concrete specimens as per IS-516-1959.
3. Test Navigator Standard Software (For Flexure and compression test) should: enter pace rate at the beginning of test, plot graph of compression, strain, stress v/s time and should calculate Young, s modulus of concrete. Automatic display of load at any time and breaking load.

One Year warranty and installation of machine at NIT Kurukshetra.

Detailed Specification of Beam Deflection and Bending Stress Equipment

Sr.No.2

Quantity : 1No.

(a)	Structural test Frame-Made of Aluminium to hold various interchangeable experiment modules and a digital force display, load capacity 5 KN (minimum) dimensions 880 x 850 x 610 mm, experimental window 700 x 450 mm.
(b)	Test beams of rectangular sections (1 each of steel & aluminium) dimensions 880 x 180 x 120 mm.
(c)	10 knife edges for 10 weight hangers and 150 x 10g weights
(d)	500 N electronic load cell.
(e)	Nine strain gauges (with nine dummy gauges) and a 16 way digital strain bridge, resolution 1 micro strain
(f)	Automatic data acquisition unit with interface software to enable data logging and simulation, all necessary leads to accept inputs from digital force display, digital strain display, an angular sensor and two digital deflection indicators.
(g)	Digital force display unit:- Front Panel to include four way selector switch and LCD, tough Resin case, Range 0 to 15 N, 0 to 500 N, output to an automatic data acquisition unit.

Terms & Conditions

1. Two years onsite next business day warranty and to be supplied by a company accredited to ISO 9001.
2. The price should be FOR NIT Kurukshetra.
3. Installations and training of faculty for 7 days (min.) at NIT Kurukshetra.

Detailed Specifications of
PC BASED UV-VIS-IR SPECTROPHOTOMETER

Sr.No.3

Quantity: 1 No.

Double beam, grating system
Compartment 40 cm x 40 cm or better
Range: 175 nm – 2600 nm or better
Wave length accuracy: $\pm .3\text{nm}$ or better
Wave length repeatability 0.1 nm or better
Input: 220V (50 Hz)

The spectrophotometer should be equipped with all essential accessories and required software

Detailed operational and service manual should be provided.

One year on spot warranty

Detailed Specifications of
IR THERMAL IMAGER

Sr.No.4

Quantity: 1 No.

Spectral range 8-13 μm or better
Thermal Sensitivity 0.08°C at 30°C
Temperature range: -10°C to 100°C or better
Field of View: $24^{\circ} \times 18^{\circ} / 0.3\text{m}$
Image Quality : 320 x 240 pixels
Auto focus
Color Video Display
With latest software and essential accessories.

Detailed operational and service manual should be provided.

One year on spot warranty.

Detailed Specifications of

PERSONAL COMPUTERS P-4

Sr.No.5

Quantity : 40 Nos.

Sr.No.	Item	Particulars
1.	Processor	Intel Pentium 4 Processor 530 (3.0 GHz) with HT or higher 1 MB onboard L2 cache memory 800 MHz front side bus
2.	Memory	Double Data Rate (DDR) memory @ 400 MHz, 512 MB on single slot
3.	Chipsets	Intel 915G OEM or better
4.	Hard Disk	40 GB HDD, Serial ATA 7200 rpm or better
5.	Monitor	15" Colour
6.	Floppy Drive	1.44 MB, 3.5" Floppy Drive
7.	Audio	Integrated Audio
8.	Graphics	Intel Media Graphics Accelerator (GMA 900 or better)
9.	Bays	2 internal, 3 external with Free One external bay (5¼ inch)
10.	Optical Drive	DVD Combo Drive 16x DVD Read, 48x CD Write, 48x CD Read or better
11.	Communication	Integrated Gigabit Ethernet
12.	Ports	1 Parallel, 1 Serial, 6 or more USB 2.0 Ports, PS/2 Mouse, PS/2 keyboard
13.	Keyboard	Standard 104 keys keyboard
14.	Mouse	3 button Optical Wheel Mouse with Mouse Pad
15.	Operating system	Windows XP Professional preloaded with license and latest security updates SP2/3
16.	Manageability	Features to help monitor health of machine. Recovery in case of crash
17.	Certifications	ISO 9001, ISO 14001, DMI 2.0 compliant
18.	Warranty	3 Yrs. Warranty

Detailed Specifications of PLC Systems

Sr.No.6

Quantity : 1 No.

PLC system and applications: Fundamentals of logic, Basics of PLC programming developing ladder-logic programs and PLC installation practices. Industrial Applications modules: Traffic light, single conveyor system, washing machine system.

Specifications for PLC: Micrologics 1000 16 I/O PLC, Hand Held Programmer, RS logics 500 starter pack

Specifications for application modules:

Traffic light and washing modules Both modules should use 5V TTL signal levels. A 24 dc output line on PLC should provide 5V output on the interface module which in turn gives input to both of the above modules.

Single Conveyor modules D.C. motor driven system with vertical gauging unit inductive and optical proximity detectors, inbuilt power supply interface unit with range of sensors and solenoid actuators. System should have following inputs and outputs Input to PLC: Optical proximity-2, vertical gauge-3, material detector-1, start/stop button. Output from PLC: conveyor motor-1 gauge motor-1,dispensor solenoid-1, parts selector/ejector-2

With Programmable controller users manual

Hand Held programmer's guide

Interface cable for PC

Terms and conditions:

Installation and demonstration on site

All the prices to be quoted for NIT Kurukshetra

one year warranty on site

INVITATION OF TENDERS FOR HIGH VOLTAGE LAB ITEMS FROM SL.NO.
7 TO 10 OF ABOVE TENDER NOTICE

Serial. No.of Press Notice	Name of Equipment	Qty.	Approx. Cost	Earnest Money
7.	Single Stage 100 KV HVAC test set. with PD measuring equip.	1 No.	22.00 Lacs	44,000/-
8.	Two Stage 280 KV,1.96 kj, HV Impulse generator test set	1 No.	28.00 Lacs	56,000/-
9.	Single Stage 140 KV, 13 mA HVDC test set	1 No.	9.00 Lacs	18,000/-
10.	Digital Storage oscilloscope, 500 Mega Hertz, 2Gs/s. 4 channel with HV Measuring cables/probes	1 No.	7.00 Lacs	14,000/-

TENDER FORM & DETAILED SPECIFICATIONS OF EQUIPMETS

**NATIONAL INSTITUTE OF TECHNOLOGY
(DEEMED UNIVERSITY)
KURUKSHETRA-136119**

This tender is due for submission in the National Institute of Technology, Kurukshetra upto 2.30 P.M. on 16.9.2005 and will be opened on same day at 3.00 P.M.

INSTRUCTIONS TO TENDERERS

1. Tender must be sent in a properly sealed envelope with tender number and due date subscribed on the envelope addressed to the Stores Officer, NIT, Kurukshetra.
2. Descriptive literature full technical data and drawing/photos must be furnished along with the tender.
3. All the columns of the tender form shall be duly and properly filled in separately. The rates and units shall not be overwritten in the price schedule. The rates shall be quoted both in figures and words. The tender should be signed by the authorized signatory of the firm.
4. The prices should be quoted on prescribed price schedule.
5. All corrections must be attested by the tenderer.

6. The rates quoted should be firm and include all charges for delivery FOR KURUKSHETRA inclusive of packing, forwarding and Insurance charges. The material may be dispatched "FREIGHT PAID" in all cases where the offer is F.O.R. destination.
7. The consignment must be insured not exceeding at the rate of 1% of the value against the risk of breakdown and damage in transit with an Insurance Company if the goods are likely to get damaged in transit. In the absence of insurance the entire responsibility shall rest with the supplier and the Director shall not be bound to pay for such items, broken or damaged in transit.
8. Certificate on Form 'D'/concessional form of certificate will be issued for charging Sales Tax at the concessional rate wherever applicable. If nothing is mentioned about charging of Sales Tax in the Tender then the rates quoted shall be treated inclusive of Sales Tax.
9. In case of imported goods, the country of origin, maker's name and Brand must be mentioned along with the FOR price. Payment of Custom Duty & Excise Duty is exempted to this Institute for the equipments required for research purpose.
10. No payment will be made in advance for any supplies under this tender.
11. No claim for any duty, not stipulated in tender will be admitted at any stage.
12. In case of goods controlled by the Government, the tendered rates shall not be higher than the controlled rates.
13. Tenderer should furnish a list of users where similar equipment has been supplied in the past.
14. Director of the Institute reserves the right to accept or reject any tender without assigning any reason.
15. Delivery period must be mentioned against each item. After the order has been placed, the goods must be delivered within the stipulated period or by the delivery period extended by the Director. In case of late delivery of goods the Director is entitled to recover as penalty from the tenderer a sum @ 0.5% of the tendered amount for every week or part thereof for which the consignment is delayed beyond the due date.
16. The payment will be made after receipt of goods according to specifications, its installation and good working order. In case the goods are rejected these have to be removed by the supplier at his own cost. The rejected goods must be replaced by the supplier within 15 days of the dispatch of registered notice intimating that the goods have been rejected failing which the order may be cancelled and security forfeited.
17. The tenderer shall have to deposit earnest money as per Tender Notice alongwith Technical Bid in the form of Bank Draft in favour of Director, National Institute of

Technology, Kurukshetra payable at State Bank of India, REC, Kurukshetra. The tenders without Earnest Money shall be rejected.

18. In case the Tender Documents are downloaded from the website of the Institute for submission of the tender, the Document Fee should be deposited alongwith the Tender otherwise the tender will be rejected

19. System of Tendering

Two bid system (Technical & Commercial bids will be submitted in separate covers in following manner) :

(i) Bid containing technical specifications and Earnest Money Deposit.

(II) Bid containing financial offer.

The envelopes should be marked as Technical Bid and Financial Bid with reference numbers and submitted in one cover.

These bids will be opened in two stages on different dates. The bid containing technical specifications and Earnest Money Deposit will be opened at 1st stage and if the same is found according to required specifications, the bid containing financial offer shall be opened in 2nd stage.

20. The successful tenderer shall furnish the Performance Security for an amount of 5% of total value of the equipment in shape of Bank Guarantee in favour of the Director NIT, Kurukshetra valid upto 60 days after the date of the completion of warranty period.
21. The successful tenderer shall be required to deposit security equivalent to the amount of Earnest Money for due performance of the contract in the form of Bank Draft in favour of Director, National Institute of Technology, Kurukshetra payable at State Bank of India, REC, Kurukshetra. The amount of earnest money will be adjusted towards the amount of Security.
22. Unless otherwise stipulated the tender will be valid for 120 days from the due date of opening of tender.
23. In case of dispute the decision of the Director shall be final.
24. All above conditions will be enforced unless written orders of the Director are obtained relaxing any specific condition in any particular instance..
25. TENDER RECEIVED BEYOND THE FIXED DATE AND TIME SHALL NOT BE ACCEPTED.
26. Fax/Conditional tenders shall not be accepted.
27. The tenderers are required to quote their lowest rates in the very first instance and there shall be no negotiation in purchases. In case only one tender is received or only one tender remains according to specifications of the required goods, negotiations will be carried out.

PRICE SCHEDULE

Having examined the tender documents, the receipt of which is hereby duly acknowledged, we offer to supply the goods and services in conformity with the said tender documents at the rates shown below:

1	2	3	4	5	6	7	8	9	10	11
Sr. No.	Particulars of the items	Unit	Ex-works, Ex-godown or C.I.F.	Customs Duty/excise duty inclusive ,if exclusive rates be given	Packing forwarding Octroi inclusive,if exclusive rates be given	Whether Sales Tax inclusive,if exclusive rates be given	Total Cost F.O.R. Kurukshetra	Delivery Period	Particulars of Manufacturers and Country in which manufactured	Remarks

N.B. : The price column should be properly filled. In case nothing is mentioned in the columns the price will be considered Inclusive of Excise Duty, packing and forwarding Octroi etc.

Dated the _____ Date of _____

Address with seal
Signature

**DETAILED SPECIFICATIONS OF EQUIPMENTS FOR
HIGH VOLTAGE LABRATORY**

Sr.No.7.

Quantity: 1 No.

AC Test Set 100 kV Single Stage with PD measuring set comprising following matching equipments/items:

1 A) AC Test Set 100 kV Single Stage

1. High Voltage Test Transformer :

Input 220 V 50 Hz,

Output 100kV, 7.5 kVA continuous, 20 kVA for 1 Hr.

Rated Test Voltage: 120kV

Short Circuit Impedance: Approx. 8%

Housing Type : FRP cylinder (Fiber Reinforced Polyurethane cylinder)

Cooling : Oil Cooled

PD Level : Less than 5pC upto 100kV

2. Control Desk: to control and operate the HV AC Set

SUPPLY VOLTAGE = 220V, 50Hz

POWER RATING = 10kVA Continuous and 20kVA, short time duty (2minute)

SOCKETS = 220V for integrating Measuring sphere gap for Calibration of HV Measuring Instruments.

It should be motorized and should incorporate suitable regulating transformer and should have following control and safety features:

- Emergency 'OFF' and key Interlock
- Compulsory 'ZERO START' Interlock
- Control Switches and Signal Lamps
- Instantaneous Over-Current with a provision to control percentage of over-current and Bimetallic Thermal Overload Protections
- Measurement of Primary Voltage and currents
- Provision for inserting AC Peak Voltmeter
- Provision for External door-interlock and Safety Loops
- Provision for controlling the rise of output voltage 10% to 100%.

3. Measuring Capacitor :

Oil insulated and hermetically sealed capacitor in FRP housing, mounted on mobile platform and with Corona-free HV Electrodes to Measure HVAC in conjunction with AC Peak Voltmeter

RATED VOLTAGE = 100kV, 50Hz

RATED CAPACITANCE = 100pF

RATED PD LEVEL < 3pC

4. **AC Peak Voltmeter:** 100kV suitable for use in conjunction with the above Measuring Capacitor.
5. **HV Flexible connector:** to make PD free connections to connect HV Test Transformer and Measuring Capacitor.
6. **Other necessary matching** items like earthing rod, connecting rod, connecting cup, floor pedestal etc.

Note : Above system should be suitable for direct integration with Partial Discharge Measuring system specified in (IB – i, ii).

IB) Partial Discharge Measuring Equipment:

(i) PD Meter:

- The PD meter should be suitable to Measure partial discharge in pC and RIV in μV (in accordance with IS6209/IEC 60270) and consist of :
- Facility to measure PD by straight detection method
- Facility to measure PD by balance mode PD detection to minimize background noise.
- Wide band filter Insert, 40 KHz to 220kHz.
- Narrow Band filter insert with Variable center frequency from 600 kHz to 2400 kHz, Bandwidth 9 kHz
- Built in oscilloscope (Analogue) to display PD pulses on elliptical time base window gating facility.
- Pulse Generator (Calibrator) to Calibrate the PD meter at the time of conducting PD test.
- Measuring impedance and coaxial connecting cable.

(ii) COUPLING CAPACITOR

Oil insulated and hermetically sealed capacitor in FRP housing mounted on mobile platform and with Corona-free HV Electrodes

RATED VOLTAGE	= 120kV
RATED CAPACITANCE	= 1000pF +/-10%
RATED PD LEVEL	< 5pC

Note: All the necessary accessories for HV AC test set should be provided. All measuring instruments should be of class 0.5. The test system should be modular in construction and suitable for rapid dismantling and construction. The test set should have facility to be extended to higher rating in the future. It should be suitable for demonstration to engineering students with full safety. The system should be suitable for integration with digital storage oscilloscope. The test system should also satisfy IEC and IS standards. It should be suitable for testing electrical equipments like small CTs, PTs, Lightning arresters, Switchgears, transformers etc.

S.No.8. II) Impulse Test Set Two- stage

Quantity : 1 No.

Two stage 280 kV, 1.96 kJ HV Impulse Generator to generate 1.2/50 micro sec. Lightning impulse and 250/2500 micro sec. Switching impulse consisting of the following matching equipments/items:

1. High Voltage Test Transformer :

Input	: 220 V 50 Hz,
Output	: 100kV, 5 kVA continuous, 10 kVA for 1 Hr.
Rated Test Voltage	: 120kV
Short Circuit Impedance	: Approx. 4%
Type of Housing	: FRP cylinder (Fiber Reinforced Polyurethane cylinder)
Cooling	: Oil Cooled
PD Level	: Less than 5pC upto 100kV

2. Control Desk to control and operate the HV Impulse Test Set

SUPPLY VOLTAGE	= 220V, 50Hz
POWER RATING	= 5kVA Continuous and 10kVA, 2 min. duty
SOCKETS	= 24V for Earthing Switch and 220V for integrating Measuring sphere gap for calibration of Measuring Instruments.

It should be motorized and should incorporate suitable regulating transformer and should have following control and safety features:

- Emergency 'OFF' and key Interlock
- Compulsory 'ZERO START' Interlock
- Control Switches and Signal Lamps
- Instantaneous Over-Current with a provision to control percentage of over-current and Bimetallic Thermal Overload Protections/ tripping
- Measurement of Primary Voltage and currents
- Provision for inserting DC and Impulse peak Voltmeters
- Provision for External door-interlock and Safety Loops
- Additional wiring for trigger device
- Provision for controlling the rise of output voltage 10% to 100%.

- 3. Rectifiers**, in FRP tube, 140KV (PIV), 20mA with suitable current protective resistance for DC Charging of the Generator.
- 4. Capacitor**, (Impulse) 140 kV, 100 nF (Nano Farads), Resin Cast construction
- 5. Measuring Resistor**, 140 kV, 280 M Ohm, in FRP tube, to measure HV DC
- 6. DC Voltmeter**, digital display to measure DC Voltage in conjunction with the above Measuring Resistor
- 7. Earthing Switch**, Electrically Operated earthing Switch for automatic Grounding of the system.
- 8. Impulse Voltage Divider**, Oil insulated and hermetically sealed capacitor in FRP housing, 140kV, 1.2 nF to Measure Impulse Voltage.
- 9. Impulse Peak voltmeter** digital display suitable to measure Impulse Voltage in conjunction with above Impulse Voltage Divider.
- 10. Charging Resistor**, 140 kV, 2.5 M Ohm in FRP tube, for Impulse Generator.

11 Wave shaping resistors, Wave front and wave tail resistors in FRP tube, for generating standard lightning 1.2/50 micro sec and 250/2500 micro sec. switching impulse voltages.

12.Sphere Gaps, in FRP housing, for Generation of Impulse Voltages

13.Earthing Rods, in FRP housing, for manually discharging the system.

14. Trigger Device and Electronic Trigger sphere for controlled triggering of the Impulse Generator through **Fibre Optic cable**.

15. Other necessary matching accessories like low voltage dividers, HV flexible connectors, connecting rods, connecting cups, spacer tubes, electrodes, earthing rod, insulating rods, floor pedestal etc.

16. I. MEASURING SPHEREGAP

MEASURING SPHEREGAP for measurement of AC, DC, IMPULSE voltages suitable for manual as well as 220V,50Hz Motor operation

RATED VOLTAGE = 100kV AC, 140kV DC and IMPULSE

SPHERE DIA. = 100 mm

ACCESSORIES:

- i) 50mm SPHERES, ii) ROD ELECTRODE(20mm dia.),
 - iii) NEEDLE ELECTRODE(20mm dia.),
 - iv) FLAT ELECTRODE(150 mm dia.),
- ONE SET EACH

II. MEASURING SPHERE GAP

MEASURING SPHEREGAP for measurement of AC, DC, IMPULSE voltages suitable for manual as well as 220V,50Hz Motor operation

RATED VOLTAGE : 200kV AC, 280kV DC and IMPULSE

SPHERE DIA. = 250 mm

Note: All the necessary accessories for HV Impulse test set should be provided. All measuring instruments should be of class 0.5. The test system should be modular in construction and suitable for rapid dismantling and construction. The test set should have facility to be extended to higher rating in the future. It should be suitable for demonstration to engineering students with full safety. The system should be suitable for integration with digital storage oscilloscope. The test system should also satisfy IEC and IS standards. It should be suitable for testing electrical equipments like small CTs, PTs, Lightning arresters, Switchgears, transformers etc.

S.No. 9 III- DC Test Set:

Quantity : 1 No.

Single Stage 140 kV, 13mA HVDC test set comprising following matching equipments/items:

1. High Voltage Test Transformer :

Input : 220 V 50 Hz,
Output : 100kV, 5 kVA continuous, 10 kVA for 1 Hr.
Rated Test Voltage : 120kV
Short Circuit Impedance: Approx. 4%
Housing Type : FRP cylinder FRP cylinder (Fiber Reinforced Polyurethane cylinder)
Cooling : Oil Cooled
PD Level : Less than 5pC upto 100kV

2. Control Desk: to control and operate the HV DC Set

SUPPLY VOLTAGE = 220V, 50Hz
POWER RATING = 5kVA Continuous and 10kVA, short time duty
SOCKETS = 24V for Earthing Switch and 220V for integrating
 Measuring sphere gap for calibration of HVMeasuring
 Instruments.

It should be motorized and should incorporate suitable regulating transformer and should have following control and safety features:

- Emergency 'OFF' and key Interlock
- Compulsory 'ZERO START' Interlock
- Control Switches and Signal Lamps
- Instantaneous Over-Current with a provision to control percentage of over-current and Bimetallic Thermal Overload Protections / tripping
- Measurement of Primary Voltage and currents
- Provision for inserting DC and Impulse Voltmeters
- Provision for External door-interlock and Safety Loops
- Provision for polarity reversal
- Provision for controlling the rise of output voltage 10% to 100%.

3. **Rectifiers**, in FRP tube, 140 kV (PIV), 20 mA and suitable protective resistance.
4. **Capacitor (Smoothing)**, Oil insulated and hermetically sealed capacitor in FRP housing, resin cast, 140 kV, 25nF (Nano Farads)
5. **DC Voltmeter**, 41/2digital display to measure DC voltage in conjunction with above measuring resistor
6. **Measuring Resistor**, 140 kV, 280 M Ohm, in FRP tube, to measure HV DC
7. **Earthing Rods**, made in FRP for manually discharging the system.
8. **Earthing Switch**, Electrically Operated earthing Switch for automatic Grounding of the system.
9. **Other necessary matching** items like electrodes, connecting rods, connecting cup, spacer tube floor pedestal etc.

note: All the necessary accessories for HV DC test set should be provided. All measuring instruments should be of class 0.5. The test system should be modular in construction and suitable for rapid dismantling and construction. The test set should have facility to be extended to higher rating in the future. It should be suitable for demonstration to engineering students with full safety. The system should be suitable for integration with digital storage oscilloscope. The test system should also satisfy IEC and IS standards. It should be suitable for testing electrical equipments like small CTs, PTs, Lightning arresters, Switchgears, transformers etc.

S.No.10 IV). Digital Phosphor Oscilloscope four channel with color display and 5G-samples/s capable to measure HV Impulse/AC/DC waves (With Facility of PC interface) Quantity: 1 No.

Real time bandwidth:	DC-500MHz simultaneously on all channels
1. Number of channels:	4 with external channel
2. Sample Rate (max.):	5GS/s or higher on all channels
3. Acquisition memory:	1Mpoints per channel
4. Vertical Resolution:	8 bits
5. Vertical sensitivity:	1 mV to 10 V
6. Time base Range:	20 ps to 10 sec per division
7. Time base accuracy:	10 ppm
8. Waveform capture rate:	140000 waveforms/sec
9. Sweep mode:	Auto, normal, and single sequence
10. Maximum input voltage:	150 CAT I
11. Input coupling:	AC, DC, and Ground
12. Triggering:	Edge, video, logic, Pulse (width or Glitch) alternate
13. Analysis mode:	Peak detect, Average, sample, single sequence, DPO, wave alert, Envelop
14. Measurements:	40 automatic parameter measurements, Time and voltage cursors, Math (add, subtract, divide, multiply), FFT
15. Display:	Color LCD with touch screen
16. Interpolation:	sinx/x
17. Format:	Y-T and X-Y, XYZ
18. Power supply:	220V +/- 10%, 50Hz AC supply
19. Accessories:	One 1x/10x switch able probes per channel, power cord, HV probes, operators manual, remote control manual, calibration certificates port for plotter and PC interface, math functions with FFT, Inbuilt hard drive, RS232C, parallel, 10/100base T Ethernet port, USB ports, three years warranty

Terms and Conditions:

Qualifying Conditions for above equipments at Sr. No. 7 to 10.

1. The company should be ISO 9001:2000 certified.
2. The company must have supplied this equipment to at least to two reputed educational institutions like IISc, IITs, NITs etc. after 01-07-2002.

General Conditions:

1. F.O.R HV laboratory NIT Kurukshetra.
2. The free installation and commissioning should be done at the site.
3. The training of the faculty and the staff and the maintenance aspects of the equipment should be provided at the site free of cost.
4. Minimum 1-year warranty at site from the date of commissioning should be provided for the product.

5. Necessary instructions, operation, and maintenance manuals (original) of the full equipment should be provided.
6. Essential spare parts like switches, bulbs, fuses, etc. may be available for three years..
7. The details of the equipment supplied to various institutions in the last five years should be provided.
8. Total cost of the each test set should be quoted.
9. Equipments should be supplied with in 4 months of the placement of the order.
10. All test equipments should satisfy relevant IEC and IS standards.