



Engineering College, Ajmer,
(An Autonomous Institute of Govt. of Rajasthan)
N.H.8 , Barliya Circle, Near Nareli Temple, Ajmer

INVITATION LETTER for High Voltage

Package Code: TEQIP-III/2019/RJ/GECA/ 103

Current Date: 05.12.2019

Package Name: GECA/TEQIP-III/2017-18/ EE-High Voltage

Method: Shopping Goods

To,

M/S _____

Sub: Invitation Letter For GECA/TEQIP-III/2017-18/ EE-High Voltage.

Dear Sir,

- You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

S. N.	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	Determine capacitance and dielectric loss of an insulating material using Schering bridge.	1	Engg. College, Ajmer N.H. 8,Barliya Circle, Near Nareli Temple, Ajmer	Onsite installation and testing & commissioning required.
2	Determine dielectric strength of transformer oil	1		
3	High Vacuum Oil Filter Machine	1		
4	Study high voltage testing of electrical equipment: line insulator, cable, bushing, power capacitor,	1		
5	Study solid dielectrics used in power apparatus & Study applications of insulating materials.	1		
6	Electrical Machines Trainer set	1		
7	Computer Interface panel	1		
8	Universal Motor	1		
9	3 phase squirrel cage motor	1		
10	3 Phase Salient Pole alternators	1		
11	Phase Shift Lock Rotor Mechanism:	1		
12	Test gear for Synchronising	1		
13	30MHz Dual Trace Oscilloscope With Component Tester	4		
14	Regulated DC Power Supply Dual Channel 0-32V / 0-2A	2		

- Government of India has received a credit from the International Development Association (IDA)



towards the cost of the **Technical Education Quality Improvement Programme [TEQIP]-Phase III** 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. Quotation

- 3.1 The contract shall be for the full quantity as described above.
- 3.2 Corrections, if any, shall be made by crossing out, initialling, dating and rewriting.
- 3.3 All duties and other levies payable by the supplier under the contract shall be included in the unit Price.
- 3.4 Applicable taxes shall be quoted separately for all items.
- 3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- 3.6 The Prices should be quoted in Indian Rupees only.

4. Each bidder shall submit only one quotation.

5. Quotation shall remain valid for a period not less than 90 days after the last date of quotation submission

6. Evaluation of Quotations: The Purchaser will evaluate and compare the quotations determined to be Substantially responsive i.e. which

- 6.1 are properly signed; and
- 6.2 Confirm to the terms and conditions, and specifications.
- 6.3. Incomplete quotation in any regards will not be considered for the evaluation. Vendor is required to submit complete quotation with all relevant documents.

7. The Quotations would be evaluated for all items together.

8. The prices submitted by vendor in quotation will be final and no negotiation for the price and terms and conditions will be entertained.

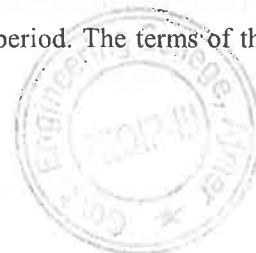
9. Award of contract The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

9.1 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.

9.2 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.

10. Payment shall be made in Indian Rupees as follows:

Satisfactory Delivery & Installation - 90% of total cost



Satisfactory Acceptance - 10% of total cost

11. **Delivery period : 45 days from the date of Purchase Order.**
12. Liquidated Damages will be charged at the rate of 0.01% per day, L.D. Max. 10% on pre tax billing amount if delivery period exceeds 45 days. Purchase Order shall be understood cancelled automatically without any prior notification if delivery period exceeds 60 days.
- 13 All supplied items are under warranty of **12** months from the date of successful acceptance of items and AMC/Others.
14. Vendor/bidder must submit two bids concurrently, i.e technical bid and financial bid, with proper marking on envelopes.
- 15 You are requested to provide your offer latest by **10:00** hours on **19-Dec.-2019**, the quotation received within stipulated date and time shall be opened as follows :
 - i. Technical Bid at 10:00 AM on **19-Dec.-2019**.
 - ii. Financial Bid at 03:00 PM on **19-Dec.-2019**.
- 16 Technical bid contains followings:
 - i The technical bids should contain the details specifications of items (As per Annexure-1). Any deviation should be highlights in the bid. Compliance sheet of technical specification of evaluation (in the order on given in Annexure-1) should be providing. Compliance Sheet of technical specifications is must.
 - ii Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
 - iii Only authorized dealer/ agency of Original Equipment Manufacturer (OEM) or OEM should apply against this invitation for bid. In the case of the bidder, offering to supply goods under the bid, which the bidder does not manufacture or otherwise produce, the bidder has to provide Manufacturer's Authorization Certificate for each item (excluding services) strictly as per format at Annexure -2. Bids submitted without authorization certificate for each item (excluding services) as per Annexure-2 will be summarily rejected.
 - iv The OEM firm should have the valid ISO 9001:2015 and/or ISO14001:2015 certification as applicable (copies of ISO certificate(s) to be submitted.)
 - v The bidder shall quote only one specific make/model from only specific OEM for each of the goods. Bid will be rejected if bidder provides more than one make/model for an item/good
 - vi Vendor will have to submit an Affidavit on non-judicial stamp paper of Rupees 500.00 mentioning following:
 - a. The average turnover of the bidder quoting for the bid have Rs. 200 Lakhs during the last three financial years (2016-2017, 2017-2018 & 2018-2019).
 - b. The bidder has not been blacklisted **last five years** by Central Govt./State



Govt./PSUs/Autonomous bodies.

- c. Commercial warranty/guarantee of 12 months on all supplied items, and agrees with the terms & conditions mentioned in the invitation letter.
 - vii OEM firm or bidder must have executed at least :
 - *One single order of similar items having value of Rs. 16.80 Lakhs
(OR)
 - *Two orders of similar items having value of Rs. 10.50 Lakhs.
(OR)
 - *Three orders of similar items having value of – Rs. 8.40 Lakhs.
- {Here,*similar means 'supply and installation of **High Voltage Lab Equipment / Instruments** for any Govt. Dept/PSU/reputed organization in the last three years i.e. 2016-2017, 2017-2018 & 2018-2019 till the date of invitation letter. Copies of purchase order must be submitted.
- viii Bidder must submit the latest GST Registration Certificate and copy of latest quarterly GST return.
 17. The bidder must submit their financial bid in the prescribed format (Annexure-3) and no other format is acceptable.
 18. Training Clause (if any) : **Onsite full training required.**
 19. Testing/Installation Clause (if any) **Onsite installation and testing & commissioning required. The vendor should visit the site to understand the installation requirement.**
 20. Performance Security shall be applicable: **5% of pre tax billing amount**
 21. Purchase Order awarded bidder shall furnish one performance security of **5%** of contract value (pre tax billing amount) in the form of bank guarantee valid for **15 months** from the scheduled date of completion of assignment.
 22. **Incomplete bids in any regards will be considered unfit and subject to cancelled without any notification. So it is suggested that vendor should submit complete quotation with all relevant documents.**
 23. Sealed quotation to be submitted/ delivered having title "**Quotation for High Voltage Lab**" at the address mentioned below, **Principal, Engineering College, Ajmer, N.H.8 , Barliya Circle, Near Nareli Temple, Ajmer.**
 24. We look forward to receiving your quotation and thank you for your interest in this project.

Dr. U.S. Modani
Principal



Annexure-1

S. N.	Item Name	Specifications																
1	Determine capacitance and dielectric loss of an insulating material using Schering bridge.	<p>Electrical properties of insulating systems change due to age and continuous electrical stress.</p> <p>By measuring electrical properties such as capacitance and Tan-delta regularly it should possible to ensure the operational reliability of H. V. insulating system and to avoid costly breakdowns.</p> <p>This is particularly important for HV bushings, power transformers, Generator, power capacitors, H.T. cables etc. interference suppression the Capacitance & dissipation factor test systems has been specially shielded with configured layouts of mu-metal sheets to avoid the effect of external interferences.</p> <p>This makes the measurement accurate in outdoor applications particularly in very high magnetic induction switch yards.</p> <p>Phase reversal switch provided in the H.V. Power supply effectively cancels interface/ pick up by the object under test in energized environment.</p> <p>There is separate 3-level interference suppression unit that is also provided for situation where the induction is too excessive, and cannot to cancel even by phase reversal switch.</p> <p>Operation schering bridge for Tan delta tester 10 kv includes have power source, standard capacitor (SF6 Gas filled) , and set of cables. The compact design of the system uses the principle of three winding differential transformer on a high permeability mu-metal core.</p> <p>The set is contained in a sturdy metallic housing with mu-metal lining which shields it from external powered null indicator make the system suitable for operation in workshop, factories, high voltage switch yards etc. it is suitable for both grounded as well as ungrounded objects.</p> <p>Protection the system should be provided with High Voltage Protection devices which protect the system and operator against failure of test object or standard capacitor. The other safety features are- zero start control.</p> <p>Technical Parameters</p> <table data-bbox="592 1400 1300 1960"> <tr> <td>Input power required</td> <td>230 VAC/ 50 Hz \pm 10% (110V, 60Hz available on special request)</td> </tr> <tr> <td>Voltage Range</td> <td>0-12kV</td> </tr> <tr> <td>Leakage Current</td> <td>100mA Continuous</td> </tr> <tr> <td>Voltage Indication</td> <td>3½ digit Digital Panel Meter (DPM)</td> </tr> <tr> <td>Resolution</td> <td>10 Volt</td> </tr> <tr> <td>Accuracy</td> <td>\pm 1% of the reading \pm 2 digit</td> </tr> <tr> <td>Standard Capacitor</td> <td>SF6 Gas filled, 100pf / 12kV \pm 1% , Tan $\delta \leq 1 \times 10^{-4}$</td> </tr> <tr> <td>Modes for testing</td> <td>UST (Ungrounded Specimen Test) GST (Grounded Specimen Test) GST g (Grounded Specimen Test with Guard)</td> </tr> </table> <p>Cable Test Set - Specially shielded connecting cables to for the object testing.</p>	Input power required	230 VAC/ 50 Hz \pm 10% (110V, 60Hz available on special request)	Voltage Range	0-12kV	Leakage Current	100mA Continuous	Voltage Indication	3½ digit Digital Panel Meter (DPM)	Resolution	10 Volt	Accuracy	\pm 1% of the reading \pm 2 digit	Standard Capacitor	SF6 Gas filled, 100pf / 12kV \pm 1% , Tan $\delta \leq 1 \times 10^{-4}$	Modes for testing	UST (Ungrounded Specimen Test) GST (Grounded Specimen Test) GST g (Grounded Specimen Test with Guard)
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		<p>10 mtr of 12kV, Double screened cable with insulated crocodile clip for HV. 10 mtr Single screened cable with insulated crocodile clip for LV. 10 mtr 1.0 sq. mm cable for GROUND User manual – 1 no Calibrator Decade Box – 3kV AC, 3 tan-delta tapings for periodic calibration check Test certificate – 1 no Warranty Certificate – 1 no (Standard warranty 1 yr)</p>
<p>2</p>	<p>Determine dielectric strength of transformer oil</p>	<p>It should be self contained compact and portable sets giving smooth variable output voltage from 0 to 60 KV. These testers should be designed for testing the die-electric breakdown strength of insulating liquids. Technical specifications: Input :0-230V Output:0-60 KV Capacity: 20Ma. Component specification: Main on/off switch and one main ON indicator (1 Nos) increase decrease switch (1 Nos.) H.T. On Off push button switch</p>
<p>3</p>	<p>High Vacuum Oil Filter Machine</p>	<p>The plant will be suitable for carrying out following operations: 1. Degassing, Dehydration and filtering transformer oil under high vacuum. 2. Filling of treated oil in to transformer tank. 3 Filtration and Dehydration of transformer. 4. The plant will be capable of attaining the following oil parameters in 3/5 passes. A. Breakdowns voltage with 2.5 mm electrode gap- 50-70kV B. Moisture content- upto <5ppm c. Neutralization value- < 0.05mg of KOH/gm of oil d. Particle size (filtration level) - < 1 micron e. Gas content - up to 0.1% by volume The plant will be mounted on caster while (pneumatic) & the casing shall be provided with doors of CRCA sheets, hinged on fabricated framework, angles and channels to have access to the operational controls and inspection and shall be fully caster while mounted and shall be weather proofed and shall be suitable for outdoor use. The plant components will have adequate strength and rigidity to withstand normal conditions of handling & usage. The plant will be mobile mounted. Strainer: It will be a metallic strainer with magnet fitted in it. It will remove magnetic and suspended particles to protect the inlet pump from damage due to abrasive particles. a. Rating - 1mm b. Flow – 250GPH (1200 Lph) Inlet Pump Details: Positive Displacement type Rotary Gear Pump with following specification: a. Flow Rate – 250GPH (1200Lph) b. Suction – 5Meters c. Provided with - Automatic Pressure By pass, flow control valve.</p>



4	Study high voltage testing of electrical equipment: line insulator, cable, bushing, power capacitor,	<p>d. Gear pump coupled with Electric motor of rating 1HP, 3Phase, and 415volts.</p> <p>e. The electric motor should be ABB/CG/Siemens and any other ISI marked.</p> <p>Module construction kits should be able to design the generation of 100 KV rating current (AC), 140 KV direct current (DC) and impulse high voltage (HV) by construction kit element, available of indoor design. It must be an ideal test system to use when training students in college programs and for application in research and development. The following components should be within the system: Console, including switch, on-off switch, and regulator output voltage indicator.</p>
5	Study solid dielectrics used in power apparatus & Study applications of insulating materials.	<p>This kit is used for the purpose of determining the HV breakdown voltage of the insulation materials used in manufacturing of the transformers.</p> <p>SPECIFICATION: Input voltage: 220V, 1ϕ 50 Hz AC supply. Input current: 4 Amps. Output voltage: 30,000 volts AC. Output current: 30mA Special Features: Enclosures are made from CR sheet with duly galvanized and powder coated. Necessary push button and indicators with identification are provided for the easy operation. Built in fuse protection, built in over current protection. Start/ stop. Reset switch. Trip status indicator Meters: 30KV AC meter for measuring the HV breakdown voltage. 30mA AC meter for measuring the breakdown current. Digital timer is provided for withstand test which i.e. for 60 sec. testing of insulators, bushings.</p>
6	Electrical Machines Trainer set	<p>Electrical Machines Trainer set should consist of the following Features :</p> <ul style="list-style-type: none"> • Should have 4mm sturdy shrouded banana patch cords and shrouded arrangements. • All machines should be mounted on finely painted sturdy base frame with easy machine interchangeability. • Should be able to draw all graphs • Machines should operate upto 300W power levels and upto 1500 RPM. • Must use Trunnion mounted DC machine as Dynamometer for loading other machines with facility to measure shaft power using electronic torque / speed measurement • One Dynamometer type DC m/c per aluminum Rack with multiple panels <p>A) Technical Specifications of interfacing panel rack - 1 No. Powder coated Sturdy aluminums Flat panel system made up off Alluminium extruded profiles carrying various high voltage components housed in plastic enclosures to minimize shock possibility. Should be able to hold following control panels with colorful overlay.</p> <p>B) Each control panel rack consists of : -</p>

Input 3 phase DOL Starter panel [10 Shrouded Banana] 1 No.

- 4 pole MCB of 415 V/1A .
- DOL 9A Contactor with 230V / 50 Hz / 11VA COIL .
- Bimetallic thermal O/L relay with range 1.4A - 2.3A .

Multifunction 3 Phase Meter

2 Nos.

- Connection : 3Phase 3/4 wire
- Volts Input : 400V/230V AC
- Aux Supply : 230V AC, 45-65Hz,5W
- Display : LCD Display
- CT Input : 5A, 0.1 VA/Ph.
- Measurement: V, I, Hz, Pf, KVA, KW, KWh
- Computer Input : Modbus RTU RS 485
- Termination : SBSS Terminal

FWD/REV ,Star-Delta starter panel [12 Shrouded Banana] 1 No.

- FWD/REV, 3 pole 3 way switch with centre OFF,6A/440V .
- Star/Delta switch 3 pole ,3 way with centre OFF,6A/440V .

3 Phase wound Rotor & Sync. Motor panel [8 Shrouded Banana] 1 No.

- Rotor resistors of 30E/5A with 3 taps of 0E, 15E, 21E, 30E
- Rotor resistor selector switch ,3 pole.6 Way .6A/440 V .
- DC Rotor excitation over current relay (3Amp)

1 Phase Motor, Alternator & Sync. Motor Panel [14 Shrouded Banana] - 1 No.

- 1 ϕ MCBs of 4A/1.6A – 2nos.
- 2no 2P2W selector switches to run as 1 ϕ alternator then as synchronous motor.
- 8A pushbutton switch to simulate as centrifugal switch.

DC voltmeter and DC ammeter panel [14 Shrouded Banana] 1 No.

- a) DC voltmeter(0-300V) b) DC Ammeter (0-5A) with polarity protection diode
- c) Field failure relay to control Armature supply. Both 6A/6B needed simultaneously.

SCR Actuator (variable DC) cum sensor signal conditioning panel [4 Shrouded Banana]-3 Nos.

- Half bridge SCR based 0V-195V / 5 Amp cosine firing with linear characteristics.
- Supports signal conditioning circuit for speed, torque in kg wt to output 0-2.5Vdc (FS).
- 3 Nos. of these supplies required for DC Armature, DC motor field and AC generator field.

Instrumentation Power supply cum Multichannel DPM panel [10 Shrouded Banana] 1 No.

- (a) +/-12 V ,500 mA (b) +5V ,300mA (c) Unregulated 17V dc/750 mA
- (d) line synchronizing signal.
- (e) 13V / 3 Amp. (f) Multi channel DPM for digital display of torque, speed etc

Resistor Load Panel 1 No.

Should have off position to run on no load.

(1)AC Resistors = 10K/200WX3 phases/ 6 steps (2) DC Resistors = 750E/400W / 6 steps

LC Load panel 2 Nos

(A) Inductive load =



0.15H/0.3H/0.45H/0.6H/0.75H/1.5H/3H/400mAX3Nos.

(B) Capacitive load = $1.25\mu/2.5\mu/5\mu/415VX$ 3Nos.

a. DC INTEGRATED M/C 1 No.

Voltage : $V_{arm} = 180V$, $V_{field} = 180V$

Capacity/RP M/Terminals : 300W / 2 Pole m/c / 1500RPM 6 terminals

Rotor Construction : Should be Standard commutator / brush arrangement with laminated stack, brought out on 2 terminals

Stator Construction : separately excited field winding with laminated pole solid yoke and series winding brought out on 4 terminals

Chasis mounted, 19mm dia, trunion mounted Machine for use as Dynamometer with torque & speed sensors. Must be able to work as shunt/series/compound motor as well as generator.

Following Essential accessories should be provided with trainer:

A) Hand held tacho meter – 1 No.

B) Shrouded patch chord – 118

C) Well written students workbook explaining atleast 50 experiments with instructor guide–1 No.

D) DEMO CD to help student to work by themselves – 1 No.

7	Computer Interface panel	Computer Interface panel connects to pc usb port using usb IO module through 25 pin D (M) connector on CIP & Type A to mini B cable consisting of 4 ADC channels i/p: 0 to 2.5V with 1 no. AI input simulation pot, 1 DAC channel O/P 2.5 V, V to I function block I/P 0 to 2.5V & O/P 0-20 or 4-20 mA (100E load) switch settable, I to V function block: I/P 4 to 20 mA & O/P 0-2.5V, DC V/I measurement panel using panel. facility of modbus to communicate AC multi parameter measurement meter (MMM)/Power Network analyzer. supplied in electrical machine trianer quoted above. Software on CD: Virtual Workbench package is a USB / serial modbus based software working on windows dot Net platform coupled with USB IO module useful as general purpose utility which supports different control strategies like Single or multi loop PID controllers, Fuzzy controller etc, Graph plotting in XY, XT and polar mode etc, Modbus interface, Data logging, Event trigger, inbuilt Function generator etc
8	Universal Motor	Universal Motor Voltage : 230VAC, 50Hz / 150Vdc Capacity/RP M/Terminals : 300W / 4 Pole m/c / 1600/1500RPM 4 terminal. Rotor Construction : Standard commutator . brush arrangement brought out on 2 terminals Stator Construction : Stator brought out on 2 terminals to facilitate AC/ DC operation & direction change. Built in compensating winding to minimize AR & sparking. Chasis mounted with 19mm dia.
9	3 phase squirrel cage motor	3 phase squirrel cage motor Voltage: 415VAC, 50Hz. Capacity/RP M/Terminals : 300W / 4 Pole m/c / 1500RPM 12 terminals Rotor Construction: Diacast rotor. Stator Construction: 6X2 terminals brought out to run machine at two speeds using pole changing method, Chasis mounted with 19mm dia. Applications: Motor should work as Induction generator, Torque speed curve in both motor as well as generator mode.
10	3 Phase Salient Pole alternators	3 Phase Salient Pole alternators:- Voltage: 415VAC, 50Hz Capacity/RPM /Terminals : 300W/4 Pole m/c / 1500RPM



Rotor Construction : Star connected, four terminals including star point brought out on 4 slip rings mounted on shaft.
Stator construction : Separately excited field winding with laminated solid yoke, 4 pole brought out on 2 terminals
Winding Temp. : A embedded Thermistor brought out on 2 eyelets mounted on terminal box for monitoring winding temperature
Frame/ Mounting Shaft dia: 90 Frame, Chasis mounted 19mm dia. With easily swappable gear coupling

11 Phase Shift Lock Rotor Mechanism:
Phase Shift Lock Rotor Mechanism:
 I) Mounting Method: By mounting PSLR mechanism on C bracket, using 4 nuts & bolts, it can be directly inserted on to the shaft of diameter 19mm of 3Phase AC machine & to screw the C bracket securely to U shaped open slots of chassis.
 II) Block Rotor Test : Above mechanism is mounted on chassis as shown & coupled to 3 phase AC induction squirrel cage motor (0.5HP) to carry out block rotor test. Here the turning wheel or knob of PSLR mechanism has no role to play.

12 Test gear for Synchronising
 Test gear for Synchronising of 2Nos. Of 3 phase Generator (3 phase AC machines) consist of one set of Synchroscope panel with 3X2 lamps, Sync Switch, essential accessories like connecting cables, students workbook, patch cords etc.

13 30MHz DUAL TRACE OSCILLOSCOPE With Component Tester
Features

- DC - 30MHz Bandwidth
- 1mV/div Sensitivity on Both Channels
- CH1, CH2 (Independent Channels), CH1 & CH2 (Alternate / CHOP), CH2 INVT, ADD and SUBTRACT
- X-Y Operation
- 40ns/div to 0.2s/div Time Base
- 140mm Rectangular CRT with Internal Graticule
- Triggering to 40MHz
- Z Modulation (TTL Level)
- 8 x 10 cm. Display
- TV Triggering Frame (V) & Line (H)
- MAINS Trigger
- Variable Hold Off
- Built-in Component Tester / Comparator

Technical Specifications

VERTICAL DEFLECTION

Deflection Coefficient (CH1 & CH2)	1mV/div to 20V/div. 5mV/div to 20V/div in 12 calibrated steps in 1-2-5 sequence. x5 Magnification increases the sensitivity to 1mV/div & 2mV/div. (LED indicated).
Accuracy	±3%.
Bandwidth	DC - 30MHz (-3dB), dc coupled. 10Hz -30MHz (-3dB), ac coupled. 20MHz (-3dB) in x5 MAG.
Rise-Time	11.6 ns or less, 17.5ns in x5 MAG.
Display Modes	CH1, CH2, CH1 & CH2 Alternate or Chop mode, Algebraic addition CH1 + CH2, Algebraic subtraction CH1 -



	CH2, CH2 Invert & X-Y.		
Input Impedance	1 M ohms & 25 pF (approx).		
Maximum Input Voltage	400 Volts (dc + peak ac).		
TIME BASE			
Sweep Speed	18 calibrated steps. 0.5 μ s/div to 0.2 s/div in 1, 2 & 5 sequence.		
Sweep Magnifier	x5 Magnification extends the sweep speed to 100 ns/div. x5 Magnification indication with LED.		
Accuracy	$\pm 3\%$.		
Variable	Uncalibrated continuously variable control between steps, extends fastest sweep speed to 40 ns/div (approx). (Uncal LED indication).		
Hold-off Time	4:1 variable control.		
TRIGGER SYSTEM			
Triggering Mode	Automatic or Normal with Level Control.		
Source	CH1 / CH2 / MAINS / EXT.		
Slope	Positive or Negative.		
Coupling	ac / dc / HF reject or TV Frame / TV Line.		
Trigger Sensitivity	Mode	Freq - Range	INT
	AUTO	30Hz - 30MHz	1 div
	NORM	3Hz - 30MHz	1 div
(Typical 40MHz at 2 div).			
HORIZONTAL DEFLECTION			
Deflection Coefficient	Same as CH2.		
Bandwidth	DC - 1MHz (-3dB).		
Input Impedance	1M ohms and 25pF (approx).		
COMPONENT TESTER / COMPARATOR			
Dual Component Tester allows comparison of V-I characteristics of a Device - Under - Test (D.U.T.) and a sample Device.			
Test Voltage	8.6V r.m.s.		
Test Current	28mA.		
Test Frequency	50Hz or 60Hz.		
GENERAL INFORMATION			
Cathode Ray Tube	140mm Rectangular screen, Internal Graticule, 8 x 10 cm, P31 phosphor.		
Trace Rotation	Front Panel control, allows $\pm 50^\circ$ of trace adjustment.		
Z-Modulation	TTL level.		
Calibrator	Provides 0.2V $\pm 2\%$, 1KHz square-wave output for probe compensation.		

Power Requirement	230V AC $\pm 10\%$, 47-65Hz, 40VA.
Dimensions	165 (H) x 340 (W) x 420 (D) mm.
Weight	7.5 Kgs. approx.
Standard Accessories	Instruction Manual, 2 Input BNC Leads.
Optional Accessories	High impedance switch probe with x1 or x10 attenuation (Model 306), Trolley.
Environmental	Normal : 100C to 400C RH 85%.
Specifications	Operational : 00C to 500C RH 85%.

14 Regulated DC
Power Supply
Dual Channel 0-
32V / 0-2A

Output Voltage & Current : 0-32V / 0-2A
Metering : 3.Digit DPM.
Meter Accuracy : ± 3 counts.
Constant Voltage Mode :
Regulation :
Line : $\pm 0.01\% \pm 2\text{mV}$ for $\pm 10\%$ change in line output.
Load : $\pm 0.01\% \pm 2\text{mV}$ for load change from zero to full load.
Ripple & Noise: 1mV rms max. 20Hz - 20MHz.
Constant Current Mode:
Regulation :
Line : $\pm 0.1\% \pm 250\mu\text{A}$ for $\pm 10\%$ line change.
Load : $\pm 0.1\% \pm 250\mu\text{A}$ for change in output voltage from 0 Volts to maximum output voltage.
Ripple & Noise: 0.04% rms.
Mode Indication: LED indication for constant voltage / constant current operating mode.
Output Polarity : Floating w.r.t. ground.
Overload Protection : Automatic overload and short circuit protection.
Transient Response : 100 μsecs to within 10mV of set output voltage for load change from 10% to 90%.
Stability: Total drift within 8 hours, after warm-up.
 $< \pm 0.2\%$ plus 5mV in constant voltage mode.
 $< \pm 0.5\%$ plus 5mA in constant current mode with constant line, load and ambient temperature conditions.
Operating Temperature: 0-50 C.
Line Voltage : 230V AC $\pm 10\%$ 50Hz, single phase.
Note : Regulation To Be Measured At Sense Terminals.
CUSTOM CAPABILITY:
Special Voltage And Current Ratings Available On Request.



Annexure 2 (Invitation)

MANUFACTURER AUTHORIZATION FORM

No. _____ dated _____

To

Dear Sir:

Package No. _____

We----- (Name of the OEM) who are established and reputed manufacturer of _____ (*name and description of goods offered*) having factories at _____ (*address of factory*) with factory registration no. --
----- do hereby authorize M/s _____ (*Name and address of Agent*) to submit a bid, and sign the contract with you for the goods manufactured by us against the above bid.

We hereby extend our full warranty as per your invitation letter, for the goods and services offered for supply by the above firm against this Invitation for Bid.

Yours faithfully,

(Name)

(Name of manufacturers)

Note: This letter of authority should be on the letterhead of the manufacturer or OEM and should be signed by a person competent and having the power of attorney to legally bind the manufacturer.



Annexure-3

FORMAT FOR QUOTATION SUBMISSION
(In letterhead of the supplier with seal)

Date: _____

To: _____

Sl. No.	Description of goods \ (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex-Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
Total Cost							

Gross Total Cost (A+B): Rs. _____ (Amount in figures)

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. _____ (Rupees _____ amount in words) within the period specified in the Invitation for Quotations. We confirm that the normal commercial warranty/ guarantee of _____ months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter. We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: _____
Address: _____
Contact No. _____

