



Gautam Buddha University

Greater Noida – 201 310

Website : www.gbu.ac.in

BID FORM

FOR THE SUPPLY OF EQUIPMENTS FOR
POWER SYSTEM LABORATORY

OF

SCHOOL OF ENGINEERING

Gautam Buddha University

Greater Noida – 201 310

TENDER FOR SUPPLY OF EQUIPMENT FOR POWER SYSTEM LABORATORY OF SCHOOL OF ENGINEERING

Tender	Supply of Equipment for Power System Lab.
Opening Date	13 th May, 2011
Closing Date	13 th June 2011 upto 3.00 p.m.
Last date of Bid Submission	13 th June 2011 upto 5.00 p.m.
Technical Bid Opening Date, Time & Place	14 th June 2011 at 3.00 p.m. Venue : Conference Room of the Registrar Office, 1 st Floor, Administrative Building, G.B.U., Gr. Noida.
Earnest Money Deposit	2% of the offered cost
Completion Period	Within 10-12 weeks from the date of Purchase Order issued
Bid System	Two Tier : 1) Technical Bid 2) Financial Bid
Technical Bid Shall Contain	<ul style="list-style-type: none"> i. Technical specifications of each equipment quoted ii. All documents in support of commercial terms & conditions and eligibility criteria. iii. Bidders Proforma iv. EMD & Tender Fee demand drafts / pay orders.
Financial Bid	The Financial Bid shall contain rate schedule only. The price shall be in words as well as in numeric numbers.

“TECHNICAL BID (BIDDER’S PROFORMA)”
(To be submitted in separate envelope)

1. Name of the firm:
2. Date of incorporation.....
3. Name of the company – Government / Public Ltd. / Private Ltd. / Partnership /
Proprietorship :
4. Specify the number of years in this line of activity by the company:.....
5. Sales Tax/VAT registration No. (please attach certificate) :
6. Experience (in year) of supplying & installation for similar software to IITs, NIT’s or
Central Universities or any Academic Institute of National Repute (please attached
certificate/P.O.) :
7. Turnover in the last three financial years (Figures should be in Indian Rupees in
Lakhs; please attach the certified copies of balance sheet with trading, profit & loss
account) : (if the figures for 10-11 are not available then they may furnish balance
sheet of year 07-08)

2008-09	2009-10	2010-11

8. Provide the postal address, telephone & fax numbers, and email address of the
nearest service center :
.....
9. Mention delivery period from the date of the placement of an official purchase order :
.....
10. Enclose the list of customers to whom you have supplied /serviced during the last 3
years ending 31/03/2011 with full postal address and name of the contact person
with phone, FAX numbers, and E-mail-id, billing amount etc. Certificate regarding
satisfactory performance from the minimum three end users should be furnished.
11. Are you the manufacturer / authorized dealer / distributor/ reseller for the product
quoted (please attached relevant certificate):
12. Was there any lapse or delay in supplying the goods ordered or any service related
issue during the warranty period for the products supplied by your firm to different
Institutes/Universities during last three years? If yes, provide details.
13. Deviations in specifications, if yes, please mention in separate sheet.
14. Whether technical specification are attached with Technical Bid or not. Yes/No

DECLARATION

1. The rates quoted in financial bid are inclusive of all taxes, packing, handling and installation charges.
2. The information given in the financial bid by the undersigned is correct.

(SIGNATURE OF THE BIDDER)
WITH SEAL

NAME :

ADDRESS :

:

:

Tel./Mobile No. :

Note: The financial bid is required to be submitted separately in a sealed cover superscribing as 'Supply of Equipments for Power System Lab. of School of Engineering.'

Gautam Buddha University

School of Engineering

TECHNICAL SPECIFICATIONS: POWER SYSTEM LABORATORY

S.N.	ITEM	TECHNICAL SPECIFICATIONS
1.	Microcontroller based IDMT over current relay trainer	<p>This test set-up should consists of (1) Micro controller based over current-relay (2) Current Injection source:</p> <ul style="list-style-type: none">• Micro controller Based Over-Current Relay.• One number of 20A CT used to sense fault current.• * One number of 12V auxiliary relay used for contactor operation. <p>* Specification:</p> <ul style="list-style-type: none">• Current input : 0-20Amp• Number of contacts : One number "NC" contact @ 220V,10Amp rating one number of "NO" contacts @ 220V, 10Amp rating.• Auxiliary supply : 230VAC, 50 Hz <p>Current Injection Unit</p> <ul style="list-style-type: none">• One number of auto transformer used for current adjustment.• One number of loading transformer used for current source. Current output terminated in the banana-sockets.• One number of digital meter used to indicate current.• Specification: Current Range: 0-20Amp AC (Continuously variable)
2.	Electromechanical type IDMT Relay trainer	<p>This test set-up should consist of (1) Electro-mechanical Over Current Relay (2) Current Injection source with meter.</p> <p>Current rating:5 Amp # Current setting multiplier # Time setting multiplier # One number of NO contacts @ 220V ,10Amp rating # One number of NC contacts @ 220V ,10Amp rating</p> <p>Current Injection source:</p> <ul style="list-style-type: none">• One no. of auto transformer provided for current adjustment• One no. of loading transformer used for current source• # Current output applied to relay coil.• # One no. of digital ammeter used to indicate current• # Specification: current range: 0-20 Amp AC. (continuously variable)• # One no. of automatic relay tripping time measurement circuit.• # One no. of Digital timer provided to measure relay tripping time.• # One number of reset switch provided for timer reset.
3.	Microcontroller based Over / Under Voltage relay Trainer	<p>This test set-up should consist of (1) Micro controller based Over / Under Voltage Relay (2) Voltage Injection Source.</p> <p>Voltage input : 0 - 220volt Number of contacts :</p>

		<p>One number "NC" contact @ 220V,10Amp rating One number of "NO" contacts @ 220V, 10Amp rating Auxiliary supply : 230 V AC,50Hz * PC interfacing facility, Power ON/OFF switch with indicator</p> <p>VOLTAGE INJECTION SOURCE</p> <ul style="list-style-type: none"> * One no. of auto transformer used for voltage adjustment. * Voltage output terminated in the banana-sockets * One number of digital meters used to indicate output voltage. * Specification: Voltage range: 0-300V AC. (Continuously variables)
4.	Electromechanical type Over / Under Voltage Relay trainer	<p>This set-up should consists of (1) Electro mechanical type Over voltage-relay, (2)relay test setup with meter Voltage setting multiplier.(121v,132,143,154,165,176,187v) # Time setting multiplier. # One number of "NO" contacts @ 220V ,10Amp rating. # One number of "NC" contacts @ 220V ,10Amp rating.</p> <p>Electro Mechanical Type Under Voltage Relay</p> <p>Voltage setting multiplier.(55V,66,77,88,99V) # Time setting multiplier # One number of "NO" contacts @ 220V, 10Amp rating # One number of "NC" contacts @ 220V, 10Amp rating</p>
5.	Electromechanical type Earth Fault Relay	<p>This test set-up should consists of (1) Electromechanical earth-fault-relay. (2) Transformer test setup with meter # Current rating : 5V or 1Amp # Current setting multiplier # Time setting multiplier # One number of NO contacts @ 220V, 10Amp rating # One number of NC contacts @ 220V 10Amp Rating</p> <p>Current Injection Source</p> <ul style="list-style-type: none"> * One number of 24/24V, 3Amp three phase delta-star transformer provided with secondary midpoint tapping * Midpoint provided for earth fault creation * One number of variable rheostat provided for variation of short-circuit earth resistance * 24V,3Amp three phase ac source provided for transformer primary input * One number of digital ammeter used to indicate current * One number of digital timer provided for tripping time measurement * One number of automatic relay tripping time measurement circuit * One number of start/stop push-to on switch provided for time measurement circuit * One number of reset switch provided for timer reset
6.	Reverse Power Relay	<p>One number of 230/5V PT used to sense voltage * One number of ZCD for phase angle measurement * One number of 12V auxiliary relay used for contractor operation * Specification: # Current input : 0-20 Amp # Voltage input : 0-230V # Phase diff : 0-89 degree # Number of contacts : One number NC contact @ 220V,10Amp rating # One number of NO contacts @ 220V, 10Amp rating. # Auxiliary supply : 230VAC,50Hz * PC interfacing facility power ON/OFF switch with indicator.</p>

Gautam Buddha University

School of Engineering

TECHNICAL SPECIFICATIONS: POWER SYSTEM LABORATORY

S.N.	ITEM	TECHNICAL SPECIFICATIONS
1.	<p><u>Power System Simulator</u></p> <p>Power System Simulator should be consisting of the following three modules:</p> <ol style="list-style-type: none"> 1.Power Plant Module 2. Transmission line and distribution module 3.Receiving Substation Module <p>It should come with the complete SCADA package connected with minimum 20 computers.</p> <p>Also, a second generator set should be included to enable the various experiments related to synchronization and parallel operation of alternator.</p> <p>Each module should have an arrangement for emergency stop.</p> <p>The system should be able to perform the following experiments:</p> <p><i>System Level Experiments:</i></p> <ul style="list-style-type: none"> • Load flow • Symmetrical faults • Unbalanced faults • Unsymmetrical faults • Circuit interruption <p><i>Generator:</i></p> <ul style="list-style-type: none"> • Synchronisation • Characteristics and performance • Voltage variation and control • Voltage regulation • Stability studies <p><i>Transformer:</i></p> <ul style="list-style-type: none"> • Unequal taps • Unequal impedances • Unbalanced loads 	<p><i>Operating temperature range:</i> +5°C to +40°C</p> <p><i>Operating relative humidity range:</i> 80% at temperatures < 31°C decreasing linearly to 50% at 40°C</p> <p><i>Simulator voltages:</i></p> <ul style="list-style-type: none"> • Distribution: 415 V three-phase line to line • Utilisation: 415 V three-phase line to line <p><i>Grid transformer:</i></p> <ul style="list-style-type: none"> • 5 kVA delta to star (Dy11) <p>Primary is matched to the incoming three-phase supply to give the 415 V three-phase line-to-line secondary distribution voltage.</p> <p>Includes earth link for the secondary star point and a selectable tapping earth resistor for restricted earth fault protection tests.</p> <p><i>Generator and prime mover:</i></p> <ul style="list-style-type: none"> • 6 kVA maximum, Voltage 415V, 4-Pole, salient pole a.c generator with automatic and manual excitation. • 7 kVA maximum induction motor with shaft encoder and electronic four-quadrant a.c vector-drive control, with a four-position drive inertia switch. <p><i>Generator transformer:</i></p> <ul style="list-style-type: none"> • 5 kVA, 1:1 ratio delta-to-star (Dy11) impedance matching with adjustable secondary tapping <p><i>Transmission lines:</i></p> <p>Transmission voltage: 132kV, on 100MVA base</p> <p>Line reactances simulate 'per unit' (pu) values of impedance:</p> <ul style="list-style-type: none"> • Line 1: 0.10 pu • Lines 2 and 3: 0.15 pu • Lines 4 and 5: 0.25 pu • Line 6: 5 x 0.1 pu length with four test points and dedicated three-zone distance protection • Line 7: 4 x 0.01 pu (cable) <p>Capacitors should be provided adjacent to the lines.</p> <p>Each capacitor should have selectable values and should have option of getting inserted in circuit to give π or T-line configurations for studies of losses.</p> <p><i>Distribution transformers:</i></p> <ul style="list-style-type: none"> • Two identical 2 kVA transformers. <p>With adjustable primary tapplings and matched impedances</p> <p><i>Switched busbar:</i></p> <ul style="list-style-type: none"> • Six bi-directional feeders, each with circuit-breakers – one circuit breaker is a 'point-on-wave' device • Two circuit-breakers to break each half of each bus • Twelve bus isolators, six on each half of the bus • Two circuit-breakers that break the coupling between the main and reserve bus

S.N.	ITEM	TECHNICAL SPECIFICATIONS
	<p>Protection:</p> <p><i>Overcurrent protection:</i></p> <ul style="list-style-type: none"> • Relay grading • Auto-reclose • High-set instantaneous • Back-tripping • Directional control <p><i>General protection:</i></p> <ul style="list-style-type: none"> • Phase faults • Earth faults • Distance protection • Differential protection of transformers • Differential protection of generators • Busbar protection • Generator protection <p>Extra studies:</p> <p>Central and embedded generation</p> <ul style="list-style-type: none"> • Synchronising and paralleling with another three-phase source (mains or generator) • Load sharing • Stiff/weak systems • Circulating current monitoring • Three-source systems: connecting the generator at the central generation or embedded generation level • Automatic voltage regulator operation in constant reactive power and constant power factor modes 	<p>Protection relays:</p> <ul style="list-style-type: none"> • Grid transformer protection • Grid bus protection • Generator protection • Generator bus protection • Distance protection • 2 x double bus protection • 4 x distribution transformer protection <p>Loads:</p> <ul style="list-style-type: none"> • Two separate 415 V (distribution) loads, each with delta-connected variable resistors and inductors; One load should be near to the generator and the other near to the distribution bus. • Two sets of 415 V (utilisation) loads at the utilization bus; each should have delta-connected variable resistors, inductors and capacitor banks. • One dynamic load – an induction motor at the utilisation bus <p>SCADA</p> <p>Software:</p> <ul style="list-style-type: none"> • Industry-standard supervisory control and data acquisition (SCADA) • Full colour, compatible with Microsoft® Windows® XP (Professional) • Multi-level security features • Real-time display of voltages, currents and powers • Event logging and alarm functions • Emergency stop <p>Hardware:</p> <ul style="list-style-type: none"> • High-specification computer, keyboard and mouse • Large full-colour, high-resolution LCD monitor • RS232 (serial port) to RS485 and K bus converters <p>Communications standard:</p> <p>Modbus and K bus (converter to simulator)</p> <p>Second Generator</p> <p>Generator and motor:</p> <ul style="list-style-type: none"> • 6 kVA maximum, four pole salient pole a.c generator. Brushless, with automatic and manual excitation. • 7 kVA maximum induction motor with shaft encoder and electronic four-quadrant a.c vector drive control. <p>Relays:</p> <ul style="list-style-type: none"> • Generator bus protection: overcurrent and earth fault • Generator protection: over speed and under speed, overvoltage and overcurrent, and loss of mains (from rate of change of frequency and voltage vector shift) <p>Meters:</p> <ul style="list-style-type: none"> • 2 x multi-function meters to show voltage, current and power • 4 x digital meters to show generator excitation voltage and current, prime mover speed and generator load angle <p>Distribution transformer:</p> <ul style="list-style-type: none"> • 415 V to 415 V delta-to-delta (Dd) with adjustable primary tapplings and an earthing transformer to the secondary windings <p>Generator transformer:</p> <ul style="list-style-type: none"> • 415 V to 415 V delta-to-star (Dy) with adjustable secondary tapping and an earth link for the secondary star point

GENERAL TERMS AND CONDITIONS

1. Detailed information about the Equipments/Instruments and their specifications are available in tender document, which can be downloaded from the University website www.gbu.ac.in.
2. Two bids system of tender will be adopted.
 - (i) The bid containing technical specifications and EMD
 - (ii) Bid containing financial offer

Technical and financial bids should be submitted in separate covers. The envelopes should be marked as technical bid and financial bid with reference numbers. These two envelopes shall be sealed in a common cover and addressed to **The Registrar, Gautam Buddha University, Greater Noida, Gautam Budh Nagar -201310 (U.P.)** superscribing **“Tender against Notification Advt. GBU/S&P/02/2011, Name of supply: Laboratory Equipments/Instruments for the Power System Lab. in School of Engineering”** so as to reach us on or before last date of bid submission.

3. The Technical Bid and Financial Bid should be duly filled-up.
4. These bids will be opened in two stages. The bid containing technical specifications and EMD will be opened at first stage and if same is found according to required specifications, the bid containing financial offer shall be opened in second stage.
5. The **“Technical Bid”** shall contain all documents in support of quoted Equipments/Instruments, their specifications, commercial terms & conditions and eligibility criteria along with the page number for cited specifications in the company brochure for the particular item.
6. The **“Financial Bid”** shall contain price schedule only. The rates and units shall not be overwritten in the price schedule. The price shall be both in words and figures.
7. **Eligibility Criteria:** All the participating suppliers/firms or principal manufacturer-should meet the following qualifying criteria. The firm should be a registered supplier for such supplies. Following documents are required to be submitted with Technical Bid, to qualify eligibility criteria:
 - (a) Sales Tax/VAT registration certificate.
 - (b) PAN and TIN number should be mentioned.
 - (c) The firm should have experience of supplying & installation for similar Equipments/Instruments to institute of National repute such as IIT, AIIMS, CSIR labs etc. The company should also furnish a list of clients of last 3 years.
 - (d) Certified copy of balance sheet with trading, profit & loss account for the last three financial years should be submitted.
 - (e) Name of branch offices & service centres after sales arrangements.
 - (f) Earnest Money Deposit (EMD) **as 2% of the offered cost** is required to be submitted in the form of DD/Banker's Cheque only drawn in favour of “Finance Officer, Gautam Buddha University” payable at “Greater Noida” along with the Technical Bid. If supply is not made within the prescribed period EMD would be forfeited.
 - (g) Authorized signatory should sign on all pages. Bids without authorized signature will be rejected.
 - (h) **Minimum turnover required to procure the equipments/instruments : Rupees One Crore for Annexure – ‘A’ and Rupees Two Crore for Annexure – ‘B’.**
 - (i) The bidder must be either sole Manufacturer of the Equipments/Instruments or the authorized agent/representative of the OEM. In the case of agent/representative, certified copy of the agency/authorization issued by the OEM should be enclosed with the tender.

8. Offer should be sent in a sealed envelope, submitted either in person or by post on which name and address of the supplier/firm shall be written. Tenders received through E-mails or FAX will not be considered.
9. The technical bids will be opened on scheduled date and time in the presence of the vendors present possessing authorization letter from the respective companies/firms. Suppliers intending to attend the tender opening should intimate in advance.
10. The rate quoted should be F.O.R. Gautam Buddha University (Gautam Budh Nagar, Greater Noida, UP) in rupees inclusive of all charges e.g. packing, forwarding local taxes, railway freight, transit insurance, for outside firms and free delivery at University stores in the case of local firms. The total price should include all accessories required for final installation of the Equipments/Instruments.
11. The Equipments/Instruments should have USEPA/International/National validation certificates, wherever applicable.
12. The cost of the tender is Rs.1000/- (Rupees One Thousand) inclusive of taxes (Non-refundable) and it shall be paid separately in the form of DD/Banker's Cheque only drawn in favour of "Finance Officer, Gautam Buddha University" payable at "Greater Noida" and should be attached with technical bid envelope.
13. The EMD of the successful bidder will be refunded after two months of the completion of the supply and installation of the Equipments/Instruments to the satisfaction of the Gautam Buddha University. The EMD of the unsuccessful bidders will be returned to the concerned immediately after finalization of the tenders. No interest will be paid on EMD in any case.
14. The required delivery period must be mentioned against each item. Tenders should preferably be given only for those equipments/items/articles, which are available ex-stock. Rates of imported goods should be quoted excluding custom duty, as this University is exempted from payment of custom duty (by letter of Department of Scientific and Industrial Research, Ministry of Science & Technology, GOI).
15. Detailed specifications with the mention of make and model/Version of each item should be clearly given supported by the illustrated pamphlets wherever possible. Quotations without specified make and Model/Version and other particulars may be rejected. The payment will be made after the goods have been received, opened, checked, installed and found to be working satisfactorily as per the specifications and requirements. The accessories included in the Equipments/Instruments should also be clearly mentioned.
16. Losses or damage in transit will be borne by the Supplier. The supplier may, if he so desires, get the goods insured and include such charges in the tendered rate.
17. Offered prices should be valid at least for two months from the last date of receipt of tenders.
18. All legal proceedings, if necessity arises to the University may be any of the parties (University or Contractor/Supplier) shall have to be lodged in the courts situated at Gautam Buddha Nagar and not elsewhere.
19. (a) The Equipments/Instruments delivery time should be preferably within 10-12 weeks after the date of issuance of the purchase order. If the delivery time is quoted more than 10-12 weeks, GBU reserves all rights to permit the bidder to compete.

(b) The Penalty Clause is as under:-

Should the bidder fail to deliver the goods within stipulated period, the Competent Authority may, at his discretion, allow an extension in time subject to recovery from the bidder as agreed liquidated damages, and not by way of penalty, a sum equal to the percentage of the value of tender amount which the bidder has failed to supply for period of delay as stated below:-

i.Delay up to one week	1%
ii.Delay exceeding one week but not	2%

exceeding two weeks

iii.Delay exceeding two weeks but not exceeding one month 5%

iv.Delay exceeding one month 5% for each month and part there of subject to maximum 10%

(c) In case of failure to supply the goods within stipulated delivery period and in accordance with the specifications given in the quotations, the University shall be free to cancel the order.

20. Supply of the placed order in part will not be accepted.
21. The University's term for payment: 90% against delivery of items in good condition, installation and putting those in satisfactory working conditions; balanced 10% payment shall be released after 60 days of satisfactory working of the items. For balance 10% payment, the firm has to raise bill/letter for balance payment. No advance payment shall be released.
22. The AMC cost, wherever applicable, after warranty period shall be made in equal installments at the end of each quarter subject to satisfactory service rendered.
23. The price quoted should be in Indian Rupees.
24. No revision of price bid will be allowed once the price bids are opened.
25. No increase in price will be allowed after our purchase order(s) are placed.
26. Warranty certificate against all the Equipments/Instruments developed defects covering warranty period, which commences from the date of installation shall be given at the time of supply of the Equipments/Instruments.
27. Inspection certificates of the equipments/instruments inspected by the qualified engineer of the manufacturer and packed in accordance with the terms and conditions of this order must be enclosed.
28. During the warranty period whenever the firm is called upon to attend to the rectification of the defects/faults in the consignments, the firm shall attend to the repair work within a period of a week. They should render timely back up service whenever called upon. A certificate to the effect should be attached to the tender.
29. A certificate to the effect that Equipments/Instruments supplied is fully operational and no additional accessory or space is required to fully functioning the Equipments/Instruments should be issued along with the delivery challans/invoice. GBU reserves the right to refuse payment in the event of not furnishing this certificate at the time of supply.
30. Complete user, technical and service manuals/installation drawings/documentation and spare parts catalogue are to be provided along with the supply of the item.
31. Failure to comply with all the terms and conditions mentioned herein would result in the tender being summarily rejected.
32. Vendors are informed that once the firms are shortlisted based on the eligibility criteria and technical specifications, only then the financial bids of the firms meeting eligibility criteria, technical specifications / requirements would be opened.
33. Conditional tenders will not be accepted.
34. Any cutting and overwriting in the financial bid will not be accepted.
35. GBU reserves the right to change the order quantity or split the orders among multiple vendors without assigning any reason (s) whatsoever.
36. GBU reserves the right to reject any or all the tenders without assigning any reasons whatsoever.

SPECIAL TERMS AND CONDITIONS

1. Warranty period of equipments should be of two years.
2. Quote for three year extensive Annual Maintenance Contract (AMC) should be submitted separately in financial bid.
3. Price quoted shall include all necessary component parts, accessories and software required to run the equipments for successful intended experiments.
4. To verify the technical specifications and capabilities while evaluating technical bids, the firm may be asked to demonstrate the equipment in the University. If demonstration of the equipments in the University is not possible the firm shall arrange a visit of university officials to the nearby location for the same
5. Successful bidders shall arrange training programmes for the faculty and staff for the period decided by the University.
6. All equipments shall be compatible for Indian environmental conditions.

Registrar
Gautam Buddha University

ACCEPTANCE

We accept the above terms and conditions and shall comply with them strictly.

SIGNATURE OF THE AUTHORISED SIGNATORY :

NAME OF THE SUPPLIER :

ADDRESS :

:

:

FINANCIAL BID**Name of Laboratory : Power System Laboratory****Name of the School : School of Engineering**

S.N.	Item	Qty.	Unit Price (Rs. In figure)	Unit Price (Rs. in words)	Total Cost (Rs.)
1.	Microcontroller based IDMT over current relay trainer	01			
2	Electromechanical type IDMT Relay trainer	01			
3	Microcontroller based Over / Under Voltage relay Trainer	01			
4	Electromechanical type Over / Under Voltage Relay trainer	01			
5	Electromechanical type Earth Fault Relay	01			
6	Reverse Power Relay	01			

Extensive Annual Maintenance Contract cost (three years) should be mentioned on a sheet for each item separately.

Total cost of the offer is Rs._____ in words (Rupees _____)

_____. I abide by all the terms & conditions of the tender.

DECLARATION

1. The information given in the financial bid by the undersigned is correct.

SIGNATURE OF THE AUTHORISED SIGNATORY: _____

NAME OF THE SUPPLIER : _____

ADDRESS : _____

FINANCIAL BID**Name of Laboratory : Power System Laboratory****Name of the School : School of Engineering**

S.N.	ITEM	Qty.	Unit Price (Rs. In figure)	Unit Price (Rs. in words)	Total Cost (Rs.)
1	<p><u>Power System Simulator</u></p> <p>Power System Simulator should be consisting of the following three modules: 1.Power Plant Module 2. Transmission line and distribution module 3.Receiving Substation Module</p> <p>It should come with the complete SCADA package connected with minimum 20 computers.</p> <p>Also, a second generator set should be included to enable the various experiments related to synchronization and parallel operation of alternator.</p> <p>Each module should have an arrangement for emergency stop.</p> <p>The system should be able to perform the following experiments:</p> <p><i>System Level Experiments:</i></p> <ul style="list-style-type: none"> • Load flow • Symmetrical faults • Unbalanced faults • Unsymmetrical faults • Circuit interruption <p><i>Generator:</i></p> <ul style="list-style-type: none"> • Synchronisation • Characteristics and performance • Voltage variation and control • Voltage regulation • Stability studies <p><i>Transformer:</i></p> <ul style="list-style-type: none"> • Unequal taps • Unequal impedances • Unbalanced loads <p><i>Protection:</i></p> <p><i>Overcurrent protection:</i></p> <ul style="list-style-type: none"> • Relay grading • Auto-reclose • High-set instantaneous • Back-tripping • Directional control <p><i>General protection:</i></p> <ul style="list-style-type: none"> • Phase faults • Earth faults 	01			

<ul style="list-style-type: none"> • Distance protection • Differential protection of transformers • Differential protection of generators • Busbar protection • Generator protection <p>Extra studies: Central and embedded generation</p> <ul style="list-style-type: none"> • Synchronising and parallelling with another three-phase source (mains or generator) • Load sharing • Stiff/weak systems • Circulating current monitoring • Three-source systems: connecting the generator at the central generation or embedded generation level • Automatic voltage regulator operation in constant reactive power and constant power factor modes 				
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Extensive Annual Maintenance Contract cost (three years) should be mentioned on a sheet for each item separately.

Total cost of the offer is Rs. _____ in words (Rupees _____)

_____. I abide by all the terms & conditions of the tender.

DECLARATION

1. The information given in the financial bid by the undersigned is correct.

SIGNATURE OF THE AUTHORISED SIGNATORY: _____

NAME OF THE SUPPLIER : _____

ADDRESS : _____
