**Government College of Engineering, Bargur,Government College of Engineering, Bargur - 635104. Tamilnadu, INDIA.**

## INVITATION LETTER

**Package Code: TEQIP-III/2019/TN/gebt/28** **Current Date: 06-Jun-2019**

**Package Name: Multichannel Electrochemical Workstation** **Method: Shopping Goods**

**Sub: INVITATION LETTER FOR Multichannel Electrochemical Workstation**

Dear Sir,

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

| Sr. No | Item Name | Quantity | Place of Delivery | Installation Requirement (if any) |
|---|---|---|---|---|
| 1 | Multichannel Electrochemical Workstation | 1 | Government College of Engineering Bargur- 635 104. | |

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 re writing.

   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 **120**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.

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

8. 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.

8.1 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.

8.2 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.

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

**Satisfactory Delivery & Installation - 100% of total cost**

10. Liquidated Damages will be applied as per the below:
Liquidated Damages Per Day Min % : N/A
Liquidated Damages Max % : N/A

11. All supplied items are under warranty of **12** months from the date of successful acceptance of items and AMC/Others is .

12. You are requested to provide your offer latest by **13:30** hours on **21-Jun-2019.**

13. Detailed specifications of the items are at Annexure I.

14. Training Clause (if any) **Yes**

15. Testing/Installation Clause (if any) **Yes**

16. Performance Security shall be applicable**: 0%**

17. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.

18. Sealed quotation to be submitted/ delivered at the address mentioned below, **Government College of Engineering, Bargur,Government College of Engineering, Bargur - 635104. Tamilnadu, INDIA.**

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

Dr P K Palani

(Authorized Signatory)

Name & Designation

**PRINCIPAL**

Government College of Engg

BARGUR - 635 104.

6/6/19

**Annexure I**

| Sr. No | Item Name | Specifications | |
|---|---|---|---|
| 1 | Multichannel Electrochemical Workstation | **Technical Specifications** | • Number of Channels: 1 (Expandable upto 10 more channels at minimum)<br>• Compliance voltage: Standard ± 20 V or better at ± 400 mA current<br>Note: Adjustable compliance voltage configurations should be mentioned separately<br>• Maximum Output Current: ± 400 mA or better at ± 20 V.<br>• Current boosting option: Expandable anytime to ±10A measured current or better with Current Booster at unchanging compliance voltage of ± 20 V and 0.0003% measured current resolution<br>• Output Voltage Range: ± 10 V or better<br>• Maximum scan rate: **1000V/s with 15 mV steps – Required**<br>• Current Ranges: ± 10 nA to current range 100 mA in eight or more ranges<br>• Measured current accuracy: 0.0003% of current range (30 fA at 10 nA range): Must be a default hardware configuration without any additional external accessories or current boosters – **Required**<br>• Built-in Current Integrator: We require to separate faradaic current from capacitive current and also directly measure integrated charge in real-time rather than current<br>• Built-in Electromagnetic Noise filter: The system hardware must have internal third order Sallen-key filters for removing background noise that cannot be removed by simple measures such as faraday cage<br>• Measured Potential Resolution: 3µV or better<br>• Potentiostat Rise/fall Time: < 300 ns or lower<br>• Interface: USB interface for connection with PC.<br>• Input bias current: < 1 pA<br>• Bandwidth of electrometer: > 4 MHz<br>• Input impedance of electrometer: > 100 GOhm // 8 pF |
| | | **Electrochemical Impedance Spectroscopy: Qt. 1** | • Applied Frequency Resolution: 0.003%<br>• At 1 Hz frequency, impedance of 0.01 Ω must be determined with 0.3° Phase accuracy & 0.3 % measured impedance accuracy. i.e – Measured impedance = 0.01 ±0.00003 Ω - **Required**<br>• Frequency Range with External Waveform generator: 10 µHz to 32 MHz |

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|---|---|---|---|
| | | | • Frequency Range with PSTAT/GSTAT: 10 µHz to 1 MHz at a maximum current of ±400 mA currents<br>• Required – Real time fit-simulation, live lissejous plots, live 3D plotting.<br>• Preferred Option in near future – An Advanced EIS software that selects equivalent circuit by itself and allows touch free fitting and simulation of upto 50+ EIS data files in single run<br><br>**The system must have capability for hybrid measurements such as E-SPR, S-ECM, Spectro-electrochemistry, IMPS-IMVS, EQCM, etc. It should have TTL triggering, ADC, DAC based communication ports.** |
| | | **Electrochemical Cell Accessory: Qt. 1** | A 50 mL total volume three electrode set-up is required with following features:<br>• Gas tight construction with flangeless fittings (PEEK)<br>• A combination of chemically inert and organic solvent resistive materials including (i) PEEK: lid, electrode plugs and gas fittings, (ii) glass: chamber and RE body, (iii) FFKM O-Rings (iv) FEP tubbing and (v) Epoxy resin: WE electrode body.<br>• 2 mm GC RDE type electrode, Ag/AgCl aqueous electrode, platinum wire counter Electrode; Gas purging option. |
| | | **Software** | The system software must have capability for hybrid measurements such as Spectro-electrochemistry, E-SPR, SECM, IMPS-IMVS, EQCM, etc. It should have TTL triggering, ADC, DAC based communication ports. The Software must be able to be downloaded to unlimited computers, free updates & fully windows based. Software should be capable of supporting a wide variety of electrochemical techniques as mentioned below:<br>**Corrosion**:<br>Linear polarization with Tafel Slope Analysis, Polarization resistance evaluation, Electrochemical Noise analysis, critical pitting technique, **electrochemical frequency modulation**, hydrogen permeation analysis etc.<br>**Battery & Supercapacitor Analysis**: Rectangular CV analysis at varying scan rates for pseudo capacitor analysis, complete charge and discharge with built in integration and 'linkable' cut-offs, Galvanostatic charge discharge with cycle number vs specific capacitance plot, Voltage measurement on counter electrode, GITT, PITT, etc.<br>**Solar Cell / Fuel Cell Studies**:<br>Linear polarization, I-V plotting with automatic determination for max power point & fill factor, IMPS-IMVS evaluation, EQE |

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|---|---|
| | / IPCE Analysis, Charge extraction, Photo-current response, Mott-Schottky plots for single frequency scan, automated band-gap analysis, etc.<br>**Electro-catalysis / Electro-deposition**: ORR analysis using RDE/RRDE at varying rotation speeds and built-in Kotecky-levich plot generation, HER and OER Tafel based analysis for water splitting, Carbon dioxide reduction analysis, default plug-n-play protocol for spectro-electrochemistry based LSV, CV and Chrono evaluation, Galvanostatic CV and Chrono, ASV, DPSV, etc.<br>**Trace Metal Analysis / Polarography**:<br>DPSV, ASV, Chrono Coulometry, etc.<br>**Sensors**: Automated one-click protocol for CV and LSV analysis at varying scan rates, fully automated single click amperometric detection protocol, EIS measurement with real-time equivalent circuit fit option, etc.<br>**3D Based Live Plotting**:<br>Powerful graphic engine with useful features such as vector graphics, individual axis scaling, overlays, multiple Y-axes, plot addition, real-time 3D with zooming and rotation. Minimum 10+ plot could be plotted simultaneously. |
| **Computer Station** | A suitable branded Computer like Dell or Compaq or equivalent for system control & data acquisition should be offered with the system. It should have following minimum specs: CPU Intel Core i5, RAM 8 GB RAM, HDD 500 GB, GPU DirectX 9.0c compliant display adapter with 1GB RAM, TFT Monitor 21 inch, 101 Keys Keyboard, Optical Mouse, 3 USB Ports. Software should be freely upgradable in future. The model and the software capability offered should be well documented in the brochure/catalogue and should be available at Principal website. |
| **Any-time Switchable Option 1 Vs EIS** | A Multiplexer Module to allow Sequential Electrochemical Measurement from 4 to 64 independent Cells: Future Expandability. |
| **Any-time Switchable Option 2 Vs EIS** | A dual-mode bipotentiostat module for electro catalysis measurements using RRDE set-ups or sensor research. |
| **Any-time Upgradation to existing system** | A high current booster for a full-range ±10A measureable current with ± 20V compliance at a current resolution of 0.0003% or better. |
| **Warranty** | 1 year + 2 years AMC free or 3 Years Manufacturer's Warranty Certificate |

**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. _____

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. _____ (Amount in figures)
(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. _____