Tender Document

Tender No. 11-14042016-01

PROCUREMENT OF EQUIPMENT FOR ELECTRICAL ENGINEERING LABS (DIGITAL SYSTEM LAB, ELECTRICAL MACHINES LAB, SIGNALS & CONTROL SYSTEMS LAB, DSP & COMMUNICATION SYSTEMS LAB AND MICROWAVE DEVICES & ANTENNA LAB" ON DELIVERED DUTY PAID (DDP) BASIS

AT

INFORMATION TECHNOLOGY UNIVERSITY

INFORMATION TECHNOLOGY UNIVERSITY (ITU)

6th Floor, Arfa Software Technology Park (ASTP),
346-B, Ferozepur Road, Lahore, Pakistan

Phone: (+ 92) (42) (99046073), Fax: (+92) (42) (99232537)
URL: www.itu.edu.pk

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Important Note

Bidders must ensure that they submit all the required documents indicated in the Bidding Documents without fail. Bids received without, undertakings, valid documentary evidence, supporting documents and the manner for the various requirements mentioned in the Bidding Documents or test certificates are liable to be rejected at the initial stage itself. The data sheets, valid documentary evidences for the critical components as detailed hereinafter should be submitted by the Bidder for scrutiny.

Applicability of Punjab Procurement Rules, 2014

This Bidding Process will be governed under Punjab Procurement Rules, 2014, as amended from time to time and instructions of the Government of the Punjab if and when received.

Important Dates

Last date of Bid Submission: April 28th, 2016 (3pm) – 6th Floor Arfa Software Technology Park, Ferozepur Road, Lahore.

1. Invitation to Bid

1.1 PPRA Rules to be followed
Punjab Procurement Rules, 2014 will be strictly followed. These may be obtained from PPRA's website. http://ppra.punjab.gov.pk

In this document, unless otherwise mentioned to the contrary, "Rule" means a Rule under the Punjab Procurement Rules, 2014.

1.2 Mode of Advertisement(s)
As per Rule 12(1&2), this Tender is being placed online at PPRA's website, as well as being advertised in print media.

As per Rule 12(2), this Tender is also placed online at the website of Purchaser. The bidding document carrying all details can be downloaded from ITU's website **http://www.itu.edu.pk** and from PPRA's website **www.ppra.punjab.gov.pk** for information only. All prospective bidders are required to collect a Challan Form from the Procurement Assistant, ITU at above given address; to submit an amount of Rs.1,000/-(for each lot) in ITU's account. The deposit slip must accompany respective bid; elsewise the bid will stand rejected.

1.3 Type of Open Competitive Bidding
As per Rule 38(2)(a), Single Stage - Two Envelope Bidding Procedure shall be followed. The said procedure is reproduced as follows:

(i)   the bid shall be a single package consisting of two separate envelopes, containing separately the financial and the technical proposals;

(ii)   the envelopes shall be marked as "Financial Proposal" and "Technical Proposal";

(iii)   in the first instance, the "Technical Proposal" shall be opened and the envelope marked as "Financial Proposal" shall be retained unopened in the custody of the procuring agency;

(iv)   the procuring agency shall evaluate the technical proposal in the manner prescribed in advance, without reference to the price and shall reject any proposal which does not conform to the specified requirements;

(v)   during the technical evaluation no amendments in the technical proposal shall be permitted;

(vi)   after the evaluation and approval of the technical proposals, the procuring agency shall open the financial proposals of the technically accepted bids, publically at a time, date and venue announced and communicated to the bidders in advance, within the bid validity period;

(vii)   the financial bids found technically nonresponsive shall be returned un-opened to the respective bidders; and

(viii) the lowest evaluated bidder shall be awarded the contract.

2. Bidding Details (Instructions to Bidders)

All bids must be accompanied by Bid Security (Earnest Money), as part of Financial bid and as per provisions of the clause "Bid Security" of this document in favor of **"Information Technology University"**. The complete bids as per required under this tender document must be delivered into the Tender Box, placed at reception of Information Technology University on or before 1500 hours on **April 28, 2016**. The Technical bids shall be publicly opened in the Committee Room of Information Technology University, 6th Floor, Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore, at 1600 hours on **April 28, 2016**. In case the last date of bid submission falls in / within the official holidays / weekends of the Purchaser, the last date for submission of the bids shall be the next working day.

Queries of the Bidders (if any) for seeking clarifications regarding the specifications of the Goods/ Items/General Order Supplies must be received in writing to the Purchaser till **April 19, 2016**. Any query received after said date may not be entertained. All queries shall be responded to within due time. ITU may host a Q&A session, at ITU premises (6th Floor, Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore). The time, date and venue for said Q&A session shall be communicated to all registered bidders well in time.

The bidder shall submit bids which comply with the Bidding Document. Alternative bids shall not be considered. The attention of bidders is drawn to the provisions of this tender document Clause regarding **"Determination of Responsiveness of Bid" and "Rejection / Acceptance of the Tender"** for making their bids substantially responsive to the requirements of the Bidding Documents.

It will be the responsibility of the Bidder that all factors have been reviewed and considered while submitting the Bid and no claim whatsoever including those of financial adjustments to the contract awarded under this Bid Process will be entertained by the Purchaser at later stages. Neither any time schedule, nor financial adjustments arising thereof shall be permitted on account of failure by the Bidder.

The Bidder shall be deemed to have satisfied itself fully before Bid submission as to the correctness and sufficiency of its Bids for the contract and price/cost quoted in the Bid to cover all obligations under this Bid Process.

It must be clearly understood that the Terms and Conditions and Specifications are intended to be strictly enforced. No escalation of cost except arising from increase in quantity by the Bidder on the demand and approval of the Purchaser will be permitted throughout the period of completion of the contract.

The Bidder should be fully and completely responsible for all the deliveries and deliverables to the Purchaser.

The Primary Contact & Secondary Contact for all correspondence in relation to this bid is as follows:

<u>Primary Contact</u>

Dr. Tauseef Tauqeer
Head of Department (EE)
Email: tauseef.tauqeer@itu.edu.pk

6th Floor, Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore, Pakistan.

<u>Secondary Contact</u>

Muhammad Shaheryar Khan
Purchase Officer
Email: shaheryar.khan@itu.edu.pk

6th Floor, Arfa Software Technology Park, 346-B, Ferozepur Road, Lahore, Pakistan.

Bidders should note that during the period from the receipt of the bid and until further notice from the Primary Contact, all queries should be communicated via the Primary Contact and in writing (e-mail) only. In the case of an urgent situation where the Primary Contact cannot be contacted, the bidder may alternatively direct their enquiries through the Secondary Contact.

Bidders are also required to state, in their proposals, the name, title, contact number (landline, mobile), fax number and e-mail address of the bidder's authorized representative through whom all communications shall be directed until the process has been completed or terminated.

The Purchaser will not be responsible for any costs or expenses incurred by bidders in connection with the preparation or delivery of bids.

Failure to supply required items/services within the specified time period will invoke penalty as specified in this document.

TERMS AND CONDITIONS OF THE TENDER

3.   Definitions

3.1   In this document, unless there is anything repugnant in the subject or context:

3.2   "Authorized Representative" means any representative appointed, from time to time, by the Client, the Purchaser or the Contractor.

3.3   "Availability and Reliability" means the probability that a component shall be operationally ready to perform its function when called upon at any point in time.

3.4   "Client" means the Head of Department / Project Lead / Faculty Member at ITU for whose' particular project / department the Goods / Services have been procured or any other person, duly appointed in writing, by the Client, for the time being or from time to time, to act as Client for the purposes of the Contract.

3.5   "Bidder/Tenderer" means the interested Firm/Company/Supplier/Distributors that may provide or provides the general order items etc. and related services to any of the public/private sector organization under the contract and have registered for the relevant business thereof.

3.6   "Commencement Date of the Contract" means the date of signing of the Contract between the Purchaser and the Contractor.

3.7   "Contract" means the agreement entered into between the Purchaser and the Contractor, as recorded in the Contract Form signed by the parties, including all Schedules and Attachments thereto and all documents incorporated by reference therein.

3.8   "Contractor / Vendor" means the Tenderer whose bid has been accepted and awarded Letter of Acceptance for a specific item followed by the signing of Contract.

3.9   "Contract Price" means the price payable to the Contractor under the Contract for the full and proper performance of its contractual obligations.

3.10   "Contract Value" means that portion of the Contract Price adjusted to give effect to such additions or deductions as are provided for in the Contract which is properly apportion-able to the Goods or Services in question.

3.11   "Defects Liability Expiry Certificate" means the certificate to be issued by the Client to the Contractor, in accordance with the Contract.

3.12   "Day" means calendar day.

3.13   "Defects Liability Period" means the warranty period following the taking over, during which the Contractor is responsible for making good, any defects and damages in Goods and Services provided, under the Contract.

3.14   "Force Majeure" means an event beyond the control of the Contractor and not

involving the Contractor's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the Purchaser in its sovereign capacity, wars, revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

3.15   "Goods" means general order supplies which the Contractor is required to supply to the Purchaser under the Contract against each relevant Lot.

3.16   "Person" includes individual, association of persons, firm, company, corporation, institution and organization, etc., having legal capacity.

3.17   "Prescribed" means prescribed in the Tender Document.

3.18   "Purchaser" means the Information Technology University (ITU) or any other person for the time being or from time to time duly appointed in writing by the Purchaser to act as Purchaser for the purposes of the Contract.

3.19   "Origin" shall be considered to be the place where the Goods are produced or from where the Services are provided. Goods are produced when, through manufacturing, processing or assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components. The origin of Goods and Services is distinct from the nationality of the Contractor.

3.20   "Services" means installation, configuration, deployment, commissioning, testing, training, support, after sale service, etc. of Goods and other such obligations which the Contractor is required to provide to the Purchaser under the Contract.

3.21   "Taking-Over Certificate" means the certificate to be issued by the Client to the Contractor, in accordance with the Contract.

3.22   "Eligible" is defined as any country or region that is allowed to do business in Pakistan by the law of Government of Pakistan.

4.   Headings and Titles
In this document, headings and titles shall not be construed to be part thereof or be taken into consideration in the interpretation of the document and words importing the singular only shall also include the plural and vice versa where the context so requires.

5.   Notice
5.1   In this document, unless otherwise specified, wherever provision is made for exchanging notice, certificate, order, consent, approval or instructions amongst the Contractor, the Purchaser and the Client, the same shall be:
        5.1.1   in writing;
        5.1.2   issued within reasonable time;
        5.1.3   served by sending the same by courier or registered post to their principal

office in Pakistan or such other address as they shall notify for the purpose; and

5.1.4   The words "notify", "certify", "order", "consent", "approve", "instruct", shall be construed accordingly.

6.   Tender Scope

6.1   Information Technology University (ITU), (hereinafter referred to as "the Purchaser") invites / requests Proposals (hereinafter referred to as "the Tenders") for the supply of EQUIPMENT FOR ELECTRICAL ENGINEERING LABS. (Hereinafter referred to as "the Goods") and for after-sale support of said Goods (hereinafter referred to as "the Services") on Delivered Duty Paid (DDP) basis through irrevocable sight Letter of Credit (LC on Sight) in the name of Purchaser.

6.2   The Goods/items will be delivered to Information Technology University, Lahore. The delivery period shall start from the date of opening of Letter of Credit. Detail requirements and specifications are attached at **Annex-A**.

7.   Tender Eligibility/Qualification Criteria

7.1   Eligible Bidder/Tenderer is a Bidder/Tenderer who:

7.1.1   has a registered/incorporated company/firm in Pakistan with relevant experience of last three (3) years for each Lot;

7.1.2   Must be registered with Tax Authorities as per prevailing latest tax rules (Only those companies which are validly registered with sales tax and income tax departments and having sound financial strengths can participate);

7.1.3   has valid Registration of General Sales Tax (GST) & National Tax Number (NTN) and must be included in active taxpayers list;

7.1.4   has submitted bid for all items and relevant bid security. Non-compliance of the same shall cause rejection of the bid;

7.1.5   must be involved in manufacturing, sales or supply business for last three (3) years;

7.1.6   has authorization of the principal/manufacturer/reseller/dealer/service providers;

7.1.7   has not been blacklisted by any of Provincial or Federal Government Department, Agency, Organization or autonomous body or Private Sector Organization anywhere in Pakistan.
(Submission of undertaking on legal stamp paper is mandatory), failing which will cause rejection of the bid;

7.1.8   has the required relevant qualified personnel and enough strength to fulfill the requirement of assignment.

7.1.9   Conforms to the clause of "Responsiveness of Bid" given herein this tender

document.

7.1.10 Goods and Services can only be supplied/sourced/routed from "origin" in "eligible" member countries.

a. Eligible" is defined as any country or region that is allowed to do business in Pakistan by the law of Government of Pakistan.

b. "Origin" shall be considered to be the place where the Goods are produced or from which the Services are provided. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

Note: Verifiable documentary proof for all above requirements is a mandatory requirement, noncompliance will lead to disqualification.

8. Tender Cost

The Tenderer shall bear all costs / expenses associated with the preparation and submission of the Tender(s) and the Purchaser shall in no case be responsible / liable for those costs / expenses.

9. Joint Venture / Consortium

Joint ventures or consortium are also eligible for this tender, as long as, such arrangement complies with the following conditions:

9.1. The tenderers may form a joint venture of maximum three bidders/companies

9.2. The locally registered firm/company from amongst the Consortium/JV Partners must be nominated as Lead Partner/Prime Bidder and this authorization shall be evidenced by submitting of full Power of Attorney signed by the legally authorized signatories of all the Partners.

9.3. In case of the successful Bid, the Contract Agreement shall be signed by the Prime Bidder so as to be legally binding on all the partners. The Prime Bidder shall be authorized by the Consortium Partners through Power of Attorney to act on their behalf to incur liabilities and receive instructions for and on their behalf for entire execution of the contract and receive payment/payments which shall be done exclusively to the Prime Bidder. The prime bidder must be locally registered company in Pakistan.

9.4. All Partners of the Consortium shall be liable jointly and severally for the execution of the contract in accordance with the contract terms and a statement to this effect shall be included in the authorization mentioned above as well as in the Bid and in the agreement (in case of successful bid).

9.5. Copy of the Consortium/JV Agreement entered into by the Partners shall be submitted with the Bid.

9.6.   The Partners of a Consortium/JV are not allowed to bid individually or to be the Partner of another Consortium.

9.7.   No firm/Company/JV/Consortium shall be allowed to hide any fact. Any attempt to this effect may lead to disqualification of the firm/Company/JV/Consortium.

10.   Responsibility of Lead Partner/Prime Bidder

Any issue arising from the delivery till installation and throughout the warranty period.

11.   Examination of the Tender Document

The Tenderer is expected to examine the Tender Document, including all instructions and terms and conditions.

12.   Clarification of the Tender Document

The Tenderer may require further information or clarification of the Tender Document, within 06 (six) calendar days of issuance of tender in writing. The clarification and its replies will be shared with all prospective bidders.

Bidders should note that during the period from the receipt of the bid and until further notice from the Primary Contact given herein this document, all queries should be communicated via the Primary Contact and in writing (e.g. e-mail & letter) only. In the case of an urgent situation where the Primary Contact cannot be contacted, the bidder may alternatively direct their enquiries through the Secondary Contact.

13.   Amendment of the Tender Document

13.1   The Purchaser may, at any time prior to the deadline for submission of the Tender, at its own initiative or in response to a clarification requested by the Bidder(s), amend the Tender Document, on any account, for any reason. All amendment(s) shall be part of the Tender Document and binding on the Bidder(s).

13.2   The Purchaser shall notify the amendment(s) in writing to the prospective Tenderers as per Punjab Procurement Rules, 2014.

13.3   The Purchaser may, at its exclusive discretion, amend the Tender Document to extend the deadline for the submission of the Tender as per Rule-25(4) of Punjab Procurement Rules, 2014.

14.   Preparation / Submission of Tender

14.1   The Tenderer is allowed to bid for any or all Lots separately. The tenderer is further allowed to bid for any or all items under Lot No. 5 only.

14.2   The Tender and all documents relating to the Tender, exchanged between the Tenderer and the Purchaser, shall be in English. Any printed literature furnished by

the Tenderer in another language shall be accompanied by an English translation which shall govern for purposes of interpretation of the Tender.

14.3 The Tender shall be filed in / accompanied by the prescribed Forms, Annexes, Schedules, Charts, Drawings, Documents, Brochures, Literature, etc. which shall be typed, completely filled in, stamped and signed by the Tenderer or his Authorized Representative. In case of copies, signed and stamped photocopies may be submitted. If volume of the bid contains various set(s) of documents the same must be properly numbered and tagged in binding shape.

14.4 The Tender shall be in two parts i.e. the technical proposal and the financial proposal. Each proposal shall be in two sets i.e. the original and the copy. In the event of any discrepancy between the original and the duplicate, the original shall govern.

14.5 Technical Proposal shall comprise the following, **without quoting the price**:

14.5.1 Technical Proposal Form (**Annexure-B**)

14.5.2 Undertaking (All terms & conditions and qualifications listed anywhere in this tender document have been satisfactorily vetted) and Affidavit (Integrity Pact) (**Annexure-G&H**)

14.5.3 Covering letter duly signed and stamped by authorized representative. (**Annexure-E**)

14.5.4 Authorized Certificate / document from the principal / manufacturer.

14.5.5 Evidence of eligibility of the Tenderer and the Goods

14.5.6 Evidence of conformity of the Goods / the Services to the Tender Document

14.5.7 Technical Brochures / Literature

14.5.8 Submission of undertaking on legal valid and attested stamp paper that the firm is not blacklisted by any of Provincial or Federal Government Department, Agency, Organization or autonomous body or Private Sector Organization anywhere in Pakistan.

14.5.9 The statement must be signed by the authorized representative of the Bidder

14.5.10 Valid Registration Certificate for Income Tax & Sales Tax and Status of the Firm / Company on Active Tax Payer list

14.5.11 Income Tax & Sales Tax Returns for the last three (3) tax years

14.5.12 Power of Attorney, if an authorized representative is appointed (**Annexure-F**)

14.6 The Financial Proposal shall comprise the following:

14.6.1 Financial Proposal Form (**Annexure-C**)

14.6.2 Price Schedule (**Annexure-D**)

14.6.3 Bid Security **(Earnest Money), as per provisions of the clause Bid**

Security of this document (Annexure- I)

14.7   The Tenderer shall seal the Original Technical Proposal in an envelope duly marked as under:

Original Technical Tender for
Tender Name. [Name of Tender]
Tender No. **11-14042016-01**
Lot No.

[Name of the Purchaser]
[Address of the Purchaser]

[Name of the Tenderer]
[Address of the Tenderer]
[Phone No. of the Tenderer]

14.8   The Tenderer shall seal the Duplicate Technical Tender in an envelope duly marked as under:

Duplicate Technical Proposal for
Tender Name. [Name of Tender]
Tender No. **11-14042016-01**
Lot No.

[Name of the Purchaser]
[Address of the Purchaser]

[Name of the Tenderer]
[Address of the Tenderer]
[Phone No. of the Tenderer]

14.9   The Tenderer shall follow the same process for the Financial Tender.

14.10 The Tenderer shall again seal the sealed envelopes of Original Technical Proposal and the Original Financial Proposal in an outer envelope, duly marking the envelope as under:

Original Tender for

Tender Name. [Name of Tender]
Tender No. **11-14042016-01**
Lot No.

Strictly Confidential

[Name of the Purchaser]
[Address of the Purchaser]

[Name of the Tenderer]
[Address of the Tenderer]
[Phone No. of the Tenderer]

14.11 The Tenderer shall again seal the sealed envelopes of Duplicate Technical Proposal and the Duplicate Financial Proposal in an outer envelope, duly marking the envelope as under:

Duplicate Tender for
Tender Name. [Name of Tender]
Tender No. **11-14042016-01**
Lot No.

Strictly Confidential

[Name of the Purchaser]
[Address of the Purchaser]

[Name of the Tenderer]
[Address of the Tenderer]
[Phone No. of the Tenderer]

14.12 The Tenderer shall enclose soft copies of the Technical Proposal and the Financial Proposals, including all Forms, Annexes, Schedules, Charts, Drawings, Documents, Brochures, Literature, etc., in the form of MS Word Documents, MS Excel Worksheets and Scanned images, with the hard copies.

14.13 The Tender shall be dropped in the prescribed Tender Box placed at the Reception of the Purchaser's office, not later than 1500 hours on last date of submission of bids. No late bid shall be accepted.

14.14 This is made obligatory to affix authorized signatures with official seal on all original and duplicate (copies) documents, annexures, copies, certificates, brochures, literature, drawings, letters, forms and all relevant documents as part

of the bids submitted by the tenderer.

15.   Tender Price

15.1   The quoted price shall be:

15.1.1 best / final / fixed and valid until completion of all obligations under the Contract i.e. not subject to variation / escalation;

15.1.2 in US Dollars (the payment shall be made in Pak Rupees as per the terms and conditions set forth in Letter of Credit (LC) and as per foreign currency exchange rate instructed/notified by the State Bank of Pakistan in the light of prevailing law of the Land;

15.1.3 inclusive of all taxes, duties, levies, insurance, freight, etc.;

15.1.4 including all charges up to the delivery point at the office of Information Technology University.

15.2   If not specifically mentioned in the Tender(s), it shall be presumed that the quoted price is as per the above requirements.

15.3   Where no prices are entered against any item(s), the price of that item shall be deemed be free of charge, and no separate payment shall be made for that item(s).

15.4   In case of locally produced Equipment/Service, the price shall include all customs duties and sales and other taxes already paid or payable on the components and raw materials used in the manufacture or assembly of the item. In case of Contract of imported Equipment/Services offered Ex-Warehouse/Off-the-Shelf from within the Purchaser's country, import duties and sales and other taxes already paid shall be shown separately (if required by the Purchaser).

16.   Bid Security (Earnest Money)

16.1   The Tenderer shall furnish the Bid Security (Earnest Money) as under:

16.1.1 for a sum equivalent to **2%** of the Total Tender Price;

16.1.2 denominated in Pak Rupees;

16.1.3 separately against each Lot given in this tender document,

16.1.4 the tenderer is allowed to furnish bid security against any or all items under Lot No.5 only;

16.1.5 As part of financial bid envelope, failing which will cause rejection of bid;

16.1.6 if Total Tender Price is less than or equal to PKR 100 Million, in the form of Demand Draft / Pay Order / Call Deposit Receipt, in the name of the Purchaser;

16.1.7 if the Total Tender Price is more than PKR 100 Million, in the form of Bank Guarantee, issued by a scheduled bank operating in Pakistan, in the name of the Purchaser, as per the format provided in the Tender Document;

16.1.8 have a minimum validity period of (120) days from the last date for

submission of the Tender or until furnishing of the Performance Security, whichever is later.

16.2 The Bid Security shall be forfeited by the Purchaser, on the occurrence of any / all of the following conditions:

16.2.1 If the Tenderer withdraws the Tender during the period of the Tender validity specified by the Tenderer on the Tender Form; or

16.2.2 If the Tenderer does not accept the corrections of his Total Tender Price; or

16.2.3 If the Tenderer, having been notified of the acceptance of the Tender by the Purchaser during the period of the Tender validity, fails or refuses to furnish the Performance Security, in accordance with the Tender Document.

16.3 The Bid security shall be returned to the technically unsuccessful Tenderer with unopened/sealed financial bid while the unsuccessful bidders of financial bid opening procedure will be returned the Bid Security only. The Bid Security shall be returned to the successful Tenderer upon furnishing of the Performance Security.

17.   Tender Validity

The Tender shall have a minimum validity period of (120) day from the last date for submission of the Tender. The Purchaser may solicit the Tenderer's consent to an extension of the validity period of the Tender. The request and the response thereto shall be made in writing. If the Tenderer agrees to extension of validity period of the Tender, the validity period of the Bid Security shall also be suitably extended. The Tenderer may refuse extension of validity period of the Tender, without forfeiting the Bid security.

18.   Modification / Withdrawal of the Tender

18.1 The Tenderer may, by written notice served on the Purchaser, modify or withdraw the Tender after submission of the Tender, prior to the deadline for submission of the Tender.

18.2 The Tender, withdrawn after the deadline for submission of the Tender and prior to the expiration of the period of the Tender validity, shall result in forfeiture of the Bid Security.

19.   Opening of the Tender

19.1 Tenders (Technical Bids) shall be opened at 1600 hrs on the last date of submission of bids, in the presence of the Tenderer(s) for which they shall ensure their presence without further invitation. In case the last date of bid submission falls in / within the official holidays / weekends of the Purchaser, the last date for submission of the bids shall be the next working day.

19.2 The Tenderer's name, modifications, withdrawal, security, attendance of the Tenderer and such other details as the Purchaser may, at its exclusive discretion,

consider appropriate, shall be announced and recorded.

19.3 No tenderer or its representative will be allowed to keep any digital device (camera, audio recorder, cell phone etc.) during tender opening meeting at given time and location. Non-compliance will cause the rejection of respective bidder.

20. Clarification of the Tender

The Purchaser shall have the right, at his exclusive discretion, to require, in writing, further information or clarification of the Tender, from any or all the Tenderer(s). No change in the price or substance of the Tender shall be sought, offered or permitted except as required to confirm the corrections of arithmetical errors discovered in the Tender. Acceptance of any such correction is sole discretion of the purchaser.

21. Determination of Responsiveness of the Bid (Tender)

21.1 The Purchaser shall determine the substantial responsiveness of the Tender to the Tender Document, prior to the Tender evaluation, on the basis of the contents of the Tender itself without recourse to extrinsic evidence. A substantially responsive Tender is one which:

21.1.1 meets the eligibility criteria given herein this tender document.

21.1.2 meets the Technical Specifications for the Goods/Items/General Order Supplies against each Lot; and against any or all items under Lot No.5 only.

21.1.3 meets the delivery period / point for the Goods Items/General Order Supplies.

21.1.4 in compliance with the rate and limit of liquidated damages;

21.1.5 offers fixed price quotations for the Goods Items/General Order Supplies against each Lot and against any or all items under Lot No.5 only;

21.1.6 is accompanied by the required Bid Security as part of financial bid envelope against each Lot and against any or all items under Lot No.5 only;

21.1.7 The original receipt of tender fee submitted, attached with technical bid envelope against each Lot and against each Lot and against any or all items under Lot No.5 only;

21.1.8 In compliance with the Preparation/Submission of Tender in a manner prescribed in this tender document clause-13;

21.1.9 Conforms to all terms and conditions of the Tender Document, without material deviation or reservation.

21.2 A material deviation or reservation is one which affects the scope, quality or performance of the Services / Goods or limits the Purchaser's rights or the Tenderer's obligations under the Contract.

21.3 The Tender determined as not substantially responsive shall not subsequently be made responsive by the Tenderer by correction or withdrawal of the material

deviation or reservation.

22.   Correction of Errors / Amendment of Tender

22.1   The Tender shall be checked for any arithmetic errors which shall be rectified, as follows:

    22.1.1   if there is a discrepancy between the amount in figures and the amount in words for the Total Tender Price entered in the Tender Form, the amount which tallies with the Total Tender Price entered in the Price Schedule, shall govern.

    22.1.2   if there is a discrepancy between the unit rate and the total price entered in the price Schedule, resulting from incorrect multiplication of the unit rate by the quantity, the unit rate as quoted shall govern and the total price shall be corrected, unless there is an obvious and gross misplacement of the decimal point in the unit rate, in which case the total price as quoted shall govern and the unit rate shall be corrected.

    22.1.3   if there is a discrepancy in the actual sum of the itemized total prices and the total tender price quoted in the Price Schedule, the actual sum of the itemized total prices shall govern.

22.2   The Tender price as determined after arithmetic corrections shall be termed as the Corrected Total Tender Price which shall be binding upon the Tenderer.

22.3   Adjustment shall be based on corrected Tender Prices. The price determined after making such adjustments shall be termed as Evaluated Total Tender Price.

22.4   No credit shall be given for offering delivery period earlier than the specified period.

23.   Technical Evaluation Criteria

PASS MARKS: A technically eligible bidder, based on conditions listed in this document, not meeting the 70% marks limit will be rejected in Technical Evaluation, and its sealed / unopened Financial Proposal shall be returned back. All bidders scoring greater than or equal to 70% of the marks will be accepted in technical proposal, and their financial bids will be opened.

PROVISO: Provided that if NONE or ONLY ONE (single) bidder exceeds the 70% pass mark, then the Purchaser SHALL decrease the Pass Mark limit to 60%. In other words, if TWO or more bidders exceed 70%, then the Pass Marks will NOT be decreased to 60%.

If Pass Marks are decreased to 60%, then ALL bidders with scores greater than or equal to 60% shall be considered EQUALLY as approved in the Technical Evaluation, and their Financial Bids shall be opened.

The Bids which do not confirm to the Technical Specifications or Bid conditions or the Bids from the Bidders without adequate capabilities for supply and maintenance / warranty services will be rejected.

The Bidders who have duly complied with the Eligibility/Qualification and Evaluation Criteria will be eligible for further processing.

The technical proposals shall be evaluated by the technical evaluation committee in the light of following evaluation criteria against each Lot and against any or all items under Lot No.5 only:

Category	Description	Points
Legal (Mandatory)	Certificate of Company / Firm Registration/ Incorporation under the laws of Pakistan	Mandatory
	Valid Income Tax Registration	Mandatory
	Valid General Sales Tax Registration (Status = Active with FBR as on the date of submission)	Mandatory
	Submission of undertaking on legal valid and attested stamp paper that the firm is not blacklisted by any of Provincial or Federal Government Department, Agency, Organization or autonomous body or Private Sector Organization anywhere in Pakistan.	Mandatory

	Compliance to the technical specifications of all items to be procured mentioned vide Annex-A of this document.	Mandatory	
	In full compliance of the execution schedule and Delivery Period mentioned in tender document (Undertaking).	Mandatory	
	In case of authorized distributor, valid authorization certificate of the manufacturer must be provided.	Mandatory	
	Submission of copy of the Consortium/JV Agreement entered into by the Partners (In case of Joint Venture/Consortium).	Mandatory	
	Authorization of locally registered firm/company as the Lead Partner/Prime Bidder dully issue/signed by all partners of the JV/Consortium (In case of Joint Venture/Consortium).	Mandatory	
Financial	Average Annual Sales of similar nature projects for last three (3) years (Max Points 100)	10-50 million	60 Points
		50–100 million	70 Points
		Above 100 to 200 million	80 Points
		Above 200–300 million	90 Points
		Above 300 million	100 Points
Technical (Quality, Human Resource, Professional, Backup Support)	Total No. of full time technical employees (Max Points 50)	Above 5 to 10	30 Points
		Above 10 to 15	35 Points
		Above 15 to 20	40 Points
		Above 20 to 25	45 Points
		Above 25	50 Points
		Total Points	**150**

Note: Verifiable documentary proof for all above requirements and criteria points are mandatory requirement and marks will be awarded on the basis of these verifiable proofs.

24. Financial Proposal Evaluation

24.1   Technically qualified/successful bidder(s)/Tenderer(s) shall be called for opening of the Financial Proposal(s). The Financial Proposals will be opened in the presence of the Bidders at the time and venue indicated by the Purchaser accordingly. The

technically Eligible/Successful Bidder(s)/Tenderer(s) or their authorized representatives against each Lot/items shall be allowed to take part in the Financial Proposal(s) opening against their relevant Lot(s)/item(s).

24.2   Financial Proposal evaluation will be conducted under the Punjab Procurement Rules, 2014. The Price evaluation will include all duties, taxes and expenses etc. In case of any exemption of duties and taxes made by the Government in favor of the Purchaser, the contractor shall be bound to adjust the same in the Financial Proposal.

24.2.1 In cases of discrepancy between the cost/price quoted in Words and in Figures, the lower of the two will be considered.

24.2.2 In evaluation of the price of an imported item, the price will be determined and considered inclusive of the customs and other import duties etc.;

24.2.3 In evaluation of the price of articles/goods/services which are subject to excise duty, sales tax, income tax or any other tax or duty levied by the Government, the price will be determined and considered inclusive of such duties and taxes.

24.3   The Purchaser will not be responsible for any erroneous calculation of tax rates or any subsequent changes in rates or structure of applicable taxes. All differences arising out as above shall be fully borne by the Successful Bidder.

25.   Rejection / Acceptance of the Bid

25.1   The Purchaser shall have the right, at his exclusive discretion, to increase / decrease the quantity of any or all item(s) without any change in unit prices or other terms and conditions at the time of order placement. The Purchaser may cancel/reject all bids or proposals at any time prior to the acceptance of a bid or proposal. The Purchaser shall upon request communicate to any bidder, the grounds for its rejection of all bids or proposals, but shall not be required to justify those grounds. The Purchaser shall incur no liability, solely, by virtue of its invoking sub-rule(1) of Rule-35 of Punjab Procurement Rules, 2014 towards the bidders. However, bidders shall be promptly informed about the rejection of the bids, if any (As per Rule-35 of Punjab Procurement Rules, 2014).

25.2   The Tender shall be rejected if it is:

25.2.1   substantially non-responsive in a manner prescribed in this tender document clause-20; or

25.2.2   submitted in other than prescribed forms, annexes, schedules, charts, drawings, documents / by other than specified mode; or

25.2.3   incomplete, partial, conditional, alternative, late; or

25.2.4   bid not submitted separately against each Lot and relevant bid security is not submitted against each Lot separately and against any or all items under Lot No. 5 only.

25.2.5   the Tenderer refuses to accept the corrected Total Tender Price; or

25.2.6 the Tenderer has conflict of interest with the Purchaser; or

25.2.7 the Tenderer tries to influence the Tender evaluation / Contract award; or

25.2.8 the Tenderer engages in corrupt or fraudulent practices in competing for the Contract award;

25.2.9 the Tenderer fails to meet all the requirements of Tender Eligibility / Qualification Criteria (Clause-7);

25.2.10 the Tenderer fails to meet the evaluation criteria requirements (clause-22);

25.2.11 the tenderer has been blacklisted by any public or private sector organization;

25.2.12 the tenderer has mentioned any financial implication(s) in the financial proposal that is in contradiction to this document and Government rules and regulations.

25.2.13 there is any discrepancy between bidding documents and bidder's proposal i.e. any non-conformity or inconsistency or informality or irregularity in the submitted bid.

25.2.14 the Tenderer submits any financial conditions as part of its bid which are not in conformity with tender document.

25.2.15 Non-submission of verifiable proofs against the mandatory as well as general documentary, qualification and eligibility related requirements.

26. Award Criteria

26.1 At first step, eligible bidder(s)/tenderer(s) as per clause-7 (Tender Eligibility) of this tender document fulfilling the qualification and technical evaluation criteria against each Lot/item(s) will stand technically qualified.

26.2 At second step, technically qualified and successful bidder(s)/tenderer(s) will be evaluated in the light of all Pre-Conditions, necessary requisites and shall be selected on lowest cost quoted as per rules and fulfilling all codal formalities against each Lot/item(s), irrespective of their score in the previous step.

27. Acceptance Letter

As per provisions of Rule-(55) of Punjab Procurement Rules 2014, the Purchaser shall issue the Acceptance Letter to the successful Tenderer, at least after 10 days of announcement of bid evaluation reports and prior to the expiry of the original validity period or extended validity period of the Tender, which shall constitute a contract, until execution of the formal Contract against each Lot and against any or all items under Lot No.5 only.

28. Performance Security

28.1 The successful Tenderer/The Contractor against each Lot/Item(s) shall furnish Performance Security as under:

28.1.1 within **twenty (20) days** of the receipt of the Acceptance Letter from the

Purchaser;

28.1.2 in the form of a Bank Guarantee, issued by a scheduled bank operating in Pakistan, as per the format provided in the Tender Document;

28.1.3 for a sum equivalent to **10%** of the contract value;

28.1.4 denominated in Pak Rupees;

28.1.5 have a minimum validity period till fulfilment of all obligations under the contract. No other shape or form of performance security shall be acceptable with any validity less than the prescribed time period.

28.2 The Performance Security shall be payable to the Purchaser, on occurrence of any / all of the following conditions:

28.2.1 If the Contractor commits a default under the Contract;

28.2.2 If the Contractor fails to fulfill the obligations under the Contract;

28.2.3 If the Contractor violates any of the terms and conditions of the Contract.

28.3 The Contractor shall cause the validity period of the performance security to be extended for such period(s) as the contract performance may be extended. The Performance Security shall be returned to the Tenderer within thirty working days after the expiry of its validity on written request from the Contractor.

28.4 In case the Contractor fails to furnish Performance security in the shape of bank guarantee within the stipulated period given under Letter of Acceptance and subsequent formal contract, or till end of the currency of the said contract, the amount of bank guarantee, as required, shall be deducted from the amount payable to the Contractor.

29. Redressal of grievances by the procuring agency

29.1 The procuring agency shall constitute a committee comprising of odd number of persons, with proper powers and authorizations, to address the complaints of bidders that may occur prior to the entry into force of the procurement contract.

29.2 Any bidder feeling aggrieved by any act of the procuring agency after the submission of his bid may lodge a written complaint concerning his grievances not later than fifteen days after the announcement of the bid evaluation report.

29.3 The committee shall investigate and decide upon the complaint within fifteen days of the receipt of the complaint.

29.4 Mere fact of lodging of a complaint shall not warrant suspension of the procurement process.

29.5 Any bidder not satisfied with the decision of the committee of the procuring agency may lodge an appeal in the relevant court of jurisdiction.

DRAFT
TERMS & CONDITIONS OF THE CONTRACT (TENTATIVE)

Contract Title:

PROCUREMENT OF EQUIPMENT FOR ELECTRICAL ENGINEERING LABS (DIGITAL SYSTEM LAB, ELECTRICAL MACHINES LAB, SIGNALS & CONTROL SYSTEMS LAB, DSP & COMMUNICATION SYSTEMS LAB AND MICROWAVE DEVICES & ANTENNA LAB" ON DELIVERED DUTY PAID (DDP) BASIS

[Name of Contractor]

Dated:

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This CONTRACT AGREEMENT (this "Contract") made as of the **[day]** of **[month]**, **[year]**, between **[full legal name of the Purchaser]** (the "Purchaser"), on the one part,

and

[full legal name of Contractor], on the other part severally liable to the Purchaser for all of the Contractor's obligations under this Contract and is deemed to be included in any reference to the term "the Contractor."

RECITALS

WHEREAS,

(a) The Government through the Purchaser intends to spend a part of its budget / funds for making eligible payments under this contract. Payments made under this contract will be subject, in all respects, to the terms and conditions of the Contract in lieu of the consulting services as described in the contract.

(b) The Purchaser has requested the Contractor to provide certain supply of Goods/Services as described in Tender Document; and

(c) The Contractor, having represented to the Purchaser that it has the required professional skills, and personnel and technical resources, has agreed to provide such services on the terms and conditions set forth in this Contract.

NOW THEREFORE, the Parties to this Contract agree as follows:

1. The Contractor hereby covenants with the Purchaser to supply the Goods and provide the Services and to remedy defects / damage therein, at the time and in the manner, in conformity in all respects with the provisions of the Contract, in consideration of the payments to be made by the Purchaser to the Contractor.

2. The Purchaser hereby covenants with the Contractor to pay the Contractor, the Contract Price or such other sum as may become payable, at the times and in the manner, in conformity in all respects with the provisions of the Contract, in consideration of supply of the Goods and provision of the Services and remedying of defects / damage therein.

3. The following shall be deemed to form and be read and construct as part of this Contract:
    a. The Tender Document
    b. Bidder's Proposal
    c. Terms and Conditions of the Contract

    d. Special Stipulations
    e. The Technical Specifications
    f. Tender Form
    g. Price Schedule
    h. Affidavit(s)
    i. Authorized Dealership / Agency Certificate
    j. Performance Security
    k. Service Level Agreement (SLA) (if required)
    l. Non-Disclosure Agreement (if required)
    m. Any Standard Clause acceptable for Purchaser

4. This Contract shall prevail over all other documents. In the event of any discrepancy / inconsistency within the Contract, the above Documents shall prevail in the order listed above.

IN WITNESS whereof the Parties hereto have caused this Contract to be executed in accordance with the laws of **Pakistan** as of the day, month and year first indicated above.

For **[full legal name of the Purchaser]:**   For **[full legal name of the Contractor]:**

Signature   Signature

Name   Name

Witnessed By: Witnessed By:

WITNESSES

    Signature_____   Signature _____

    CNIC #_____   CNIC # _____

    Name_____   Name _____

    Designation_____   Designation _____

    Address_____   Address _____

II. General Conditions of Draft Contract

30. Contract

The Purchaser shall, after receipt of the Performance Security from the successful Tenderer, send the Contract provided in the Tender Document, to the successful Tenderer. Within three working days of the receipt of such Contract, the Tenderer shall sign and date the Contract and return it to the Purchaser.

31. Contract Duration

The Contract duration for Lot No.1, 2, 3 and 5 shall be for the period of one (1) year starting from the date of delivery, installation, deployment & commissioning of all Goods/ Equipment/ Items or till end of warranty period, whichever is later.

The Contract duration for Lot No.4 shall be for the period of two (2) years starting from the date of delivery, installation, deployment & commissioning of all Goods/ Equipment/ Items or till end of warranty period, whichever is later.

32. Contract Documents and Information

The Contractor shall not, without the Purchaser's prior written consent, make use of the Contract, or any provision thereof, or any document(s), specifications, drawing(s), pattern(s), sample(s) or information furnished by or on behalf of the Purchaser in connection therewith, except for purposes of performing the Contract or disclose the same to any person other than a person employed by the Contractor in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only as far as may be necessary for purposes of such performance.

33. Contract Language

The Contract and all documents relating to the Contract, exchanged between the Contractor and the Purchaser, shall be in English. The Contractor shall bear all costs of translation to English and all risks of the accuracy of such translation.

34. Standards

The Goods supplied and the Services provided under this Contract shall conform to the authoritative latest industry standards.

35. Commercial Availability

The Goods supplied under this Contract shall be commercially available at the time of signing of the contract. Commercial availability means that such Goods shall have been sold, installed and operationalized in more than two installations initiated under two separate contracts by manufacturer globally.

36. Patent Right

The Contractor shall indemnify and hold the Purchaser harmless against all third party claims of infringement of patent, trademark or industrial design rights arising from use of the Goods / the Service or any part thereof.

37. Execution Schedule

The Contractor shall deliver Goods/ordered equipment against the required solution within twelve (12) weeks from the issuance of Acceptance Letter.

38. Packing

The Contractor shall provide such packing of the Goods as is sufficient to prevent their damage or deterioration during storage / transit to their final destination as indicated in the Contract. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination and withstand, without limitation, rough handling, exposure to extreme temperatures, salt and precipitation at all points in storage / transit. The Contractor shall arrange and pay for the packing of the Goods to the place of destination as specified in the Contract, and the cost thereof shall be included in the Contract Price.

39. Insurance

The Contractor shall provide all such insurance of the Goods as is sufficient to protect against their damage or deterioration during storage / transit to their final destination as indicated in the Contract. The Contractor shall arrange and pay for the insurance of the Goods to the place of destination as specified in the Contract, and the cost thereof shall be included in the Contract Price.

40. Labeling

The Goods supplied under the Contract, shall be clearly labeled so as to correspond with the delivered documentation, with proper labeling scheme provided by the Client. All networking equipment, cables, connectors, ports, boxes shall be clearly labeled.

41. Packaging

A packaging list along with every package including Model No., Batch No., Sr. No., List of Accessories, User Manuals, Do(s) and Don't(s) instructions/leaflets in English, Principle warranty documents and Any soft media (software if any) must be provided.

42. Delivery

42.1 The contractor shall be solely responsible for clearance of landed ordered equipment as per the terms and conditions / timelines set forth in Letter of Credit.

42.2 Any delay with respect to the clearance of landed equipment shall be solely managed by the contractor/Lead Local Partner in case of Joint Venture/Consortium and in no way the Purchaser shall bear any relevant cost or demerges.

42.3 The Contractor shall indicate his delivery approach clearly specifying the requirements for packing, shipping and unpacking of deliverable

Goods/Equipment/Item with any associated/relevant software and its documentation. The approach shall address shipment of deliverables to the various designated (installation) sites. The approach shall also specify any special shipping constraints such as custom requirements, security requirements, access arrangement or loading dock requirements. The Contractor shall deliver the Goods at the premises of Information Technology University.

42.4   The Goods shall remain at the risk and under the physical custody of the Contractor until the delivery, testing and taking over of the Goods is completed.

42.5   The Contractor shall ensure that the Goods shall be delivered complete to enable the testing and training to proceed without interruption. If it shall appear to the Client that the Goods have been or are likely to be delayed by reason of incomplete delivery or for any other reasons, he may require the Contractor at the expense of the Contractor to dispatch the missing items of the Goods or suitable replacements thereof to the site of delivery by the fastest available means including air freight.

42.6   The Contractor shall include in the Tender a detailed logistics plan which shall include support details for transportation, mobilization and personnel scheduling during project implementation and the warranty period. The Contractor shall provide maintenance, supply and procurement support necessary for Client to maintain all system, at the contracted performance and reliability level. The Contractor shall arrange and pay for the transport of the Goods to the place of destination as specified in the Contract.

43.   Installation and Implementation

43.1   The Contractor shall ensure that the implementation design conforms to an open standard by which new services can be added without disruption to existing services.

43.2   The Contractor shall ensure that the implementation is fault tolerant. This is accomplished by supplying a set of programs and procedures that allow the system recovery or roll back when a fault is detected.

43.3   The Contractor shall provide a document stating step-by-step procedures for installation and disaster recovery to the Purchaser.

43.4   The Contractor shall provide all the recent patches and updates for Firmware/Hardware, on a reliable media, with proper labeling, during the installation to the Purchaser.

43.5   The Contractor shall configure the system at the premises of the Purchaser for high availability and reliability, of all hardware and software.

43.6   The Contractor shall submit detailed and complete installation, transition and cutover plan for the new system, installation procedures for the new components specifying equipment checkout, installation constraints, operational cutover,

maintenance prior to Client acceptance and if special security and/or access arrangements are required.

44. Site Preparation

44.1 The Contractor shall be responsible to survey the site, prepare the site, determine power, air conditioning and floor space requirements, identify and install, if necessary, any special / additional power and air conditioning requirements, for the proposed equipment, if any.

44.2 The Purchaser and the Client shall facilitate the Contractor in discharge of the above responsibilities.

45. Safety

45.1 The Contractor shall be responsible for the embedding of safety features in the inherent design of the equipment, for elimination of identified hazards, including but not limited to high voltage, electromagnetic radiation, sharp points and edges, etc., and reduction of associated risk to personnel and equipment.

45.2 The Contractor shall be responsible for the addition of bilingual warnings and caution notices, where hazards cannot be eliminated or risks cannot be reduced.

45.3 The Contractor shall be responsible for the protection of the power sources, controls, and critical components of the redundant systems and subsystems by shielding or physical separation when possible.

46. Test Equipment and Tools

The Contractor shall evaluate the existing facilities and abilities of the Client to accomplish corrective and preventive maintenance and support and identify additional skills, test equipment and tools required to maintain and support the new equipment. Such test equipment and tools shall be state of the art in design aimed at providing an efficient, systematic and cost effective repair operation for all replaceable components.

47. Spare Parts and Support

47.1 The Contractor shall ensure that the Goods provided by the Contractor, under the Contract are standard and of exact Computer Equipment Hardware and Networking Equipment, and incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

47.2 The Contractor shall further ensure that the Goods provided by the Contractor, under the Contract shall have no defect, arising from design, materials, installation, configuration, or from any act or omission of the Contractor that may develop under normal use of the provided Goods.

47.3 The Contractor shall maintain sufficient backup stock of spare parts and tools

locally at sites, for the maintenance of the supplied Goods, during the warranty period.

47.4 The Contractor shall ensure availability of spare parts and technical assistance for all components for at least three years, without major changes, after the completion of final acceptance.

47.5 The Contractor shall give six months advance notice on any discontinued part(s) with a suggestion for appropriate alternatives failing which will cause forfeiture of Performance Security.

47.6 The Contractor shall also identify and provide the following:

47.6.1 items (repairable spares, parts and consumable supplies) that are needed to maintain design performance, reliability and availability standards prescribed in the Technical Specifications. The quantity of spare parts and consumable items provided and kept shall be equal to the requirements for one year of operating stock;

47.6.2 critical items, whose failure would cause a system failure;

47.6.3 items of high cost and/or long lead time (over thirty working days);

47.6.4 items whose design reliability is such that normal stock replenishment would not justify maintaining a level of the item in stock.

48. Inspection and Testing

48.1 The Client shall inspect and test the Goods supplied and the Services provided, under the Contract, to verify their conformity to the Technical Specifications.

48.2 The inspections and tests shall be conducted at the premises of the Contractor / at the final destination. Where conducted at the premises of the Contractor, the Contractor shall provide all-reasonable facilities and assistance, including access to drawings, production data and online verification from official web site of the Manufacture, to the inspectors, at no charge to the Purchaser.

48.3 The Purchaser may reject the Goods and the Services if they fail to conform to the Technical Specifications, in any test(s) or inspection(s) and the Contractor shall either replace the rejected Goods and Services or make all alterations necessary to meet the Technical Specifications, within four weeks, free of cost to the Purchaser.

48.4 The Purchaser's post-delivery right to inspect, test and, where necessary, reject the Goods shall in no way be limited or waived by reason of pre-delivery inspection, testing or passing of the Goods.

48.5 Nothing contained in this document shall, in any way, release the Contractor from any Warranty or other obligations under the Contract.

49. Taking-Over Certificate

49.1 The Contractor shall, by written notice served on the Client with a copy to the

Purchaser, apply for a Taking-Over Certificate.

49.2   The Client shall, within thirty (30) days of receipt of Contractor's application, either issue the Taking-Over Certificate to the Contractor with a copy to the Purchaser, stating the date of successful inspection / testing of the Goods or any portion thereof, for their intended purposes; or reject the application giving the reasons and specifying the items required to be done by the Contractor to enable the Taking-Over Certificate to be issued.

49.3   Nothing contained in this document shall, in any way, release the Contractor from any Warranty or other obligations under the Contract.

50.   Warranty

50.1   The Contractor shall warrant to the Purchaser that the Goods supplied by the Contractor, under the Contract are genuine, brand new, non- refurbished, un-altered in any way, of the most recent or current model, imported through proper channel, and incorporate all recent improvements in design and materials, unless provided otherwise in the Contract. The items/goods or component(s) of any item(s)/good(s) found dead on arrival /defective shall be replaced with new item(s)/good(s) or component(s) by the contractor as such and shall in no way be referred to the warranty.

50.2   The Contractor shall further warrant that the Goods/Services supplied by the Contractor, under the Contract shall have no defect, arising from design, materials, workmanship or from any act or omission of the Contractor that may develop under normal use of the supplied Goods/Services.

50.3   The Contractor shall provide Manufacturer's warranty for minimum one (1) year (hereinafter referred as Warranty Period) after the issue of Taking-over Certificate in respect of Goods and the Services, or any portion thereof, as the case may be, which will include:

50.3.1 Free, on site repair / replacement of defective / damaged parts and labor, within four weeks of intimation;

50.4   The Contractor shall clearly mention Terms and Conditions of service agreements for the Goods supplied after the expiry of initial warranty period. In case of International Warranties, the local authorized dealers shall mention their service and warranty setup, details of qualified engineers, etc.

50.5   The Warranty Period shall start from the date of installation / configuration / deployment of the Goods on site.

50.6   The end user licenses, end user warranties and end user contracting support services shall be in the name of Purchaser, for the Goods supplied and the Services provided, under the Contract.

51. Ownership of Goods and Replaced Components

Goods to be supplied to the Purchaser, pursuant to the Contract, shall become the property of the Purchaser when the Goods are taken over by the Purchaser. Defective components to be replaced by the Contractor, pursuant to the Contract, shall become the property of the Contractor as and where it lies.

52. Defects Liability Expiry Certificate

52.1 The Contractor shall, after expiry of the warranty period, by written notice served on the Client with a copy to the Purchaser, apply for a Defects Liability Expiry Certificate.

52.2 The Client shall, within seven days of receipt of such notice, either issue the Defects Liability Expiry Certificate to the Contractor with a copy to the Purchaser, stating the date of expiry of the Warranty Period for all the Goods supplied and fulfillment of all obligations by the Contractor, under the Contract; or reject the application giving the reasons and specifying the items required to be supplied by the Contractor to enable the Defects Liability Expiry Certificate to be issued.

53. Payment

53.1 Subject to fulfilment of all other terms and conditions of biding document and Letter of Credit and on receipt of the clearance and possession certificate from the Purchaser. The successful bidder/contractor shall submit all the relevant documents to LC opening Bank in the prescribed format(s).

53.2 The Contractor shall submit an Application for Payment, to the client. The Application for Payment shall: be accompanied by such invoices, receipts or other documentary evidence as the client may require; state the amount claimed; and set forth in detail, in the order of the Price Schedule, particulars of the Goods supplied and the Services provided, up to the date of the Application for Payment and subsequent to the period covered by the last preceding Payment, if any.

53.3 The client shall get verified the details of Goods/equipment/Items delivered against the invoice from the concerned Technical Team and Payment shall be made accordingly as per agreed terms and conditions.

53.4 Payment shall be made in Pak Rupees as per terms and conditions set forth in Letter of Credit (LC) and as per instructions by the State Bank of Pakistan in the light of law of Land.

53.5 The Contractor shall cause the validity period of the performance security to be extended for such period(s) as the contract performance may be extended. In case the Contractor fails to submit bank guarantee with extended validity period for such period(s) as the contract performance may be extended, an amount equal to 10% of total contract value shall be deducted from the payments to be made against the contract.

53.6 All payments shall be subject to any and all taxes, duties and levies applicable under

the laws of Pakistan, for the whole period starting from issuance of Acceptance Letter till termination of the signed contract in this regard.

54.   Price

The Contractor shall not charge prices for the Goods supplied, the Services provided and for other obligations discharged, under the Contract, varying from the prices quoted by the Contractor in the Price Schedule.

55.   Contract Amendment

55.1   The Purchaser may at any time, by written notice served to the Contractor, alter or amend the contract for any identified need/requirement in the light of prevailing rules and regulations.

55.2   The Contractor shall not execute any Change until and unless the Purchaser has allowed the said Change, by written order served on the Contractor with a copy to the Client.

55.3   The Change, mutually agreed upon, shall constitute part of the obligations under this Contract, and the provisions of the Contract shall apply to the said Change.

55.4   No variation in or modification in the Contract shall be made, except by written amendment signed by both the Purchaser and the Contractor.

56.   Assignment / Subcontract

56.1   The Contractor shall not assign or sub-contract its obligations under the Contract, in whole or in part, except with the Purchaser's prior written consent.

56.2   The Contractor shall guarantee that any and all assignees / subcontractors of the Contractor shall, for performance of any part under the contract, comply fully with the terms and conditions of the Contract applicable to such part under the contract.

57.   Extensions in time for performance of obligations under the Contract

If the Contractor encounters conditions impeding timely performance of any of the obligations, under the Contract, at any time, the Contractor shall, by written notice served on the Purchaser with a copy to the Client, promptly indicate the facts of the delay, its likely duration and its cause(s). As soon as practicable after receipt of such notice, the Purchaser shall evaluate the situation and may, at its exclusive discretion, without prejudice to any other remedy it may have, by written order served on the Contractor with a copy to the Client, extend the Contractor's time for performance of its obligations under the Contract.

58.   Liquidated Damages

If the Contractor fails / delays in performance of any of the obligations, under the Contract / violates any of the provisions of the Contract / commits breach of any of the terms and conditions of the Contract the Purchaser may, without prejudice to any other right of action / remedy it may have, deduct from the Contract Price, as liquidated damages, a sum of money @0.25% of the total Contract Price which is

attributable to such part of the Goods / the Services, in consequence of the failure / delay, be put to the intended use, for every day between the scheduled delivery date(s), with any extension of time thereof granted by the Purchaser, and the actual delivery date(s). Provided that the amount so deducted shall not exceed, in the aggregate, 50% of the Contract Price.

59. Blacklisting

If the Contractor fails / delays in performance of any of the obligations, under the Contract / violates any of the provisions of the Contract / commits breach of any of the terms and conditions of the Contract or found to have engaged in corrupt or in competing for the award of contract or during the execution of the contract, the Purchaser may without prejudice to any other right of action / remedy it may have, blacklist the Contractor, either indefinitely or for a stated period, for future tenders in public sector, as per provision of Rule-21 of Punjab Procurement Rules, 2014.

60. Forfeiture of Performance Security

60.1 The Performance Security shall be forfeited by the Purchaser, on occurrence of any / all of the following conditions:

60.1.1 If the Contractor commits a default under the Contract;

60.1.2 If the Contractor fails to fulfill any of the obligations under the Contract;

60.1.3 If the Contractor violates any of the terms and conditions of the Contract.

60.2 The Contractor shall cause the validity period of the performance security to be extended for such period(s) as the contract performance may be extended. In case the Contractor fails to submit bank guarantee with extended validity period for such period(s) as the contract performance may be extended, an amount equal to 10% of total contract value shall be deducted from the payments to be made against the contract.

60.3 If the Contractor fails / delays in performance of any of the obligations, under the Contract / violates any of the provisions of the Contract / commits breach of any of the terms and conditions of the Contract the Purchaser may, without prejudice to any other right of action / remedy it may have, forfeit Performance Security of the Contractor.

60.4 Failure to supply required items/services within the specified time period will invoke penalty as specified in this document. In addition to that, Performance Security amount will be forfeited and the company will not be allowed to participate in future tenders as well.

61. Termination for Default

61.1 If the Contractor fails / delays in performance of any of the obligations, under the Contract / violates any of the provisions of the Contract / commits breach of any of the terms and conditions of the Contract the Purchaser may, at any time, without prejudice to any other right of action / remedy it may have, by written notice served

on the Contractor with a copy to the Client, indicate the nature of the default(s) and terminate the Contract, in whole or in part, without any compensation to the Contractor. Provided that the termination of the Contract shall be resorted to only if the Contractor does not cure its failure / delay, within fifteen working days (or such longer period as the Client may allow in writing), after receipt of such notice.

61.2 If the Purchaser terminates the Contract for default, in whole or in part, the Purchaser may procure, upon such terms and conditions and in such manner as it deems appropriate, Goods / Services, similar to those undelivered, and the Contractor shall be liable to the Purchaser for any excess costs for such similar Goods / Services. However, the Contractor shall continue performance of the Contract to the extent not terminated.

62. Termination for Insolvency

If the Contractor becomes bankrupt or otherwise insolvent, the Purchaser may, at any time, without prejudice to any other right of action / remedy it may have, by written notice served on the Contractor with a copy to the Client, indicate the nature of the insolvency and terminate the Contract, in whole or in part, without any compensation to the Contractor.

63. Termination for Convenience

63.1 The Purchaser may, at any time, by written notice served on the Contractor with a copy to the Client, terminate the Contract, in whole or in part, for its convenience, without any compensation to the Contractor.

63.2 The Goods and the Services which are complete or to be completed by the Contractor, within thirty working days after the receipt of such notice, shall be accepted by the Purchaser. For the remaining Goods, the Purchaser may elect:

63.2.1 to have any portion thereof completed and delivered; and/or

63.2.2 to cancel the remainder and pay to the Contractor an agreed amount for partially completed Goods, Services and materials / parts previously procured by the Contractor for the purpose of the Contract, together with a reasonable allowance for overhead & profit.

64. Force Majeure

64.1 For the purpose of this contract "Force Majeure" means an event which is beyond the reasonable control of a party and which makes a party's performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances, and includes, but is not limited to, War, Riots, Storm, Flood or other industrial actions (except where such strikes, lockouts or other industrial are within the power of the party invoking Force Majeure), confiscation or any other action by Government agencies. In all disputes between the parties as to matters arising pursuant to this Contract, the dispute be referred for resolution by arbitration under the Pakistan Arbitration Act, 1940, as amended,

by one or more arbitrators selected in accordance with said Law. The place for arbitration shall be Lahore, Pakistan. The award shall be final and binding on the parties.

64.2   The Contractor shall not be liable for liquidated damages, forfeiture of its Performance Security, blacklisting for future tenders, termination for default, if and to the extent his failure / delay in performance /discharge of obligations under the Contract is the result of an event of Force Majeure.

64.3   If a Force Majeure situation arises, The Contractor shall, by written notice served on The Purchaser, indicate such condition and the cause thereof. Unless otherwise directed by The Purchaser in writing, The Contractor shall continue to perform under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

64.4   Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or Agents or Employees, nor (ii) any event which a diligent Party could reasonably have been expected to both (A) take into account at the time of the conclusion of this Contract and (B) avoid or overcome in the carrying out of its obligations here under.

64.5   Force Majeure shall not include insufficiency of funds or failure to make any payment required hereunder.

65.   Dispute Resolution

65.1   The Purchaser and the Contractor shall make every effort to amicably resolve, by direct informal negotiation, any disagreement or dispute arising between them under or in connection with the Contract.

65.2   If, after thirty working days, from the commencement of such informal negotiations, the Purchaser and the Contractor have been unable to amicably resolve a Contract dispute, either party may, require that the dispute be referred for resolution by arbitration under the Pakistan Arbitration Act, 1940, as amended, by one or more arbitrators selected in accordance with said Law. The place for arbitration shall be Lahore, Pakistan. The award shall be final and binding on the parties.

66.   Statutes and Regulations

66.1   The Contract shall be governed by and interpreted in accordance with the laws of Pakistan.

66.2   The Contractor shall, in all matters arising in the performance of the Contract, conform, in all respects, with the provisions of all Central, Provincial and Local Laws, Statutes, Regulations and By-Laws in force in Pakistan, and shall give all notices and pay all fees required to be given or paid and shall keep the Purchaser indemnified against all penalties and liability of any kind for breach of any of the same.

66.3   The Courts at Lahore shall have the exclusive territorial jurisdiction in respect of any dispute or difference of any kind arising out of or in connection with the

Contract.

67. Taxes and Duties
The Contractor shall be entirely responsible for all taxes, duties and other such levies imposed make inquiries on income tax / sales tax to the concerned authorities of Income Tax and Sales Tax Department, Government of Pakistan.

68. Contract Cost
The Contractor shall bear all costs / expenses associated with the preparation of the Contract and the Purchaser shall in no case be responsible / liable for those costs / expenses. The successful bidder shall provide legal stamp papers of relevant value according to Govt. rules and regulations for signing of the formal contract.

69. The Client
69.1   The Client shall only carry out such duties and exercise such authority as specified in the Contract. The Client shall have no authority to relieve the Contractor of any of his obligations under the Contract, except as expressly stated in the Contract.

69.2   The Contractor shall proceed with the decisions, instructions or approvals given by the Client in accordance with these Conditions.

69.3   The Client shall conform to all the relevant clauses of this Tender Document to carry out all responsibilities assigned thereto in a timely manner.

70. Authorized Representative
70.1   The Purchaser, the Client or the Contractor may, at their exclusive discretion, appoint their Authorized Representative and may, from time to time, delegate any / all of the duties / authority, vested in them, to their authorized Representative(s), including but not limited to, signing on their behalf to legally bind them, and may, at any time, revoke such delegation.

70.2   The Authorized Representative shall only carry out such duties and exercise such authority as may be delegated to him, by the Purchaser, the Client or the Contractor.

70.3   Any such delegation or revocation shall be in writing and shall not take effect until notified to the other parties to the Contract.

70.4   Any decision, instruction or approval given by the Authorized Representative, in accordance with such delegation, shall have the same effect as though it had been given by the Principal.

70.5   Notwithstanding Clause 60.2, any failure of the Authorized Representative to disapprove any Goods or Services shall not prejudice the right of the Client to disapprove such Goods or Services and to give instructions for the rectification thereof.

70.6   If the Contractor questions any decision or instruction of the Authorized Representative of the Purchaser / the Client, the Contractor may refer the matter to

the Purchaser / the Client who shall confirm, reverse or vary such decision or instruction.

71.   Waiver

Failure of either party to insist upon strict performance of the obligations of the other party, under the Contract, shall in no way be deemed or construed to affect in any way the right of that party to require such performance.

72.   Training

72.1   The Contractor shall arrange and undertake a comprehensive training program for the staff nominated by the Purchaser / the Client to ensure that they shall acquire a good working knowledge of the operation, and general maintenance of the Goods to be supplied under the Contract.

72.2   In case of non-compliance with instructions, non-cooperation or other difficulties experienced by the Contractor with regard to any of these personnel, the Contractor shall apprise the Purchaser / Client and proceed to implement suitable remedial measures after consultation with them.

73.   Documentation

The Contractor shall furnish the user documentation, the operation manuals, and service manuals for each appropriate unit of the supplied Goods and other information pertaining to the performance of the Goods, in hard copy format, in soft copy format and in the form of on-line help, before the Goods are taken over by the Purchaser.

74.   Special Stipulations

Schedule-A, Special Stipulations	
For ease of Reference, certain special stipulations are as under:	
Bid Security (Earnest Money)	The Contractor shall furnish the Bid Security (earnest Money) as under: for the total Tender Price, separately against each LOT and against any or all items under LOT No.5 only; if Total Tender Price is less than or equal to PKR 100 Million, in the form of Demand Draft / Pay Order / Call Deposit Receipt, in the name of the Purchaser; if Total Tender Price is more than PKR 100 Million, in the form of Bank Guarantee, issued by a scheduled bank operating in Pakistan, in the name of the Purchaser, as per the format provided in the Tender Document, for a sum equivalent to **2%** of the Total Tender Price; denominated in Pak Rupees; Have a minimum validity period of ninety days from the last date for submission of the Tender or until furnishing of the Performance Security, **whichever is later.**
Performance Security	The successful Contractor shall furnish Performance Security as under: within twenty (20) days of the receipt of the Acceptance Letter from the Purchaser; in the form of a Bank Guarantee, issued by a scheduled bank operating in Pakistan, as per the format provided in the Tender Document; for a sum equivalent to **10%** of the total contract value; denominated in Pak Rupees; Have a minimum validity period until the date of expiry of warranty period, support period or termination of services, or fulfilment of all obligations under the contract, **whichever is later.**
Delivery Period (including installation, configuration, deployment, commissioning, testing, and training of the delivered items)	Within Twelve (12) weeks from the issuance of Acceptance Letter for all Lots.
Liquidated damages for failure / delay in supply / installation / configuration of Goods / Services / Works by the Contractor	If the Contractor fails / delays in performance of any of the obligations, under the Contract / violates any of the provisions of the Contract / commits breach of any of the terms and conditions of the Contract the Purchaser may, without prejudice to any other right of action / remedy it may have, deduct from the Contract Price, as liquidated damages, a sum of money @0.25% of the total Contract Price which is attributable to such part of the Goods / the Services, in consequence of the failure / delay, be put to the intended use, for every day between the scheduled delivery date(s), with any extension of time thereof granted by the Purchaser, and the actual delivery date(s). Provided that the amount so deducted shall not exceed, in the aggregate, 50% of the Contract Price.

TECHNICAL SPECIFICATIONS OF
EQUIPMENT FOR ELECTRICAL ENGINEERING LABS

LOT # 1			
Sr. No.	Items	Description	Qty.
1.	**Machines and Transformer Training System**	Machines and Transformer Training System comprises of the following modules. The instructor and the student's manuals should be included. These are the minimum specifications. Modules with higher specifications can be quoted. a) **Single Phase Transformer:** Power=220V/50Hz, windings required: min 220V/0.25A/40Ω, 380V/0.15A/130Ω, 220V/0.25A/40Ω. b) **Three Phase Transformer:** 220-240V/50Hz, Power 250VA, Line current 7A. c) **Synchronizing module:** Power =220V, Phase = 440 V AC, Circuit Breaker =1A d) **Three Module workstation:** Should accommodate 03 modules for experiment e) **Transformer Training Parts:** Basic concepts of transformer were demonstrated. The kit comprises of Aluminium Ring, BNC Cables, Carrying Case, various winding Coils, Current/Voltage Probe, Fiber Spacers, Lamp Socket, Magnet Rod, Mounting Base, Nails Pack, Plastic Box, Shorting Ring, Spring Scale, Steel Rod, Wooden Bar, Laminated Bars, Lamp Coil Rating AC with Nominal Voltage 55/220V/55 VA f) **Inductive load:** Can withstand 220/380V 50Hz, Various inductors with values 3.5/7/14H and Accuracy =± 5% or better, Reactive Power = 11-77 VAR, Current range= 50-350mA g) **Resistive Loads:** Can withstand 220/380V/50Hz, three resistive loads with values 1100/2200/4400 Ω, Accuracy= ± 5% or better, Current range= 50-350 mA h) **Capacitive Loads:** Can withstand 220/380V/50Hz, three capacitive loads required = 0.72/1.45/2.89 µF, Accuracy= ± 5% or better. i) **Workstation:** Standard-size module and Half-size module dimensions, Intended Location On the floor (stands on casters) j) **DC Motor/ Generator:** Power rating: 220/380V, Motor o/p Power 175W, Generator o/p Power 110 W, Armature Voltage 220 V dc, Shunt Field Voltage 220 V dc, Full-Load Speed 1500r/min, Full-Load Motor Current more than 1A, Full-Load Generator Current 0.5A. k) **Four-Pole Squirrel-Cage Induction Motor:** Power 220/380V, Motor Stator Voltage 220/380V, 3-phase Mechanical Power min. 200W, Nominal Speed 1300r/min or above, Nominal Current 0.50A or above, Power Factor 0.7 or more, Generator Stator Voltage 220/380V, 3-phase Mechanical Power 200W, Nominal Speed min. 1500r/min, Nominal Current 0.5A, Power Factor around 0.6. l) **Synchronous Motor/Generator:** Power 220/380V, Motor Stator Voltage 220/380V, 3-phase, Rotor Voltage range 0-240 V dc, o/p Power 200W, Synchronous Speed 1500 r/min, Full-Load Current 0.3A, Power Factor 1, Generator , Stator Voltage 220/380V, 3-phase, Rotor Voltage range 0-240 V dc, Output Power 200VA, Synchronous Speed 1500 r/min, Power Factor 0.8 m) **Capacitor-Start Motor:** o/p Power 175 W, Full Load Speed 1400 r/min, Full Load Current 2.0 A or above. n) **Universal Motor:** o/p Power 175 W, Full Load Speed 1500 r/min, Full Load Current 1A or	12

		above.	
		o) **Power Supply:** Current 10A max, 3 phases (220V/380V/50 Hz), with star (wye) configuration including neutral and ground wires, min circuit breaker protection 20A. Three-Phase Fixed AC 220V/380 V/10A, Three-Phase Variable AC 0-220V/380 V/3A, Variable DC 0-220V/5A, Fixed DC 220 V/1A, Low Power AC 24 V/3A.	
		p) **Timing Belt:** Required	
		q) **Connection Lead Set:** Rated Current 32A, Rated Voltage 600V, CAT II, min 4 mm Safety Banana, Plug Leads, Yellow 30 cm 10, Red 60 cm 15, Blue 90 cm 6 for each set	
		r) **Four-Quadrant Dynamometer/Power Supply:** Dynamometer Mode, Magnetic Torque 0 to 3 N·m (0 to 27 lbf·in), Direction of Rotation CW / CCW, Parameter Value, Speed 0 to 2500 r/min, Nominal Power 350 W, Power Supply Mode, DC Voltage 0 to ± 150 V, AC Voltage (RMS) 0 to 105 V (no-load), DC Current 0 to ± 5 A, AC Current (RMS) 0 to 3.5 A, Maximum Output Power 500 W, AC Frequency 10 to 120 Hz, Control Functions, Activated Set Standard Functions (Manual Control), Liquid-Crystal Display (LCD), Control Inputs, Command Input 0 to ± 10 V, Thermistor Input 10 kΩ, type 1, Control Outputs, Shaft Encoder Quadrature encoder (A-B) - 360 pulses/revolution - TTL compatible, Torque Output Sensitivity 0.3 N·m/V, Speed Output Sensitivity 500 r/min/V, Communication Port USB 2.0, Power Requirements 220 V - 3 A - 50 Hz, must include live, neutral, and ground wires	
		s) **Data Acquisition and Control Interface:** Minimum 4 Insulated Voltage Input, Range (Low / High Scales) -80 to +80 V / -800 to + 800 V (user-selectable through software), Impedance (Low / High Scales) 326.6 kΩ / 3.25 MΩ, Bandwidth DC to 65 kHz (-3 dB), Accuracy 1% (dc to 10 kHz), Insulation 800 V, Measurement Category CAT I (network voltage ≤ 240 V), Insulated Current Inputs (4), Range (Low / High Scales) -4 to +4 A / -40 to + 40 A (25 A rms), Impedance (Low / High Scales) 50 mΩ / 5 mΩ, Bandwidth DC to 65 kHz (-3 dB), Accuracy 1% (dc to 10 kHz), Insulation 800 V, Measurement Category CAT I (network voltage ≤ 240 V), Analog Inputs (8), Voltage Range -10 to +10 V, Impedance > 10 MΩ, Bandwidth DC to 125 kHz, Measured Parameters User-selectable through software, Parameter-to-Voltage Ratio User-determined through software, A/D Converter for Insulated and , Analog Inputs (16), Type Successive approximation, Resolution 12 bits, Integral Non-Linearity ≤ ±1.5 LSB, Differential Non-Linearity ≤ ±1 LSB, Maximum Sampling Rate 600 ksamples/s (one channel), FIFO Buffer Size 16 ksamples, Analog Outputs (2), Voltage Range (2) -10 to +10 V, Operational Load Impedance > 600 Ω, D/A Converter for Analog Outputs (2), Type Resistor string, Resolution 12 bits, Integral Non-Linearity ≤ ±8 LSB, Data Acquisition and Control Interface, Parameter Value, Differential Non-Linearity - 0.5 to +0.7 LSB, Digital Inputs (3), Types Encoder (2), synchronization (1), Signal Level 0-5 V (TTL compatible),Maximum Input Frequency 50 kHz, Impedance 5 kΩ, Digital Outputs (9), Types Control (6 on a DB9 connector and 2 on 2 mm banana jacks), synchronization (1 on a DB9 connector), Signal Level 0-5 V (TTL compatible), Maximum Output Frequency 20 kHz (software-limited), Impedance 200 Ω, Control Functions, Activated Set Computer-Based Instrumentation Function, Computer I/O Interface USB 2.0 full speed via type-B receptacle, Power Requirements 24 V - 0.4 A - 50/60 Hz	
		t) **Flux Meter:** Rating Frequency 50 Hz, Ranges 0-100 µWb, with a peak of 1000 µWb, Instantaneous Flux Output 1 mV/µWb (10-1000 Hz), Probe: Number of Turns 375.	
2.	**Dissectible Machine Training System**	Dissectible Machine Training System comprises of the following modules. The instructor and the student's manuals are included.	
		a) **Dissectible Machine Workbench:** Work Bench for the Dissectible Machines Training System	**02**
		b) **Dissectible Machine Parts:** DC Motor/Generator Dissectible, Four-Pole Squirrel-Cage	

		Induction Motor Dissectible, Two-Speed Constant Power Induction Motor Dissectible, Two-Speed Variable Torque Induction Motor Dissectible, Two-Speed Constant Torque Induction Motor Dissectible, Three-Phase Wound-Rotor Induction Machine Dissectible, Two-Phase Wound-Rotor Induction Motor Dissectible, Synchronous Motor/Generator Dissectible, Three-Phase Synchronous Reluctance Motor Dissectible, Split Phase/Capacitor-Start Motor Dissectible, Capacitor-Run Motor Dissectible, Universal Motor Dissectible, Two-Value Capacitor Motor, Triple-Rate Motor Dissectible, Timing Belt c) **Assembly Housing Module:** Can House the dissectible machine parts.	
3.	**Solar/Wind Energy Training System**	Solar/Wind Energy Training System comprises of the following modules. The instructor and the student's manuals are included. a) **Solar/Wind Energy Mobile Workstation:** Workstation consists of a sturdy, welded-steel frame painted using powder-coated paint for a durable surface. The workstation includes two perforated work surfaces for module installation and operation a) **Battery Bank:** Battery Bank consists of a 12 V dc, 110 AH, deep-cycle, sealed, lead-acid, absorptive glass mat (AGM) b) **Battery Bank Junction Box:** Contains a 30 A dc circuit breaker and a 0.5 A dc ground-fault protection device (GFPD) c) **Electrical AC Outlet:** 120 V ac electrical outlet that is used to provide a power source for devices requiring a standard, NEMA-type electrical outlet. d) **Ammeter:** 30 A dc ammeter e) **DC Power Distribution Panel:** Fuse-protected distribution panels with four power outputs that can be used to provide power to low-voltage dc devices. f) **Horizontal-Mount Disconnect Switch:** Consists of a 40 A SPST horizontally mounted disconnect switch used for a multitude of purposes g) **Vertical-Mount Disconnect Switch:** Consists of a 40 A SPST vertically mounted disconnect switch used for a multitude h) **Diversion Load Controller:** Consists of a 35 A PWM controller operating in shunt mode i) **Dump Load:** Consists of a resistor used to convert into heat the excess electrical energy produced once the battery bank is fully charged. j) **DC Circuit Breaker:** Consists of a resettable 50 A dc circuit breaker k) **kWh Meters with AC Circuit Breaker Box:** Consists of two kWh meters and a circuit-breaker box to measure the power transmission to/from the utility grid, while the other is used to measure the power transmission to/from the electrical power source (e.g., solar panels, wind turbine). The circuit-breaker box contains three resettable ac circuit breakers. l) **AC/DC Wall Switch:** Consists of an ac/dc toggle switch for turning power on or off to any electrical device connected to the module terminals. The ac and dc circuits of the wall switch are electrically isolated one from the other. m) **Lockout Module:** The Lockout Module consists of an SPST switch used to teach students the principles of safety procedures when working with electrical equipment. n) **Power Bus Bar:** The Power Bus Bar consists of a 12 V dc power bus bar fitted with positive and negative rails used for distributing electrical power to/from the battery bank. Terminal screws on the positive and negative rails allow connection to the bus bar. o) **Power Usage Monitor:** Portable meter used for monitoring voltage, current, power, frequency, kWh, apparent power, power factor, and time. p) **Power Inverter with Remote Control:** The Power Inverter with Remote Control consists of a 1 kW dc-to-ac converter that converts 12 V dc power to 120 V ac power. q) **Solar Charge Controller:** Consists of a 30A PWM controller used for controlling the power produced by the solar panels to charge the battery bank. r) **Stop Switch:** Consists of a 50 A SPDT switch used for stopping the mechanical rotation of	**01**

the wind turbine generator shaft during servicing or maintenance.

s) **DC Lamp Socket:** Consists of a socket used for connecting a standard dc lamp.

t) **Photovoltaic (PV) Module Assembly:** The Photovoltaic (PV) Module Assembly consists of a solar photovoltaic module that operates at a voltage of 12 V dc and generates a nominal amount of 85 W of electrical power from solar energy.

u) **Wind Turbine Generator with DC Motor (for Wind Simulator):** There Wind Turbine Generator with DC Motor comprises a 90 V permanent-magnet dc motor operating at 1800 rpm.

v) **Solar Array Junction Box:** The Solar Array Junction Box contains a 150 V dc - 8 A circuit breaker that also functions as a dc disconnect switch.

w) **Sun Simulator Assembly:** The Sun Simulator Assembly consists of an ac light assembly used for illuminating solar panels in order to simulate the production of electrical energy from solar power.

x) **DC Motor Controller (for Wind Simulator):** The DC Motor Controller, a component of the Wind Simulator, is used to vary the speed of the dc motor to which it is connected.

y) **Accessories Package:** The Accessories Package includes a battery charger, LED lamps, fluorescent lamps, incandescent lamps, 4 mm and 2 mm leads, and two-prong outlet bulb socket adapters.

z) **Connection Cables Kit:** Connection Cables Kit provides all the connection cables required to connect the different components.

| 4. | Renewable Energy Training System | Renewable Energy Training System comprises of the following modules. The instructor and the student's manuals are included.

a) **Wind Turbine Generator/Controller:** Wind Turbine Type Direct-drive, fixed-pitch three blade rotor, Controller Output, Power 200 W at a wind speed of 12.5 m/s (28 mph), Charge Voltage Set point Range 54.4-68.0 V, Diode Rectifier 600 V – 6 A, Power Resistors, Ratings 15 Ω – 100 W (each resistor)

b) **Lead-Acid Batteries:** Type Valve-regulated lead-acid, Voltage 12 V, Capacity 2.3 Ah, Maximum Charge Current 0.92 A, Maximum Discharge Current 5 A, Auto-Reset Protective Fuse, Battery 5 A (hold current), 10 A (trip current)

c) **Lead-Acid Battery Pack:** Battery Pack Type 4 valve-regulated lead-acid batteries, Voltage 48 V (12 V for each battery), Capacity 9 Ah, Maximum Charge Current 2.7 A, Maximum Discharge Current 7 A, Parallel Charging Input 58 V maximum, Auto-Reset Protective Fuses, Battery Pack 7 A (hold current), 14 A (trip current), Test Points (3)

d) **Solar Panel Test Bench:** Power Requirements Current 1.5 A, Service Installation Standard single-phase outlet, Halogen Lamp, Power TBE, Ventilation System, Flow Rate TBE, Potentiometer Single Turn – 500 Ω – 2 W, Diodes, Peak Inverse Voltage 1000 V, Maximum Current 1 A

e) **Monocrystalline Silicon Solar Panel:** Quantity 2 Type Monocrystalline Silicon, Number of Cells 18, Open-Circuit Voltage (VOC) 9 V @ STC, Short-Circuit Current (ISC) 100 mA @ STC, Potentiometer Single Turn - 500 Ω - 2 W, Diodes, Quantity 3, Peak Inverse Voltage 1000 V, Maximum Current 1 A, Resolution ±0.1°

f) **Pyrometer:** Spectral Range 310 to 2800 nm, Sensitivity 5 to 20 uV/W/m², Response Time <18 s, Maximum Solar Irradiance 2000 W/m², Field of View 180°, Operating Temperature Range -40°C to +80°C

g) **Magnetic Field Strength Indicator:** The Magnetic Field Strength Indicator displays the strength of the residual magnetism in a metallic object. Enclosed in a rugged, pocket-sized enclosure and requires no power to operate.

h) **Wind Turbine Rotor:** The Wind Turbine Rotor is the same rotor as that used in the generator of the Wind Turbine Generator/Controller. It enables observation of the rotor | 01 |

| | | | construction. It also allows observation of the arrangement of the permanent magnets on the rotor using the Magnetic Field Strength Indicator. | |
| | | i) | Three Module Work Station Model, Resistive Load Model, Timing Belt Model, Connection Lead Model, Four Quadrant /Dynamometer/ Power supply | |

NOTE:	
i.	1 - Year Parts and Labour warranty for all components on site.
ii.	The bidders should clearly mention Terms and Conditions of service agreements for the supplied hardware equipment after the expiry of initial warranty period.
iii.	In case of International Warranties, the local authorized dealers should mention their service and warranty setup, details of qualified engineers, etc.
iv.	Please mention the country of origin / manufacturing / assembly of the quoted brand / model.
v.	All items must be factory fitted & configured. Vendor / Assembler to provide verification of Serial numbers / AA numbers of Intel products.
vi.	The Purchaser reserves exclusive rights to decrease or increase the quantity of Goods/Items/Equipment mentioned vide this tender document.

LOT # 2			
Sr. No.	**Items**	**Description**	**Qty.**
1.	**Advance Electronics Training System**	An integrated circuit teaching and experimentation platform that is aimed for teaching basic electrical engineering and electronics concepts. Integrated suite of 12 instruments, Oscilloscope (More than 90 MS/s (two channels), DM, Function Generator [More than 4 MHz (sine); Less than 2 MHz (square and triangle)], Variable Power Supply, Bode Analyzer, Dynamic Signal Analyzer, Arbitrary Waveform Generator, DIO, Impedance Analyzer, Two Wire Current Voltage Analyzer, Three Wire Current Voltage Analyzer, Includes Basic Breadboard for Electrical Circuits and Electronics, Complete integration with LabVIEW and Multisim for teaching electronics concepts, Data transfer and recording capability inside PC, Use interactive circuit teaching software, power cord included. Probes for oscilloscope, DMM and function generator should be included.	**50**
2.	**Power Electronics Three Phase Inverter Boards**	The training board should be able to demonstrate the concepts of Power Electronics. The research board contains at least two three-phase IGBT inverters, two single-phase rectifier bridges, and two DC links for connected or independent use with optional loads. The boards should be fully integrated with NI Multisim and LabVIEW FPGA co-simulation environment. The module should be accompanied with the manuals and the supporting documentation.	**15**
3.	**Basic Components Kit for Circuits & Electronics**	Specially curated set of basic electronic components for introductory circuit education laboratories. 50 components that are the building blocks of electronics courseware. **Components:** Operational amplifiers (TL072CP, TL074CN, LF356N/NOPB, LM741CN/NOPB), Data converters (ADS7816P, ADS7822P, TLV5616P), Resistors, Instrumentation amplifier (INA217AIP), Comparator (LM311P), Regulators (LM317KCT, MC34063AP), Inductors, Logic gates (SN74LS10N, SN74LS00N, SN74LS32N, SN74LS86AN, SN74LS02N, SN74LS08N), Diodes, Capacitors, Inverter (SN74LS04N), Dual complementary pair (CD4007UBE), Counter (SN74LS163N), Flip-flops (SN74LS107AN, SN74LS74AN), Transistors, Decoder, Encoder, Multiplexers (SN74LS138N, SN74LS148N, CD4511BE), LEDs, Wiring kit, Timer (TLC555), Frequency-to-voltage converters (LM2917N/NOPB), Infrared transistor, Photocell buzzer, Audio transformer	**25**
4.	**Test and Measurement Device**	Radically practical approach to bench top instrumentation and should contains 5 instruments in one device with the following specifications and accessories: **Specifications:** Mixed-signal oscilloscope (Bandwidth More than 300 MHz, at least 4 Analog Channels, More than 30 Digital Channels, Sampling rate of 1.5 GS/s or higher, 12 bit or less, Function Generator (1 channel, max Frequency 18 MHz sine or higher, 5 MHz square or less, waveform types are sine, square, ramp, triangle, DC), Digital Multimeter (Resolution5 ½ digits, max Voltage more than 2500V, max Current at least 10A, measurement functions are VDC, VAC, IDC, IAC, continuity, resistance, diode), Programmable DC Power Supply (with 3 Channels or more, 0 to +6V/0 to 3A, 0 to +25 V/0 to 1 A, 0 to -25 V/0 to 1 A), Digital I/O (8 DIO channels) Fully compatible with LabVIEW, USB, Wifi, Ethernet connectivity, Onsite training by OEM **Accessories include:** Windows Application (installed on device or downloadable), iPad App (downloadable), Power Cord, Oscilloscope Probes, 150 MHz (set of 2), MSO Logic Analyzer 40 Pin Input Cable, DMM Probes (set of 2), Power Supply	**04**

		Screw-Terminal Connector, Digital I/O Screw-Terminal Connector, Wireless Antenna, Screwdriver, USB Cable 2m	
5.	**FPGA based embedded Design Device with sensors and actuators kit**	**Specifications:** Tool to teach and implement multiple design concepts with one device, with 10 analog inputs or more, 6 analog outputs or less, 40 digital I/O lines, Wireless, LEDs, push button, accelerometer onboard, Xilinx FPGA and dual-core ARM Cortex-A9 processor, Fully programmable with LabVIEW or C; adaptable for different programming levels, Onsite Training by OEM and includes all the accessories such as shield adapted, power supply, protoboards, software etc. **Sensors and Actuators Kit:** Barrel connector with leads, Assorted capacitors, Diodes, 7-segment display, Mechanical rotary encoder, Photo interrupter (light sensor with LED), Assorted op-amps, Assorted LEDs, Small DC motor (1 VDC to 3 VDC with no load speed: 6600 rpm or more), Microphone with audio jack, Breadboard Accessory, Potentiometer (500 kΩ), Relay, Assorted resistors, Piezoelectric sensor, Photocell, 2 Hall effect sensors (latch and switch), Buzzer, Assorted switches (DIP, slide, and rotary), Thermistor (NTC: 10 kΩ, 25 degrees), Assorted transistors, Force sensing resistor, Wire kit, Keypad, Digital temperature sensor (I2C), Character LCD (I2C, SPI, and UART), Digital potentiometer (SPI), Bluetooth interface (UART), EEPROM (SPI), LED matrix, Geared motor 19:1 (includes encoder for rotation and speed, 12 V), Ultrasonic range finder (accurate readings of 0 in. to 255 in.), Compass, Servo motor: standard (215 degrees rotation) , Servo motor: continuous rotation, Accelerometer (3 axis, digital - SPI and I2C), H-bridge driver (compatible with gear motor), Gyroscope (3 axis, digital - SPI and I2C), Infrared proximity sensor (10 cm to 80 cm), Ambient light sensor (SPI)	50
6.	**HVAC Trainer Board**	The Heating, Ventilation and Air Conditioning (HVAC) Board should able to teach and demonstrate the fundamentals of climate control. The trainer board should be developed exclusively for Advance Electronics Training System (Item 1, Lot 2). The system should easily be configured to control the temperature in a chamber using a variety of control methods. **Features:** Plug-and-play design for quick and easy lab setup, Variable control of the heater, Fixed speed fan, Direct heater temperature sensor, High accuracy temperature sensors, Comprehensive digital resources and ABET-aligned courseware required **Readymade curriculum topics:** Temperature control, Relay / on-off control design, System modelling, Parameter identification, Model validation, PI control design, Saturation and integrator windup, Feedback control set-point weighing	12
7.	**DC Motor Control Trainer Board**	A versatile servo system designed to teach and demonstrate the fundamentals of motor servo control in a variety of ways. The trainer board should be developed exclusively for Advance Electronics Training System (Item 1, Lot 2). The system should easily be configured to control motor position and speed. Students learn how to model a DC motor experimentally, design and implement a proportional-integral (PI) controller to control the speed of a motor, design and implement a proportional-derivative (PD) controller to control the position of a motor, design and implement a proportional-integral-derivative (PID) controller for tracking error and disturbance rejection **Features:** Plug-and-play design, Removable inertia disk, Durable DC servo motor with no cogging, Built-in PWM amplifier with linear response, High resolution optical encoder to sense position, Hardware velocity measurement, Comprehensive digital resources and ABET-aligned courseware required **Readymade curriculum topics:** System modelling and model validation, Speed	12

		and position control, System simulation, PID control, Error tracking, Disturbance rejection.	
8.	**VTOL Trainer Board**	The trainer board should demonstrate the fundamentals of flight dynamics and vertical take-off and landing flight control. The trainer board should be developed exclusively for Advance Electronics Training System (Item 1, Lot 2). The system should easily be configured to control the flight of the trainer using a variety of control methods. Students learn how to model a system, design and implement a proportional-integral (PI) controller to control current, find the system resistance based on measurements, design and implement a proportional-integral-derivative (PID) controller to control current. Aerospace devices are typically more difficult to model, therefore software system identification tools should be accompanied to determine parameters or actual dynamics. These subsystems should be dealt with individually and then integrated to provide an overall solution. **Features:** Compact rotary servo system and-play design for quick and easy lab setup, High quality rugged propeller assembly, High air flow fan with safety guard, High resolution encoder, Built-in amplifier, Protective cover to shield the circuitry, Comprehensive digital resources and ABET-aligned courseware required, Fully documented system models and parameters **Topics covered in the readymade courseware:** Experimental modelling, Identifying parameters experimentally, Model validation, PID control, Current control, Pitch control, Cascade control and Actuator dynamics.	**12**
9.	**Inverted Pendulum on Trainer Board**	A versatile unit is required ideally suited to teach and demonstrate the fundamentals of inverted pendulum balance and control. The trainer board should be developed exclusively for Advance Electronics Training System (Item 1, Lot 2). The system should easily be configured to teach hybrid swing-up and LQR control fundamentals. Students should learn how to, model a pendulum, design and implement a state-feedback controller to balance the pendulum in the upright position, design and implement a controller to swing up the pendulum **Features:** Plug-and-play design for quick and easy lab setup, Durable DC servo motor, Built-in PWM amplifier with linear response, High resolution optical encoder, Protective cover to shield the circuitry, Comprehensive digital resources and ABET-aligned courseware required **Readymade curriculum Topics:** System modelling, Parameter estimation, Balance control, Linear-Quadratic Regulator design, Non-minimum phase, Friction compensation, Non-linear swing up control, Energy-based control, Hybrid control.	**12**
10.	**Myolectric Trainer Board**	The trainer board should be used teach and demonstrate the fundamentals of processing electromyography signals. The trainer board should be developed exclusively for Advance Electronics Training System (Item 1, Lot 2). Students should be able to use a variety of filtering and control methods to control a servo from the contraction of muscles, applying the principles of electromyography. Students should be able to learn how to analyze the electromyogram signal, condition the signal, develop task-based servo control from processed electromyogram **Features:** Electromyograph powered by batteries, with opto-isolated electrode and a grounding strap, Pulse-width controlled metal gear servo, On-board signal conditioning circuit and PWM, Can monitor electromyogram signal at different stages in circuit, Plug-and-play design for quick and easy lab setup, Compact, Protective cover to shield the circuitry, Comprehensive digital resources and ABET-aligned courseware required	**02**

		Readymade curriculum Topics: Analysing the electromyogram signal, Signal conditioning – FFT, filtering, Development of task-based servo control from processed electromyogram, Calibration, Zero-order hold, Integral control.	
11.	**Mechatronics Actuators Training Board**	The trainer board should be able to introduce a variety of actuators that are commonly used in mechatronic systems. The trainer board should be developed exclusively for Advance Electronics Training System (Item 1, Lot 2). The system should teach students about the fundamentals of each actuator, their design considerations, common specifications, interfacing and operation. Students learn principles of electromagnetic actuation, linear and PWM actuators, brushed and brushless DC motors, stepper motors and servos. **Features:** Compact rotary servo system for instrumentation and measurement base platform, Plug-and-play design for quick and easy lab setup, Two brushed DC motors with gears to compare linear versus PWM amplifier technology, Brushless DC motor, Stepper motor, Hobby servo motor, Solenoid for coupling two brushed DC motors, Separate photo micro sensors for each motor, Built-in PWM amplifier, Built-in linear amplifier, Visualization of internal actuator mechanisms animated by hardware motion, Comprehensive digital resources and ABET-aligned courseware required **Readymade Curriculum Topics:** Principles of electromagnetic actuation, Magnetic fields of coiled conductors, Implementation of electromagnetic field theory in solenoids, Principles of linear and pulse width modulation (PWM) amplifiers, Actuator dead-band measurement and compensation, Linearity of an amplifier, Principles of brushed and brushless DC motors, Principles of stepper motors, Stepper motor control and excitation modes, Introduction to servo motor position control.	**12**
12.	**Rotary Servo Base Unit**	A fundamental unit for rotary control experiments is required. The system should able to introduce basic control concepts and theories relevant to real world applications of servomotors, from cruise control in automobiles to high-precision robotics manipulators used in industry. Students should learn how to find a transfer function that describes the rotary motion of the rotary servo load shaft, develop feedback system to control the position of the rotary servo load shaft, design a PI controller and a lead compensator to regulate the rotary servo load shaft speed. In addition to teaching control concepts, the Rotary Servo Base Unit can be used for research in various areas, including nonlinear control, optimal control, time delay, and dynamic inversion. **Features:** High quality DC servo motor and gearbox, High resolution optical encoders to sense position, Continuous turn potentiometer to sense position, Tachometer to sense motor speed, Robust machined aluminium casing with stainless steel gears, Variable loads and gear ratios, Optional slip ring for continuous measurement from instrumented modules, Ten easily interchangeable add-on modules, Easy-connect cables and connectors, Fully compatible with various software allowing users to design their own controller.	**04**
13.	**Connectivity kit and software for Control Plants**	Based on standalone controller for control plants (rotary servo, rotary flexible link, rotary flexible joint) which has at least 10 analog inputs, 6 analog outputs or more, 40 digital I/O lines or more, Wireless, LEDs, push button, accelerometer on board, Xilinx FPGA and dual-core ARM Cortex-A9 processor, Fully programmable with LabVIEW or C; adaptable for different programming levels, Onsite Training by OEM **Terminal Board:** Enables to connect embedded controller to control plants, 2 encoder inputs, 2 analog inputs, 2 analog outputs, Standard set of I/O for control	**04**

		plants **Linear Voltage Amplifier:** Built-in universal power supply, Current sense output is provided per channel, Over-heating / over-current fault indication output, Lightweight, Includes a regulated ± 24 V DC power supply at least 4A, Easy connect system enable switching from one experiment to another quickly **Software Toolkit:** Significantly simplifies control experiments setup and interfacing, Allows for easier and faster control design programming in Graphical User Interfaced based software, Targets embedded controllers and Windows-based controllers with a single VI, Protocol-independent VIs supporting TCP/IP, UDP, shared memory, RS232 serial communication, Outputs are safely zeroed when VI is stopped or aborted, Supports over 25 control plants, Must be used with the Control Design and Simulation Module.	
14.	**Rotary Inverted Pendulum**	The Rotary Inverted Pendulum module should be able to demonstrate intermediate control concepts and theories relevant to challenges mechanical and aerospace engineers face in real life. The Rotary Inverted Pendulum module attaches to the Rotary Servo Base Unit (Item 12, Lot 2). With this set up students can be exposed to two pendulum challenges: Classic pendulum (Furuta Pendulum) experiment, learning to balance a vertical rod in the upright position by rotating or changing the angle at the base. Self-erecting inverted pendulum experiment, learning to design a controller that swings the pendulum up and maintains it in the upright position. **Features:** Rotary Inverted Pendulum module easily attaches to the Rotary Servo Base Unit, High resolution encoders to sense rod and shaft angles, High quality aluminium chassis with precision-crafted parts, Easy-connect cables and connectors, Fully compatible with various software, Fully documented system models and parameters provided for various software, Open architecture design, allowing users to design their own controller.	**02**
15.	**Rotary Double Inverted Pendulum**	The Rotary Double Inverted Pendulum module should be able to demonstrate real-world control challenges related, for example, to take-off stabilisation of a multi-stage rocket. The Rotary Double Inverted Pendulum module attaches to the Rotary Servo Base Unit (Item 12, Lot 2). Using this experiment, students should be able to learn to: obtain a state-space representation of the open-loop system, design a state-feedback gain for the closed-loop system using LQR optimization, simulate the system and ensure it is stabilized using the designed state-feedback control, implement the state-feedback controller and evaluate the system performance. In addition to teaching advanced control concepts, the Rotary Double Inverted Pendulum can be used for research in various areas, including nonlinear control and optimal control. The rotary arm moves accordingly to balance the two links and the process repeats itself. **Features:** High resolution encoders sense rotary arm and pendulum link angles, Easy-connect cables and connectors, Fully compatible with various software, Fully documented system models and parameters provided for various software, Open architecture design, allowing users to design their own controller.	**02**

16.	**Rotary Flexible Link**	The Rotary Flexible Link module should be able to introduce various control concepts related to vibration analysis and resonance. Allows to demonstrate real-life control challenges encountered in large, lightweight structures that exhibit flexibilities and require feedback control for improved performance. The Rotary Flexible Link module attaches to the Rotary Servo Base Unit (Item 12, Lot 2). Using this experiment, the students should learn to find the stiffness experimentally, use Lagrange to develop the system model, develop and implement a feedback control using the linear-quadratic regulator **Features:** High resolution strain gage to sense link deflection, Flexible Link module easily attaches to the Rotary Servo Base Unit, High quality aluminium chassis with precision-crafted parts, Easy-connect cables and connectors, Fully compatible with various software, Fully documented system models and parameters provided, Open architecture design to allow users to design their own controller **Readymade Experiment Topics:** Modelling Topics, Lagrange derivation, State-space representation, Model validation, Parameter estimation, Control Topics, Linear-quadratic regulator, Vibration control	**02**
17.	**Rotary Flexible Joint**	The Rotary Flexible Joint module attaches to the Rotary Servo Base Unit (Item 12, Lot 2). Using this experiment, students learn to model the system using Lagrange and find the linear state-space model of the system, perform basic model validation, design a state-feedback controller using pole-placement, simulate the closed-loop flexible joint system, implement the designed controller on the device, and assess the behaviour of implementing a partial-state feedback controller. **Features:** Variable load length and spring anchors to change system parameters, Variable spring stiffness, High resolution encoder to sense arm position, High quality aluminium chassis with precision-crafted parts, Easy-connect cables and connectors, Fully compatible with various software, Fully documented system models and parameters provided, Open architecture design to allow users to design their own controller. **Readymade Experiment Topics:** Modelling Topics, Lagrange derivation, State-space representation, Model validation, Parameter estimation, Control Topics, Pole placement, Vibration control.	**02**
18.	**Signals & Systems Trainer Board**	This trainer board should be specifically designed for teaching signals and systems in electrical and computer engineering curricula. It is ideal for signal and systems and introduction to signal processing courses. It should be developed exclusively for Advance Electronics Training System (Item 2, Lot 2). Ideal platform to teach concepts such as characterizing linear and nonlinear signals, understanding convolution, using poles and zeros in the Laplace domain, and sampling and aliasing with a hands-on experimental approach so students can understand the theory that they learn in the classroom. The lab manual should include step-by-step instructions on each topic as well as references to topics for signals and systems classes. The trainer should include all accessories to make it easy for educators to set up and teach the concepts. Fully compatible with various software. Includes printed lab manual of 15 or more experiments with software. Onsite Training by OEM. **Readymade Courseware**: Signals and systems board circuit modules, Instrumentation and Measurement Platform functions, Signals and systems board Soft Front Panel descriptions, Pulse sequence speed throttled by inertia, Isolated step response of a system, Isolated pulse response of a system, Sinewave input, Clipping, Systems: Linear and non-linear, Unravelling convolution, Integration,	**15**

		correlation & matched filters, Exploring complex numbers and exponentials, Build a Fourier series analyser, Spectrum analysis of various signal types, Time domain analysis of an RC circuit, Poles and zeros in the Laplace domain, Sampling and Aliasing, Getting started with analog-digital conversion, Discrete-time filters with FIR systems, Poles and zeros in the z plane with IIR systems, Discrete-time filters – practical applications.	
19.	**Power Quality Analyser**	Complete System for Power Quality Monitoring and Analysis is required, Embedded hardware, 3-phase + neutral current inputs (5 Arms), 3-phase voltage inputs (300 Vrms), Monitor power according to international standards such as IEC 61000-X and EN 50160, Fully compatible with graphical user interface software, Onsite Training by OEM **International Standards:** IEC 61000-4-30: Power Quality Measurement Methods, Class A, IEC EN 61000-4-7: Guide on Harmonics Measurements, IEC EN 61000-4-15: Flicker meter, EN 50160: Voltage Characteristics of Electricity Supplied by Public Distribution Systems **Software Functionality:** Vector scope, oscilloscope, Power and energy monitor, voltage monitor including Flicker meter, Symmetrical components analyzer of 3-phase system, Power network impedance analyzer, Half-period RMS monitor, Transient recorder and fault recorder, Voltage telegrams and alarms, Digital inputs, FFT analyser	**02**
20.	**Educational Digital Signal Processing (DSP) Device**	The educational device that should consist of a multifunction DAQ device and a DSP board: Compact, portable, and USB-powered educational device for use anywhere, anytime, Oscilloscope , DMM, Function Generator ,Variable Power Supply, Bode Analyzer, Dynamic Signal Analyzer, Arbitrary Waveform Generator, DIO, Single device provides 8 plug-and-play computer-based lab instruments, Data acquisition engine with analog inputs/outputs and digital lines, Extend capabilities by programming with software, Simulate and compare with other software, Fully compatible with graphical user interface based software, Onsite Training by OEM **DSP Board:** Entry-level teaching tool for hands-on learning of digital filters, Teach digital filter design, calculate coefficients, and observe poles and zeros, 50 MHz microchip DSP with anti-aliasing filters and reconstruction filters on the output, 32-bit precision or higher to create filters up to the 10th order	**25**
21.	**Communications Teaching Bundle for Undergraduate Communications Courses**	The package should feature two software defined radio, software-configurable RF transceivers and turnkey courseware, the Introduction to Communications Teaching Bundle is a complete solution for early undergraduate communication courses. It should also include components of a single lab station designed to help students gain hands-on experience with a live communication link between two USRPs. Ready-to-teach communications systems courseware. 2 x software defined transceivers (2X2 MIMO, 70 MHz to 6 GHz or higher). Covers FM radio, GPS, GSM, Bluetooth, and ISM bands. Up to 56 MHz bandwidth with USB 3.0 connectivity. OEM technical support and onsite training by OEM. Fully programmable with graphical user interface based Communications System Design Software **Courseware:** Source Coding: Digital Cosine Transform, Digital Communications: UART, Sync and Channels, BPSK and QPSK Modulation, BPSK and QPSK Demodulation and Decoding, Build a Wireless Packet Transceiver **Accessories:** 2 x 6V DC 3A Power Supply, 2 x 144 MHz, 400 MHz, 1200 MHz , Tri Band Vertical Antenna, 2 x 2.4 and 5 GHz Dual Band Vertical Antenna, 2 x 824-960 MHz, 1710-1990 MHz Dual-band Vertical Antenna	**12**

22.	**Software Defined Radio with Kintex-7 programmable FPGA (50 MHz to 2.2 GHz)**	Integrated hardware and software solution is required for rapidly prototyping high-performance wireless communication systems. Tuneable centre frequency from 50 MHz to 2 GHz or higher with 40 MHz per channel real-time bandwidth, 2x2 MIMO with the ability to expand to higher channel count systems, DSP-focused Xilinx Kintex-7 FPGA, programmable, Optimized RF performance FPGA Module, High-speed, low-latency PCI Express x4, 800 MB/s connection to the host, Windows 7/Vista/XP compatibility, technical support, and 1-year extendable warranty, OEM technical support and onsite training by OEM, Fully programmable with graphical user interface based Communications System Design Suite **Accessories:** PCIe - MXI Express Interface Kit, PXIe - MXI Express Interface Kit, International Power Cords, GPIO Connection Kit, 2 x 144 MHz, 400 MHz, 1200 MHz, Tri Band Vertical Antenna.	**04**
23.	**Software Defined Radio with Kintex-7 programmable FPGA (1.2 GHz to 6 GHz SDR)**	Integrated hardware and software solution is required for rapidly prototyping high-performance wireless communication systems. Tuneable centre frequency from 1.2 GHz to 6 GHz with a 40 MHz per channel real-time bandwidth, 2x2 MIMO with the ability to expand to higher channel count MIMO systems, DSP-focused Xilinx Kintex-7 FPGA, programmable FPGA Module, Optimized RF performance with FPGA Module, High-speed, low-latency PCI Express x4, 800 MB/s, connection to the host, Windows 7/Vista/XP compatibility, NI technical support, and 1-year extendable warranty, OEM technical support and onsite training by OEM, Fully programmable with graphical user interface based Communications System Design Suite **Accessories:** PCIe - MXI Express Interface Kit, PXIe - MXI Express Interface Kit, International Power Cords, GPIO Connection Kit, 2 x 2.4 and 5 GHz Dual Band Vertical Antenna.	**04**
24.	**Vector Signal Transceiver**	Vector signal analyzer and generator, FPGA-based real-time signal processing and control, Features the flexibility of a software defined radio architecture with RF instrument class performance. 65 MHz to 6 GHz frequency range, Up to 200 MHz instantaneous bandwidth, 24 channels of high-speed digital I/O, Can be used to test a variety of cellular and wireless standards such as IEEE 802.11ac with an error vector magnitude of better than -45 dB (0.5 percent) at 5.8 GHz, OEM technical support and onsite training by OEM, Fully programmable FPGA. All the accessories are included.	**01**
25.	**Manual Calibration Kit, K-Type, for Vector Network Analyzer**	Manual Calibration Kit, K-Type, for Vector Network Analyzer, OEM technical support and onsite training by OEM.	**03**
26.	**Microwave Experiment Kit with RF Design Technology Trainer**	This setup is meant to be used with PXI RF platform including PXI Vector Network Analyzer (10 MHz to 6 GHz, >100 dB dynamic range, <-123 dBm/Hz noise floor) and PXI Vector Signal Transceiver (65 MHz to 6 GHz frequency range, 200 MHz instantaneous BW, 24 HSDIO channels). RF PXI platform should also features a 2.3 GHz Quad-Core PXI Express Controller with a 9 slot PXI express chassis **Microwave Experiment Kit:** An experimental equipment to educate Microwave Component Design, Manufacturing, and Measuring techniques include Microstrip line theory and Microwave device design theory, Study the microstrip line design theory, Study the basic theory of microwave component, Microwave component design & simulation, Microwave component manufacturing, Microwave component measurement, Microwave component analysis of characteristics **RF Design Technology Trainer:** Help users acquire basic RF circuit designing	**12**

		skills, Helps users acquire RF module manufacturing skills, Provides RF circuit measuring practices, Provides chip components'' value measuring practices in high frequency band.	
27.	**Antenna Training System with discrete Microwave Components**	The laboratory facility is intended for hands-on study of traditional patterns of antennas. The facility is based on the RF PXI platform and use software developed with the graphical programming language. All hands-on experiments are implemented on the facility consisting of a turntable tripod used for mounting the antennas under test, a tripod for the auxiliary antenna, and a set of 7 antennas in the 2.4GHz range. Signal received by the antenna under test is fed to the RF spectrum analyzer for further processing. The facility allows the students to measure the parameters of studied antennas by using the method of far field measurements. OEM technical support and onsite training by OEM. Fully programmable with graphical user interface based software **Antenna Set:** Rod antenna, Biquadratic antenna, YAGI antenna, Horn antenna, Parabolic antenna, Cophasal antenna array, Auxiliary rod antenna **9-Slot 3U PXI Express Chassis:** 5 hybrid slots, 3 PXI Express slots, 300 W total power, Midperformance – Up to 250 MB/s per-slot bandwidth and 1.75 GB/s system bandwidth, low depth chassis - ideal for rack-mount as well as benchtop applications, Compatibility with PXI, PXI Express, CompactPCI, and CompactPCI Express modules 2.3 GHz quad-core Intel Core i7-3610QE processor (3.3 GHz maximum in single-core, Turbo Boost mode): 2.3 GHz quad-core Intel Core i7-3610QE processor (3.3 GHz maximum in single-core, Turbo Boost mode), High-bandwidth PXI Express embedded controller with up to 8 GB/s system and 4 GB/s slot bandwidth, 4 GB (1 x 4 GB DIMM) dual-channel 1600 MHz DDR3 RAM standard, 16 GB maximum, 2 SuperSpeed USB, 4 Hi-Speed USB, 2 Gigabit Ethernet, GPIB, serial, and other peripherals, Windows OS and drivers already installed; hard-drive-based recovery **PXI 6 GHz Vector Network Analyzer:** 10 MHz to 6 GHz frequency range, >100 dB dynamic range, <-123 dBm/Hz noise floor, -30 dBm to +5 dBm power range, <400 µs/point sweep speed over 3,201 points **PXI Source Measure Unit (SMU):** ±20 V, 2 A, isolated output, 4-quadrant operation - up to 10 W sinking, Remote (4-wire) sense, 5 current ranges - 2 A to 200 µA, 1 nA measurement resolution on the 200 µA range, Additional utility channel for programmable source and measure at up to 6 V, 1 A **DAQ card with16-Bit, 1 MS/s (Multichannel), 1.25 MS/s (1-Channel), 16 Analog Inputs:** 16 analog inputs, 1.25 MS/s 1-channel, 1 MS/s multichannel; 16-bit resolution, ±10 V, Correlated DIO (8 clocked lines, 10 MHz); analog and digital triggering, NIST-traceable calibration certificate and more than 70 signal conditioning options, MCal calibration technology for increased measurement accuracy, DAQmx driver software and interactive data-logging software Discrete MW components: Including oscillators, mixers, modulators, demodulators, filters, combiners, couplers etc **Labs Layout:** The labs should consist of the following basic parts: Theoretical study of antenna characteristics with different input parameters, Software simulation of antenna characteristics with different input, Experimental study of antenna characteristics, Comparison of theoretical and experimental results (in certain labs), Lab report, Test questions. The test bench can be used for Simulation of antenna performance, Experimental characterization of antennas. **Hands on Experiments:** Study of dipole antennas. Rod antenna, Study of traveling-	**12**

		wave antennas: Yagi or director type antenna, Study of traveling wave antennas: Helical antenna, Horn antennas, Parabolic mirror antennas, Cophasal antenna array.	
NOTE:			
i.	1 - Year Parts and Labour warranty for all components on site.		
ii.	The bidders should clearly mention Terms and Conditions of service agreements for the supplied hardware equipment after the expiry of initial warranty period.		
iii.	In case of International Warranties, the local authorized dealers should mention their service and warranty setup, details of qualified engineers, etc.		
iv.	Please mention the country of origin / manufacturing / assembly of the quoted brand / model.		
v.	All items must be factory fitted & configured. Vendor / Assembler to provide verification of Serial numbers / AA numbers of Intel products.		
vi.	The Purchaser reserves exclusive rights to decrease or increase the quantity of Goods/Items/Equipment mentioned vide this tender document.		

LOT # 3			
Sr. No.	Items	Description	Qty.
1.	**LabVIEW Departmental License**	The Academic Site License should include the LabVIEW Professional Development System and a large set of modules and toolkits. Other select NI software packages are also included such as NI LabWindows/CVI. **Core Engineering**: LabVIEW Professional Development System, LabVIEW MathScript RT Module, LabVIEW Desktop Execution Trace Toolkit, LabVIEW Application Builder, LabVIEW VI Analyzer Toolkit, LabVIEW Signal Express, LabVIEW LEGO MINDSTORMS NXT Module, NI LabWindows/CVI Full Development System, LabWindows/CVI Execution Profiler, NI TestStand, NI Measurement Studio Enterprise Edition **Measurements and Data Management:** LabVIEW DataFinder Toolkit, LabVIEW Report Generation for Microsoft Office Toolkit, LabVIEW Database Connectivity Toolkit, NI DIAdem Professional, NI-DAQmx Device Driver, LabWindows/CVI SQL Toolkit, LabVIEW Biomedical Toolkit **Controls and Robotics:** LabVIEW for myRIO Module, LabVIEW Control Design and Simulation Module, LabVIEW System Identification, NI Vision Development Module, NI Vision Builder for Automated Inspection, LabVIEW PID Control and Fuzzy Logic, LabVIEW Robotics Module, LabVIEW Simulation Interface Toolkit, LabVIEW Statechart Module, LabVIEW Softmotion Module, NI Motion Assistant, Lab Windows/CVI PID Toolkit **Real-time and Embedded:** LabVIEW Real-Time Module, NI Real-Time Execution Trace Toolkit, LabVIEW FPGA Module, LabVIEW FPGA Xilinx Tools, LabWindows/CVI Real-Time Module, LabVIEW Electrical Power Measurement Suite, LabVIEW Touch Panel Module, LabVIEW Data logging and Supervisory Control (DSC) Module, NI VeriStand **Signal Processing and Communications:** LabVIEW Modulation Toolkit, LabVIEW Digital Filter Design Toolkit, LabVIEW Multicore Analysis and Sparse Matrix Toolkit, LabVIEW Spectral Measurements Toolkit, LabVIEW Advanced Signal Processing Toolkit, LabVIEW Sound and Vibration Measurement Suite, LabVIEW Adaptive Filter Toolkit, LabVIEW GPU Analysis Toolkit, LabWindows/CVI Spectral Measurements Toolkit, LabWindows/CVI Signal Processing Toolkit.	01
2.	**Software for Rapid Wireless Prototyping**	**LabVIEW Communications System Design Suite:** Hardware-Aware Environment for Rapid Wireless Prototyping, Unified design flow from algorithm to processor and FPGA, Support for C and .m to enable flexible algorithm design, Advanced compiler to enable high-level algorithm design with an easy path to hardware, Built-in floating point to fixed point conversion utility for a seamless design flow, Support Windows-7, 64-bit.	01
NOTE:			
i.	1 - Year Parts and Labour warranty for all components on site.		
ii.	The bidders should clearly mention Terms and Conditions of service agreements for the supplied hardware equipment after the expiry of initial warranty period.		
iii.	In case of International Warranties, the local authorized dealers should mention their service and warranty setup, details of qualified engineers, etc.		
iv.	Please mention the country of origin / manufacturing / assembly of the quoted brand / model.		
v.	All items must be factory fitted & configured. Vendor / Assembler to provide verification of Serial numbers / AA numbers of Intel products.		
vi.	The Purchaser reserves exclusive rights to decrease or increase the quantity of Goods/Items/Equipment mentioned vide this tender document.		

**LOT # 4**

Sr. No.	Items	Description	Qty.
1.	**Network Analyzer**	A 300KHz to 20GHz Network Analyzer is required with the following specifications or higher: **Specification (dB)** • Frequency range 300KHz to 20GHz with bias tees • Test port input stability at 20GHz frequency ±0.04 dB/°C • Test port Noise level at 20GHz (IFBW = 70 kHz) 0.023 dB rms(at maximum output power level of sweep range) • Low trace noise: 0.004 dB rms @ 70 kHz IFBW • Wide dynamic range: 130 dB (typical) • Fast measurement speed: 8 msec @ full 2-port cal • 401 points High temperature stability: 0.005 dB/°C. • TFT Color Display with touch screen • Operating voltage 90V-264V Ac single phase 47Hz to 64Hz (160W) • Inclusive of 4-in-1 OSLT Calibration kit that satisfies the whole range • RF Cable pair 1 Meter • Connector type N(F) to Type N(F) • Connector Type N(m) to Type N(m)	**01**
2.	**Power Supply**	A DC power supply is required with the following specifications or higher: • Triples output DC power supply DC voltage 0-60 x 2 current 0-3 Amp, 5V fix with 3Amp • Provides total power of 375 W for three outputs • Output sequencing capability • Excellent load and line regulation (CV: < 0.01% + 2 mV; CC: < 0.02% + 2 mA) ensures stable output • Provides clean output with ≤ 1 mVrms (0.5 mVrms typical) noise • Fast < 50 μs transient response for stable testing • Dual display shows both voltage and current reading • Over-voltage and over-current protection • Security features: keypad lock and physical lock mechanism	**01**
3.	**Semiconductor Parameter Analyser**	The System should be able to characterize semiconductor devices with 2, 3 and 4 electrical connections including pn junction didoes, BJT, MOSFET Transistors. It should be able to measure I-V response of the device under test. It should be able to provide 10fA/0.5uV resolution and a range up to 100mA for testing. Optionally, it should be able to provide up to 1A range and Multi-frequency capacitance measurements (C-V, C-t, C-f) from 1KHz to 5MHz range.	**01**
4.	**Probe Station**	The system should have mounting capability to handle small devices and wafers up to 150mm in Diameter. It should have both DC and RF chucks/probes to test devices at both DC and RF frequencies (sub-THz range). It should have 3 axis substrate alignment (X,Y,Z) with at least 10mm travel in z direction, and up to 150mmX150mm movement in X and Y direction. It should have an optical microscope and stage motion resolution to allow alignment of 5um and bigger features. Optical microscope motion range should be 50mmX50mm. It should have a camera to take device pictures. It should allow users to take fAmp resolution measurements from DC to RF, using at least 4 probes simultaneously. It should have a vacuum chuck to be able to hold small devices and wafers in place. It should come with 4 DC and 4 RF probes as well with all necessary	**01**

		accessories and pump.	

NOTE:	
i.	2 - Years Parts and Labour warranty for all components on site.
ii.	The bidders should clearly mention Terms and Conditions of service agreements for the supplied hardware equipment after the expiry of initial warranty period.
iii.	In case of International Warranties, the local authorized dealers should mention their service and warranty setup, details of qualified engineers, etc.
iv.	Please mention the country of origin / manufacturing / assembly of the quoted brand / model.
v.	All items must be factory fitted & configured. Vendor / Assembler to provide verification of Serial numbers / AA numbers of Intel products.
vi.	The Purchaser reserves exclusive rights to decrease or increase the quantity of Goods/Items/Equipment mentioned vide this tender document.

LOT # 5			
Sr. No.	Items	Description	Qty.
1.	**802.15.4 Mote Module with additional power amplifier and LNA**	IEEE 802.15.4 WSN platform, TI MSP430F1611 Microcontroller, CC2420 RF with additional power amplifier & LNA, TinyOS 2.x & ContikiOS Compatible, 2xAA Battery Holder, External 5dBi SMA antenna included, Hirose 51-pin connector, DC Input, Included DC Power Supply	**15**
2.	**Analog & digital data acquisition board**	Compatible with WSN Motes (Item 1, Lot 5): ADC 4 ports, GPIO (UserINT) 2 ports, RS232, 2 ports SP3232 SIPEX, VoltAmp, 2 ports LMV932 National Semiconductor	**15**
3.	**Temperature, Humidity, Light & Accelerometer sensor board**	Compatible with WSN Motes (Item 1, Lot 5): with Hirose 51-pin connector, Sensirion SHT11 Temperature & Humidity Sensor, Hamamatsu S1087 light sensor (visible range), Hamamatsu S1087-01 light sensor (visible & infrared range), Analog Devices ADXL32 2-axis Accelerometer	**15**
4.	**Temperature, CO & CO2 sensor board**	Compatible with WSN Motes (Item 1, Lot 5): CO, NIDS Co GS-02A, Resistive-based technology, CO_2, SOHA TECH, SH-300-DC (CO_2), Voltage output based, Samkyung Ceramics, NTC-103F397F, NTC Thermistor Technology	**10**
5.	**Standalone and Computer Interfaced Chip Programmer**	**Features:** Standalone Universal 48-pin driver that supports most complex devices, Improved programming processor for high-speed programming, Programs devices with Vcc as low as 1.2V, Oerates in either **PC hosted or stand-alone mode**, **PC mode:** the programmer controlled by a PC via a high-speed USB cable for chip programming, **Stand-alone mode:** the programmer is controlled and operated via a built-in keypad and LCD display, Project files are stored in a CF (compact flash) card for convenience and data security, In-system programming (ISP / ICP) capability, Programming / testing features for TTL/CMOS logic ICs and memories, Only IC manufacturer approved programming algorithms used for high reliability, Over-current and over-voltage protection for safety of the chip and programmer hardware, Compatible with Windows XP / Vista / 7 / 8 (32/64 bit), Vcc verification (at +5% ~ -5% and +10% ~ -10%) enhances programming reliability, **Advanced and powerful software functions:** Production mode start chip operation the moment the chip is inserted properly, Project function simplifies processes such as Device Selection, File Loading, Device Configuration Setting, Program Option, and Batch File Setting into one step, Password for project files can be set for volume production control, Batch command combines device operations like Program, Verify, and Security into a single command at any sequence, Serial numbers generators are available as standard or customer-specific functions, Log file is useful for quality tracking. **Accessories included:** Programmer, AC adapter, Software CD, USB Cable.	**02**
6.	**Computer Interfaced Chip Programmer**	**Features:** Universal 48-pin driver that supports most complex devices, Improved programming processor for high-speed programming Programs devices with Vcc as low as 1.2V, In-system programming (ISP / ICP) capability, Programming / testing features for TTL/CMOS logic ICs and memories, Only IC manufacturer approved programming algorithms used for high reliability, Over-current and over-voltage protection for safety of the chip and programmer hardware, Compatible with Windows XP / Vista / 7 / 8 (32/64 bit), Vcc verification (at +5% ~ -5% and +10% ~ -10%) enhances programming reliability, **Advanced and powerful software functions:** The Project function simplifies processes such as device selection, file loading, device configuration setting, program option, and batch file setting into one step. Password	**08**

		protection provides security for project files and production volume control. The Batch command combines device operations like program, verify, security into a single command at any sequence. Serial number generators are available as standard or customer-specific functions. A Log file provides quality tracking. **Accessories Included:** Programmer, AC adapter, Software CD, USB Cable.	
7.	**Modular Electronics Circuits**	The modular Kit should give in-depth exploration of the electronic components included with the pick and place approach Circuits. The students should grasp the basic principles of electronics. The kit should enable the student to perform more than 500 experiments with various combinations of circuit components. The kit should be accompanied with a DC power supply and the enclosure box. The Student and Teacher Guide should be included as educational curriculum. The system should include real world applications and problem solving quizzes. The teacher guide is meant to prepare educators for proper introduction of Circuits and guide them through each chapter with quizzes for students to test their knowledge. **Topics Covered:** Resistors, Capacitors, Transistors, Motors, Integrated Circuits, Switches, Series Circuits, Parallel Circuits, Batteries, Relays, Transformers, Digital Recording, 7-segment Displays, SCRs, Analog Meters, Diodes, FM Radio.	**40**
8.	**LCR Meter**	The inductance, capacitance and resistance handheld meter is required. The test frequency extends should be as high as 100 kHz/10kHz, providing greater flexibility to test a wider range of components. The LCR meter should use a dual 20,000 /2,000 count display. The 20,000 count display is used for displaying the primary parameters such as capacitance, inductance and resistance as well as DC resistance measurement, and a 2,000 count display is for secondary parameters such as Q, D, ESR and RP measurement. The LCR meter should provide two measurement methods, 2 wire and 5 wire measurement. The meters should also include handy functions such as data hold, tolerance sorting, zero mode and Min/Max. There should be a meter's USB interface that can be used to log data to a PC using the LCR meter software and provide the DC 5V needed to power the meter. **Features:** 20,000/2,000 Counts Dual Display, Test Frequency : 100/120Hz/1/10/100kHz, Auto LCR Mode for DUT Measuring, 0.2% Basic Accuracy, Measurement Parameter : L, C, R, D, Q, ESR, θ, DCR, Parallel/Series Testing Mode, Sorting Mode for Quality Control, 2Wire or 5Wire Measurement Available, Data Hold and Zero Mode Supported, Max/Min Auto Range, Auto Backlit, Low Battery Indication, Auto Power off, Data Collection/AC power operation.	**05**
9.	**Power Clamp Meter**	Power Clamp meter 1000A AC with high performance or higher. **Features:** 10000 Count digital display, Active Backlit, Large scale display, VoltSense (None Contact Voltage), Analog Bar graph, True RMS reading on AC and AC+DC mode, Torch lightening when clamping, AC 1000 Amps capability, AC Current via Flexible Current Probe, Auto AC/DC 1000 Volts capability and selection, Auto Ohms/Continuity/Diode selection, 100K Ohms Resistance capability, Continuity Beeper, Frequency Counter, Power and Power factor measurement, Total Harmonics distortion and Harmonics 1 to 25, Capacitance capability, Inrush Current, Peak Hold, MIN/MAX HOLD, Smart Data Hold, Phase rotation indication, Low pass Filter, Auto Power Off.	**05**

10.	**PCB Prototyping Machine**	A machine for prototyping of fine line as well as RF PCBs is required with the following specifications or higher. Working area bench top type, Spindle motor speed 10,000 - 100,000 rpm, Automatic tool Change with 15 positions, Automatic milling width adjustment, Vision System with Fiducial recognition with measuring functions, Excellent Solder Paste Dispensing function, Vacuum Table, Pneumatic non-contact working depth limiter, Resolution 0.5 um (0.02 mil), Repeatability 1 um (0.04 mil), Travel speed (maximum) 150 mm/sec (6 in/sec), Drilling capacity (maximum) 1, Minimum track size 0.1 mm (4 mil) & Minimum hole size 0.2 mm, X/Y Drive: 3-phase stepper motor, Z-Drive: 2-phase stepper motor, Integrated Acoustic cabinet (machine hood), Includes software on CD One Year warranty. Set of Tools & Accessories that includes Drill backing plate, various Base Plate, various End Mill tools, Tool Set, special tape, micro cutter and various drills etc. Dust Extraction Unit, Hand Microscope, Easy to use Rivets based through hole plating system, Compressor Max Pressure 10 bars, output 165 L/Min and 50 L container, Noise level 68 dB (A) working on 220V and 50Hz. System to apply solder resist masks on prototype PCBs Sufficient for 10 double sided PCB, UV Exposure unit, Hot Air Oven to cure solder resist mask & conductive plate. A system for easy-to-apply green solder resist mask.	01
11.	**Programmable Logic Controllers - Basic**	Basic programmable logic controllers are required with the following specifications or higher: 14 points 24VDC digital input (4 points high speed 200KHz, 4 points medium speed 20KHz, 6 points medium speed total 5KHz); 10 points relay or transistor output (4 points high speed 200KHz, 4 points medium sped 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block. **Features:** Digital input 24V DC, Digital output Transistor, Communication port built-in and expendable, Calendar built-in, Built-in power supply 24-AC, Wiring mechanism 7.62mm detachable terminal block.	07
12.	**Programmable Logic Controllers - Advanced**	The power PLC for the mid to high-end performance ranges, The solution for even the most demanding tasks, With a comprehensive range of modules and performance-graded CPUs for optimal adaptation to the automation task, Flexible in use through simple implementation of distributed structures, User-friendly connections **System includes the following: Power supply module (PS):** for connecting the controller to a supply voltage of 120/230 V AC or 24 V DC. **CPUs:** Different CPUs with integral PROFIBUS DP interfaces are available for different performance ranges. Depending on type, they are also available with integral PROFINET interface. The PROFIBUS interface enables the connection of up to 125 PROFIBUS DP slaves. Up to 256 PROFINET IO devices can be connected to the PROFINET interface. All CPUs of the controller should handle extremely large configurations. In addition, several CPUs should work together in multi-computing in one central controller to increase performance. The CPUs enable short machine cycle times by means of their efficient processing speed and deterministic response times. Signal **modules (SMs) for digital (DI/DO) and analog (AI/AO) input/output** **Features:** Digital input/output modules, Analog input modules, Analog output modules, **Hardware interrupt:** Process signals can be monitored, and responses to signal changes can be triggered via process interrupt. General technical data, Degree of protection IP20, Ambient temperature 0 to 60 °C Relative humidity, 5 to 95%, no condensation, Atmospheric pressure, 1080 to 795 hPa (corresponds to an altitude of -1000 m to +2,000 m), Electromagnetic compatibility: Interference immunity According to 61000-6-2, Emitted interference According to EN 61000-6-4.	07
13.	**Smart Vision**	A development board for vision system design is required. The board should provide a	12

	Development Kit	Zynq based processing platform and also provides the camera to acquire images/videos such as Xylinx Zynq based PicoZed 7015 Zynq SOM based Smart Vision Development Kit + Aptina 1.2MP camera module & Support for CoaXPress, GigEVision, HDMI output, Machine Vision Carrier Card, PicoZed 7015T SOM, USB3Vision	
14.	All Programmable SoC Evaluation Kit	Xilinx SoC ZC702 based development board with device locked Vivado Licence is required.	02
15.	FPGA Board	A board based on the latest Artix-7 Field Programmable Gate Array (FPGA) from Xilinx is required. With support for: generous external memories, and collection of USB, Ethernet, and other ports. Provides support for ports and peripherals including: • 16 user switches, USB-UART Bridge, 12-bit VGA output • 3-axis accelerometer, 16Mbyte Cellular RAM, Pmod for XADC signals • 16 user LEDs, Two tri-color LEDs, PWM audio output, Temperature sensor • Serial Flash, Micro SD card connector, PDM microphone, 10/100 Ethernet PHY • Four Pmod ports, Two 4-digit 7-segment displays • Digilent USB-JTAG port for FPGA programming and communication • USB HID Host for mice, keyboards and memory sticks	12
16.	Multiple RF & Microwave Accessories	Various RF Circuits with SMA connector preferably are required: Mixer1 (100-2000MHz), Mixer2 (1000-4200MHz), Couplers (10dB Coupling, Directivity 25dB, Frequency Range 10-1800MHz), Power Splitter (1900-4200MHz), VCO1 (800-1600MHz), VCO2 (2150-3050MHz), LNA1 (2200-2700MHz), LNA2 (Gain 20 dB, NF 0.5dB, Frequency range 0.7-1.6GHz, High Output of +19.9dBm), attenuators (-10dB, -20dB and -30dB), High Gain Amplifier (700-3500MHz with High IP3 around +44dBm), 50Ohm terminator (DC-4GHz), RF Choke (50-8200MHz), Bias Tee(50-6000MHz) for RF front end implementation in the frequency range of different bands up to 10GHz for various applications.	06
17.	Modular Robotic Kits	The package should combine enough materials and equipment for a class to design and create robots – or other building projects. Should Come with a video to help teach robot construction as well as a teacher's guide that focuses on pivots, end effectors, and design challenges for robotics. This should include enough hardware to support up to students with a base kit, R/C radios, and motor controllers. The equipment should feature heavy-duty, aircraft-grade aluminium elements for construction, powerful drive motors, and expandable capabilities. The student should be able to build a basic square chassis robot base with a remote control or incorporate other electronics to design a highly specific autonomous robot. Should include all in a box; Resource Sets; 12-volt Rechargeable NiMH Battery Packs; NiMH Battery Pack Chargers; and the comprehensive Builders Guide, a 150 plus page teacher's resource packed with several model build instructions, safety, resources, challenges, and more (comes printed and on a Windows CD).	20
18.	Plastic Parts Maker	The system should be able to make custom plastic parts based upon a given design file, in a short time period. The system should be able to make as small as 20um features, at least 12.5 micron XY precision with 5 micron Z precision and the total part size should be 8.5 inches by 8.5 inches by 8 inches, at least. Its printing speed should be at least 20 cubic mm per second and a travel speed of 300mm/second or higher. It should be able to use common plastic materials like PLA, ABS and CBE. The essential software and accessories should be included. The power requirements should not exceed 24V and 10 Amp with an AC input of 100-240V / 4A / 50-60Hz, maximum 250W.	01
19.	Electronic	The system should be able to create prototypes of electrical circuits and devices on a	01

		variety of substrates. It should be able to create devices out of different conducting materials (e.g. gold, silver, platinum) and insulators (e.g. FR4, silicon oxide) using user fillable cartridges. It should be able to handle substrates of 8.0 in by 12.0 in, at least when substrate thickness is less than 500 microns. Its repeatability should be at least 25micrometer. It should have a camera mounted to allow substrate alignment. Its nominal drop volume should be up to 10 pL. The essential software and accessories should be included.	
20.	**Software Defined Radio**	Software Defined Radio peripheral capable of transmission or reception of radio signals from 1 MHz to 6 GHz. The hardware should be designed to enable test and development of modern and next generation radio technologies, an open source hardware platform that can be used as a USB peripheral or programmed for stand-alone operation. The hardware support half-duplex transceiver, up to 20 million samples per second, 8-bit quadrature samples (8-bit I and 8-bit Q), compatible with GNU Radio, SDR, and software-configurable RX and TX gain and baseband filter, software-controlled antenna port power (50 mA at 3.3 V), SMA female antenna connector, SMA female clock input and output for synchronization, convenient buttons for programming, internal pin headers for expansion, Hi-Speed USB 2.0 and USB-powered. A telescopic antenna and any other accessories should be included. A log periodic Antenna that covers from 750MHz to 11GHz should also be included.	04
NOTE:			
i.	1 - Year Parts and Labour warranty for any or all items on site.		
ii.	The bidders should clearly mention Terms and Conditions of service agreements for the supplied hardware equipment after the expiry of initial warranty period.		
iii.	In case of International Warranties, the local authorized dealers should mention their service and warranty setup, details of qualified engineers, etc.		
iv.	Please mention the country of origin / manufacturing / assembly of the quoted brand / model.		
v.	All components must be factory fitted & configured. Vendor / Assembler to provide verification of Serial numbers / AA numbers of Intel products.		
vi.	The Purchaser reserves exclusive rights to decrease or increase the quantity of Goods/Items/Equipment mentioned vide this tender document.		

FORMS & OTHER REQUIRED DOCUMENTS

Technical Proposal Submission Form

[Location, Date]

To   _(Name and address of Client / Purchaser)_

Dear Sir,

We, the undersigned, offer to provide the _(insert title of assignment)_ in accordance with your Request for Proposal/Tender Document No._____ dated _(insert date)_ and our Proposal. We are hereby submitting our Proposal, which includes the Technical Proposal and the Financial Proposal sealed in two separate envelopes.

We undertake, if our Proposal is accepted, to provide supply of _____related to the assignment.

We also confirm that the Government of Pakistan / Punjab has not declared us, or any, ineligible on charges of engaging in corrupt, fraudulent, collusive or coercive practices. We furthermore, pledge not to indulge in such practices in competing for or in executing the Contract, and we are aware of the relevant provisions of the Proposal Document.

We understand you are not bound to accept any Proposal you receive.

We remain,

Yours sincerely,

Authorized Signature (Original)

(In full and initials)

Name and Designation of Signatory

Name of Firm

Address

Financial Proposal Submission Form (Part of Financial Bid Envelope)

[Location, Date]

To   _(Name and address of Client / Purchaser)_

Dear Sir,

We, the undersigned, offer to provide the _(Insert title of assignment)_ in accordance with your Request for Proposal No._____ dated _(insert date)_ and our Technical Proposal. Our attached Financial Proposal is for the sum of _(insert amount in words and figures)_. This amount is inclusive of all taxes.

Our Financial Proposal shall be binding upon us up to expiration of the validity period of the Proposal, i.e. before the date indicated in _____ of the Proposal Data Sheet.

We also declare that the Government of Pakistan / Punjab has not declared us or any Sub-Contractors for any part of the Contract, ineligible on charges of engaging in corrupt, fraudulent, collusive, or coercive practices. We furthermore, pledge not to indulge in such practices in competing for or in executing the Contract, and are aware of the relevant provisions of the Proposal Document.

We understand you are not bound to accept any Proposal you receive.

Signed
In the capacity of:
Duly authorized to sign the proposal on behalf of the Applicant.
Date:

Price Schedule/ Financial Cost Sheet for all Items

Sr. #	Items/ Description	Qty.	Price per Unit (Excl. duty/freight etc.) ($)	Duty/freight etc. (if any) per unit ($)	Price per unit (Incl. duty/freight etc.) ($)	Total Cost ($)
		(a)	**(b)**	**(c)**	**d=(b+C)**	**e=(d×a)**
1.						
2.						
	Total Bid Price					**X1**

The top of the table spans: **Lot # 1**

Notes to Price Table:

i. **X1** will determine the total bid cost against lot No. 1.
ii. Prices must be quoted for all items under lot No. 1 as per prescribed under given above table.
iii. The Purchaser reserves exclusive rights to decrease or increase the quantities of Goods/Items/Equipment mentioned vide this tender document.

Total Cost (in words) _____   Date _____

                                                 Signature of authorized person
                                                 Name:
                          (Company Seal)

_____

In the capacity of
Dully authority by

Note: No cutting or overwriting is allowed. Any cutting or overwriting will lead to rejection of the financial bid.

Lot # 2						
Sr. #	Items/ Description	Qty.	Price per Unit (Excl. duty/freight etc.) ($)	Duty/freight etc. (if any) per unit ($)	Price per unit (Incl. duty/freight etc.) ($)	Total Cost ($)
		(a)	(b)	(c)	d=(b+C)	e=(d×a)
1.						
2.						
	Total Bid Price					X2

Notes to Price Table:

i. **X2** will determine the total bid cost against lot No. 2.
ii. Prices must be quoted for all items under lot No. 2 as per prescribed under given above table.
iii. The Purchaser reserves exclusive rights to decrease or increase the quantities of Goods/Items/Equipment mentioned vide this tender document.

Total Cost (in words) _____   Date _____

                                        Signature of authorized person
                                        Name:
                    (Company Seal)

_____

In the capacity of
Dully authority by

Note: No cutting or overwriting is allowed. Any cutting or overwriting will lead to rejection of the financial bid.

Lot # 3						
Sr. #	Items/ Description	Qty.	Price per Unit (Excl. duty/freight etc.) ($)	Duty/freight etc. (if any) per unit ($)	Price per unit (Incl. duty/freight etc.) ($)	Total Cost ($)
		(a)	(b)	(c)	d=(b+C)	e=(d×a)
1.						
2.						
	Total Bid Price					**X3**

Notes to Price Table:

  i. **X3** will determine the total bid cost against lot No. 3.
  ii. Prices must be quoted for all items under lot No. 3 as per prescribed under given above table.
  iii. The Purchaser reserves exclusive rights to decrease or increase the quantities of Goods/Items/Equipment mentioned vide this tender document.

Total Cost (in words) _____   Date _____

                                                                     Signature of authorized person
                                                                     Name:
                         (Company Seal)

_____

In the capacity of
Dully authority by

Note: No cutting or overwriting is allowed. Any cutting or overwriting will lead to rejection of the financial bid.

Lot # 4						
Sr. #	Items/ Description	Qty.	Price per Unit (Excl. duty/freight etc.) ($)	Duty/freight etc. (if any) per unit ($)	Price per unit (Incl. duty/freight etc.) ($)	Total Cost ($)
		(a)	(b)	(c)	d=(b+C)	e=(d×a)
1.						
2.						
	Total Bid Price					X4

Notes to Price Table:

    i. **X4** will determine the total bid cost against lot No. 4.
    ii. Prices must be quoted for all items under lot No. 4 as per prescribed under given above table.
    iii. The Purchaser reserves exclusive rights to decrease or increase the quantities of Goods/Items/Equipment mentioned vide this tender document.

Total Cost (in words) _____   Date _____

                                        Signature of authorized person
                                        Name:
                     (Company Seal)

_____

In the capacity of
Dully authority by

Note: No cutting or overwriting is allowed. Any cutting or overwriting will lead to rejection of the financial bid.

Lot # 5						
Sr. #	Items/ Description	Qty.	Price per Unit (Excl. duty/freight etc.) ($)	Duty/freight etc. (if any) per unit ($)	Price per unit (Incl. duty/freight etc.) ($)	Total Cost ($)
		(a)	(b)	(c)	d=(b+C)	e=(d×a)
1.						
2.						
	Total Bid Price					**X4**

Notes to Price Table:

    i. **X4** will determine the total bid cost against lot No. 4.

    ii. Prices must be quoted for all items under lot No. 4 as per prescribed under given above table.

    iii. The Purchaser reserves exclusive rights to decrease or increase the quantities of Goods/Items/Equipment mentioned vide this tender document.

Total Cost (in words) _____   Date _____

                                       Signature of authorized person
                                       Name:

                     (Company Seal)

_____

In the capacity of
Dully authority by

Note: No cutting or overwriting is allowed. Any cutting or overwriting will lead to rejection of the financial bid.

Format for Covering Letter

To

      (Name and address of Purchaser)

Sub: _____.

Dear Sir,

a) Having examined the tender document and Appendixes we, the undersigned, in conformity with the said document, offer to provide the said items on terms of reference to be signed upon the award of contract for the sum indicated as per financial bid.

b) We undertake, if our proposal is accepted, to provide the items/services comprise in the contract within time frame specified, starting from the date of receipt of notification of award from the client Department / Office.

c) We agree to abide by this proposal for the period of ___ days (as per requirement of the project) from the date of bid opening and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

d) We agree to execute a contract in the form to be communicated by the _(insert name of the Purchaser)_, incorporating all agreements with such alterations or additions thereto as may be necessary to adapt such agreement to the circumstances of the standard.

e) Unless and until a formal agreement is prepared and executed this proposal together with your written acceptance thereof shall constitute a binding contract agreement.

f) We understand that you are not bound to accept a lowest or any bid you may receive, not to give any reason for rejection of any bid and that you will not defray any expenses incurred by us in biding.

                                    _____

Authorized Signatures with Official Seal

INSTRUCTION FOR PREPARATION OF POWER OF ATTORNEY

a) To be executed by an authorized representative of the bidder.

b) The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executants and when it is so required the same should be under common seal affixed in accordance with the required procedure.

c) Also, wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a resolution/power of attorney in favor of the Person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.

d) In case the Application is signed by an authorized Director / Partner or Proprietor of the Applicant, a certified copy of the appropriate resolution / document conveying such authority may be enclosed in lieu of the Power of Attorney.

Format of Power-of-Attorney

POWER OF ATTORNEY

(On Stamp Paper of relevant value)

Know all men by these presents, we (name of the company and address of the registered office) do hereby appoint and authorize Mr. (full name and residential address) who is presently employed with us and holding the position of as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our proposal for (name of the project) in response to the tenders invited by the (name of the Purchaser) including signing and submission of all documents and providing information/responses to (name of the Purchaser) in all matters in connection with our Bid.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

Dated this _____ day of _____ 20__

For _____

(Signature)

(Name, Designation and Address)

Accepted

(Signature)

(Name, Title and Address of the Attorney)

Date:

UNDERTAKING

It is certified that the information furnished here in and as per the document submitted is true and correct and nothing has been concealed or tampered with. We have gone through all the conditions of tender and are liable to any punitive action for furnishing false information / documents.

Dated this _____ day of _____ 20__

Signature

(Company Seal)

_____

In the capacity of

Duly authorized to sign bids for and on behalf of:

(To be submitted on legal stamp paper)

AFFIDAVIT

(Integrity Pact)

We _(Name of the bidder / supplier)_ being the first duly sworn on oath submit, that Mr. / Ms. _____

(if participating through agent / representative) is the agent / representative duly authorized by _(Name of the bidder company)_ hereinafter called the Contractor to submit the attached bid to the _(Name of the Purchaser)_. Affiant further states that the said M/s (Bidding Firm/Company Name) has not paid, given or donate or agreed to pay, given or donate to any line officer or employee of the _(Name of the Purchaser)_ any money or thing of value, either directly or indirectly, for special consideration in the letting of the contract, or for giving undue advantage to any of the bidder in the bidding and in the evaluation and selection of the bidder for contract or for refraining from properly and thoroughly maintaining projects implementations, reporting violation of the contract specification or other forms of non-compliance.

[The Seller/Supplier/Contractor] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with the Purchaser and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[The Seller/Supplier/Contractor] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to the Purchaser under any law, contract or other instrument, be voidable at the option of the Purchaser.

Notwithstanding any rights and remedies exercised by the Purchaser in this regard, [the Seller/Supplier/Contractor] agrees to indemnify the Purchaser for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to the Purchaser in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by

[the Seller/Supplier/Contractor] as aforesaid for the purpose of obtaining or inducing the Items any contract, right, interest, privilege or other obligation or benefit in whatsoever form from the Purchaser.

_____
Signature & Stamp

Subscribed and sworn to me this _____ day of ____ 20__

_____ Notary Public

BID SECURITY FORM

WHEREAS [Name and Address of the Contractor] (hereinafter called "the Contractor") has submitted Tender against Tender Name _____ , Tender No._____, LOT No._____(hereinafter called "the Tender") to the [Name and Address of the Purchaser] (hereinafter called "the Purchaser") for the Total Tender Price (in figures _____) (in words _____).

AND WHEREAS [Name of the Bank] having registered office at [Address of the Bank] (hereinafter called "the Guarantor") has agreed to give the Contractor a Guarantee;

THEREFORE the Guarantor hereby affirms to bind himself, his successors and his assigns to the Purchaser, for the sum of PKR (in figures _____) (in words _____) and undertakes to pay to the Purchaser, upon receipt of his written demand(s), any sum(s) as specified by him, not exceeding the above limit in aggregate, without cavil / argument and without the Purchaser having to substantiate / prove or to show grounds / reasons for such claim(s), on the occurrence of any / all of the following conditions:

1. If the Contractor withdraws the Tender during the period of the Tender validity specified by the Contractor on the Tender Form; or

2. If the Contractor does not accept the corrections of his Total Tender Price; or

3. If the Contractor, having been notified of the acceptance of the Tender by the Purchaser during the period of the Tender validity, fails or refuses to furnish the Performance Security, in accordance with the Tender Document.

Provided that the Purchaser shall specify the occurred condition(s) owing to which the said sum is due to him.

Provided further that any demand(s) / claim(s) from the Purchaser shall reach the Guarantor within thirty working days after the expiry of the Guarantee.

This guarantee shall remain valid up to _____ or until furnishing of the Performance Security, whichever is later.

Date this _____day of 2014.

GUARANTOR

Signature   _____
CNIC #   _____
Name   _____
Designation   _____
Address   _____

PERFORMANCE SECURITY

Issuing Authority:
Date of Issuance:
Date of Expiry:
Claim Lodgment Date: (Must be one month later than the expiry date)

WHEREAS [Name and Address of the Contractor] (hereinafter called "the Contractor") has agreed to supply the Goods and render the Services against Tender Name. _____, Tender No._____

(hereinafter called "the Contract") for the Contract Value of PKR (in figures _____) (in words _____).

AND WHEREAS it has been stipulated in the Tender Document that the successful Contractor shall furnish Performance Security, within twenty (20) days of the receipt of the Acceptance Letter (Letter of Acceptance) from the Purchaser, in the form of a Bank Guarantee, issued by a scheduled bank operating in Pakistan, as per this format, for a sum equivalent to Rs._____(10% of the contract value) valid from the date of issue until all obligations have been fulfilled in accordance with the Contract;

AND WHEREAS [Name of the Bank] having registered office at [Address of the Bank] (hereinafter called "the Guarantor") has agreed to give the Contractor a Guarantee;

THEREFORE the Guarantor hereby affirms to bind himself, his successors and his assigns to the Purchaser, for the sum of PKR (in figures _____) (in words

_____) and undertakes to pay to the Purchaser, upon receipt of his written demand(s), any sum(s) as specified by him, not exceeding the above limit in aggregate, without cavil / argument and without the Purchaser having to substantiate / prove or to show grounds / reasons for such claim(s), on the occurrence of any / all of the following conditions:

1. If the Contractor commits a default under the Contract;
2. If the Contractor fails to fulfil any of the obligations under the Contract;
3. If the Contractor violates any of the provisions of the Contract.

Provided that the Purchaser shall specify the occurred condition(s) owing to which the said sum is due to him.

Provided further that any demand(s) / claim(s) from the Purchaser shall reach the Guarantor within thirty working days after the expiry of the Guarantee.

This guarantee shall remain valid up to _____ or until expiry of warranties / support period or all obligations have been fulfilled in accordance with the Contract, **whichever is later**.

Date this _____day of 2014.

GUARANTOR

Signature   _____
CNIC #   _____
Name   _____
Designation   _____
Address   _____