राष्ट्रीय इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी संस्थान (रा.इ.सू.प्रौ.सं)- अगरतला केंद्र

National Institute of Electronics and Information Technology

(NIELIT)- Agartala Centre

Ministry of Electronics & Information Technology, Government of India

R.K. Nagar (Opposite to NEEPCO) , Khayerpur , Agartala – 799008,

Web: www.nielit.gov.in/agartala , Phone: 0381-239 1010 , e-mail: dir-agartala@nielit.gov.in

REQUEST FOR PROPOSALS (RFP)

NIELIT invites Online Tenders through e-Procure Portal (http://eprocure.gov.in/eprocure/app) to the following Request for Proposal ("RFP") from OMs Agencies/Authorized Partners ("Bidders")

Sl. No	Description of the Tender/RFP	Tender Ref No and date	Estimated Tender value in Rs	Last date & time of bid submission	Date & time for opening of Bid
1.	Supply & Installation of Electronics & Communications Lab and Computer Science Lab Equipment at NIELIT Agartala	NIELIT/AGT/Lab Eqpt/55/2011/EC-CS Dated 10th August 2016	87 Lakhs	01.09.2016 (02:00 PM)	05.09.2016 (02:00PM)

Details of the RFP can be downloaded from the following websites

http://www.nielit.gov.in or **http://www.nielit.gov.in/agartala** or **http://eprocure.gov.in**

Sd/ – Director-in-Charge

NIELIT – Digital Literacy For All

National Institute of Electronics and Information Technology

Request for Proposal (RFP)

For

Supply & Installation of Electronics & Communications Lab and Computer Science Lab Equipment

At NIELIT Agartala

National Institute of Electronics and Information Technology
Agartala Centre
Department of Electronics and Information Technology
Ministry of Communications and Information Technology
Government of India
R.K. Nagar (Opposite to NEEPCO), Khayerpur, Agartala, West Tripura,
P.S. –Bodhjungnagar, PIN-799008
Phone No: 03812391010, Website: www.nielit.gov.in/agartala

Fact Sheet

S. N	Particular	Details
1	**Tender ID**	NIELIT/AGT/Lab Eqpt/55/2011/EC-CS
2	**Tender date**	10th August 2016
3	**Selection Method**	Pre-Qualification with Least Cost based selection
4	**Availability of RFP**	RFP can be downloaded from NIELIT website http://nielit.gov.in or http://nielit.gov.in/agartala or http://eprocure.gov.in
5	**Earnest Money Deposit (EMD)**	Earnest Money Deposit of amount **Rs. 1,75,000/- (Rs. One Lac seventy five thousand only**). **Demand Draft/FDR/Banker's Cheque** in favour **of NIELIT Agartala Centre and payable at Agartala** from any of the Nationalised Bank.
6	**Performance Security**	10% of the total cost of ownership in form of **Bank Guarantee** in favour **of NIELIT Agartala Centre and payable at Agartala** from any of the Nationalised Bank.
7	**Nodal Officer for correspondence and clarification**	Shri Niladri Das Scientist-D NIELIT Agartala R.K. Nagar, (Opposite NEEPCO), Khayerpur, Bodhjungnagar, Agartala 799008, Tripura (West), Tel: 0381-2391010, email: niladridas@nielit.gov.in
8	**Estimated Tender value**	Rs 87 Lakhs
9	**Last date for Pre bid queries**	19.08.2016 (11.00 AM)
10	**Pre bid conference**	A pre-Bid meeting will be held on 23.08.2016 at 02:00 PM at **NIELIT Agartala Centre.**
11	**Last date of bid submission**	Proposals must be submitted online no later than the following date and time: 01.09.2016 (02.00 PM) through through e-Procure Portal (http://eprocure.gov.in/eprocure/app)
12	**Opening of bid**	05.09.2016 (02:00 PM)

1. Background Information

1.1. Basic Information

a) NIELIT invites Online Tenders through e-Procure Portal (http://eprocure.gov.in/eprocure/app) to this Request for Proposals ("RFP") from OMs Agencies/Authorized Partners ("Bidders") for the provision of Hardware as described in this RFP, "Scope of Work". **Manual Bids will not be accepted.**

b) Any contract that may result from this RFP Process will be issued for a term of minimum Three year ("the Term") which would include the supply, warranty and maintenance support. The warranty would be for a period of atleast 1 year or as per the warranty of OEM whichever is higher and AMC for 2 years after warranty.

1.2. About NIELIT

NIELIT is a 100% owned organization of the Ministry of Electronics & Information Technology, Government of India, actively engaged in Capacity Building and Skill Development in the areas of IT; Electronics; Communication Technologies; Hardware; Cyber Law; Cyber Security; IPR; GIS; Cloud Computing; ESDM; e-Governance and related verticals.

NIELIT offers courses both in the Formal as well as the Non-Formal sectors of education and is also one of the National Examination body which accredit institutes / organizations for the conduct of courses in the Non Formal IT & Electronics Sectors.

NIELIT has been mandated to undertake various projects under Capacity Building in IECT with the objective of creating human resources at various levels including development of employment and self-employment linked quality and cost effective training programmes, besides conducting IT Literacy programmes for the masses, especially targeted towards the rural/ underdeveloped areas in the country. NIELIT is also the preferred agency for many State Governments for rolling out IT Literacy programmes for its employees and the masses.

The current manpower strength at NIELIT comprises of about 644 regular employees and 2140 project-based employees at more than 34 locations in the country. NIELIT has PAN India presence through a network of about 900+ Accredited Institutes engaged in training of Non Formal courses for skill development of youth, especially from rural India. NIELIT also has a network of about 6000+ Facilitation Centres providing training in Digital Literacy.

NIELIT's own centres are located at Agartala, Aizawl, Ajmer, Aurangabad, Calicut, Chandigarh, Chennai, Delhi, Gangtok, Gorakhpur, Guwahati, Tezpur, Imphal, Itanagar, Kohima, Chuchuyimlang, Kolkata, Lucknow, Patna, Shimla, Shillong, Lunglei, Jorhat, Silchar, Churachandpur, Ranchi, Senapati, Srikakulam, Leh with its Headquarters at New Delhi.

2. Instructions to the Bidders

2.1. General

a) While every effort has been made to provide comprehensive and accurate background information and requirements and specifications, Bidders must form their own conclusions about the requirement. Bidders and recipients of this RFP may wish to consult their own legal advisers in relation to this RFP.

b) All information supplied by Bidders may be treated as contractually binding on the Bidders, on successful award of the assignment by the NIELIT on the basis of this RFP

c) This RFP supersedes and replaces any previous public documentation & communications, and Bidders should place no reliance on such communications.

2.2. Compliant Tenders / Completeness of Response

a) Bidders are advised to study all instructions, forms, terms, requirements and other information in the RFP documents carefully. Submission of the bid / proposal shall be deemed to have been done

after careful study and examination of the RFP document with full understanding of its implications.

b) Failure to comply with the requirements of this paragraph may render the Proposal non-compliant and the Proposal may be rejected. Bidders must:

i. Comply with all requirements as set out within this RFP.
ii. Submit the forms as specified in this RFP and respond to each element in the order as set out in this RFP.
iii. Include all supporting documentations specified in this RFP.

2.3. Pre-Bid Meeting & Clarifications

a) NIELIT shall hold a pre-bid meeting with the prospective bidders on date, time & venue as mentioned in Fact sheet of this document.

b) The queries should necessarily be submitted in the following format:

Sl N	RFP Document Reference(s) (Section & Page Number(s))	Content of RFP requiring Clarification(s)	Points of Clarification
1			
2			
3			

c) NIELIT shall not be responsible for ensuring that the bidder's queries have been received by them. Any requests for clarifications post the indicated date and time may not be entertained by NIELIT.

2.3.1. Responses to Pre-Bid Queries and Issue of Corrigendum

a) The Nodal Officer notified by the NIELIT will endeavor to provide timely response to all queries. However, NIELIT makes no representation or warranty as to the completeness or accuracy of any response made in good faith, nor does NIELIT undertake to answer all the queries that have been posed by the bidders.

b) At any time prior to the last date for receipt of bids, NIELIT may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the RFP Document by a corrigendum.

c) The Corrigendum (if any) & clarifications to the queries from all bidders will be posted on the website of NIELIT http://nielit.gov.in or http://nielit.gov.in/agartala or http://eprocure.gov.in.

d) Any such corrigendum shall be deemed to be incorporated into this RFP.

e) In order to provide prospective Bidders reasonable time for taking the corrigendum into account, NIELIT may, at its discretion, extend the last date for the receipt of Proposals.

2.4. Right to Terminate the Process

a) NIELIT may terminate the RFP process at any time and without assigning any reason. NIELIT makes no commitments, express or implied, that this process will result in a business transaction with anyone.

b) This RFP does not constitute an offer by NIELIT. The bidder s participation in this process may result NIELIT selecting the bidder to engage towards execution of the contract.

2.5. Earnest Money Deposit (EMD)

a) Bidders shall submit, along with their Bids, EMD of amount as mentioned in fact sheet, in the form of a Demand Draft or FDR or Banker's Cheque issued by any nationalized bank in favor of NIELIT Agartala Centre payable at Agartala, and should be valid for 90 days from the due date of the tender / RFP. The original payment instruments like Demand Draft etc as specified in this tender document have to be sent to the following address by post/speed post/courier/by hand on or before Bid Submission Closing Date & Time. Otherwise the tender will be summarily rejected without assigning any reason.

The Director In-charge
NIELIT Agartala Centre
R.K. Nagar, (Opposite NEEPCO), Khayerpur,
Bodhjungnagar, Agartala 799008, Tripura (West)

b) EMD of all unsuccessful bidders would be refunded by NIELIT within 15 days of the bidder being notified as being unsuccessful. The EMD, for the amount mentioned above, of successful bidder would be returned upon submission of Performance security.

c) The EMD amount is interest free and will be refundable to the unsuccessful bidders without any accrued interest on it.

d) The bid / proposal submitted without EMD, mentioned above, will be summarily rejected.

e) The EMD may be forfeited:

- If a bidder withdraws its bid during the period of bid validity.
- In case of a successful bidder, if the bidder fails to sign the contract in accordance with this RFP.

f) Firms registered with NSIC are exempted from submission of bid security subject to condition that they submit the proof for the same.

2.6. Submission of Responses

a) The bidders should submit their responses as per the format given in this RFP in the following manner:

i. Response to Pre-Qualification Criterion
ii. Technical Proposal
iii. Commercial Proposal

b) Prices should not be indicated in the Pre-Qualification Proposal or Technical Proposal but should only be indicated in the Commercial Proposal.

c) Bids must be submitted **online** through e-Procure Portal (http://eprocure.gov.in/eprocure/app) on or before the stipulated time mentioned in the Fact Sheet. No bid will be accepted after the said date & time for submission of the bid.

2.7. Site Inspection

Bidders are advised to inspect the site and its surroundings where these equipment are to be installed and satisfy them before submitting their tenders. A bidder shall be deemed to have full knowledge of the work whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed.

2.8. Acceptance

Acceptance Test shall be conducted, before commissioning by NIELIT and it's representative. The tests to be carried out, test procedures, test schedules, test equipment and tools, and expected test results are to be provided by the vendor to meet all the specified parameters/ service requirements. The date on which Final Acceptance Certificate is issued shall be deemed to be the date of successful commissioning of the Equipment.

The Bidder shall provide such packing of the Equipment as is required to prevent their damage or deterioration during shipment. The Bidder shall promptly repair or replace any Equipment that is damaged in transit. The packing, marking, and documentation within and outside the packages shall also comply strictly with the requirements. The Bidder shall insert in each case a packing list, fully itemized to show case number, contents, gross and net weight, and cubic measurement.

If the Equipment fail to meet the standards of performance for Acceptance Testing and during warranty period due to faulty part/component, the replacement of faulty part/component has to be carried out by the Bidder free of cost. Freight, insurance and other allied expenditure like customs duties etc. for such part/component shall be the liability of the Bidder. Bidder will reimburse to NIELIT the cost incurred by NIELIT, if any, on replacement of such faulty part/component.

If it becomes necessary for the Bidder to replace or renew any defective portions of the Equipment under this clause, the provisions of this clause shall apply to the portions of the Equipment so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of the warranty period whichever may be the later. If any defects be not remedied within 15 (Fifteen) days from the date of communication thereof or within such other specific period as may be allowed by the NIELIT in his discretion on application made to that effect by the Bidder, the NIELIT may proceed to carry out the work at Bidder's risk and expense, but without prejudice to any other rights which the NIELIT may have against the Bidder in respect of such defects.

2.9. Training to NIELIT/Department

Bidder shall provide training to the personnel nominated by the NIELIT to enable them to have sufficient knowledge and skill to effectively manage, maintain, use and operate Equipment and to change/modify program during installation, warranty and O&M period.

On-site training during the installation of the Equipment shall be arranged by the Bidder. Arrangement of all training materials such as manuals, drawings, brochures etc. shall be the responsibility of the Bidder.

2.10. Preparation and Submission of Proposal

2.10.1. Proposal Preparation Costs

The bidder shall be responsible for all costs incurred in connection with participation in the RFP process, including, but not limited to, costs incurred in conduct of informative and other diligence activities, participation in meetings/discussions/presentations, preparation of proposal, in providing any additional information required by NIELIT to facilitate the evaluation process, and in negotiating a definitive contract or all such activities related to the bid process.

NIELIT will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

2.10.2. Language

The Proposal should be filled by the bidders in English language only. If any supporting documents submitted are in any language other than English, translation of the same in English language is to be duly attested by the Bidders. For purposes of interpretation of the documents, the English translation shall govern.

2.11. Evaluation process

A Proposal evaluation committee shall be constituted by the NIELIT. The Proposal Evaluation Committee may ask for meetings with the Bidders to seek clarifications on their proposals.

The Proposal Evaluation Committee reserves the right to reject any or all proposals on the basis of any deviations.

Each of the responses shall be evaluated as per the criterions and requirements specified in this RFP.

2.11.1. Tender Opening

Pre-Bid Qualification Envelopes of bidders received within the last date and time of submission of RFPs will be evaluated by NIELIT officials or any other officers authorized by NIELIT.

Technical Bid Envelopes of Bidders who qualify as per the pre-bid requirement criteria will be considered by NIELIT officials or any other officers authorized by NIELIT.

Financial Bids of Technically Qualified Bidders will be considered by the NIELIT officials or any other officers authorized by NIELIT.

2.11.2. Tender Validity

The offer submitted by the Bidders should be valid for minimum period of 90 days from the date of submission of Tender.

3. Criteria for Evaluation

3.1. Pre-Qualification (PQ) / Eligibility Criteria

S. No.	Basic Requirement	Specific Requirements	Documents Required
1.	Sales Turnover in Lab Equipment Sales & Maintenance services	Average Annual Turnover during each of the last three financial years (FY 2012-13, 2013-14, 2014-15), should have a minimum of Rs. 1 Crore that is generated from Lab Equipment Hardware supply and their associated maintenance services, etc.	▪ Extracts from Audited/Certified financial statements and Annual Accounts for last three financial years as per financial year of participating company/firm OR; ▪ Certificate from Chartered Accountant and Authorized Signatory
2.	Bidder should be a Company/firm registered under the Indian companies act (or) a firm registered under the Limited Liability Partnership Act, 2008 (or) a firm registered under the Partnership Act, 1932 for **last 3 years**.		Certificate of Incorporation and Articles of Association of the Participant in case of Company / Limited Liability Partnership Agreement in case of LLP

S. No.	Basic Requirement	Specific Requirements	Documents Required
3.	Certificates	Apart from company / firm registration, Participant must have registered under the following: ▪ Valid Service Tax Registration Certificate; ▪ Valid Value Added Tax (VAT) registration Certificate ▪ Income Tax Return with for last three FY (2012-13, 2013-14, 2014-15)	Copy of all the mentioned certificates/ITR certified by authorized signatory
4.	Letter of authorization from OM	The bidder should be an OM or their authorized dealer/representative. In case of authorized/dealer representative, a letter of authorization/dealership clearly stating the component/equipment for which the authorized representative is representing on behalf of the original manufacturer (OM) must be furnished.	Letter of authorization; as per template provided
5.	Technical Capability Bidder should be an established agency	Bidder must have successfully undertaken at least the following numbers of similar* assignments. *(*Similar refers to supply and installation of Lab Equipment and their associated maintenance & support services, etc.)* Value of engagement(s) are specified herein: ▪ One assignment of similar nature not less than the amount of Rs. 0.75 crores; OR ▪ Two assignments of similar nature not less than the amount of Rs. 0.50 crore each; OR ▪ Three assignments of similar nature not less than the amount equal to Rs. 0.35 Lakhs each;	Completion Certificates from the client
6.	The Bidder in case of OEM) preferably should have ISO 9001: 2000/2008 Certificate		Copy of Valid ISO 9001:2000/2008 certificate to be submitted certified by authorized signatory

S. No.	Basic Requirement	Specific Requirements	Documents Required
7.	Local Service Centres	The bidder should have presence in Agartala/Guwahati/Kolkata with support Centres. The bidder should have technical manpower with experience to provide service for support under this contract.	A Self Certified letter by authorized signatory
8.	Participant should not be an entity which has been black-listed by Government	A self-certified letter by the authorized signatory of the bidder that the bidder has not been blacklisted by any Central / State Government (Central/ State Government and Public Sector) or under a declaration of ineligibility for corrupt or fraudulent practices as on bid submission date, must be submitted on original letter head of the bidder with signature and stamp	Self-Certified letter by authorized signatory

3.2. Technical Qualification Criteria

Bidders who meet the pre-qualifications/eligibility criteria requirements would be considered as qualified to move to the next stage of Technical Evaluations.

The Product offered should meet all the technical and functional specifications given in the section "Scope of Work". Non-compliance to any of the technical and functional specification will attract rejection of the proposal.

3.3. Commercial Bid Evaluation

a) The Financial Bids of only technically qualified bidders will be considered.

b) Any conditional bid would be summarily rejected.

4. Appointment of vendor

4.1. Right to reject Proposal

NIELIT reserves the right to accept or reject any proposal, and to annul the tendering process / Public procurement process and reject all proposals at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for NIELIT action.

4.2. Performance security

NIELIT will require the selected bidder to provide an *irrevocably, unconditional* Performance Security in the form of an Account payee Demand Draft, Fixed Deposit Receipt from a Nationalised bank, Bank Guarantee from a Nationalised bank, before issue of Purchase Order/Signing of contract, for a value equivalent to 10% of the total cost of the contract. The Performance security for the supplied items should be valid for a period of minimum 38 months/till 2 months beyond completion of Contract whichever is later. The selected bidder shall be responsible for extending the validity date and claim period of the Performance security as and when it is due on account of non-completion of the supply order, Warranty period and AMC period. In case the selected bidder fails to submit performance security within the time stipulated, the NIELIT at its discretion may cancel the order placed on the selected bidder without giving any notice and forfeit the EMD. NIELIT shall invoke the performance security in case the selected Vendor

fails to discharge their contractual obligations during the period or NIELIT incurs any loss due to Vendor's negligence in carrying out the supply order implementation as per the agreed terms & conditions.

4.3. Signing of Contract

Post submission of Performance security by the successful bidder, NIELIT shall enter into a contract, incorporating all clauses, pre-bid clarifications and the proposal of the bidder between NIELIT and the successful bidder.

5. Terms and Conditions: Applicable Post Award of Contract

5.1. Right to Terminate the Process

NIELIT reserves the right to cancel the contract placed on the selected bidder and recover expenditure incurred by NIELIT under the following circumstances:-

a) The selected bidder commits a breach of any of the terms and conditions of the bid.

b) The bidder goes into liquidation, voluntarily or otherwise.

c) If the selected bidder fails to complete the assignment as per the time lines prescribed in the RFP and the extension if any allowed, it will be a breach of contract. The NIELIT reserves its right to cancel the order in the event of delay and forfeit the bid security as liquidated damages for the delay.

d) If deductions of account of liquidated damages exceeds more than 10% of the total contract price.

e) In case the selected bidder fails to deliver the quantity as stipulated in the delivery schedule, NIELIT reserves the right to procure the same or similar product from alternate sources at the risk, cost and responsibility of the selected bidder.

5.2. Liquidated Damages

a) Notwithstanding NIELIT's right to cancel the order, liquidated damages for late delivery at 1% (One percent) of the undelivered portion of order value per week will be charged for every week's delay in the specified delivery schedule subject to a maximum of 10% of the value of the order value.

b) Liquidated damages for late commissioning at 1% (One percent) of the order value per week will be charged for every week's delay in commissioning to a maximum of 10% of the value of the order value.

c) Please note that the above LD for delay in delivery and delay in commissioning are independent of each other and shall be levied as the case may be.

d) NIELIT reserves its right to recover these amounts by any mode such as adjusting from any payments to be made by NIELIT to the bidder. Liquidated damages will be calculated on per week basis.

5.3. Limitation of Liability

a) The Bidder shall be liable to the NIELIT for damages that may have been suffered by NIELIT on account of time and cost overruns attributable to the Bidder.

b) Neither party shall be liable to the other for any special, indirect, incidental, consequential (including loss of profit or revenue), exemplary or punitive damages whether in contract, tort or other theories of law, even if such party has been advised of the possibility of such damages.

c) The total cumulative liability of either party arising from or relating to this contract shall not exceed the total amount paid to the Bidder by the client under that applicable statement of work that gives rise to such liability (as of the date the liability arose); provided however, that this limitation shall not apply to any liability for damages arising from (a) Willful misconduct or (b) Indemnification against third party claims for infringement.

5.4. Penalty

a) The Bidder shall perform its obligations under the agreement entered into with the NIELIT, in a professional manner.

b) The Bidder should perform all the activities as per timelines and parameters stipulated by NIELIT in this RFP, failing which NIELIT may at its discretion impose penalties on the Bidder as defined in the RFP. The penalties on the delivery of the Lab Equipment will be deducted from the payment to the vendor @ 1% of the project cost per week subject to a maximum of 10% or termination of the contract.

c) If any act or failure by the bidder under the agreement results in failure or inoperability of Equipment and if the NIELIT has to take corrective actions to ensure functionality of its property, the NIELIT reserves the right to impose penalty, which may be equal to the cost it incurs or the loss it suffers for such failures.

5.5. Dispute Resolution Mechanism

In case any dispute between the Parties, does not settle by negotiation in the manner as mentioned above, the same may be resolved exclusively by arbitration and such dispute may be submitted by either party for arbitration within 20 days of the failure of negotiations. Arbitration shall be held in Agartala and conducted in accordance with the provisions of Arbitration and Conciliation Act, 1996 or any statutory modification or re-enactment thereof. Each Party to the dispute shall appoint one arbitrator each and the two arbitrators shall jointly appoint the third or the presiding arbitrator.

The Provisions of this RFP shall be governed and construed in accordance with the Laws of India and would come under the exclusive jurisdiction of the Courts in Agartala, (Tripura).

5.6. Force Majeure

Force Majeure is herein defined as any cause, which is beyond the control of the selected bidder or NIELIT as the case may be which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affect the performance of the contract, such as:

- Natural phenomenon, including but not limited to floods, droughts, earthquakes and epidemics.
- Acts of any government, including but not limited to war, declared or undeclared priorities, quarantines and embargos
- Terrorist attack, public unrest in work area provided either party shall within 10 days from occurrence of such a cause, notifies the other in writing of such causes.

The bidder or NIELIT shall not be liable for delay in performing his/her obligations resulting from any force majeure cause as referred to and/or defined above. Any delay beyond 30 days shall lead to termination of contract by parties and all obligations expressed quantitatively shall be calculated as on date of termination. Notwithstanding this, provisions relating to indemnity, confidentiality survive termination of the contract.

6. Technical Requirements

The successful Bidder shall procure the Lab Equipment as required from a reputed OM. The Bidder shall note that the specification provided is the minimum requirement and can supply better specification if required. The Bidder shall supply all components as per requirements of the RFP. The Bidder shall be responsible for supply of the Lab Equipment and installation at NIELIT Agartala centre.

All Lab Equipment proposed by the bidder shall be licensed to NIELIT and will be the property of NIELIT. The Bidder has to prepare and submit a delivery report including details of all components supplied. The delivery report will be validated by NIELIT.

The Lab Equipment provided by the Successful Bidder shall meet all the Service Level requirements as mentioned in the RFP. While the basic Bill of Material will not change, any change in the BOM specification will be done only to provide a higher specification.

Successful bidder will be expected to bring all the installation equipment and tools required for the installation of the Equipment. All the work shall be done in a conscientious manner as per the OM guidelines and best industry practices. The Equipment shall be subjected to inspection at various stages. Local regulation/codes shall be followed at all times. The Successful Bidder shall follow all Safety Regulations and Practices at the time of installation and implementation.

The Successful Bidder shall not cause any damage to buildings/installation site and property and will perform restoration to the original condition to the satisfaction of Board authorities, if any damage occurs.

NIELIT shall perform the acceptance test (AT) ensuring that all the Lab Equipment supplied are performing as per the specification. NIELIT would issue certification of completion after verifying availability of all the Lab Equipment.

The bidder should provide all relevant documentation including:

- Original Manuals, Data Sheets, Installation Documents and any other documents relevant to the hardware, software and peripherals supplied by the Bidder.
- Documentation should be provided by the selected Bidder on a regular basis as and when desired by NIELIT during the entire period of Contract.

7. Service Level Agreement

The purpose of this Service Level Agreement (hereinafter referred to as SLA) is to clearly define the levels of service which shall be provided by the Bidder to NIELIT for the duration of this contract.

7.1 SLA Signing

The successful bidder has to sign a SLA with the NIELIT (on Rs.100/-Stamp paper) within 10 days of issuing the LOA for the provision and execution of services as per the tender terms.

7.2 Format of SERVICE LEVEL AGREEMENT

This Agreement dated …….. is made by and between ……., with its registered office located at ……. and with its corporate office located at ……through Shri ……., duly authorized by the Board resolution dated …….. (hereinafter appropriately referred to as "Service Provider" which term shall include its successors and permitted assigns), of the One Part

And

NIELIT Agartala Centre Bodhjungnagar Agartala-Tripura having its head office at 6, CGO Complex , Electronics Niketan New Delhi through ……. (hereinafter referred to as "NIELIT" which term shall include in its successors and permitted assigns of the OTHER PART

WHEREAS:

Service Provider is willing to provide NIELIT Agartala with the “Supply, Installation & Commissioning of Lab Equipment” accordance with the terms and conditions of this Agreement;

NOW THEREFORE, in consideration of the mutual promises set forth below, and in the Attachments hereto which form an integral part of this Agreement, the Parties hereby agree to the following:

1. Delivery Period

   The Delivery, installation & commissioning shall be completed within 30 (Thirty) days from placement of the purchase or work order. Any delay by the Tenderer in the delivery of goods and

services shall render the Tenderer liable to any or all of the sanctions viz. invocation of Bank Guarantee / forfeiture of security deposit, imposition of liquidated damage, blacklisting etc.

If the tenderer fails to deliver any or all of the goods and services or complete the installation / commissioning within the period specified in the purchase / work order, the The support personnel should be available over phone. On critical situations or when directed by NIELIT, the support personnel must be available on site within 24 hours of request from NIELIT at the office/locations. Non-availability of the support personnel as stated above will be treated equivalent to single occasion of non-conformity.

2. Service Outage Reporting

Bidder must provide with 24*7*365 emergency number to reach a support person and their backup in the event of equipment failure.

3. Process for resolving performance issues

Any performance issues on the part of <Service Provider> shall be discussed within four hours of their occurrence by <Company> management. This can be in the form of a face-to-face meeting or an electronic conference via Skype, GotoMeeting or other accepted conference system. Issues will be presented by <Company> representatives and <Service Provider> will have the opportunity to explain its performance. Minutes of such meetings will be recorded. If <Service Provider> accepts report by <Company> it will have 72 hours to remediate the issue. If <Service Provider> rejects report by <Company> it will have 24 hours to provide a suitable explanation and proposal for remediation.

7.3 Remedies for failure to provide acceptable performance, escalation procedures

Heavy penalties shall be levied as per the Liquidated Damages clause mention in this tender in case of delay in implementation of the Installation and commissioning of Lab Equipment as per the time schedule provided by the Bidder.

7.3.1 Implementation Service Levels

Measurement	Target	Severity	Penalty
Installation and commission of Lab Equipment	1. **Implementation Service Levels**	Critical	Penalty of 0.05% of quoted amount per day for first one week, 0.5% per day for second week onwards subject to a maximum of 10% penalty computed on total value of Contract (inclusive of taxes). The penalty will be calculated on the total value of the contract irrespective of whether a certain portion of equipment has been installed and commissioned. Penalty will not be calculated with effect from the day upon full installation and commissioning.

7.3.2Manpower Related Service Levels

The support personnel should be available over phone. On critical situations or when directed by NIELIT, the support personnel must be available on site within 24 hours of request from NIELIT at the office/locations. Non-availability of the support personnel as stated above will be treated equivalent to single occasion of non-conformity.

Measurement	Target	Penalty
Number of occasion of non-conformity	Upto 5 in a year	No penalty
	More than 5 occasion of non-conformity in a year	0.2% of the Performance Bank Guarantee for every occasion of non-conformity exceeding 5
	More than 25 occasion of non-conformity in a year	0.5% of the Performance Bank Guarantee) for every occasion of non-conformity exceeding 25 (in addition to the penalty for exceeding 5 occasion of non-conformity as mentioned above)

7.4 Protection of intellectual property

<Service Provider> agrees to safeguard any intellectual property (IP) developed in the course of providing the aforementioned services to <Company>. <Company> agrees to safeguard any IP the <Service Provider> makes available to it in the course of this agreement.

7.5Compliance with legislation, regulations, practices

<Service Provider> warrants that the services to be provided are in compliance with all applicable laws, statutes, regulations and other legal provisions applicable to this agreement.

7.6Termination of agreement

1. The Contract in whole or part can be terminated at the option of the NIELIT, if the NIELIT for any reason whatsoever does not require the whole or part of the job thereof as specified in the tender to be carried out and in the said event the NIELIT shall give notice of the fact with reason to the Tenderer / Bidder, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage, which would have derived from the execution of the work in full, but which he did not derive in consequences the full amount of the work not having been carried out, neither shall he have any claim on compensation / damage for the loss suffered by him by reason of termination of contract by the NIELIT and of any alterations having been made by the NIELIT in the original specification or the designs and instruction which shall involve any curtailment of the work contemplated.
2. The Institute without prejudice to any other remedy, reserves the right to terminate the Tender / Contract in whole or in part and also to blacklist a Tenderer / Bidder for a suitable period in case he fails to honour his bid / contract without sufficient grounds or found guilty for breach of condition /s of the tender / contract, negligence, carelessness, inefficiency, fraud, mischief and misappropriation or any other type of misconduct by such Tenderer / Bidder or by its staff.

7.7 Arbitration:-

In case any dispute between the Parties, does not settle by negotiation in the manner as mentioned above, the same may be resolved exclusively by arbitration and such dispute may be submitted by either party for arbitration within 20 days of the failure of negotiations. Arbitration shall be held in Agartalaand conducted in accordance with the provisions of Arbitration and Conciliation Act, 1996 or any statutory modification or re-enactment thereof. Each Party to the dispute shall appoint one arbitrator each and the two arbitrators shall jointly appoint the third or the presiding arbitrator.
The Provisions of this RFP shall be governed and construed in accordance with the Laws of India and would come under the exclusive jurisdiction of the Courts in Agartala, (Tripura).

Date: **Name and Signature of Tenderer/ bidder with Corporate Seal**

Witnesses

1.

2.

8. Details on Scope of Work

The scope of work for this RFP will include the following activities:

- Supply and installation of Lab Equipment at NIELIT Agartala.
- Maintenance of the supplied Lab Equipment for 2 years after warranty.

Equipment to be supplied shall be latest models manufactured with 100% new OM parts. All products to be supplied should be part of current production as on the date of award of the tender. For purpose of this contract "current production" shall mean that the equipment model has been manufactured and introduced in the Indian market as new equipment. **Refurbished** equipment are not acceptable in any case.

IMPORTANT NOTE: The Bidders may substitute alternative standards, alternative brand names in its bid, provided that it demonstrates equal or better to the specifications of bidding document. Do not mention Best Quality/Good Quality/Superior Quality, etc. Instead give make and brand of items quoted.

The bid for same equipment cannot be submitted both by the OM and by its Authorized Representative. Whether an OM or its authorized representative bids for the tender may have to furnish a letter categorically stating that the said firm/agency is bidding exclusively for the said component and no authority has been given to any other agency/firm. An OM shall not be allowed to be part of more than one bidder for a particular Lab Equipment. An OM, however, shall be allowed to authorize more than one Bidder for different Lab Equipment.

All equipment ordered as stated in the RFP must be shipped fully configured with the required memory, components, and selected or specified operating Equipment.

Table 1: Electronics & Communication Laboratory Items:

Sl No	Item name & its description/Specification		Quantity
Capital Items			
1	Kirchhoff's Law Trainer kit	Completely self contained stand - alone unit. Demonstrates the principle & verification of Kirchoff's Law i. Current Law. ii. Voltage Law. based on resistive circuit. Facility for connecting external Power Supply. Built - in Resistor bank for building various combinations. Set of required number of patch cords. Multi - coloured test points are provided in the circuit to observe voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction	2

		manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection & LED indication for supply "ON" to work on 230V AC Mains.	
2	Maximum Power Transfer Theorem Trainer kit	SALIENT FEATURES : Completely self contained stand - alone unit. Demonstrates the principle & verification of Maximum Power Transfer Theorem based on resistive circuit Facility for connecting external Power Supply. Built - in Resistor bank for building various combinations. Set of required number of patch cords. Multi - coloured test points are provided in the circuit to observe voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection & LED indication for supply "ON" to work on 230V AC Mains.	2
3	Thevenin Theorem Trainer kit	Completely self contained stand - alone unit. Demonstrates the principle & verification of Thevenin's Theorem based on resistive circuit. Facility for connecting external Power Supply. Built - in Resistor bank for building various combinations. Set of required number of patch cords. Multi - coloured test points are provided in the circuit to observe voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection & LED indication for supply "ON" to work on 230V AC Mains.	2
4	Norton's Theorem Trainer kit	Completely self contained stand - alone unit. Demonstrates the principle & verification of Norton's Theorem based on resistive circuit Facility for connecting external Power Supply. Built - in Resistor bank for building various combinations. Set of required number of patch cords. Multi - coloured test points are provided in the circuit to observe voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection & LED indication for supply "ON" to work on 230V AC Mains.	2
5	Coulomb Law Trainer Kit	Coulumb law Demonstrator and measuring charge	2
6	Magnetic Materials	Completely self contained stand - alone unit. Demonstrates the BH curve of a magnetic material Supply required 230V, 50hz AC. Set of coils with E laminations provided. Output to be connected to the oscilloscope.	2

		Multi - coloured test points are provided in the circuit to observe voltages and waveform. Set of required number of patch cord. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details.	
7	Three phase voltage Trainer kit	To Observe the Waveform of three phase voltage on CRO	2
8	Universal IC Programmer	For IC flash	2
9	P-N Diode Ch.Trainer Kit	Characteristics of Semiconductor Diodes is a versatile and well - designed self - contained trainer kit. It is a useful training tool for the teacher and the students for basic electronics. Study, perform, demonstrate and plot the V-I forward and reverse characteristics of : A germanium diode. A silicon diode. Determination of Vknee , static and dynamic resistance from graph. Comparison of characteristics of germanium and silicon diodes. Completely self contained stand - alone unit. Built - in germanium diode, silicon diode and other necessary components. Built - in DC regulated variable power supply with short circuit protection of 0 - 12 V. Mains ON / OFF switch with LED indicator for supply “ON”. Multicoloured sturdy 4mm test points are provided at various stages in the circuit to observe the waveforms and voltages and for necessary inter connections. Provision for connecting external voltmeter / current meter as per requirement. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Working on 230V, 50Hz, single phase AC mains. ACCESSORIES : 4mm - 4mm terminated, sturdy, spring loaded patch cords : Quantity : 03 numbers provided. Strongly supported by a comprehensive instruction manual complete with theory and operating details : Quantity : 01 number provided.	1
10	B.J.T Ch.Trainer kit	Characteristics of Transistor is a versatile and well - designed self - contained trainer kit. It is a useful training tool for the teacher and the students for basic electronics. Study, perform, demonstrate and plot the input and output characteristics of a PNP transistor in different configurations, such as : Common Emitter Mode. Common Collector Mode. Common Base Mode. (Dedicated circuit for each mode). To plot various graphs for above modes and determination of Vknee from graph. Comparison of characteristics of different modes. Completely self - contained stand - alone unit. Built - in dedicated circuit for each mode with transistors and other necessary components.	1

		Built - in two isolated DC regulated variable power supplies with short circuit protection of 0 - 12V each. Mains ON / OFF switch with LED indicator for supply "ON". Multi - coloured sturdy 4mm test points are provided at various stages in the circuit to observe the waveforms, voltages and for necessary inter connections. Provision for connecting external volt meter / current meter as per requirement. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Working on 230V, 50Hz, single phase AC mains. ACCESSORIES : 4mm - 4mm terminated, sturdy, spring loaded patch cords : Quantity : 10 numbers provided. Strongly supported by a comprehensive instruction manual complete with theory and operating details : Quantity : 01 number provided.	
11	Rectifier Trainer kit	Completely self contained stand - alone unit. Demonstrates the principle and working of different rectifier circuits such as half wave, full wave, and bridge and effect of different filter circuits on its output. Supply required 230V, 50Hz AC. Built - in step down centre tapped transformer. Built - in bank of rectifying diodes, capacitors, resistors and coils. Demonstrates the different characteristics of various rectifying circuits with and without filters. Determination of ripple factor for all filters circuits. Multi - coloured Test points at various stages in the circuit to observe the waveforms and voltages. Set of patch cords. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operation details. Different Filter circuits like capacitors filter, Inductance Filter, L section Filter and PI Filter.	1
12	JFET Trainer kit	Characteristics of Field Effect Transistor (FET) is a versatile and well - designed self - contained trainer kit. It is a useful training tool for the teacher and the students for basic electronics. Study, perform, demonstrate and plot the transfer and output characteristics of a n - channel Field Effect Transistor (FET). Determination of (from graph) : Pinch off voltage (Vp) and Drain current (Id) for zero gate voltage IDSS. Value of forward trans - conductance (gm) and dynamic resistance. Completely self - contained stand - alone unit. Built - in n - channel FET and other necessary components. Built - in two isolated DC regulated power supplies with short circuit protection. 0 - 20V (Variable). 0 - 5V (Variable). Mains ON / OFF switch with LED indicator for supply "ON". Multi - coloured sturdy 4mm test points are provided at various stages in the circuit to observe the waveforms, voltages and for necessary inter connections.	1

		Provision for connecting external voltmeter / current meter as per requirement. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Working on 230V, 50Hz, single phase AC mains. ACCESSORIES : 4mm - 4mm terminated, sturdy, spring loaded patch cords Quantity : 02 numbers provided. Strongly supported by a comprehensive instruction manual complete with theory and operating details : Quantity : 01 number provided.	
13	SCR Trainer Kit	Characteristics of SCR is a versatile and well - designed self - contained trainer kit. It is a useful training tool for the teacher and the students for basic electronics. OBJECTIVES : Study, perform, demonstrate and plot the V - I characteristics of a unidirectional Silicon Controlled Rectifier (SCR) under different gate current conditions. Determination of (from graph) : Holding Current (IH). Latching Current (IL). Forward break over voltage (VF). SALIENT FEATURES : Completely self - contained stand - alone unit. Built - in Silicon Controlled Rectifier (SCR) and other necessary components. Built - in two isolated DC variable power supplies of : 0 - 50V (Unregulated). 0 - 5V (Regulated). Mains ON / OFF switch with LED indicator for supply “ON”. Multi - coloured sturdy 4mm test points are provided at various stages in the circuit to observe the waveforms, voltages and for necessary inter connections. Provision for connecting external voltmeter / current meter as per requirement. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Working on 230V, 50Hz, single phase AC mains. ACCESSORIES : 4mm - 4mm terminated, sturdy, spring loaded patch cords Quantity : 02 numbers provided. Strongly supported by a comprehensive instruction manual complete with theory and operating details : Quantity : 01 number provided.	1
14	Clippping &clamping circuit Trainer Kit	Completely self - contained stand - alone unit. Demonstrates the principle, working and comparison of various clipping and clamping using diodes. Various experiments possible are : Positive Clipping. Negative Clipping. Biased Positive Clipping. Biased Negative Clipping. Combination Clipping. Positive Clamping. Negative Clamping. Built - in bank of resistors, capacitors and diodes. Multi - coloured test points are provided at various stages in the circuit to observe the waveforms and voltages.	1

		Set of patch cords. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection and LED indication for supply "ON" to works on 230V AC Mains.	
15	R-L-C Circuit Trainer kit	Completely self contained stand - alone unit. Built-in a block of resistors, 8 inductors and 8 Capacitors of assorted values. Built-in +12VDC supply. More then 10 experiments Possible. Experiments such as Ohms Law, RC circuits like Low Pass & High Pass, RL Circuits like Low Pass and High Pass, Kirchoff's Law's, etc. Multi - coloured test points are provided in the circuit to observe voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on front panel. Strongly supported by a comprehensive instruction manual complete with theory and operating details.	1
16	Network Theorems Trainer kit	Completely self contained stand - alone unit. Demonstrates the principle & verification of various theorem's and laws based on resistive circuit. Built - in DC regulated power supplies as required. Built - in Resistor bank for building various combinations. Set of required number of patch cords. Multi - coloured test points are provided in the circuit to observe voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Supply required :230 V, Single Phase AC. the various theorem's and laws covered are as follows : 1. Thevenin's Theorem 2. Norton's Theorem. 3. Super Position Theorem. 4. Reciprocity Theorem. 5. Maximum Power Transfer Theorem. 6. Kirchoff's Laws a. Voltage Law. b. Current Law. 7. Ohm's Law.	1
17	RC Couple Amplifier Trainer Kit	Dedicated trainer board for each Amplifier circuit. Completely self - contained stand - alone unit. Construction and study of a Two Stage RC Coupled amplifier. Study of frequency response of individual (single stage) as well as the cascade (two stages) amplifier. Study of its various parameters and its advantages, disadvantages and applications. Test points are provided at various stages in the circuit to observe the waveforms and voltages. Set of patch cords. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing.	1

		Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection and LED indication for supply "ON" to works on 230V AC Mains	
18	OP-Amp (741) parameter Trainer kit	Completely self - contained stand - alone unit. Construction and study of various circuits for measuring different parameters of an op - amp (op - amp used is the popular IC 741). Study and comparison of various parameters in the theory and practice. Parameters studied and determined are : Input Impedance. Output Impedance. Slew Rate. Frequency Response. Input offset voltage. Input offset current. Input bias current. CMRR. Two modules for various parameters study. Test points provided at various stages in the circuit. Set of required number of patch cords. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection and LED indication for supply "ON" to works on 230V AC Mains.	1
19	OP-Amp (741) Application Trainer kit	Lucidly illustrated User's Manual UN - ravels electronic concept through brief theoretical reviews followed by experiments, self test questions and exercises. Built - in power supplies provide all the necessary voltages for experimentation. Modularly designed patch panel contains all commonly used discrete components. TYPICAL EXPERIMENTS : Study of major operational amplifier characteristics, open loop gain, output resistance, differential input resistance, unity gain bandwidth, rated output, full power response slewing rate, input offset voltage, input bias current, input noise, current, CMRR, common mode input resistance etc. Study of operational amplifier amplifications inverting amplifier, difference amplifier, inverting summing amplifier, voltage follower, differentiator, integrator, log amplifier, limiter, AC - DC converter, etc. Study of the characteristics and operation of a high speed voltage comparator (710). Study of comparator applications : Schmitt trigger, pulse width modulator, etc. Study of various waveform generators using operational amplifiers, Wein Bridge, Sine cosine, Square wave, Triangular wave, Saw - tooth wave generators, etc. Study of active filters. TECHNICAL SPECIFICATIONS : DC Regulated Power Supply : + 12V / 500mA (short - circuit protected).-12V / 500mA (short - circuit protected).	1

		AC Supplies: 7.5V. 18 - 0 - 18V. GENERAL : Components on the patch panel includes : Operational Amplifier : IC 741 : 02 Nos. IC TL061 : 02 Nos. IC 710 : 01 Nos. IC 356 : 01 Nos. IC 3140 : 01 Nos. 37 Resistors of assorted values from 100E to 20 Mohms. 25 Capacitors (including Electrolytic) of assorted values from 100 pF to 10 µF. 11 potentiometers for op - amp offset adjustments, & for other applications as required. Built - in speaker (2 ½ " round, 8E / 0.5W). Terminal strip solderless, Breadboard, Spring loaded with 640 tie points.	
20	555 Trainer Kit	Completely self - contained stand - alone unit. Demonstrates the principle and working of IC 555 timer and applications. Following experiments can be performed. →555 Timer as Monostable Multivibrator. →555 Timer as Bistable Multivibrator. →555 Timer as Astale Multivibrator. →555 Timer as Schmitt Trigger. →555 Timer as Missing Pulse Detector. →555 Timer as Pulse width Modulator. Mains operated. Built - in IC based DC regulated power supply with short circuit protection and LED indication. Built - in resistors, capactiors, transistors diodes, potentiometer IC's etc. Test points at various stages in the circuit to observe the waveforms and voltages in the circuit. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details.	1
21	Zener Diode Trainer kit	Characteristics of Zener Diodes is a versatile and well - designed self - contained trainer kit. It is a useful training tool for the teacher and the students for basic electronics. OBJECTIVES : Study, perform, demonstrate and plot the V - I forward and reverse bias (breakdown) characteristics of two zener diodes of different values. Determination of Vknee , static and dynamic resistance from graph. Comparison of characteristics of the two zener diodes of different values. Investigate zener diode's unique application as a voltage regulator. Completely self contained stand - alone unit. Built - in two zener diodes of different values, load resistor and other necessary components. Built - in DC regulated variable power supply with short circuit protection of 0 - 12 V. Mains ON / OFF switch with LED indicator for supply "ON".	1

		Multi - coloured sturdy 4mm test points are provided at various stages in the circuit to observe the waveforms, voltages and for necessary inter connections. Provision for connecting external voltmeter / current meter as per requirement. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Working on 230V, 50Hz, single phase AC mains. ACCESSORIES : 4mm - 4mm terminated, sturdy, spring loaded patch cords Quantity : 05 numbers provided. Strongly supported by a comprehensive instruction manual complete with theory and operating details : Quantity : 01 number provided.	
22	Phase shift oscillator	Dedicated trainer board for each wave shaping circuit. Completely self - contained stand - alone unit. Study the construction and working of phase shift oscillator. Observation and determination of the frequency of an R - C phase shift oscillator. Comparison of the phase of output across each element of phase shift network in the oscillator. Test points provided at various stages in the circuit. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operating details. Built - in DC regulated power supply with short circuit protection and LED indication for supply “ON” to works on 230V AC Mains.	1
23	Digital IC Trainer Kit:	Trainer kit model Elaborately detailed User’s Manual unfolds digital fundamentals through well thought out experiments with theoretical reviews self tested questions and exercises. Built - in power supply provides all voltages necessary for experimentation. Patch panel contains commonly used SSI and MSI devices. TYPICAL EXPERIMENTS : Verification of the laws / theorems of Boolean Algebra. Study of gates and verification of their truth tables. Construction of their combinational circuits. Study of TTL terms and definations. Verification of important TTL circuit parameters. Study of various flip - flops and their truth tables. Building flip - flops using gates. Study of monoshot truth table and timing. Study of shift registers operations, implementing registers using flip - flops, serial to parallel conversion. Verification of the operation of decade counters and synchronous up / down counters. Study of arithmetic circuits and comparators. Implementing adders using gates. Understanding 7 - segment display and decoder / driver. TECHNICAL SPECIFICATIONS : POWER SUPPLY : Output voltage available on the front panel from the built - in regulated power supply is : Output Voltage & Current:5V / 1A, short circuit protected. Load Regulation:1 % (No load to full load). Line Regulation:1 % (for + 10 % variation in line voltage).	6

		Ripple :< 12 mV. GENERAL : Components on the patch panel include the following : Quad 2 input NAND gate (7400). Quad 2 input NOR gate (7402). Dual 2 input AND gate (7408). Dual 4 input NOR gate with enable (7425). Quad inverters (7404). Dual 2 input OR gate (7432). Dual 4 input NAND gate (7440). 3 to 8 Line Decoder / Demultiplexer (74138). Dual EX - OR gate (7486). Quad J - K flip - flop with preset and clear (7476). One shot (Mono - shot) (74121). 4 - bit Parallel Access shift register (7495). Synchronous UP / DN counter with dual clock (74193). BCD / 7 - segment decoder / driver (7447). 4 - bit Binary Adder with fast carry (7483). 4 - bit magnitude comparator (7485). 1 to 8 Data Selector / Multiplexer (74151). Decade Divide by 12 and Binary counter (7490). 4 - bit Bi - directional Universal shift register (74194). One 7 segment LED display, 10 logic input switches with LED indication, 4 pulsar switches, 10 logic output indicators. Breadboard Terminal strip with 640 tie points. 4 Connecting Strips. Variable clock generator. Fixed Clock (0.1 Hz, 1 Hz, 100 Hz & 1 KHz). 20 Pin ZIF Socket. STANDARD ACCESSORIES : Detailed Instruction Manual. Set of Patch Cords.	
24	TMS 320C6713 (32-Bit Floating Point Processor) Based DSP Trainer Kit	Trainer kit model	2
25	Xilinx Virtex-5 FPGA based DSP Development Board	Trainer kit model	2
26	Xilinx Zynq-7000 SoC Video and Imaging Kit	Trainer kit model	1
27	Digital Multimeter Make: Rish, Model: 15s	4 ½ Digit Display	10
28	Opto coupler kit	Characteristics of Opto - Coupler is a versatile and well - designed self - contained trainer kit. It is a useful training tool for the teacher and the students for basic electronics. Study, perform, demonstrate and plot the characteristics of an Opto - Coupler based on infrared light. Determination of minimum current required to switch ON the output of an Opto - Coupler. Study, perform and demonstrate optical coupling. Compare benefits of Optical Coupling over Electrical Coupling. Investigate Opto - Coupler's unique application as a switch. Completely self - contained stand - alone unit. Built - in Opto - Coupler and other necessary components. Built - in DC regulated variable power supply of 0 - 5V. Mains ON / OFF switch with LED indicator for supply "ON".	1

		Multi - coloured sturdy 4mm test points are provided at various stages in the circuit to observe the waveforms, voltages and for necessary inter connections. Provision for connecting external voltmeter / current meter as per requirement. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Working on 230V, 50Hz, single phase AC mains. ACCESSORIES : 4mm - 4mm terminated, sturdy, spring loaded patch cords Quantity : 03 numbers provided. Strongly supported by a comprehensive instruction manual complete with theory and operating details : Quantity : 01 number provided.	
29	Signal Generator and Frequency Modulation Kit	Completely self - contained stand - alone unit. Demonstrates the principle of Frequency Modulation using IC 8038. Supply required 230V, 50Hz AC. Built - in IC based DC regulated power supply with short circuit protection and LED indication for supply "ON". Built - in HF carrier signal generator. Facility for connecting external modulating signal. IC based modulating circuit. Observation of frequency modulated signal. Test points are provided at various stages in the circuit to observe the waveforms and voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual completely with theory and operation details.	2
30	Amplitude modulation Kit	SALIENT FEATURES : Completely self - contained stand - alone unit. Demonstrates the principle of Amplitude Modulation. Supply required 230V, 50Hz AC. Built - in IC based DC regulated power supply with short circuit protection and LED indication for supply "ON". Built - in carrier signal generator with Amplitude adjust, frequency adjust, and waveform adjust potentiometer on the front panel. Facility for connecting external modulating signal. Observation of Amplitude Modulated signal at the output on CRO. Calculation of Modulation index. IC based modulating circuit. Observation of amplitude modulated waveforms for different modulation depths. Test points are provided at various stages in the circuit to observe the waveforms and voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual completely with theory and operation details.	2
31	Amplitude Demodulation Kit	Completely self - contained stand - alone unit. Demonstrates the principle of Amplitude Demodulation. Supply required 230V, 50Hz AC. Built - in IC based DC regulated power supply with short circuit protection and LED indication for supply "ON".	2

		Demodulation achieved using diode detector. Observation of demodulated waveform. Built - in amplifier to increase detection efficiency. Test points are provided at various stages in the circuit to observe the waveforms and voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual completely with theory and operation details.	
32	FDM Transmitter / Receiver kit	Two channel FDM with one channel as audio Study & demonstrate the carrier generation, AM, DSBSC Modulation Study DSBSC demodulation. On board carrier generator and two variable frequency audio oscillator On board DSBSC modulator adder, DSBSC demodulator, low pass filter, output amplifier Microphone and headphones provided Detailed instruction manual TECHNICAL SPECIFICATIONS Channels: Two channel FDM Carrier Generators: Two sine wave generators a. 100 KHz & b. 200 KHz Modulating Input Frequencies : Two separate sine wave generators of 1 KHz - 10 KHz (variable frequency and variable amplitude) Modulators: Two DSBSC (Double Side Band Suppressed Carrier) Modulators Demodulators : Two DSBSC (Double Side Band Suppressed Carrier) Demodulators Low Pass Filters : Two separate fourth order low pass butterworth filters with a cut of frequency of 10 KHz Output Amplifier :One output amplifier with a gain of 20 Test Points:46 Interconnection :4 mm banana socket Power Requirement :230V + 10 %, 50 Hz AC Accessories :1. Detailed Instructions Manual 2. Set of Twelve patch cords 3. One Microphone 4. One Headphone EXPERIMENTS POSSIBLE : 1. Two channel FDM with one channel as audio. 2. Study & demonstrate the carrier generation, AM, DSBSC Modulation. 3. Study DSBSC demodulation.	2
33	Noise Power Spectral Density Measurement kit	Trainer kit model	2
34	Frequency Demodulation Kit	SALIENT FEATURES : Completely self - contained stand - alone unit. Demonstrates the principle of a Frequency Demodulation using Ratio Detector circuit. Passive Circuit using Ge Diode, IFT etc. Facility for connecting externally, the Frequency Modulated signal. Observation of demodulated output on CRO Facility for connecting external modulating signal. Test points are provided at various stages in the circuit to observe the waveforms and voltages.	2

		Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual completely with theory and operation details.	
35	Filter/Noise and Audio Amplifier Kit	Trainer kit model	2
36	Noise Power Spectral Density Measurement kit	Trainer kit model	2
37	Transmission line Trainer Kit	Transmission Line Trainer (simulated line), is a versatile training system for investigating the characteristics of a transmission line, including attenuation, delay, matching, frequency response, standing waves AC line coupling and effect of additive noise. A complete unit with detailed instruction manual & set of required patch cords is provided. Topics Covered : Attenuation : Delay using a pulse input. Reactive Termination : Matching using a pulse input. Noise in Communication Systems : AC Coupling of pulse inputs. Matching & Frequency Response: Standing waves. Transformer Matching : Low pass filter effect. Transmission Line Oscillator: Time Domain Reflectometry (TDR). Technical Specifications Simulated Transmission Lines: 50 □ & 70 □. Attenuation Line: 600□□. Standing wave display circuit : Allows standing waves to be viewed on a standard oscilloscope. Pulse generator : Produces pulses of adjustable frequency and pulse width. Summing amplifier : With adjustable gain and output impedance. Digital noise generator : With adjustable output amplitude. Pulse squarer circuit: Provided. Buffer: with fixed 50 □ output. BNC to 4 mm adapter : Provided. Switched faults : Eight faults are provided Four open circuit faults, four short circuit faults, affecting all major functional blocks. Interconnections: 4 mm sockets on all input / output connections. Test points: 70, numbered. On board circuit mimic : Illustrates functional operation of individual circuits. Power Requirement : 230 V, + 10 %, 50 Hz, 1 □ AC.	4
38	Transient analysis of RLC	Basic Control System Trainer is a very versatile and useful trainer kit for the control laboratory for all engineering, polytechnic and vocational courses. It provides with in depth knowledge of the basics of control systems like open loop, closed loop, Ist, IInd and IIIrd order systems active and passive, Type 0, 1, and 2 control systems. Practical and Theoretical concepts can be verified for all types of control systems. The unit is housed in an elegantly designed metal cabinet with a well spread circuit layout on the front panel. A comprehensive Instruction Manual complete with Theory and Operation details is provided. These are some of the salient features of the Basic Control System Trainer. TECHNICAL SPECIFICATIONS	2

		1.Signal Generator Circuit:Using Microcontroller. Output Signals : a. Square wave b. Ramp wave c. Parabolic wave Frequency: 100 Hz Fixed Amplitude: 1 Vpp. 2. Variable Square wave generator Circuit: Using discrete components Output : Square wave Frequency: 40 Hz to 4 KHz approx. Amplitude: 1 Vpp Variable DC Voltage: -12V to +12V Unit Step Input Low : -0.5V to 0.5V High: -0.5V to +1V 5.Impulse generator Circuit : Using Microcontroller Amplitude: -0.5V to +0.5V, Fixed Duration: 50 usec 6.Passive Components Resistors: 100E, 1K, 1K, 10K, 50K and 100K Capacitors: 1 nF, 10 nF, 10 nF, 100 nF, 1 uF and 1 uF Inductors: 1 uH, 680 uH, 1 mH, 10 mH, 68 mH, and 100 mH 7.Active control circuit blocks a. Open Loop System (Transistorized current source system) b. Error Amplifier c. Amplifier with calibrated gain control d. Ist order system e. IInd order system f. IIIrd order system g. Type 0 Control system h. Type 1 Control system i. Type 2 Control system 8. Experiments 1. Study of Open Loop Control System. 2. Study of Closed Loop Control System. 3. Study of Ist Order RC control System and plot its frequency response. 4. Study of IInd Order RLC control system, observe the various damping conditions and plot its frequency response. 5. Study of IIIrd Order RLC control system, observe the various damping conditions and plot its frequency response. 6. Study of First Order active system and observe the effect of gain on damping. 7. Study of Second Order active system and observe the effect of gain on damping. 8. Study of Third Order active system and observe the effect of gain on damping. 9. Study of Type 0 Control System and observe the error analysis for Step, Ramp, Parabolic and Impulse inputs. 10. Study of Type 1 Control System and observe the error analysis for Step, Ramp, Parabolic and Impulse inputs. 11. Study of Type 2 Control System and observe the error analysis for Step, Ramp, Parabolic and Impulse inputs. 12. Study response of Ist order, IInd order, IIIrd order active control system for unit step input. 13. Study response of Type 0,1,2 Control System for DC voltage input.	

39	Transient analysis of RC/RL circuits	Basic Control System Trainer is a very versatile and useful trainer kit for the control laboratory for all engineering, polytechnic and vocational courses. It provides with in depth knowledge of the basics of control systems like open loop, closed loop, Ist, IInd and IIIrd order systems active and passive, Type 0, 1, and 2 control systems. Practical and Theoretical concepts can be verified for all types of control systems. The unit is housed in an elegantly designed metal cabinet with a well spread circuit layout on the front panel. A comprehensive Instruction Manual complete with Theory and Operation details is provided. These are some of the salient features of the Basic Control System Trainer. TECHNICAL SPECIFICATIONS 1.Signal Generator Circuit:Using Microcontroller. Output Signals : a. Square wave b. Ramp wave c. Parabolic wave Frequency: 100 Hz Fixed Amplitude: 1 Vpp. 2. Variable Square wave generator Circuit: Using discrete components Output : Square wave Frequency: 40 Hz to 4 KHz approx. Amplitude: 1 Vpp Variable DC Voltage: -12V to +12V Unit Step Input Low : -0.5V to 0.5V High: -0.5V to +1V 5.Impulse generator Circuit : Using Microcontroller Amplitude: -0.5V to +0.5V, Fixed Duration: 50 usec 6.Passive Components Resistors: 100E, 1K, 1K, 10K, 50K and 100K Capacitors: 1 nF, 10 nF, 10 nF, 100 nF, 1 uF and 1 uF Inductors: 1 uH, 680 uH, 1 mH, 10 mH, 68 mH, and 100 mH 7.Active control circuit blocks a. Open Loop System (Transistorized current source system) b. Error Amplifier c. Amplifier with calibrated gain control d. Ist order system e. IInd order system f. IIIrd order system g. Type 0 Control system h. Type 1 Control system i. Type 2 Control system 8. Experiments 1. Study of Open Loop Control System. 2. Study of Closed Loop Control System. 3. Study of Ist Order RC control System and plot its frequency response. 4. Study of IInd Order RLC control system, observe the various damping conditions and plot its frequency response. 5. Study of IIIrd Order RLC control system, observe the various damping conditions and plot its frequency response. 6. Study of First Order active system and observe the effect of gain on damping.	2

		7. Study of Second Order active system and observe the effect of gain on damping. 8. Study of Third Order active system and observe the effect of gain on damping. 9. Study of Type 0 Control System and observe the error analysis for Step, Ramp, Parabolic and Impulse inputs. 10. Study of Type 1 Control System and observe the error analysis for Step, Ramp, Parabolic and Impulse inputs. 11. Study of Type 2 Control System and observe the error analysis for Step, Ramp, Parabolic and Impulse inputs. 12. Study response of Ist order, IInd order, IIIrd order active control system for unit step input. 13. Study response of Type 0,1,2 Control System for DC voltage input.	
40	T and pie Network Trainer	Complete self contained stand - alone unit. Demonstrates the principle and working of Attenuators. Supply required 230V, 50Hz AC. Built - in IC based DC regulated power supply, variable, with short circuit protection and LED indication for supply "ON". Facility for connecting external AC variable voltage through function generator. Built - in resistive loads. Built - in resistive attenuators for T,□, Bridge T and Lattice networks. Multi - coloured test points are provided at various stages in the circuit to observe the waveforms and voltages. Set of patch cords. Housed in an elegant cabinet with a well spread intelligently designed circuit layout on acrylic front panel with mirror image printing Strongly supported by a comprehensive instruction manual complete with theory and operating details.	2
41	Pulse Amplitude Modulation Time Division Multiplexing (PAM-TDM) Kit	Crystal controlled Clock. On - board Sine Generator (synchronised). On - board Pulse Generator. 4 Analog input channels sampled and time division multiplexed. Five selectable sampling frequencies. Selectable Pulse Duty Cycle. Selectable Internal / External sampling. 4 channel Demultiplexer. Generation of clock at receiver by PLL system. Fourth order Butterworth low pass filters. TECHNICAL SPECIFICATIONS : Crystal Frequency: 6.4 MHz. Analog Input Channels : 4. Multiplexing : Time Division Multiplexing. Modulation : Pulse Amplitude Modulation. On Board Analog Signal : 250 Hz, 500 Hz, 1 KHz, 2KHz (sine wave synchronized to sampling pulse, adjustable amplitude & separate variable DC level). Sampling Rate : 16 KHz / channel. Sampling Pulse : With duty cycle variable from 0-90% in decade steps. Clock Regeneration at receiver : Using PLL. Low Pass filter cut - off frequency: 3.4 KHz. Test Points : 52. Power : 230V + 10% 50 Hz, 1 □ AC. Accessories : a. Detailed Instruction Manual. b. Set of Patch cords.	2

		EXPERIMENTS : Study of Pulse Amplitude Modulation (PAM) technique. Study of Time Division Multiplexing (TDM) and demultiplexing. Study of PLL as Frequency Mutiplier to generate clock from sync signal. Study of three modes of operation to regenerate original signal. a. 3 connections between transmitter and receiver (clock, sync, information). b. 2 connections (information & sync); clock generated at receiver. c.1 connection (information only) clock & sync derived at receiver. Study of effect of varying duty cycle of sampling pulse and signal reconstruction. Signal Sampling & Reconstruction using external Sampling input.	
42	Pulse code Modulation Kit	Completely self - contained stand - alone unit. Demonstrates the principle of Pulse Code Modulation (PCM). Supply required 230V, 50Hz AC. Built - in IC based DC regulated power supply with short circuit protection and LED indication for supply "ON". IC based modulating circuit. Modulating circuit consists of a Positive Clamper, Sample and Hold (S & H), Analog to Digital Converter (ADC), Parallel to Serial Converter and Control Signal Generator. Facility for connecting external AC or DC Modulating Signal. Observation of binary coded analog information by the LED status. Test points are provided at various stages in the circuit to observe the waveforms and voltages. Housed in an elegant cabinet with a well spread intelligently designed circuit layout on the front acrylic panel with mirror Image printing Strongly supported by a comprehensive instruction manual completely with theory and operation details.	2
43	Pulse Code Demodulation Kit	Completely self - contained stand - alone unit. Demonstrates the principle of Pulse Code Demodulation. Supply required 230V, 50Hz AC. Built - in IC based DC regulated power supply with short circuit protection and LED indication for supply "ON". Built - in pulse code demodulation circuit. The demodulated circuit is made using a Serial to Parallel Converter, Parallel Shift Register, DAC, Low Pass Filter for both AC and DC. Observation of demodulated waveform on CRO. Pulse code modulated signal to be provided externally for which connecting facility provided on board. 1 MHz clock to be provided from the Pulse Code Modulator unit. Test points are provided at various stages in the circuit to observe the waveforms and voltages. Housed in an elegant cabinet with a well spread intelligently designed circuit layout on the front acrylic panel with mirror Image printing Strongly supported by a comprehensive instruction manual completely with theory and operation details.	2
44	ASK/PSK/FSK Modulation&	In digital communication data formatting is very important. The data stream is converted into different formats best suited to individual transmission system. Various formats are covered in	2

	Demodulation Kit (set)	this trainer. Also to transmit the digital information the digital information carrier modulation is necessary. Various modulation techniques are also covered in this trainer. Features : On - board carrier generation circuit (sine wave synchronized to transmitted data). On - board inphase and quadrature phase carrier for QPSK modulation. Different data conditioning formats NRZ (L), NRZ (M), RZ, Biphase (Manchester), Biphase (Mark), MAI, RB Differentially encoded dibit pair. FSK, PSK, ASK carrier modulation. Variable carrier and modulation offset. Variable carrier gain. On - board unipolar to bipolar conversion. On - board data inverter. Technical Specification Input: Two channel time division multiplexed data. Data formats : NRZ (L), NRZ (M), RZ, Biphase (Manchester),Biphase (Mark), MAI, RB Differentially encoded dibit pair. Carrier Modulation: FSK, PSK, ASK carrier modulation. On - board: Sinewaves synchronized to transmitted data at 1.44 MHz 960 KHz (0^0 phase) 960 KHz (90^0 phase) Test Points :38. Interconnections : 4 mm sockets. Power : 230V + 10% 50 Hz. Accessories : a. Manuals b. Set of patch cords. c. Line cord. Experiment that can be performed : Study of conversion of NRZ (L), NRZ (M), RZ, Biphase (Manchester), Biphase (Mark), MAI, RB Differentially encoded dibit pair. Study of following carrier modulation techniques and their comparison ASK, FSK, & PSK. Data conditioning and carrier modulation is done it can be demodulated and reformatted by using this trainer. Features : 7 different data reconditioning formats (NRZ (M), RZ, AMI, RB Biphase (Manchester), Biphase (Mark), Differentially encoded dibit to NRZ data). FSK, PSK, ASK & QPSK carrier demodulation. Output gives 2 channels TDM multiplexed data output. On - board biphase clock recovery circuit. On - board data squaring circuit and differential decoder. On - board butterworth filters 4th order (02 nos.). Technical Specification Input : From Transmission Trainer. Output : 2 channel TDM multiplexed data stream. Reconditioning Options :(NRZ (M), RZ, AMI, RB Biphase (Manchester), Biphase (Mark), Differentially encoded dibit to NRZ (L). Carrier Demodulation: 1. ASK Rectifier diode. 2. FSK PLL detector. 3. PSK Square loop detector Biphase clock recovery :By PLL. Test Points :54. Interconnections : 4 mm sockets. Power : 230V + 10% 50 Hz. Accessories : a. Manuals	

		b. Set of patch cords. c. Line cord. Experiment that can be performed : Study of conversion of different data formats to NRZ data format. Study of various carrier demodulation techniques (ASK, FSK, PSK).	
45	Delta and Adaptive Delta Modulation & Demodulation Kit	Digital Communication specially operating at low frequencies or speech, communication a saving in bandwidth can be result using delta modulation and its associated techniques because this requires single bit encoding of sample This trainer covers delta, adaptive delta and delta sigma modulation & Demodulation. Features : Both transmitter and receiver on same board. Clock generation from crystal. 4 Switch selectable sampling rates. 4 on - board generators at 4 different frequencies (synchronized). Separate adjustable DC level. Selectable integrator gain setting by (switch or control circuit). On - board 4th order butterworth LP filter. Unipolar to bipolar conversion on board. Technical Specification Crystal Frequency : 4.096 MHz. Sampling Frequencies : 32 KHz, 64 KHz, 128 KHz, 256 KHz (switch selectable) On - board generator : Synchronized & adjustable amplitude sine wave generator at 250 Hz, 500 Hz, 1 KHz, 2 KHz, separate variable D.C. level Integrator : 4 integrator gain settings normally x2, x4 & x8. LP Filter : 4th order butterworth (3.4 KHz cut off). Test Points : 59. Interconnections: 4 mm sockets. Power : 230V + 10% 50 Hz. Accessories : a. Manuals b. Set of patch cords. c. Line cord. Experiment that can be performed : Study of delta modulation & demodulation. Study of effect of slope overload and increased integrator gain in delta modulation. Study of adaptive delta modulation & demodulation. Study of delta sigma modulation & demodulation. Study of amplitude overload in delta sigma modulation.	2
46	Pulse Amplitude/Pulse Width/Pulse Position Modulation / Demodulation Kit	The trainer provides all necessary inputs and connections for students to study signal Pulse Amplitude Modulation / Pulse Width Modulation / Pulse Position Modulation techniques. It provides to examine sampling, modulation, Demodulation and signal reconstruction. Features : All types of Modulation Demodulation techniques using natural & flat top sampling. Pulse Amplitude Modulation Pulse Width Modulation Pulse Position Modulation Analog sampled outputs & sampled 'hold' outputs. Selectable 4 different sampling frequency from on-board Pulse Generator. 4 different on-board sine-wave generator	2

		Voice Communication using dynamic mic & speaker 4th order butterworth LP filter. 8 Switch Fault On – board Filter & AC amplifier Technical Specification On Board Sampling Frequency : 4 KHz, 8KHz, 16KHz, 32KHz . Modulation :1. Pulse Amplitude Modulation 2.Pulse Width Modulation 3.Pulse Position Modulation On - board Sine Wave Generator :250 Hz, 500 Hz, 1 KHz, 2 KHz (Variable Amplitude 0-4 V.p-p). Voice Communication : Voice link using Dynamic Mic & Speaker Low Pass filter cut - off freq. : 3.4 KHz / 4th order butterworth LP filter. Power Requirement : 230V + 10% 50 Hz. Dimensions :a. Manuals b.Set of patch cords. c.Line cord. AC Amplifier : with adjustable gain control D.C. Output : 0 - 4 V (Variable) Interconnection : 4mm Bannana Socket. Test point : 29. Experiment that can be performed : Study of pulse amplitude modulation & demodulation using natural sampling & flat top. Study of pulse amplitude modulation & demodulation using flat top sampling. Study of pulse width modulation & Demodulation using natural & flat top sampling / with different frequency. Study of pulse position modulation & Demodulation using natural sampling / DC & AC modulating signal. Study of Voice Communication using PAM & PWM techniques.	
47	QPSK Modulation/Demodulation Kit	QPSK/DQPSK Modulation & Demodulation Trainer is an Advance Digital Communication Trainer System that helps one understand various Digital Modulation and Demodulation Techniques. Various functional block diagrams are provided on-board as an aid for Teaching/Training. These Kits are provided with various Test Points to visualize the signals on Oscilloscopes. All ICS are mounted on IC Sockets. Bare board Tested Glass Epoxy PCB is used. Attractive Wooden enclosures of Light weight Pine Wood. FEATURES: Onboard Synchronized 500 KHz Sine wave generator. Differential Encoding type Data Format On-board crystal controlled Pulse Generator On board 8 bit Data Simulator Block Description screen printed on PCB In-Built Power Supply TECHNICAL SPECIFICATIONS Carrier Sine Wave Generator : Synchronized Sine waveform output of 500 KHz (0 deg.), 500 KHz (90 deg.), 500 KHz (180 deg.), 500 KHz (270deg.) Amplitude of 0 – 4 Vp-p Provision for Amplitude Adjustments Provided. Data Format (Coding) : Dibit Pair (I & Q), Differential Encoding of I & Q Bits. Carrier Modulation Techniques :1. DPSK modulation	2

		2. DQPSK modulation Carrier Demodulation Techniques:1. DPSK Demodulation 2. DQPSK Demodulation Pulse Generator: Clock frequency of 250 KHZ BIT, BIT Clock, Word Clock. Crystal Controlled Pulse Generator. On-board features:1. On board 8 bit variable NRZ-L pattern Data Simulator 2. Switch Faults are provided on board to study different effects on circuit 3. Block Description Screen printed on glassy epoxy PCB 4. Receiver Clock generated by PLL method 5. Switch Faults are provided on board to study different effects on circuit 6. Block Description Screen printed on glassy epoxy PCB Interconnections: 4 mm sockets. Test Points : 51 Power : 230V + 10% 50 Hz, 1 □ AC. Accessories a. Detailed Instruction Manual. b. Set of Patch cords. EXPERIMENTS: Principles of advance digital modulation techniques. Differential Encoding of Data. Binary Phase Shift Keying Modulation / Demodulation technique. Differential Phase Shift Keying Modulation / Demodulation technique. Differentially Encoded Phase Shift Keying Modulation / Demodulation technique. Effect of Switch Faults.	
48	DPSK modulation/Demodulation Kit	QPSK/DQPSK Modulation & Demodulation Trainer is an Advance Digital Communication Trainer System that helps one understand various Digital Modulation and Demodulation Techniques. Various functional block diagrams are provided on-board as an aid for Teaching/Training. These Kits are provided with various Test Points to visualize the signals on Oscilloscopes. All ICS are mounted on IC Sockets. Bare board Tested Glass Epoxy PCB is used. Attractive Wooden enclosures of Light weight Pine Wood. FEATURES: Onboard Synchronized 500 KHz Sine wave generator. Differential Encoding type Data Format On-board crystal controlled Pulse Generator On board 8 bit Data Simulator Block Description screen printed on PCB In-Built Power Supply TECHNICAL SPECIFICATIONS Carrier Sine Wave Generator : Synchronized Sine waveform output of 500 KHz (0 deg.), 500 KHz (90 deg.), 500 KHz (180 deg.), 500 KHz (270deg.) Amplitude of 0 – 4 Vp-p Provision for Amplitude Adjustments Provided. Data Format (Coding) : Dibit Pair (I & Q), Differential Encoding of I & Q Bits. Carrier Modulation Techniques :1. DPSK modulation 2. DQPSK modulation Carrier Demodulation Techniques:1. DPSK Demodulation 2. DQPSK Demodulation	2

		Pulse Generator: Clock frequency of 250 KHZ BIT, BIT Clock, Word Clock. Crystal Controlled Pulse Generator. On-board features:1. On board 8 bit variable NRZ-L pattern Data Simulator 2. Switch Faults are provided on board to study different effects on circuit 3. Block Description Screen printed on glassy epoxy PCB 4. Receiver Clock generated by PLL method 5. Switch Faults are provided on board to study different effects on circuit 6. Block Description Screen printed on glassy epoxy PCB Interconnections: 4 mm sockets. Test Points : 51 Power : 230V + 10% 50 Hz, 1 □ AC. Accessories a. Detailed Instruction Manual. b. Set of Patch cords. EXPERIMENTS: Principles of advance digital modulation techniques. Differential Encoding of Data. Binary Phase Shift Keying Modulation / Demodulation technique. Differential Phase Shift Keying Modulation / Demodulation technique. Differentially Encoded Phase Shift Keying Modulation / Demodulation technique. Effect of Switch Faults.	
49	Telephone Trainer Kit	SALIENT FEATURES : Telephone Demonstrator is a high technology, rugged, user-friendly replica of a professional electronic push button telephone receiver. It uses the latest state of art technology based solid state Integrated Circuits, making it a highly reliable electronic telephone receiver designed to provide a high level of communication. Telephone Demonstrator is a versatile training demonstrator, useful for studying the principle & working of an electronic push button telephone. All the components are mounted on a single PCB with demarcated sections & test points. a. Ringer Section b. Keypad Section c. Sound Amplifier Section d. Dialer Section e. Hand set with cut off plunger type switch. Fault creating facilities are provided, where by 13 faults can be created. Telephone Set Type :Electronic push button type. Dialing System: Pulse / Tone (selectable). Connection : To be connected to a P & T line. Ringer Volume: Volume Control for Ringer is provided. Keypad Switches :0,1,2,3,4,5,6,7,8,9,*,# switches are provided. Power Required : Derived from the P&T line to which it is connected	3
50	EPABX Trainer KIT	SALIENT FEATURES : EPABX Trainer is a single board EPABX TRAINING KIT configured around the most popular microcontroller 89C51. EPABX can be used to Train the Engineers about the architecture of EPABX. The kit has the capability of interfacing with an IBM compatible PC. The kit provides various powerful software commands like	2

		INSERT, DELETE, BLOCK MOVE, FILL, SET/CLR BREAKPOINTS etc. EPABX gives the complete idea about the working of EPABX. Students can write own program for alter the working of EPABX by their own idea. EPABX trainer, also work as normal EPABX Training Kit is to enable the students to understand the working of the systems which are using in the real world. EPABX trainer have the provision to use 1, 2 or 3 trunk lines & 4, 6 or 8 extension lines respectively. Locking & other facilities are provided in this trainer same as normal EPABX. This trainer can perform the following functions such as use the password to protect the call Extension to Extension call, Hold, Call transfer, Call pickup, Call parking, Call forwarding, Redial, Call control, Conference, Do not disturb etc. SPECIFICATIONS Based on 89c51CPU. Provision for upto 1 trunk Line & 3 extension lines. IBM PC Compatible Keyboard for using commands. 20 x 2 LCD Display. Complete circuitry of EPABX is on board. Working in 2 Modes: Trainer Mode l EPABX Mode Explanation, Observation, Alignment and adjustment of internal & external controls is possible. Program for different section can be written in RAM. Programs written by user are executable. 70 db m Cross Talk Attenuator. Telephone Instruments (Optional). EXPERIMENTS Redial Extension to Extension Call Paging To hold a line Call consult Call parking Call forwarding busy Talk trunk to extension Call pickup Call transfer Auto call back Locking/Unlocking etc	
51	Mobile Hand Set Trainer Kit	MOBILE PHONE SPECIFICATIONS Cellular System : EGSM / GSM 900 Rx Frequency Band : EGSM 925, 960MHz, GSM 900, 935, 960Mhz. Tx Frequency Band : EGSM 880, 890MHz GSM900, 890, 915MHz. Output Power : +5, +33dBm / 3.2mw - 2W. Channel Spacing : 200Khz Antenna : Loop type 50W Display : 84x48 pixels. On Board Sections : Antenna keypad SIM charging circuit clock. User interface such as buzzer, vibrator and LED's. Test Points : 41 Fault : 25. Features that can be set: Screen savers ring tones logos SMS etc. Accessories : Battery mains cord. Instruction Manual	2

		Power Supply : 220V + 10%, 50Hz/60Hz on request. GSM SPECIFICATIONS: GSM Capacity : GSM 900/1800EGSM, GSM data services Asynchronous transparent & non transparent. Modes : 14.4Kbits/s SIM interface : 3V. RF CHARACTERISTICS: RECEIVER: EGSM sensitivity : < -104dBm DCS sensitivity : < -102dBm Selectivity @ 200Khz : >+9dBc Selectivity @ 400Khz : >+41dBc. Dynamic Range : 63dB Intermodulation : >-43dBm C- Channel Rejection : > 9dBc TRANSMITTER : Maximum output power : 33dBm +2dB (EGSM). Maximum output power : 30dBm +2dB (DCS) Maximum output power : 5dBm +5dB (EGSM) Maximum output power : 0dBm +5dB (DCS 1800) Noise in 925-935MHz <-67dBm Noise in 935-960MHz <-79dBm Noise in 1805 –1880 Mhz <-71dBm Phase error at peak power <5deg.RMS. Frequency error : 0.1ppm max Power Supply : 9V Current consummation : Max 500mA	
52	TMS 320C6713 (32-Bit Floating Point Processor) Based DSP Trainer Kit	Trainer kit model	5
53	TMS 320C6416 (32-Bit Fixed Point Processor) Based DSP Trainer Kit	Trainer kit model	2
54	Microphone trainer kit	Completely self contained stand - alone unit. Designed for educational & experimenting purpose. Demonstrates the principle & working of various microphones. Test points at various stages in the circuit to observe and record the waveforms and voltages. Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on the acrylic front panel with mirror image printing. Strongly supported by a comprehensive instruction manual complete with theory and operation details. The complete system consists of : Three different microphones. One Loudspeaker to transmit the Audio Signal as Source for the Microphone under test. Amplifier - Low noise, variable gain dedicated amplifier. Motorised directional plate with auto and manual mode. Measuring Tape. Facility for finding : Frequency Response with calculation of gain in dB for various microphones various distance & various inputs and plotting of graph.	2

		Directional Response with calculation of gain in dB for various microphones various distance & various inputs and plotting of polar graph.	
55	BLACK AND WHITE T.V trainer kit	Trainer kit model	1
56	Separate sections of Black and White T.V.	Trainer kit model	2
57	Color pattern generator	Trainer kit model	2
58	Color T.V trainer kit	Trainer kit model	2
59	Separate sections of Color T.V trainer	Trainer kit model	2
60	DVD Player trainer	Trainer kit model	1
61	MODEL-PID,PID CONTROL TRAINER	Process Control Simulator (Advance PID Controller) is an excellent learning tool for the students to learn the concept of Proportional, Integral, Derivative and its combinations using simulated approach. The unit consists of an Input Disturbance generator, PID Controller, different types of processes, non—linear characteristics generator, indicating meters, etc all housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on the front panel. A comprehensive Instruction manual complete with theory and operation details is provided. TECHNICAL SPECIFICATIONS : GENERAL Input and Output Range is + 10V at all points Frequency response of all basic amplifier configuration is flat at full output to 10 KHz Minimum resistive load on any output for full range: 5 KW All outputs are short circuit proof. INPUT DISTURBANCE GENERATOR BLOCK DC Voltage : 0 to +2.5V Square and Sine wave Frequency : Slow Mode - 0.02Hz to 10Hz Fast Mode - 0.2Hz to 100Hz Amplitude :Variable, 0 — 5Vpp Single Step Input: +2.5V CONTROLLER BLOCK Set Value : 0 to +10V Integral Time (Ti) : Slow Mode- 25Sec to 500mSec Corresponding to 0.04 to 2 repeats / s Fast Mode - 250mSec to 5mSec Corresponding to 4 to 200 repeats / s Derivative Time (Td) : Slow Mode - 0 to 2Sec Fast Mode - 0 to 20mSec Proportional Band (P) : 200% to 4% Corresponding to gain constant of 0.5 to 25 PROCESS BLOCK The Process Block consists of various process like Inverter : It represents a sign changer. Distance Velocity Lag : It represents the time required to transport material or propagate a signal or condition from one point to another. Time Delay :Slow Mode - 1Sec Fast Mode - 10mSec Frequency Range:	1

		Slow Mode - 0 to 0.3Hz Fast Mode - 0 to 30Hz Simple Lag : It represents the simple lag due to circuit components. Lag: Slow Mode - 1Sec Fast Mode - 10mSec Lag / Integrator : This circuit works as a Lag or Integrator selectable using (2 Blocks) switch. Lag / Integrator : Slow Mode - 1Sec Fast Mode - 10mSec NON - LINEAR UNIT The non-linear unit represents characteristics like Linear : Slope of Linear portion is Unity Limits : 0.5 to 5V Deadband Backlash Two step and Three step (relay) with overlap.	
62	OPEN LOOP/CLOSE LOOP MOTOR SPEED CONTROL TRAINER kit	Trainer kit model SALIENT FEATURES Closed loop motor speed control with eddy current brake Compact system-no mechanical hassles Opto electronic speed sensor Digital display of speed on the panel TECHNICAL SPECIFICATIONS Speed control of a 12V, 4W permanent magnet d.c. motor Speed range: 0 to 3000 rpm (typical) Opto-interrupter based speed sensing 4-digit speed display in rpm Electronic tachogenerator for feedback Separate unit for motor in a cabinet Smooth, non-contact eddy current brake for loading Built-in 3½ digit DVM for signal measurements Built-in IC regulated internal power supply 220V±10%, 50Hz mains operation Comprehensive Instruction Manual complete with theory, operating details and Observation table, etc EXPERIMENTS Effect of loading on the speed of the motor in the open loop Steady state error variation with forward gain System time constant variation with forward gain Effect of forward gain on disturbance rejection Determination of the motor transfer function and tachometer characteristics	1
63	STEPPER MOTOR CONTROL TRAINER kit	Stepper Motor Demonstration unit is a versatile self - contained stand alone unit useful in the study and demonstration of the principle and working of a stepper motor with various electronic controls such as manual switching and Microprocessor based controls. Provision for direct up interface is provided. It consists of two units viz., stepper motor unit and the translator unit. Each unit is housed in an elegant cabinet with a well spread intelligently designed circuit layout on the front panel. Multicoloured test points are provided at various stages in the circuit to observe the waveforms and voltages. It is strongly supported by a comprehensive instruction manual complete with theory, operating details and machine code program. TECHNICAL SPECIFICATIONS STEPPER MOTOR UNIT : Motor : Bi - directional with permanent magnet rotor & bifilar wound stator. Motor Characteristics : Self starting, low moment of inertia, instantaneous start, stop and reversal of rotation. Rotation: 200 Steps / revolution. Torque : 3.5 kg cm^2	1

		Stepping Angle : 1.8 deg. Protection : Against forcible stalling. Operating Voltage: 12V DC. Mounting : Motor mounted in a metal cabinet with a calibrated dial and pointer. Connector : Special connector with wires to connect motor unit to translator unit. TRANSLATOR UNIT : Translator : Versatile solid state electronic switching circuit for conversion of input pulses. Output : Required pulse pattern for driving the stepper motor using digital circuitry, analog demultiplexer & power amplifier. Type of Control : 1. Number of steps. 2. Speed of revolution. 3. Direction of rotation. DC Source : Translator : + 12V DC Regulated. Motor : + 15V DC Unregulated Pulser : Bounceless manual pulser. Clock Generator : Variable clock frequency generator with high / low and fine control. Controls: 1. Mains ON / OFF. 2. Manual Pulser. 3. Forward / Reverse rotation switch. 4. High / Low variable clock for speed. 5. Potentiometric Fine Control for variable clock. Test Points: Provided at various stages in the circuit to observe waveforms & voltages. Indicators:1. Mains ON / OFF. 2.Logic level indicators for monitoring the logic status of each winding of stepper motor. Connector : Facility for connecting the motor unit. Power Requirements :230V, + 10%, 50Hz, 1□. Standard Accessories :1. Detailed Instruction Manual. 2.Set of required number of patch cords.	
64	Klystron Mount	Freq. Range (GHz):8.2-12.4 Flange:UG-39/U Waveguide:RG-52/U	5
65	Klystron tube	2k-25 (X-band)	5
66	Isolator	Freq. Range(GHz):8.6-10.0 Max VSWR (dB):1.2 Min. Insertion loss(dB):0.4 Min.Isolation(dB):20	5
67	Frequency Meter (DR)	Freq. Range(GHz):8.2-12.4 Calibration Accuracy:+2 Calibration Increment(MHz):10 VSWR Max.:1.02	5
68	Variable Attenuator	Freq. range:8.2-12.4 VSWR :1.1 Av. Power:2W Waveguide:RG-52/U Flange :UG-39/U	5
69	Slotted Section	Freq. range(GHz):8.2-12.4	5

		Residual VSWR:1.01	
		Slope(dB):+ 0.2	
		Waveguide:RG-52/U	
		Flange:UG-39/U	
70	Tunable Probe	Freq. Range:8.2-12.4	5
		Detector:IN-23	
		Outpurconnector:BNC(F)	
		Type:Tunable	
71	Detector Mount	Freq. Range:8.2-12.4	5
		Crystal:IN21	
		OutpurconnectorFemale:BNC	
72	Movable Short	Freq. Range:8.2-12.4	5
		Reflection co-efficientT:0.98	
		Waveguide:RG-52/U	
		FLANGE:UG-39/U	
73	Matched termination	Freq. Range: 8.2-12.4	5
		VSWR: 1.02	
		Flange: UG-39/U, Waveguide: RG-52/U	
74	S. S. Tuner	Freq. Range (GHz):8.2-12.4	5
		Flange:UG39/U	
		Waveguide:RG-52/U	
		Max. VSWR:20:1.02	
75	Waveguide stand	Universal waveguide stand	20
76	Microwave, RF Power & VSWR Meter	320X240 Pixel TFT Touch screen Power meter with sensor: 10 MHz to 26GHz Frequency with USB interface, Power measurement: +20dBm to -30dBm in dBm and 22 other units with 0.1 dB resolution, Sensor Return Loss: 20dB upto 12.4GHz, 15dB upto 26GHz, Adapters: N-SMA, X-band waveguide to coax adapter. Separate VSWR meter	1
77	Solid State Klystron Power supply	Beam Supply:	5
		Voltage Range: 195-400 V continuously variable	
		Current: 45mA Max.	
		Regulation: Better than 0.5% for + variation in Mains Supply Voltage	
		Ripple: Less tan 5 mV rms	
		Separate Digital Voltmeter & Current Meter	
78	Cooling Fan with stand	100 mm. square fan with stand	5
79	BNC Cable	Coaxial cable RG-52 both end BNC connector	10
80	Gunn Oscillator	Freq.Range (GHz):8.2-12.4	5
		Pushing fac.(MHz/V):8	
		Bias V. Max:10V	
		Nominal Power output:10	
		Temp.Coeff.(MHz):+ 0.2	
		Output Connector:BNC(F)	
		Freq. Adjustment:By Micrometer	

		W. guide:RG-52/U	
		Flange :UG-39/U	
81	PIN Modulator	Freq. Range(GHz):8.2-12.4	5
		Bias Volt.:0.10 VOLTS	
		Output connector:BNC (F)	
		Waveguide:RG-52/U	
		Flange:UG-39/U	
82	Gunn Power Supply	Voltage Range : 0 - 12V	5
		Current :1 Amp Maximum	
		Stability :0.2 % for + 10 % variation in Main Supply	
		Ripple :1 mV rms	
		Modulation Frequency : 1KHz - 10 %	
		Modulation Voltage : 0 - 10V peak to peak	
		Output Connector: BNC Female	
		Separate Digital Voltmeter & Current Meter	
83	BNC Cable	Coaxial cable with both end BNC connector	5
84	Mechanical Turn Table	Table size fixed with accessories	5
85	Standard Gain Horn	Freq.range: 8.4-12.4	5
		Flange: UG-39/U, waveguide RG-25/U	
86	E-plane Bend	Freq. range: 8.2-12.4GHz, VSWR MAX: 1.05, Waveguide: RG-52/U, Flange: UG-39/U	10
87	Pick up horn	Freq.range: 8.4-12.4	2
		Flange: UG-39/U, waveguide RG-52/U, VSWR: 1.2	
88	Slotted Antenna - Broad Wall	Freq.range: 8.4-12.4	2
		Flange: UG-39/U, waveguide RG-52/U, VSWR: 1.2	
89	Slotted Antenna - Narrow Wall	Freq.range: 8.4-12.4	2
		Flange: UG-39/U, waveguide RG-52/U, VSWR: 1.2	
90	Dielectric Antenna	Freq.range: 8.4-12.4	2
		Flange: UG-39/U, waveguide RG-52/U, VSWR: 1.2	
91	E-Sectoral Horn	Freq. Range(GHz):8.2-12.4	2
		Flange:UG-39/U	
		Waveguide:RG-52/U	
		Type:E-Sectoral	
		Gain:15	
		Max.VSWR:1.2	
92	H-Sectoral Horn	Freq. Range(GHz):8.2-12.4	2
		Flange:UG-39/U	
		Waveguide:RG-52/U	
		Type:H-Sectoral	
		Gain:15	
		Max.VSWR:1.2	
93	Parabolic Disc (with feed) 8" dia	Freq.range: 8.4-12.4	2
		Flange: UG-39/U, waveguide RG-52/U, VSWR: 1.3	

94	Pyramidal Horn		2
		Freq. Range(GHz):8.2-12.4	
		Flange:UG-39/U	
		Waveguide:RG-52/U	
		Type:Pyramidal	
		Gain:16	
		Max.VSWR:1.2	
95	Precision Short	Freq.Range:8.2-12.4	2
		Reflection Co-efficient:0.98	
		Wave guide:RG-52/U	
		Flange:UG-39/U	
96	Solid Dielectric Cell	Freq. Range(GHz):8.2-12.4	2
		Max. length of cell(mm):110	
		Plunger Movement (mm):25	
97	Liquid Dielectric Cell	Freq. Range(GHz):8.2-12.4	2
		Max. length of cell(mm):200	
		Plunger Movement (mm):65	
98	Phase Shifter	Freq. Range:8.2-12.4	2
		VSWR Max:1.3	
		Calibration Accuracy:+2.50	
		Waveguide:RG-52/U	
		Flange:UG-39/U	
99	Fixed Attenuator : 3 dB	Band : X,	2
		Freq. range: 8.2-12.4,	
		VSWR Max.: 1.08,	
		Av. Power: 2W,	
		Accuracy: +0.5dB,	
		Waveguide: RG-52/U,	
		Flange: UG-39/U	
100	Fixed Attenuator : 6 dB	Band : X,	2
		Freq. range: 8.2-12.4,	
		VSWR Max.: 1.08,	
		Av. Power: 2W,	
		Accuracy: +0.5dB,	
		Waveguide: RG-52/U,	
		Flange: UG-39/U	
101	Fixed Attenuator : 10 dB	Band : X,	2
		Freq. range: 8.2-12.4,	
		VSWR Max.: 1.08,	
		Av. Power: 2W,	
		Accuracy: +0.5dB,	
		Waveguide: RG-52/U,	
		Flange: UG-39/U	
102	Magic Tee	Freq.range: 8.4-12.4	2

		Flange: UG-39/U, waveguide RG-52/U, VSWR: 1.25	
103	Directional Coupler : 3 dB	Freq. Range (GHz): 8.2-12.4	2
		Coupling(DB): 3+0.6	
		Directivity(MIN.):35	
		VSWR(MAIN):1.12	
		VSWR (AUSILLIRRY LINE):1.2	
104	Directional Coupler : 10 dB	Freq. Range (GHz): 8.2-12.4	2
		Coupling(DB): 10+0.6	
		Directivity(MIN.):35	
		VSWR(MAIN):1.12	
		VSWR (AUSILLIRRY LINE):1.2	
105	CD-coupler-20db	Freq.Range(GHz): 8.4-12.4,	2
		Couplig DB-20,	
		Min. Directivity-25	
		Coupling accuracy + 1DB	
106	T Circulator	Freq. Range(GHz): 8.6-9.6	2
		Max VSWR (dB): 1.2	
		Min. Insertion loss(dB):0.4	
		Min.Isolation(dB):20	
107	Y.Circulator	Freq. Range(GHz): 8.6-9.6	2
		Max VSWR (dB): 1.2	
		Min. Insertion loss(dB):0.4	
		Min.Isolation(dB):20	
108	E- Plane Tee	Freq. Range:8.2-12.4	2
		Flange:UG-39/U	
		Waveguide:RG-52/U	
109	H- Plane Tee	Freq. Range:8.2-12.4	2
		Flange:UG-39/U	
		Waveguide:RG-52/U	
110	VLSI Trainer kit	FPGA,LCD module, segment displays, stepper motor interface,	1
111	CPLD Trainer kit	CPLD using Xilinx standard, LCD module, segment displays,	1
112	FPGA XC2S50 Development Board trainer kit	Sub-board for CPLD, FPGA, VGA interface, Verilog HDL, VSDL	1
113	ARM Processor trainer kit	ARM based 32 bit, GPIO expansion header, DAC/ADC header	1
114	Xilinx SPARTAN XC3S50 trainer kit	FPGA Xilink Spartan 3 XC3S400, Flash ROM	1
115	Virtex 5Kit PCLe 280 FPGA trainer kit	FPGA on board, Virtex 5 with 330000 logic cell	1
116	Basic Fibre Optic Trainer Kit	SALIENT FEATURES :	2

		Fibre Optic Analog Transmission Kit Demonstrates the characteristics of different Fibre optic components such as FO transmitter (660 nm & 850 nm), FO receiver (Photo Transistor), losses in a FO system, analog signal transmission and a FO audio transmission system. A special type of FO power meter with FO PIN diode is also provided with output to be observed on a digital multimeter to observe the power output. All there is enclosed in a specially designed user friendly elegant powder coated metal cabinet with intelligently designed layout on imported acrylic front panel with mirror image printing are some of its other important features : Technical Specifications FO Sources (Transmitter):a. 660 nm LED SMA Connectorised. b. 850 nm LED SMA Connectorised. FO Receiver : FO Photo Transistor SMA Connectorised. Power Meter : Using FO PIN DETECTOR and logarithmic amplifier with output to be read on DMM. Controls: Input Power adjust (PO Adj) in the FO Transmitter. Gain adjust in the FO Receiver. Input Analog Signal : Microphone (Internal). Sine wave from function generator (external). Output Signal to be monitored on: Audio amplifier with speaker (internal). CRO (external). Experiments that can be performed : Loss is fibres at 660 nm & 850 nm. Characteristics of FO LED's at 660 nm and 850 nm. Characteristics of FO Photo Transistors. Characteristics of a FO Linear intensity modulation system. Frequency response of a FO linear intensity modulation system. Waveform distortion in a FO linear intensity modulation system. Gain bandwidth product of a FO linear intensity modulation receiver. Transmission of an audio signal through an optical fibre. Determination of numerical aperture of □ □optical fibres & Losses in FO cables Study of E/O characteristics. Study of O/E characteristics. Study of an AC intensity modulation system Accessories: 1. 1 meter PMMA fibre optic patch cord with SMA connector on both sides (01 Nos). 2. 5 meter PMMA fibre optic patch cord with SMA connector on both sides (01 Nos). 3. In line SMA adapter (01 Nos). 4. Mandrel. 5. Numerical aperture measurement jig. 6. Instruction Manual. Operating Voltage :230 V + 10 % AC 1□. Test Point : Multicoloured test points are provided at various stages in the circuit to observe the waveform and voltages.	
117	Fibre Optic Communication Trainer Kit	Specifications Fiber Optics Trainer is designed to learn the basics of Fiber Optics. The trainer demonstrates properties of Fiber Optic	2

		Transmitter & Receiver, Characteristics of Fiber Optic Cable and different types of Modulation / Demodulation techniques. A large number of experiments are included in the workbook and many more can be performed using the trainer. The trainer can also be used to demonstrate various Digital Communication techniques via Fiber Optic link using other Digital Communication Trainers. Simplex Analog & Digital Trans Receiver. Single Module covering large number of experiments including experiments with optical power meter (optional). 660 nm channel with Transmitter & Receiver. AM - FM - PWM Modulation / Demodulation. On - board Function Generator. Crystal Controlled Clock. Functional Blocks indicated on - board mimic. Input / Output and test points provided on board. On - board voice link. Built - in DC power supply. Numerical aperture measurement jig and mandrel for bending loss are included. Switched faults on Transmitter & Receiver. PC to PC communication using RS-232 Standard Detailed instruction manual consists of student workbook & operating manual containing theory of Fiber Optics Technology, Experiments and Glossary of Fiber Optics Terms. The manual consists of the following chapters : Introduction to Fiber Optics. Theory of Fiber Optics. Optical Fiber Communications System. Advantages of Fiber Optic System. Characteristics of Optical Fiber. Glossary of Fiber Optic Terms. Experiments That can be Performed : Setting up Fiber Optic Analog Link. Setting up Fiber Optic Digital Link. AM system using Analog Input Signal. AM system using Digital Input Signal. Frequency Modulation System. Pulse Width Modulation System. Study of Propagation Loss in Optical Fiber. Study of Bending Loss. Measurement of Numerical Aperture. Characteristics of E - O Converter (LED). Characteristics of Fiber Optic Communication Link. Measurement of Optical Power Using Optical Power Meter. Characteristics of E - O Converter Using Optical Power Meter. Measurement of propagation loss in optical fiber using optical power meter. Setting of fiber optic voice link using amplitude modulation. Setting of fiber optic voice link using frequency modulation. Setting of fiber optic voice link using PWM. Study of Switched Fault in AM system. Study of Switched Fault in FM system. Study of Switched Fault in PWM system. Technical Specifications Transmitter: 01 no, Fiber Optic LED having peak wave length of emission 660 nm. Receiver: 01 no, Fiber Optic Photodetector. Modulation Techniques : 1.AM. 2. FM. 3.PWM.	

		Drivers : 01 no. with Analog & Digital modes. PLL Detector : 01 no. Comparator :01 no. Filters : 01 no. 4th Order Butterworth, 3.4 KHz cut off frequency. Analog Bandwidth : 350 KHz. Digital Bandwidth : 2.5 MHz. Function Generator : 1. 1 KHz Sinewave (amplitude adjustable). 2.1 KHz Square Wave (TTL). Voice Link: F.O. voice link using microphone & speaker (built - in). Switched Faults: 08 nos. viz., 4 in transmitter & 4 in receiver. Fiber Optic Cable : 02 nos. of different lengths. Connector Type Standard SMA. Cable Type : Step indexed multimode PMMA plastic cable. Core Refractive Index : 1.492. Clad Refractive Index : 1.406. Numerical Aperture : Better than 0.5. Acceptance Angle : Better than 60 deg. Fiber Diameter : 1000 microns. Outer Diameter : 2.2 min. Fiber Length : 0.5 m & 1 m. Test Points : 41. Interconnections : 4 mm sockets. Power Supply : 230 V + 10 %, 50 Hz. Accessories Included : Detailed Instruction Manual, NA measurement jig, mandrel, Fiber Cables (0.5m & 1m), Microphone, Headphone, Set of Patch Cords.	
118	Biometric fingerprint analyser with Door Access Control	Fingerprint for all fingers, contact based.	10
119	TCP IP Trainer	TCP IP Trainer is a versatile system that supplements courses on computer networks and LAN. Fundamentals of networking, knowledge of all network layers, cable designing and building of complete network of computers. Understanding and Implementation of various topologies using different standards given by IEEE, protocols, measurement of error rate, throughput and effect of errors on protocols. software provides graphical representation of data with differentiation of packet to be transmitted, packet being transmitted, packet transmitted with acknowledgment, packet with bad packet error and packet which is discarded or resend. SALIENT FEATURES HARDWARE * Topology i) Node to Node Ii) Bus Iii) Star Iv) Ring * Number of Nodes 04 * Data Rates 10 / 100 Mbps * Types of Connection i) RJ45 Ethernet Ii) DB9 Serial * Types of Protocols i) Stop and Wait Ii) Go Bank and N Iii) Selective and Repeat Iv) Sliding Window V) Token Ring Vi) Unicast Broadcast Mode Vii) CSMA / CA Viii) CSMA/CD Ix) Pure ALOHA X) Slotted ALOHA xi) Encryption and Decryption.	1

		* Packet Size 16, 32, 64, 128, 256, 512 Bytes. * Interpacket Delay 500, 1000, 1500, 2000 mSec. * Types of Error Generation i) BAD Packet Ii) ACKNOWLEDGMENT Error Iii) RANDOM Error * NETWORK Details i) System Name Ii) System ID Iii) Connection Status Iv) System MAC ID SOFTWARE * Graphical Representation i) Various colour packet indication with numbers Ii) Sucessfully sent package Iii) BAD Packet Iv) Not Acknowledged packet V) Resend / Rereceived packet. vI) Simulation of OSI layer. Vii) Token status indication. Viii) Ring Formation. Ix) Carrier Sensing X) Collusion detector * Analysis i) Send File name Ii) Send file size in bytes Iii) Number of Packet generated. Iv) Selection of Packet group size. V) Received file name. Vi) Online send / Receive packet. Vii) Number of Mode selection in Ring * Specfications * 10 / 100 Mbps RJ45 Nway ports * Complies IEEE 802.3 standards. * Full duplex mode * Plug and Play Installation * Hardware Lock dongle Experiments i) Study of Socket Programming ii) Study Encryption and Decryption of Data. iii) Study of Node to Node communication iv) Study of Various generated errors. v) Study of Broadcast Bus Topology. Vi) Study of Unicast Bus Topology. vIi) Study of CSMA/CA in Bus Topology. Viii) Study of CSMA / CD in Bus Topology. ix) Study of Stop and Wait mode in Star Topology. x) Study of Go Back N in star topology. Xi) Study of Selectivce Repeat in Star Topology. Xii) Study of Ring Topology. Xiii) Study of Pure ALOHA in Bus Topology. Xiv) Study of Slotted ALOHA in Bus Topology. Xv) Study of Sliding Window Protocol.	
120.	TCP / IP Protocol Suite Kit	LAN Trainer is a versatile system that supplements courses on computer networks and LAN. Fundamentals of networking, knowledge of all network layers, cable designing and building of complete network of computers. Understanding and Implementation of various topologies using different standards given by IEEE, protocols, measurement of error rate, throughput and effect of errors on protocols. software provides graphical representation of data with differentiation of packet to be transmitted, packet being transmitted, packet transmitted with acknowledgment, packet with bad packet error and packet which is discarded or resend. SALIENT FEATURES HARDWARE * Topology i) Node to Node Ii) Bus Iii) Star Iv) Ring * Number of Nodes 04 * Data Rates 10 / 100 Mbps * Types of Connection i) RJ45 Ethernet Ii) DB9 Serial * Types of Protocols i) Stop and Wait Ii) Go Bank and N Iii) Selective and Repeat Iv) Sliding Window V) Token Ring Vi) Unicast Broadcast Mode	1

		Vii) CSMA / CA Viii) CSMA/CD Ix) Pure ALOHA X) Slotted ALOHA xi) Encryption and Decryption. * Packet Size 16, 32, 64, 128, 256, 512 Bytes. * Interpacket Delay 500, 1000, 1500, 2000 mSec. * Types of Error Generation i) BAD Packet Ii) ACKNOWLEDGMENT Error Iii) RANDOM Error * NETWORK Details i) System Name Ii) System ID Iii) Connection Status Iv) System MAC ID SOFTWARE * Graphical Representation i) Various colour packet indication with numbers Ii) Sucessfully sent package Iii) BAD Packet Iv) Not Acknowledged packet V) Resend / Rereceived packet. vI) Simulation of OSI layer. Vii) Token status indication. Viii) Ring Formation. Ix) Carrier Sensing X) Collusion detector * Analysis i) Send File name Ii) Send file size in bytes Iii) Number of Packet generated. Iv) Selection of Packet group size. V) Received file name. Vi) Online send / Receive packet. Vii) Number of Mode selection in Ring * Specfications * 10 / 100 Mbps RJ45 Nway ports * Complies IEEE 802.3 standards. * Full duplex mode * Plug and Play Installation * Hardware Lock dongle Experiments i) Study of Socket Programming ii) Study Encryption and Decryption of Data. iii) Study of Node to Node communication iv) Study of Various generated errors. v) Study of Broadcast Bus Topology. Vi) Study of Unicast Bus Topology. vIi) Study of CSMA/CA in Bus Topology. Viii) Study of CSMA / CD in Bus Topology. ix) Study of Stop and Wait mode in Star Topology. x) Study of Go Back N in star topology. Xi) Study of Selectivce Repeat in Star Topology. Xii) Study of Ring Topology. Xiii) Study of Pure ALOHA in Bus Topology. Xiv) Study of Slotted ALOHA in Bus Topology. Xv) Study of Sliding Window Protocol.	
121	Cathode Ray Oscilloscope (CRO): 30 MHZ Dual Trace		20
122	LCD Color Digital Storage oscilloscope: 100 MHz, 4 Channel		5
123	Function Generator / Counter: Frequency : 2 MHz SALIENT FEATURES Multi waveforms: Sine, Triangle, Square, Ramp, Pulse etc Built-in 6 digits counter up to 30MHz DC offset, symmetry continuously adjustable VCF input TECHNICAL SPECIFICATIONS MAIN OUTPUT Output frequency : 0.2Hz ~ 2MHz Output waveforms : Sine, Square , Triangle, Ramp, Pulse, etc Output impedance : 50 ohm ±10% Output amplitude : >20Vp - p (1Mohm Load); >10Vp - p (50ohm Load) Output attenuation : 0dB / 20dB / 40dB/60dB		10

	DC offset : 0 ~ ±10V(1Mohm Load); 0 ~ ±5V (50ohm Load) Symmetry : 10% ~ 90% SINE WAVE Distortion factor : 20Hz ~ 20kHz < 1% Frequency response : 2Hz ~ 2MHz < ±1dB SQUARE WAVE Rise or fall time : <30 ns VCF Input Voltage : -5 ~ 0V Input Impedance : 10kohm ± 10% 50Hz Output : 2Vp-p, mains synchrony TTL OUTPUT Rise or fall time : <50 ns Low level : <0.4 V High level : <3.5 V COUNTER Display : 6 digits Frequency range : 0.5Hz ~ 30MHz Input impedance : 10Komh ± 10% Sensitivity : 200mVrms Accuracy : 0.1Hz / 1Hz Error : <0.1% ± 1 digit Max. input voltage : 50 Vp-p POWER SOURCE : 220~240 VAC ± 10%, 50Hz ± 2Hz	
124	Regulated DC Power Supply: 0-30v dc volt PROGRAMMABLE LINEAR DC POWER SUPPLY : Full digital programmable interface. High resolution 10mV .1 mA. LCD Display, Display teams of setting and measurement results at the same time. Alterable display mode. Intelligent window interface. Support multiple immediate buttons. Automatic parallel function. Over - voltage, over - current, over temperature protection. Intelligent fan control. Buzzer built as a warning alerts. 100 groups setting storage. RS-232 interface. TECHNICAL SPECIFICATIONS : OUTPUT : Voltage : 0 ~ 32V x 3. Current : 0 ~ 2A x 3. Over Voltage Protection : 0 ~ 33V x 3. RESOLUTION : Voltage : 10mV. Current : 1mA. Over Voltage Protection : 10mV0. RIPPLE AND NOISE (20HZ ~ 20MHZ) : Voltage Ripple : 1mVrms / 3mVp-p. Noise : 2mVrms / 30mVp-p. Current : 3mArms. SET ACCURACY : Voltage : 0.05% + 10mV. Current : 0.1% + 5mA. Over voltage protection : 0.05% + 10mV. READING ACCURACY : Voltage : 0.05% + 10mV. Current : 0.1% + 5mA. REFLECTION TIME :	10

	Voltage Rise : 10% ~ 90% 100mS. Voltage Fall : 90% ~ 10% 100mS. IN SERIES SYNC OPERATION : In series sync error : 0.1% + 20mV. In series (Load) : 20mV. PARALLEL SYNC OPERATION : Voltage : 0.05% + 10mV. Current : 0.1% + 10mA. Over voltage protection : 0.05% + 10mV. Input Power AC : 220V + 10%, 50Hz. ACCESSORIES : Power Cord : 01 No. User Manual : 01 No. Test Leads : 01 No. Serial Cable : 01 No.		

Table 2: Computer Science Laboratory Items:

Sl No	Item Name & Description / Specification	Quantity
Capital Items		
1	DSLR camera: Canon EDOS 70D	1
2	Camera lens kit and accessories compatible with Canon EOS 70D	1
3	Hand held video camera: with 4K video capture	1
4	Studio Speaker set with Dolby/DTS certification, silk dome tweeters, amplifier compatible, 120dB signal noise ratio, 16 Hz - 22 kHz	1
5	Wireless Noise cancellation headphones	50
6	Microphone: plug n play type	5
7	Sound mixer and amplifier: yamaha	1
8	USB HDD 1TB: USB 3.0, slim type	10
9	USB Portable web cam	2
10	External/USB CDV Writer: with external power option	5
11	Bar Code reader	5
12	QR Code reader/scanner	5

8.1. No Advance Payment

No advance payment will be made to any supplier.

8.2. Installation of Lab Equipment

The items should be installed and demonstrated by the supplier at the site of the consignee immediately after receipt of the item and the same will be put under operation to the satisfaction of NIELIT who will test the performance of the items. No separate charges for installation / demonstration will be paid to the party beyond the quoted prices.

8.3. Warranty period, maintenance & technical support

The warranty period of all capital item shall commence after receipt of the items in good working condition and from the date of its satisfactory installation and acceptance test by the consignee.

The warranty period and validity of Performance security shall be extended for the period of delay in satisfactory installation and delay in warranty services.

All the Capital items / Lab Equipment shall be covered under onsite comprehensive warranty of atleast 1 year or as per the warranty of OEM whichever is higher and AMC for 2 years after warranty.

8.4. Deliverables & Timelines

The Bidder should deliver the Lab Equipment within four weeks from the date of issuance of purchase Order.

9. Payment Terms and Procedure

9.1. Payment Schedules

The payment amount will be equal to the amount specified in financial bid of the bidder. Payments will be released only on Satisfactory acceptance, Installation and Commissioning of the deliverables for each Lab equipment.

Form 1: Compliance Sheet for Pre-qualification Proposal

S. No.	Basic Requirement	Documents Required	Provided	Reference & Page Number
1	Earnest Money Deposit	Demand Draft / FDR	Yes / No	
2	Particulars of the Bidders	As per Form 2	Yes / No	
3	ISO 9001:2000/2008 certificate	Copy of Valid ISO 9001:2000/2008 certificate	Yes / No	
4	Sales Turnover in Supply & Installation of Lab Equipment	Extracts from the audited Balance sheet and Profit & Loss; OR Certificate from the statutory auditor	Yes / No	
5	Technical Proposal	As per Format Form 3	Yes / No	
6	Letter of proposal	Letter of proposal; as per template provided (Form 4)	Yes / No	
7	Technical Capability	Completion Certificates from the client	Yes / No	
8	Local Service Centers	A Self Certified letter by an authorized signatory	Yes / No	
9	Quality Certifications	*[As relevant]*	Yes / No	
10	Legal Entity	Copy of Certificate of Incorporation; and Copy of Service Tax Registration Certificate	Yes / No	-
11	Letter of authorization from OM	Letter of authorization from OM	Yes / No	
12	Blacklisting	A self-certified letter	Yes / No	

Form 2: Particulars of the Bidders

S. N.	Information Sought	Details to be Furnished
A	Name and address of the bidding Company/Firm	
B	Incorporation status of the firm (public limited / private limited, etc.)	
C	Year of Establishment	
D	Date of registration	
E	ROC Reference No.	
F	Details of company registration	
G	Details of registration with appropriate authorities for service tax	
H	Name, Address, email, Phone nos. and Mobile Number of Contact Person	

Form 3: Compliance Sheet for Technical Proposal

S. No	Requirement	Proposed Equipment	Version & Year of Release & EOL expected	O&M Support (Warranty/Support as required as per RFP)	OM	Features mandated in RFP [to be filled by Nodal Agency]

Form 4: Letter of Proposal

BID FORM

Date……..

Bid No……

To

The Director-in-Charge,
National Institute of Electronics and Information Technology,
R.K. Nagar (Opposite to NEEPCO), Khayerpur, Agartala,
West Tripura, P.S. –Bodhjungnagar, PIN-799008

Sir,

Having examined the Bid Documents, the receipt of which is hereby duly acknowledged, we, the undersigned, offer to supply in conformity with the said Bid documents in accordance with the schedule of prices attached herewith and made part of this Bid.

We undertake, if our Bid is accepted, to deliver the goods within the delivery period as specified in the Bid document of as mentioned in Annexure-I. We will also submit the Performance security for an amount equal to 10% of the contract value.

We agreed to abide by all Terms and conditions of this Bid for a period of 180 days after the date fixed for Commercial Bid opening and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal contract is prepared and executed, this Bid, together with your written acceptance thereof and your notification of award, shall constitute a binding contract between us.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988". If we are found in Bid pooling which is against law and involved fraudulent or and corrupt practices, my / our firm may be black listed.

Further we also certify that our organization is not blacklisted by any Govt. Department as on date.

Dated_____

(Signature)

SEAL

Annexure-1

INSTRUCTIONS FOR ONLINE BID SUBMISSION

As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal (URL: http://eprocure.gov.in). The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal. More information useful for submitting online bids on the CPP Portal may be obtained at: https://eprocure.gov.in/eprocure/app.

REGISTRATION

1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app) by clicking on the link "Click here to Enroll" on the CPP. Portal is free of charge.
2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
6) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal.
2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.
2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black and white option.
4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will

lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

1) Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
3) Bidder has to select the payment option as "offline" to pay the tender fee / EMD as applicable and enter details of the instrument.
4) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the Tender Processing Section, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.