# TENDER DOCUMENT

FOR

# SUPPLY, INSTALLATION & COMMISSIONING OF LABORATORY EQUIPMENT FOR

# **ELECTRICAL ENGINEERING DEPARTMENT**

AT GOVERNMENT POLYTECHNIC, SUKMA - 494111

(From 03.11.2021 to 02.12.2021)

NIT No./GPS/Store/Tender-EE/2021/295 Sukma, Dated 30.10.2021



Government Polytechnic, Sukma

At Kumharras, Sukma, Malkangiri Road, Tah- Sukma Distt - Sukma – 494111

> Website: <u>www.gpolysukma.in</u> Email Id: <u>gpolysukma@gmail.com</u>

# **NOTICE INVITING TENDER**

Government Polytechnic, Sukma, Chhattisgarh invites separate sealed tenders by **SPEED POST** only for supply, installation and commissioning of Laboratory Equipments/ Machinery for **Electrical Engineering Department** from **registered OEM** with manufacturing facility in India **or Authorized Dealer /Supplier /Agency /Distributor /Stockiest of OEM** as per following details -

SI.	Item Description	Approximate	Tender Document	EMD
No.		PAC in INR	Fees in INR	In INR
1.	Supply, Installation & Commissioning of Laboratory Equipment/ Machinery for Electrical Engineering Department	24,00,000/-	1,000/-	75,000/-

# Important Events and time schedule for this tender are as follows:-

Particulars	From	То	Remark
	Date &Time	Date & Time	
Date of issue of Notice	03-11-2021		
Inviting Tender	10:00 am		
Period of availability of	03-11-2021	02-12-2021	http://www.gpolysukma.in
Tender	03:00 pm	03:00 pm	https://cgdteraipur.cgstate.gov.in
Document on website			
Submission of queries in	04-11-2021	27-11-2021	Email - gpolysukma@gmail.com
writing/ on email by	11:00 am	05:00 pm	
bidders			
Displaying Clarifications	28-11-2021	30-11-2021	http://www.gpolysukma.in
/Responses on website	05:00 pm	03:00 pm	
by GPS regarding			
queries received			
Documentary	02-12-2021		
Submissions (if any) by	03:00 pm		
bidder as per			
clarification			
Opening of Technical Bid	02-12-2021		Govt. Polytechnic, Sukma
	04:00 pm		At Kumharras, Sukma,
			Malkangiri Road, Tah –
			Sukma,
			Distt – Sukma - 494111
Declaration of Eligible	13-12-2021		http://www.gpolysukma.in
Bidders	11:00 am		
Opening of Financial Bid	14-12-2021		
& Issuance of LoI	03:00 pm		
Submission of LoA,	14-12-2021	23-12-2021	
Performance Security &	04:00 pm	05:00 pm	
Contract Agreement			
Returning back of EMD	15-12-2021	03-01-2022	
(by Speed Post only) of	11:00 pm	05:00 pm	
not eligible bidders by			
Speed post only			

Tender document can be downloaded from institute website <u>www.gpolysukma.in</u> and <u>https://cgdteraipur.cgstate.gov.in</u> only, from **03.11.2021**, **03:00 pm** onwards.

Tender Document Fees (TDF) and Earnest Money Deposit (EMD) will be acceptable only in the form of Demand Draft of Nationalized Bank in the favor of **Principal, Government Polytechnic, Sukma** payable at Sukma - 494111, Chhattisgarh.

# Last date for submission of tenders is **02.12.2021 till 03:00 pm**.

Government Polytechnic, Sukma reserves all rights to accept/reject any or all tenders in full/part without assigning any reasons.

# **CHECK LIST**

To ensure that your tender submitted to GPS is complete in all respects, please go through the following checklist & tick mark for the enclosures attached with your tender:-

S.no.	Description	Complied (Yes/No)	Page No.
	Envelope -A		
01	Separate Demand Draft for Tender Document Fees		
02	Separate Demand Draft for Earnest Money Deposit		
03	ANNEXURE -05		
04	The original tender document duly signed & with stamp on		
	Each page, as a confirmation of acceptance of Terms &		
	Conditions and which is complete in all respects.		
	Envelope -B		
05	TECHNICAL PROPOSAL SUBMISSION LETTER on		
	original		
	letter head of firm (ANNEXURE -01)		
06	PROFILE OF THE		
	BIDDER(ANNEXURE -02)		
07	Registration proof of the bidder firm		
08	Authorization Certificate of OEM in the name of bidder(if Any)		
09	Copy of PAN in the name of bidder		
10	Copy of GSTIN in the name of bidder		
11	ORIGINAL GENERAL POWER OF ATTORNEY as per		
12	ORIGINAL AFFIDAVIT ABOUT UNDERTAKING BY		
12	BIDDER as per ANNEXURE -04		
13	ORIGINAL CERTIFICATE OF AVERAGE TURNOVER as		
	per ANNEXURE -06 duly signed by Chartered Accountant		
14	ORIGINAL EXPERIENCE CERTIFICATE as per		
	ANNEXURE -07 duly signed by Chartered Accountant		
15	Performance Certificates of equipments delivered at any		
	Institutes of National Importance.		
	Envelope -C		
16	TECHNICAL BID as per		
	ANNEXURE -08		
17	Media Containing soft copy of ANNEXURE -08		
18	The CD/DVD containing complete videos of performances and		
10	observations of required equipments		
19	Complete brochure/booklet of the equipments delivered by the		
	company which must include our listed items.		
	Envelope -D		
20	FINANCIAL BID		
	as per ANNEXURE -09		
<b>.</b>	MAIN Envelope		
21	It shall contain labeled and sealed A, B, C, & D envelopes		
	Any Other Supporting Documents		
22	(Please Specify)		
23	(Please Specify)		
24	(Please Specify)		

## **ABBREVIATIONS**

In this document, unless the context specifies otherwise, following abbreviations shall mean:-

Sl.	Abbreviation	Full Form / Meaning	
01	GoI	Government of India	
02	GoCG	State Government of Chhattisgarh	
03	OSG	Other State Governments/ UT administrations	
		in India	
04	CG	Chhattisgarh	
05	BIS	Bureau of Indian Standards	
06	ISO	International Organization for Standardization	
07	ISI	(Indian Standards Institution) Mark	
		of BIS for Industrial Products Tax	
08	TDS	Deduction at Source Permanent	
09	PAN	Account Number Goods & Services	
10	GST	Tax	
11	GSTIN	Goods & Services Tax Identification Number	
12	FY	Financial Year	
13	UDIN	Unique Document Identification Number	
14	OEM	Original Equipment Manufacturer with	
		manufacturing facility in India	
15	GPS	Government Polytechnic, Sukma	
16	DTC	Departmental Technical Committee	
17	TDF	Tender Document Fee	
18	EMD	Earnest Money Deposit	
19	LoI	Letter of Intent	
20	LoA	Letter of Acceptance	
21	PAC	Probable Amount of Contract in INR	
22	$B_1, B_2 \dots B_N$	Best Suitable -01N	
23	$L_1, L_2, L_N$	Lowest -01N	

#### **DEFINITIONS**

In writing Terms & Conditions of Contract, Specifications and bill of quantity, the following words/phrases shall have the meanings hereby indicated, unless there is something in the subject matter or content inconsistent with the subject.

Sl.	Word/ Phrase	Meaning		
01	AUTHORITY	Principal, Government Polytechnic, Sukma		
02	CONTRACT	The legal document signed by the Principal, Govt. Polytechnic, Sukma and successful bidder which are binding both the parties to all terms and conditions, any special conditions of the tender document including any final corrections or modification to the Tender, if any. Terms and conditions not herein defined shall have the same meaning as are assigned to them in the Indian Contract Act or any other Act in vague or by any person of common knowledge and prudence.		
03	BID / TENDER PROPOSAL	The complete proposal including all documents, information, corrections, addendum and modifications made therein submitted by the bidder supporting his bid to provide the goods and services to Principal, Govt. Polytechnic, Sukma, as Required under the tender document		
04	BIDDER	A Business entity as per section 1.3, chapter 01 of tender document who is either OEM with manufacturing facility in India or a authorized Supplier/ Distributor/ Dealer/ Agency /Stockiest of OEM, eligible to participate in the Tender/bidding process.		
05	PRE-QUALIFIED BIDDER	A bidder who is found eligible as per stage-01 evaluation.		
06	ASSIGNMENT	The supply, installation, commissioning of the Laboratory Equipment /machinery as per the needs and requirements of the GPS according to the standards and technical specifications and other conditions as detailed in <b>ANNEXURE -08</b> .		
07	CONTRACT PERIOD	Entire contract period from date of LoI till the end of warranty period.		
08	CORRUPT PRACTICE/S	Direct or indirect offering/ giving/ receiving/ soliciting of anything of value, Pressurizing to influence the action of a public official in the process of Bidder Selection and Contract execution.		
09	DELIVERY LOCATION	The place where the goods to be supplied i.e. specific department or laboratory of Government Polytechnic, Sukma, At Kumharras, Sukma, Malkangiri Road, Tah – Sukma, Dist – Sukma - 494111, Chhattisgarh		
10	DELIVERY CUM INSTALLATION REPORT	The delivery report prepared by DTC after final delivery of all Laboratory Equipment/Machinery etc. as per Tender /supply order along with Operating /Instructions Manuals /Technical Literature /Leaflets /Brochures/ software/hardware etc.		
11	GOVERNMENT AUTHORITY	Any Indian entity, authority or body exercising executive, legislative, judicial, regulatory or administrative functions, including, without limitation, any government authority, agency, department, board, commission or instrumentality of Indian or any political subdivision thereof, court, tribunal, arbitrator or self- regulatory organization.		
12	LAW	Includes all the provisions of all Indian statutes, regulations, ordinances, codes, official or other standards, administrative or other rules, zoning and other plans and restrictions, building and other permits, judgments awards and decrees of, or agreements with any Governmental, semi-Governmental or quasi-Governmental Authority as currently in effect or as may be in effect from time to time and /or as may be amended or supplemented from time to time.		
13	AUTHORIZED DEALER /SUPPLIER/ AGENCY DISTRIBUTOR/ STOCKIST	Person/Firm who is authorized by OEM for supply of Equipment/Machinery		
14	AUTHORIZED SIGNATORY	Person who is authorized to sign and execute all the documents / Agreements /Contracts related to Tender on behalf of the bidder.		
15	SELECTION PROCEDURE	The entire procedure conducted by GPS to select and appoint the successful bidder For the provision of the services pursuant to the Tender Process and the subsequent negotiation, finalization and execution of the Agreement.		
16	TOTAL ACCEPTED TENDER VALUE	The total value of goods and services as covered under this Tender and agreed Upon by the successful Bidder.		
17	WARRANTY PERIOD	The period of minimum 02 calendar year from the successful Installation/commissioning of the equipment/machinery at the institute during which all Electrical /Electronic and Mechanical spare/parts/accessories of Equipment/machinery or its Auxiliary Unit to be replaced without any cost/charge by the successful bidder.		

# CHAPTER -01

# **TERMS & CONDITIONS**

#### GENERAL

- **A.** The Bidder is expected to **examine contents of tender document carefully** and annexure provided therein for the sake of better understanding and clarity regarding the quality and standards of the goods required by GPS.
- B. It shall be deemed that prior to the submission of the bid proposal, the bidders have: -
  - Made a complete and careful examination of terms and conditions /requirements, tender document along with all annexure, specifications, contract document and all other information as set forth in this tender document to their entire satisfaction;
  - Received all such relevant information/certificates which has been requested by GPS;
  - > Made a complete and careful examination of the various aspects of the whole assignment.
- **C.** Failure to furnish all required information and/or lack of information shall not in any way relieve the bidder of his responsibility to fulfill his obligations under this tender document.
- D. GPS shall not be liable for any mistakes or errors or neglect by the bidder in respect to tender document. Failure to comply with the requirements of tender document shall be at bidder's own risk.
- **E.** The submission of the bid proposal will be **deemed as unconditional acceptance of all the terms and conditions** of the tender document.
- **F.** The bidder shall **bear all the costs associated with the preparation and submission of bid proposal** and its participation in the bidding process. In no case, GPS will be responsible for those costs, regardless of the conduct or outcome of the bidding process.
- **G.** The terms, conditions and specifications mentioned in **tender document shall be binding on the bidders** and no condition or stipulation contrary to the terms and conditions shall be acceptable. Printed condition/s on the back side of the tender proposal will not be binding on the Authority. It may please be noted that the bidders who do not accept terms and conditions stipulated in this tender document, their offers shall be liable to be rejected out-rightly without assigning any reason whatsoever.
- **H.** The bidder must **furnish complete and detailed technical specifications supported by printed original literature** for all offered equipment /machinery. Print out of the web pages /photocopy of literature (color or black & white) /Duplicate / Incomplete literature / Literature without seal affixed and/or which is not signed will not be considered.
- I. Each page of tender document & enclosures/annexure (Including Printed Technical Literature and/or any supporting documents) shall be signed by the authorized signatory of bidder and seal affixed. All the pages of the downloaded tender document must be submitted along with the bid proposal.
- J. Bidders shall submit their bid proposal in properly arranged manner (with index, proper paging and with flags on important documents). Item No. and page no. of the tender document/annexure should be strictly in chronological order only. Incomplete, loose, or improperly arranged bid proposals may be rejected without assigning any reason whatsoever.
- K. Authority will not arrange for import license and/or custom duties or any other required certifications for imported items /equipment /machinery. The entire imported item will have to be delivered on door delivery basis inclusive of all applicable taxes/duties/levies etc and payment will be made in Indian Rupees only.
- L. The CD/DVD containing complete videos of performances and observations of equipments EE05, EE06, EE07, EE08, EE10, EE11, EE12, EE13, EE14, EE15, EE16, EE19, EE20, EE58, EE59 must be provided in Envelope C.
- M. Original complete brochure/booklet of equipments delivered/manufactured by the firm including

our listed items should be provided in envelope C. The photographs of the equipments in the brochure must of original equipments.

- N. A soft copy of ANNEXURE 08 prepared in Microsoft Excel -2010 shall be submitted in the form of CD/DVD with bid proposal. Absence of media containing soft copy of said annexure may result in rejection of bid proposal.
- **0.** Preferably quoted items /equipment/ machinery shall **conform to the BIS/ISO/ISI** or other certifications as far as possible related to the item categories and shall be **made in India**.
- **P.** The equipment/ machinery **calibrated in metric system and with minimum warrantee period of not less than 02 (Two) calendar years** from the date of installation need only be quoted.
- **Q.** The bid proposal should clearly indicate whether offered equipment /machinery are complete in itself. If in the opinion of the bidder, for the satisfactory performance of offered equipment /machinery certain accessories /spares /parts /set-ups /auxiliary unit /hardware /software

/power supply /cables etc are necessary then bidder must quote the rate inclusive of aforesaid accessories /auxiliary unit /set-up and mention it under the heading **Extra but Essential in Technical Bid**.

- **R.** The Successful Bidder is required to enter into a contract with Authority for the assignment within stipulated time period.
- **S. Procurement** (Supply, Installation and Commissioning of various Equipment /Machinery) **under this tender may be procured phase wise** as per requirement of GPS. Separate supply orders may be issued time to time for the procurement of required goods.
- **T.** Quantities shown in the tender (if any) are tentative and can vary to any extent. No claim shall be entertained for deviation in quantities required to complete the assignment.
- U. Authority reserves the right: -
- To reject (either fully or partly) any or all bids and/or to annul the bidding process, at any time prior to award of contract, without thereby incurring any liability to the affected bidder(s) or any obligations to inform the affected bidder(s) of the grounds for such decision.
- > To permit any bidder to resubmit his bid proposal.
- To pursue negotiations with any number of bidders and to withdraw from negotiations with any bidder at any time.
- > To suspend, discontinue, modify and/or terminate the tender process at any time without assigning any reason on the grounds considered advantageous to GPS.
- > To split the quantities against the tender further for the same equipment/machinery. No reason will be assigned by GPS for this purpose and it will be binding on the all the bidders.
- To verify the claims made by the bidders and/or to carry out the assessment regarding Pre-Qualification conditions of the bidders. Decision of authority in this regard shall be final and binding on all the bidders.
- To increase or decrease the scope of work under the assignment and/or to appoint other agencies for providing services which is not in the scope of this tender.
- To waive off any of the conditions and /or requirements in the tender in respect of any or allof the bidders.
- To seek clarification/justification from the bidder about quoted rate(s) in case GPS deems it necessary. Based on the clarification /justification provided by the bidder, if GPS feels that the rate(s) is/are unrealistic /infeasible in order to execute assignment of this nature, GPS may reject the bid proposal out rightly.
- To appoint the successful bidder subject to such further terms & conditions as it considers appropriate in relation to the tender process and/or the provision of the services. GPS shall not be obliged to give any reason(s) for the selection and/or rejection of any bid proposal or any part thereof.
- Not to be bound in any manner to select any of the bidders submitting proposals or to select the bidder who quoted lowest rate(s).

#### **TENDER PROPOSAL**

- **A.** The **bid proposal** prepared by the bidder, as well as all correspondence and documents relating to the bid shall be **in English language only**. Supporting documents and printed original literature furnished by the bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in English. For purposes of interpretation of the bid, the translation shall govern.
- **B.** Bid proposal (Pre-Qualification submissions, Technical and Financial Bid) shall **not contain any interlineations /alterations /erasures /overwriting**, except as necessary to correct bona fide errors made by bidders themselves. Any such corrections /interlineations /alterations /erasures /overwriting shall be signed across by authorized signatory; otherwise bid proposal may be rejected.
- **C.** All pages of bid proposal, enclosures/annexure, any certificates, printed original literature and/or supporting documents or copies of it shall be **seal affixed and signed by authorized signatory of the bidder**. Absence of sign and/or seal at any of the appropriate places/pages in bid proposal may result into rejection of the bid proposal out rightly.
- **D.** Bidder's proposal should be submitted in following manner in **separate appropriately super scribed envelopes which are sealed & signed on all joints** :-

MAIN	Main Envelope must <b>contain sealed A, B, C &amp; D envelopes.</b> Bidder's Name, Address and type of firm (OEM / Authorizes	It shall contain labeled and
Envelope	Supplier/Distributor/Agency/Stockiest) should be clearly Written on main envelope in <b>BOLD letters only</b> .	sealed A, B, C, & D envelopes
Envelope -A	It shall contain separate Demand Drafts for TDF and EMD and duly seal affixed & signed (by authorized signatory on each & every page) hard copy of tender document which is Complete in all respects.	ANNEXURE -05
Envelope -B	It shall contain Pre-Qualification documents in the prescribed Formats and any other documentary evidences in support of Pre-Qualification conditions.	ANNEXURE -01, 02, 03, 04, 06, 07
Envelope -C	It shall contain complete and detailed Technical specifications for offered equipments/machinery in prescribed format and supporting printed original literature/ Brochures/ Catalogue/ Leaflets/ Instruction Manual/ Handouts.	ANNEXURE -08 & media containing soft copy of same
Envelope -D	shall contain financial bid in prescribed format	ANNEXURE -09

# BID PROPOSAL WHICH DOESN'T FOLLOW THE ABOVE FORMAT SHALL BE REJECTED OUT RIGHTLY.

#### **ELIGIBILITY CRITERIA**

- **A.** For the purpose of bid proposal submission, a **business entity** shall mean a **Sole Proprietorship Firm / Registered Partnership Firm/ a Company** registered in India under the Companies Act 1956 / **Registered Society / Registered NGO** 
  - A Sole Proprietorship Firm should furnish either the Sales/GST/service tax or IT returns for FY 2018-19, 2019-20 and 2020-21 as proof of identity.
  - A Registered Partnership Firm should furnish registration certificate under the registrar of firms and the partnership deed executed between the partners as proof of identity.
  - A Company should furnish certificate of incorporation and memorandum of association as proof of identity.
  - Registered Society/ Registered NGO should furnish incorporation/registration certificate issued by appropriate authorities.
- **B.** The bidder shall be **registered OEM** with manufacturing facility in India **or Authorized Dealer /Supplier /Agency /Distributor /Stockiest of OEM** engaged in respective area of works.
- C. The bidder should have sufficient Infrastructure, Technical Expertise and Financial Capability to undertake the assignment.
- **D.** Authority **intends to appoint a single entity for this assignment**; hence the bidders participating in this tender process shall be a single business entity only. Submission of Proposal by consortia shall not be eligible.
- E. Experience of a bidder as a member of consortia, for any project/work shall not be considered.
- **F.** Each bidder shall submit a **maximum one (1) bid proposal** only. Any Bidders who submits more than one bid proposals shall be disqualified and all proposals shall be rejected out rightly.
- **G.** Any entity, which has earlier been barred by the any Client in India, Government of Chhattisgarh (GoCG), or any other state governments/UT administrations in India (OSG) or Government of India (GoI), Any institute of national importance, Central/State University or any of the agencies of GoCG/OSG/GoI or any Government Authority from participating in its projects and the bar subsists as on the proposal due date, shall not be eligible to submit a Proposal.
- **H.** The bidder must have **registered PAN & GSTIN for the firm** and copies of the same shall be submitted in bid proposal.
- I. The bidder shall have copies of GST (GSTR 09) & IT returns for FY 2018-19, 2019-20 and 2020-21 and copies of the same shall be submitted in bid proposal.
- J. Bid Proposal shall necessarily be accompanied by valid and separate Demand Drafts for Tender Document Fee (TDF), Earnest Money Deposit (EMD) and seal affixed & signed certificate regarding same as per the ANNEXURE -05.
- K. The Bidder shall have achieved a Minimum Average Annual Turnover from manufacturing/ supplying of laboratory equipments /machinery, installation, commissioning and testing thereof, of ₹ 50.00 Lakhs in last 03 years (i.e. FY 2018-19, 2019-20 & 2020-21). Certificate from CA as per ANNEXURE -06 must be submitted in the bid proposal.
- **L.** The bidder shall have a **minimum 03 (Three) years of experience** in the capacity of OEM/ Authorized Dealer /Supplier /Agency /Distributor /Stockiest of OEM for supplying laboratory equipments /machinery, along with installation, commissioning and testing thereof.
- M. Preference will be given to bidders who have experience for supply, installation, commissioning and testing of similar items i.e. laboratory equipments /machinery in Institutions of National Importance or Universities during last 03 (Three) years i.e. after 01/04/2018. Performance certificate should be submitted of delivered equipments from the authority of that Institutions of National Importance in envelope B.

- N. The bidder shall have executed minimum one single contract costing not less than ₹ 10.00 Lakhs OR two contract costing not less than ₹ 06.00 Lakhs each for supply, installation, commissioning and testing of similar items i.e. laboratory equipments /machinery in Government/Semi-Government Departments or Institutions of National Importance or corporations during last 03 (Three) years i.e. after 01/04/2018.
- **O. Experience Certificate from CA shall** be submitted as per ANNEXURE **-07 only**. Work/Supply order, LoI /LoA etc., will not be acceptable under any conditions unless and until supported by completion certificate from the same buyer.

#### **BIDDING PROCESS**

- A. No tender document shall be sold by GPS. Prospective bidder can download the tender document from the official website of GPS (<u>www.gpolysukma.in</u>) and <u>https://cgdteraipur.cgstate.gov.in</u> only.
- **B.** Completely filled, seal affixed and signed bid proposal (strictly as per prescribed format only) including Technical and Financial Bid must reach **ONLY BY SPEED POST** to Principal, Govt. Polytechnic, Sukma, At Kumharras, Sukma, Malkangiri Road, Tah- Sukma, Dist- Sukma 494111 (CG) **latest by 03.00 PM on 02.12.2021**.
- C. Nobody from GPS is authorized to receive or grant receipt for bid proposal delivered on behalf of GPS.
- D. Bid Proposal shall be rejected summarily for any of following :-
  - If received after due date and /or time;
  - If received through any other means except speed post;
  - If not supported by valid documentary evidences.
- E. The bidder's proposal shall be evaluated in 03 (Three) stages as follows:-
  - I. Stage -01 Evaluation (Pre-Qualification)
  - A Pre-Qualification meeting shall be organized on 02/12/2021 at 04:00 PM at Govt. Polytechnic, Sukma, At Kumharras, Sukma, Malkangiri Road, Tah- Sukma, Dist- Sukma -494111 (CG) and Only Envelope A & B of each bidder will be opened in presence of authorized representatives and purchase committee of GPS. All bidders shall be evaluated for Pre-Qualification conditions in this meeting.
    - All bladers shall be evaluated for Pre-Qualification conditions in this meeting.
  - Only one authorized representative of each bidder shall be allowed to participate in the above said meeting. It is advisable for all Bidders to attend Pre-Qualification Meeting.
  - In case, no authorized representative of bidders remain present for meeting then after 01 hour of waiting for them, meeting will be continued with all members of purchase committee of GPS.
  - Under any circumstances whatsoever may be, no extra time for submission of any of supporting documentary evidence or material will be granted by GPS or no material can be appended/added to the already submitted tender document during this meeting. Decision of purchase committee in this regard will be final and binding on all bidders.
  - All bidders shall be evaluated for Pre-Qualification conditions on the basis of the supporting documentary evidences submitted in their bid proposal.
  - Those bidders who fulfill the Pre-Qualification conditions shall only be considered for Stage-02 level of evaluation and Envelope – C of eligible bidders will be made available to DTC for technical evaluation.
  - Those bidders who fail to fulfill Pre-Qualification conditions shall be declared as non-responsive by GPS and shall not be considered to proceed further in the tender process.
  - The date and time of meeting for opening financial bid will be declared by authority in Pre-Qualification meeting and Envelope – D of eligible bidders will be sealed and kept in safe

Custody of authority till next meeting. No separate communication by any means will be sent to any bidder regarding date and time of the financial bid meeting.

- Regarding Pre-Qualification, decision of the authority will be final and binding on all the bidders.
- Due to COVID-19 pandemic, date of Pre-Qualification meeting may change subject to guidelines issued by Government Authorities. Notice regarding change of Date will be displayed on website <u>www.gpolysukma.in</u> only. No separate communication will be done by GPS in this regard. Bidders are advised to visit website of GPS regularly.

#### II. Stage-02 Evaluation (Technical Evaluation)

- The Technical Bid (**Envelope -C**) of Pre-Qualified bidders will be forwarded to Departmental Technical Committee (DTC) of GPS for technical evaluation.
- DTC will evaluate Technical bids (offered specifications) as per different criteria which may include: -
  - ✓ Suitability of the equipment as per the curriculum of CSVTU, Bhilai
  - ✓ Efficiency
  - ✓ Operating cost
  - ✓ Usability
  - ✓ Ease and cost of maintenance
  - ✓ Availability of technical staff in institute
  - ✓ Training of the faculty/laboratory staff for operations and maintenance
  - ✓ Warranty period and warranty conditions
  - ✓ Items/spares/parts covered under warranty
  - ✓ Extra but essential and/or extra but not essential parts/accessories/set-up supplied with equipment without any additional cost
- DTC will submit list of technically eligible bidders. Only those bidders who are found technically eligible shall be considered for stage -03 level of evaluation.
- As a result of technical evaluation, DTC will submit the equipment wise detailed report by marking all technically eligible bidders as  $B_1$  (Best -01),  $B_2$  etc. to the authority within specified time limit. Decision of DTC in this regard will be final and binding on all bidders.

#### III. Stage -03 Evaluation (Financial Bid)

- Bidders found eligible in both Stage -01 & 02 evaluations only shall be shortlisted for financial bid opening.
- Financial bid (**Envelope** -**D**) will be opened on scheduled date and time (declared in Pre-Qualification meeting by Authority) in presence of authorized representatives of bidders and purchase committee of GPS.
- In case, no authorized representative of bidders remains present for meeting then after 01 hour of waiting for them, financial bid will be opened in presence of all members of purchase committee of GPS.
- The technically eligible bidders will be shortlisted equipment wise as  $L_1, L_2$  etc. Purchase committee in consultation with DTC, will figure out equipment wise best possible combination of Technical specifications i.e.  $B_1, B_2$  etc with least cost i.e.  $L_1, L_2$  etc.
- Bidder with best possible combination for particular equipment(s) may be invited for negotiation and LoI for particular equipment(s) may be awarded to the successful bidder after clarifying any outstanding points.
- Bidders submitting the bid proposals should clearly understand that any or all parts of their bid proposals are liable to be part of the negotiation procedure.
- Purchase committee shall determine the approach and methodologies for any issues; which may arise during the negotiation process, prescribed evaluation process in this

Tender document and have not been addressed in this tender document. Decision ofpurchase committee in this regard will be final and binding on all bidders.

- Successful bidder will submit LoA along with performance security within 10 working days to GPS, failing to which next bidder may be issued LoI.
- Successful bidder has to sign the contract and complete all legal and/or required formalities within 10 working days from receipt of the LoA at GPS.

#### **CLARIFICATIONS AND AMENDMENTS TO TENDER DOCUMENT**

- **A.** Any extension of due date for submission of bid proposal if any, will only be uploaded on Official website of GPS (www.gpolysukma.in) and shall not be published in any print media.
- **B. Bidders may request a clarification** of any of the issues related to the tender document up to the date indicated in the Data Sheet. All suggestions, doubts, confusions, requests for clarification, queries etc., shall be presented to GPS in writing /through emails from authentic email id to the address or Email Id indicated in the Data Sheet **latest by 05:00 PM on 27/11/2021**. After prescribed date and time, any representation in this regard shall not be considered under any condition.
- **C.** The **responses of GPS will only be uploaded on official** website of GPS (**www.gpolysukma.in**) without identifying the source of inquiry **latest by 03:00 PM on 30/11/2021**.
- **D.** At any time prior to the due date for submission of bid proposal, GPS for any reason, whether at its own initiative, or in response to a clarification requested by prospective bidders, may modify the tender document by issuing an amendment notice on official website of GPS only.
- **E.** All prospective bidders will be notified about the amendment through official website of GPS (**www.gpolysukma.in**) **only** and such modification(s) and/or Amendment(s) will be binding on all bidders. The amendments shall not be published in any print media.
- F. In case of substantial change in tender document, GPS will publish revised tender document on official website of GPS (www.gpolysukma.in) only and the same shall be submitted by bidders.
- **G.** To give bidders reasonable time to take substantial amendment into account in their bid proposals, **GPS may at its discretion, extend the due date for the tender submission by uploading a notice on official website of GPS (www.gpolysukma.in) only**.

#### VALIDITY

- A. Bid proposal (Full descriptive particulars along with annexure and complete specifications) shall be valid for not less than 01 (One) Calendar year from the due date for submission ofbid proposal i.e. up to 02/12/2022.
- B. The proposal validity period may further be extended on mutual consent.
- **C.** After finalization of this tender, **approved rates shall be valid for 01 (One) Calendar year** from the date of issue of supply order; however GPS shall have liberty to increase or decrease this validity period if needed.

#### **FINANCIAL BID**

A. Bidder shall examine the various provisions of the Central Goods and Services Tax Act, 2017(CGST) /Integrated Goods and Services Tax Act, 2017(IGST) /Union Territory Goods and Services Tax Act, 2017(UTGST)/ respective state's State Goods and Services Tax Act (SGST) also, as notified by GoI /GoCG /OSG & as amended from time to time and applicable taxes before quoting rate(s) in financial bid.

- **B.** The bidder shall note that **tender is strictly on item rate basis** and shall make sure that the rates are quoted for each equipment /machinery. It is clarified that the items/quantity of items listed may vary at any time before and/or issuing supply order.
- **C. Rate(s) quoted shall be valid for not less than 01 (One) calendar year** from the due date for submission of bid proposal and can be extended for next one year by mutual agreement of GPS and bidder.

#### D. For Financial bid bidder shall quote:-

- Separate rate for each individual equipment/machinery. Lump-sum rate quoted for all the equipments/machinery items (taken together) of the tender will not be accepted.
- A single consolidated rate for complete contract period based on the payment terms specified in the tender document.
- Rate(s) which is/are legible and free from any type of errors or ambiguity.
- hand written using indelible ink only in ANNEXURE -09
- Rate(s) which is/are in valid Indian currency only.
- Rate(s) for one complete unit (including all extra but essential accessories /spares /parts /set-ups /auxiliary unit /hardware /software /power supply /cables etc which are required for successful functioning and best performance) of the equipment/machinery.
- Rate(s) which are rounded up to next rupee value i.e. Rate should be in whole numbers only and no fractional part should be there after decimal point.
- Rate(s) which is consolidated per unit for delivery location on door delivery basis inclusive of GST and all other applicable taxes and duties, roadworthy packing, forwarding, freight, insurance, loading/unloading, installation/commissioning, demonstration, training, training material, hardware, software or training media, all types of incidental charges and with minimum warranty of not less than 02 (Two) calendar years from the date of installation for free of cost/charge, onsite, unconditional post installation services as mentioned in tender document.
- E. During financial bid evaluation, the authority will correct arithmetical errors (if any) in quoted rate(s) on following basis :-
  - If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected;
  - If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.
  - The unit wise rate(s) will be rounded up to the next rupee value if it is has some fractional part.
  - Items against which no rate(s) is quoted /kept blank by the bidder will be considered as zero and will be treated as non responsive for that particular item/equipment.

# CHAPTER -02 SPECIAL TERMS & CONDITIONS

#### **BIDDER's OBLIGATIONS**

**A.** Bidder shall **thoroughly know and understand GPS's requirements** of relevant equipments /machinery in terms of its available existing stock, ability to provide post installation service during complete warranty period at the doorstep of GPS, human resources, financial capability etc. GPS may require future supplies in a matching design and/or specifications.

#### B. The bidder shall be deemed to -

- Have satisfied himself as to the correctness and sufficiency of the accepted financial bid amount; and
- Have quoted total accepted financial bid amount based on the data, interpretations, necessary information, inspections, examinations and satisfaction as to all relevant matters.
- **C.** Bidder shall be **responsible for the adequacy, stability and safety of all supplies and services** being provided at the door step of GPS during complete contract period.
- **D.** Bidder is **bound to supply goods without any variations /compromise /condition** in specifications /make /model /brand /quality /required features /quantity or quality to GPS.
- **E.** Unless otherwise explicitly stated, the **accepted financial bid amount covers all the bidder's obligations** under this tender document and all things necessary for the supply and services during complete contract period.
- **F.** The bidder shall **assume liability and shall indemnify the authority from every expense, liability or payment** by reason of the application of any labor law, act, rules or regulations existing or to be introduced at a future date during the term of the contract.

#### **GPS's OBLIGATION**

- A. GPS shall strive hard for timely release of supplier's payment as per the payment terms.
- **B.** Officer Incharge Stores is authorized by GPS to coordinate with the successful bidder /firm in all matters related to supply and services for the successful execution of the assignment and to be responsible for all necessary exchange of information required.

#### EARNEST MONEY DEPOSIT (EMD)

- A. Any bid proposal without EMD will be summarily rejected.
- **B.** EMD shall be submitted **only in the form of Demand Draft of Nationalized Bank** in the favor of Principal, Government Polytechnic Sukma payable at Sukma, Chhattisgarh. EMD submitted in any other forms shall not be accepted.
- **C.** In accordance with the provision of the Chhattisgarh Store Purchase Rules- 2002, **registered MSME units having competency certificate from Department of Industry, Government of Chhattisgarh, will be exempted from EMD deposit** (Competency Certificate to be submitted with the bid proposal, in absence of competency certificate exemption will not be applicable ).
- **D. EMD of bidders**, who are not short-listed for Stage-03 evaluation, **will be returned back to them only by speed post** within a period of 20 working days from the date of issue of Letter of Intent (LoI) to the Successful Bidder.

#### **NOTIFICATION OF AWARD & SIGNING OF CONTRACT**

**A.** Prior to expiry of the period of bid validity, **GPS shall notify the successful/selected bidder in writing** that his bid has been accepted and send **Letter of Intent (LoI)** for acceptance to Him.

- **B.** Within Ten (10) days of receipt of the LoI, the successful bidder shall submit Letter of Acceptance (LoA) seal affixed and signed by authorized signatory to the GPS and remit the performance security in the form of Demand Draft of nationalized bank only.
- C. Extension of the time contained in this clause shall be at the sole discretion of the authority.
- **D.** Failure on the part of bidder to send LoA within the prescribed time shall empower the authority to cancel the LoI and take appropriate action against the said bidder including forfeiture of the EMD and black listing of the bidder.
- **E.** It shall be **incumbent upon the successful bidder to pay stamp duty on the Contract and all other legal charges** for preparation of the Contract, as on the date of execution of the Contract.

#### **VARIATIONS, ADDITIONS & OMMISSIONS**

- A. Authority have right to alter, amend, omit, split or otherwise vary the quantum of assignment, by notice in writing to the successful bidder.
- **B.** Authority at any time order the successful bidder through written notice or email to make changes within the general scope of the contract in any one or more of the following :-
  - Designs, standards or specifications of laboratory equipments /machinery;
  - Method of shipment or packing;
  - Related services to be provided by the supplier.
- **C.** The successful bidder shall carry out such variation/changes in accordance with the approved rate(s) specified in the contract. If any such change causes an increase or decrease in the rate of equipment /machinery, or the time required for supply /service or bidder's performance of any provisions under the contract, an equitable adjustment shall be made in the approved rate(s) or in the delivery /completion schedule, or both, and the contract shall accordingly be amended by mutual agreement of GPS and successful bidder. Bidder will bear all the costs/charges for amendment of contract, if any.

#### **INSPECTION**

- A. Authority or his authorized representative(s) shall be entitled at all reasonable times to inspect supervise and test equipment /machinery before and /or during installation and commissioning at delivery location. Such inspection will not relieve the supplier(s) from their obligations under this contract.
- **B.** Equipments /Machinery **may be inspected before dispatch or in transit by the authorized representatives of GPS** at the factory /warehouse /workshop **at the cost of supplier**, if desired by authority.
- **C. Inspection** of the laboratory equipments/machinery shall be carried out **by DTC to check** whether the supplied goods are in conformity **with the technical specifications mentioned** in tender document for quality, specifications, performance, accuracy and standards etc.
- **D.** Authority's rights to inspect, supervise, test and, where ever necessary reject laboratory equipments /machinery after the arrival at delivery location shall in no way be limited or waived by reason of the equipments having previously been inspected, tested and passed / accepted by the Authority or its authorized representative(s).

#### **SUCCESSFUL BIDDER'S DEFAULT LIABILITY**

- **A.** Successful bidder **shall supply** (at the door step of GPS) **ordered goods and related services** included in the scope of supply in accordance with all (general and special) terms & conditions of this tender document.
- **B.** If, at any time, during performance of the contract /supply and services, bidder encounters

Conditions causing delay in delivery of the laboratory equipments /machinery and/or performance of services, the **bidder shall promptly notify the authority in writing about fact(s) of delay, likely duration of delay and its cause(s) at the earliest**. After receipt of the bidder's notice, the authority shall evaluate the situation and may, at its discretion, extend the bidder's time for performance with or without liquidated damages, in which case the extension shall be ratified by the both the parties by amendment of the contract.

- **C.** If **bidder fails to furnish the performance security** and contract document with LoA within the prescribed time limit, **authority reserves the right to cancel the LoI and** apply all remedies available to him under the terms and conditions of this tender document.
- **D.** If any time, **after acceptance** of equipment /machinery, **GPS finds that accepted equipment / machinery is not as per specifications /make /model / brand / quality /** required features /quantity mentioned in the tender document, the ultimate responsibility for satisfactory performance of the entrusted work shall rest with the supplier.

If in any case the successful bidder(s) does not complete the assignment as per the supply order issued, GPS may take over the task & complete the assignment at the risk and cost of successful bidder(s).

- E. GPS may by written notice of default to the successful bidder, terminate the contract in circumstances detailed hereunder:
  - i. If in the opinion of the GPS, the successful bidder fails to complete the assignment within the time specified in the supply order or within the period for which extension has been granted by GPS to the successful bidder.
  - ii. If in the opinion of GPS, the successful bidder fails to comply with any of the provisions of the contract.
  - iii. In the event of GPS terminating the contract in whole or in part as provided in paragraph
    (i) Above, GPS reserves the right to engage another successful bidder or firm upon such terms and in such a manner as it may deem appropriate.
    Successful bidder shall be liable to GPS for any additional costs; any losses and/or penalty as defined under this tender document until such reasonable time as may be required for the final completion of the work.
  - iv. In the event GPS does not terminate the contract as provided in paragraph (I) the successful bidder shall continue performance of the contract, in which case he shall be liable to GPS for penalty for delay as set out in this tender document until the work is completed.

#### **PERFORMANCE SECURITY**

- **A.** The successful bidder shall **deposit performance security** *@* **10% of the PAC value in the form of bank guarantee** from a schedule commercial bank and it will be retained by GPS till the end of warranty /contract period.
- **B.** It shall be responsibility of the successful bidder to keep the performance security valid for a period of 60 days beyond the warranty period /contract period of the assignment and any short fall in performance security will lead to termination of the contract.
- **C.** If the successful bidder **fails to remit the performance security, the EMD remitted by them will be forfeited** by the GPS and their bid shall be held void and null.

#### FORFEITING OF PERFORMANCE SECURITY

- **A.** The successful bidder shall be required to give satisfactory assurance of its ability and intention to complete the assignment pursuant to given the contract, within the time set forth therein and according to the terms, conditions and specifications of contract. Failing to which, shall lead to forfeit of performance security.
- B. The performance security may be forfeited in case of but not limited to:-
  - Bidder fails to sign the contract within the prescribed time.
  - Bidder denies to execute assignment within validity period of the tender and/or at quoted rates and/or as per the specifications and/or for make /models /brand quoted in

The bid proposal.

- Bidder does not perform/execute the said assignment either in full or in part.
- Bidder does not supply complete working set of equipment/machinery.
- Bidder shuts down the services before the duration as agreed upon.
- Complaints with regard to performance or smooth functioning of laboratory equipments /machinery.
- Degraded or erroneous performance of laboratory equipments /machinery.
- Delay or denial in repair and/or replacement of full set up or part of laboratory equipments /machinery set up during the warranty /contract period.
- Termination of contract by authority for any breach of any terms, conditions, special conditions, obligations etc mentioned in this document /contract.

#### **INSURANCE**

- A. For delivery of goods from warehouse /factory /workshop of the supplier to the delivery location, insurance shall be obtained by the supplier at their own cost equivalent to 100% of the value of the goods on "All Risks" basis including war risks/lock down and strikes etc.
- **B.** It will be the **sole responsibility of the bidder to file the claim**, if any, with the insurance company immediately after delivery of laboratory equipments /machinery at delivery location. GPS shall not bear any responsibility on this account.

#### **FRAUDULENT & CORRUPT PRACTICES**

- **A. Fraudulent practice means** a misrepresentation, concealment of any facts or information in order to influence a procurement process or the execution of a contract and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial and/or non-competitive levels and to deprive the GPS of its benefits of free and open competition.
- **B.** Authority will reject a bid proposal and/or disqualify the bidder, if it determines that the bidder has been engaged in corrupt or fraudulent practices in competing for, or in executing contract(s).
- **C. GPS requires that bidders to observe the highest standard of ethics** during the selection process and in execution of contracts. In pursuance of this policy GPS defines the terms set forth as follows :-
  - GPS will reject a proposal for award of assignment, if at any time, it determines that the bidder recommended for award has directly, or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing the contract in question; and/or
  - GPS will sanction a bidder or its successor, including declaring ineligible, either indefinitely or for a stated period of time, such bidder or successor from participation in GPS's financed activities, if at any time, it determines that the bidder has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for, or in executing the contract in question; and
  - GPS will have the right to require that, in bidder selection documentation and in contracts financed by the GPS, a provision be included requiring bidders to permit the GPS or its representative to inspect their accounts and records and other documents relating to bidder selection and of the performance of the contract and to have them audited by auditors appointed by the GPS.
- **D. Bidder shall not approach GPS officers/staff** outside of office hours and/or outside theGPS premises, from the time of the bid opening till the time contract is awarded.
- **E.** Any effort by a bidder to influence the GPS officers/staff in the decisions on bid evaluation, bid comparison or contract award may result in rejection of the bidder's proposal out rightly. If the bidder wishes to bring additional information to the notice of the GPS, it should do so in writing only.

#### **FORCE MAJEURE**

- **A. Supplier shall not be liable** for forfeiture of its performance security/ liquidated damages /termination for default /any penalty for delay or for failure to perform its obligations under the contract **for reasons of FORCE MAJEURE**, provided that supplier shall promptly submit delay notice with appropriate cause of delay to the GPS in writing within **10 days** of force majeure.
  - For purposes of this Clause, "FORCE MAJEURE" means an event beyond the control of the supplier and not involving supplier's fault or negligence and which is not foreseeable. Such events may include, but are not limited to, acts of god, acts of public, acts of enemy, LWE problems, acts of government, cyclone, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, lockdowns, acts of the purchaser either in its sovereign or contractual capacity.
  - If a Force Majeure situation arises, the supplier shall promptly notify the authority in writing of such conditions and the cause thereof within **10 days** of force majeure. GPS shall verify the facts and may grant such extension as facts justify. Unless otherwise directed by the authority in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
  - The rights and obligations of the affected party shall be suspended to the extent they are affected by the Force Majeure. GPS shall not be liable to make any payments to the agency for it being affected on account of Force Majeure.
  - GPS reserves the right to terminate the contract if the Force Majeure continues for more than 15 (Fifteen) days at a stretch.

#### SETTLEMENT OF DISPUTES THROUGH ARBITRATION

- A. Any dispute or difference including those considered as such by only of the parties arising out of or in connection with the contract or the execution of the assignments shall be to the extent possible be settled amicably between the parties only.
   If amicable settlement cannot be reached then all disputed issues shall be settled by arbitration.
- **B.** If a dispute of any kind whatsoever arises between the GPS and bidder in connection with, or arising out of, the contract or the execution of the assignments or after their completion and whether before or after the repudiation or other termination of the contract, including any disagreement by either party with any action, inaction, opinion, instruction, determination, the matter in dispute shall be settled by arbitration in accordance with the Indian Arbitration and Conciliation Act, 1996 or any statutory amendment thereof.
- C. Arbitration proceedings shall be held at SUKMA (CG) and the language of the arbitration proceedings and that of all documents and communications between both the parties shall be English only.
- D. All arbitration awards shall be in writing only and shall state the reasons for the award clearly.

#### **CONFLICT OF INTEREST**

- **A.** Authority requires **selected bidders** under contract provide professional, objective, and impartial advice and at **all times hold the GPS's interests paramount**, avoid conflicts with other assignments or their own corporate interests and act without any consideration for future work.
- B. Bidders shall not be engaged for any assignment that would be in conflict with their prior or current obligations to any other clients, or that may place them in a position of not being able to carry out the assignment in the best interest of GPS.Without limitation on the generality of the foregoing, bidders and any of their associates

considered to have a conflict of interest shall not be engaged under any of the circumstances set forth below :-

• If a bidder combines the function of service(s) with those of contracting and/or supply of

equipment / machinery; or

- If a bidder is associated with or affiliated to a bidder or manufacturer as a sub-bidder; or
- If there is a conflict among prior or current assignments, the bidder (including its personnel) and any subsidiaries or entities controlled by him, such bidder shall not be engaged for the award of assignment.

#### **TERMS OF PAYMENT**

- **A.** All taxes as applicable on date of invoice including GST shall be payable by the bidder. The rate quoted by bidder shall be deemed to have included all the applicable taxes. The supplier shall be responsible for deposition of applicable GST to the concerned authorities.
- **B.** Mandatorily **GSTIN mentioned invoice** shall be submitted by supplier **in 04 (Four) copies** supported by necessary documents /test certificates, Duly signed and seal affixed Manufacturer's/Supplier's warranty certificate for each equipment /machinery, delivery challans etc, without which payment shall not be released by GPS.
- C. All payments to the bidder shall be subject to taxes as applicable from time to time.
- **D. GPS shall deduct** Statutory **TDS** for Income Tax, GST and any other applicable taxes (if any) as per the rules/ provisions and same shall be deposited with the appropriate authority.
- E. No advance payment will be done under any condition.
- F. Payment shall be released only after all of the following conditions are fulfilled by supplier:-
  - Successful supply, installation and commissioning of the equipment/machinery to the satisfaction of DTC.
  - Completion of free of cost training and/or demonstration for operation/maintenance of the equipment /machinery to the officers/staff of GPS at delivery location to the satisfaction of DTC.
  - DTC submits delivery report about satisfactory installation, training and performance of the equipment/machinery to authority.
- **G.** Claims for escalation /increased rate(s) by supplier shall not be accepted and paid for extended period of contract.
- **H.** Each of the work in the scope of supply order **shall be paid through cheques** in the following stages consistent with the work done as agreed upon, and payment shall be adjusted against the final amount payable :-

#### **CERTIFICATES NOT TO AFFECT RIGHTS OF GPS**

The issuance of any certificate by GPS or any extension of time granted by GPS shall neither prejudice the rights of GPS in terms of the contract nor shall they relieve the successful bidder of his obligations for due performance of the contract.

#### LAWS GOVERNING CONTRACT

The bid document /resultants contract will be interpreted under Laws of India only and subjected to Sukma (Sukma), Chhattisgarh jurisdiction only.

#### LANGUAGE AND MEASURES

All documents pertaining to the contract including specifications, annexure, schedules, notices, correspondences, operating and maintenance instructions, drawings or any other technical literature shall be in English language only.

The metric system of measurement shall be used in this contract.

#### **CORRESPONDENCE / COMMUNICATIONS**

- **A.** All the communication between bidder and authority/GPS shall be in writing only. Notice sent by electronic (email) or any other means shall be effective only on confirmation of the transmission. Notice sent by registered post or speed post shall be effective on delivery only.
- **B.** Any notice to the successful bidder under the terms of the contract shall be served by registered/speed post to the registered/local office of the successful bidder and copy to the successful bidder's Head Office if any.
- **C.** Any **notice to GPS shall be served to Principal, Government Polytechnic, Sukma** by registered post or speed post only.

#### **SECRECY**

- **A. Bidder shall treat the details of the contract as private and confidential**, save in so far as may be necessary for the purposes thereof, and shall not publish or disclose the same or any particulars thereof in any trade or technical paper or elsewhere without prior written authorization from GPS.
- **B.** If any dispute arises as to the necessity of any publication or disclosure for the purpose of the contract the same shall be referred to the authority whose decision shall be final and binding.
- **C.** Bidder or his representative should neither disclose the data of assignment nor sell the data or use it for commercial exploitation or research work without the prior written authorization from GPS.

#### AGREEMENT

The successful bidder shall have to enter into CONTRACT with the GPS within **10 days** from the receipt of LoI from GPS.

#### **DECLARATION OF CONFLICT OF INTEREST**

The bidder hereby declares that nobody connected with or in the employment of GPS is not/shall not ever be admitted as partner in the contract.

#### **BID REJECTION**

If financial bid of a bidder has been opened on the basis of technical bid of a bidder which has been determined to be substantially responsive to the bidding document and in latter stage it is found that bidder does not meet the eligibility criteria or the technical bid is found substantially nonresponsive, GPS reserves rights to reject such bid of a bidder any time.

# **CHAPTER -03**

# **SCOPE OF ASSIGNMENT**

#### **SCOPE OF SERVICES**

- **A.** The role /responsibility of the successful/selected bidder would include all the necessary tasks to execute the assignment as per the bid proposal provided as part of tender document but not limited to this document and as per the specifications given at **ANNEXURE -08** of this document.
- **B.** The successful bidder is required to execute and submit the contract duly signed and witnessed to GPS along with the letter of acceptance (LoA). It should be noted that in the event of failure to submit contract duly filled in within the stipulated period, i.e. 10 (Ten) days from the date of LoI, entire amount of EMD /Performance Security is liable to be forfeited and purchase order may stand cancelled. If supply has been made in the meanwhile, it will be at the risk and responsibility of the supplier.
- **C.** The successful bidder shall supply laboratory equipments /machinery at delivery location on specified date & time given by GPS.
- D. The quoted rate(s) of all laboratory equipments /machinery shall be consolidated per unit rate for delivery location on door delivery basis inclusive of GST, all other applicable taxes, duties and all types of incidental charges (if any) and with minimum warranty of not less than 02 (Two) calendar years from the date of installation free of cost/charge, onsite, unconditional post installation services as mentioned in tender document.
- **E.** The services ancillary to the supply of the laboratory equipments /machinery such as transportation, insurance, registration, roadworthy packing, forwarding, freight, insurance, loading/unloading, installation/commissioning, demonstration, training, training material, hardware, software or training media etc. and any other incidental services, such as installation, provision of technical assistance, demonstration/training etc. shall be the sole responsibility of the bidder.
- **F.** The bidder shall provide proper and damp proof packing of the laboratory equipments /machinery as is required to prevent their damage or deterioration during transit to delivery location.
- **G.** The bidder has to provide same/similar brand and goods of equivalent quality which is/are approved by purchase committee of GPS.
- **H.** The supply, acceptance, rejection, returning back of goods for whatsoever reasons shall be free at delivery location in GPS campus and will not attract any extra cost to authority.

#### **DELIVERY DOCUMENTATION**

- A. Delivery of the goods shall be made within 15 (Fifteen) days from the date of purchase order.
- **B.** Within 24 hours of dispatching of goods from go-down/factory/workshop, the bidder shall notify the authority and the insurance company by e-mail the full details of the goods and following documents :-
  - In the event of the order, supplier who is OEM will be required to furnish a certificate to the effect that they are manufacturers of such and such make whereas the Authorized Dealer /Supplier /Agency /Distributor /Stockiest will be required to furnish authorization certificate from OEM. No equipment without this certificate will be accepted.
  - Copies of the invoice with explicitly mentioned GST and IT details, bank account details including IFSC number, goods' description, quantity, unit price & total amount etc;
  - Insurance certificate, if any;
  - Duly signed and seal affixed Manufacturer's/Supplier's warranty certificate;
  - Inspection certificate issued by the nominated inspection agency, if any;
  - In case of imported machinery bill of clearance is required;
  - Two copies of the packing list identifying the contents of each package;

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- **C.** The above documents should be received by the authority before arrival of the goods and, if not received, the purchase order may be cancelled partially/fully or penalty may be imposed on supplier at the discretion of authority.
- **D.** Supplier must supply illustration/working/operating/maintenance instructions and manuals, Trainers, Software and/or Hardware necessary for successful execution of the equipment/machinery, erection/wiring/circuit/assembly details, and any other technical literature for supplied equipments /machinery. These shall be in such details as it will enable the authority or staff of GPS to operate, maintain, adjust and repair all parts of the works as stated in the specifications.

#### **INSTALLATION & DEMONSTRATION**

- **A.** The supplier is required to do the installation and demonstration /training for the equipment/machinery free of cost/any charges within 10 (Ten) days of the arrival of goods at the delivery location in GPS campus otherwise, the penalty shall be charged as per penalty clause.
- **B.** In case of any loss or damage to equipment /machinery and other supplies during the carriage/transit of supplies from the source location to the installation site i.e. Delivery location or at the time of installation or demonstration, the supplier has to replace it with new equipment/supplies immediately at his own risk and cost within 10 (Ten) days of the arrival of goods at the delivery location in GPS campus.
- **C.** Authority will not be responsible for any loss or damage to the equipments /machinery during transit and/or installation and demonstration irrespective of the fact that they are insured or not insured or delivery is ex- go down or factory station.
- **D.** Supplier will settle his claim with the insurance company as per his convenience. GPS will not be liable to any type of losses in any form.

#### WARRANTY PERIOD AND POST INSTALLATION SERVICES

- **A.** The successful bidder shall **guarantee onsite free of cost/charge post installation services** (Replacement and/or repair) as and when required during the assignment period.
- **B.** The equipments /machinery supplied by the successful bidder shall be warranted for satisfactory operation and/or performance and against any defect in material and workmanship including mechanical /electrical /electronic components /parts /spares /accessories /set-ups for a period of not less than **02 (Two) calendar year,** from the date of commissioning.
- C. The selected bidder shall provide minimum three free services during the warranty period of 02 (Two) calendar year.
- **D.** Duly signed and seal affixed warrantee certificates/cards shall be furnished to the authority for supplied equipments/machinery. Also supplier shall provide the documents relating to warranty and defect liability.
- E. The warrantee period shall be extended by the period during which the equipment/machinery remains non-operative due to reasons within control of the supplier.
- F. The warrantee must be free of cost/charge, unconditional, onsite warrantee and the successful bidder shall be responsible for replace/repair the defective equipment/machinery or rectify defect positively within 15 (Fifteen) days upon written notice from GPS failing to which the equipment/machinery will not be accepted and performance security will be forfeited either in full or in part at the discretion of authority. However authority may condone the delay in deserving cases at its discretion.
- **G.** Supplier shall be responsible to **take back the defective equipment/machinery and replace it within 10 (Ten) days** at his own cost and risk.

#### **EXTENSION OF THE TIME**

If the completion of installation is delayed due to any reason beyond the control of the successful bidder, the successful bidder shall promptly inform to the GPS in writing of his claim for an extension of time. GPS on receipt of such request may or may not agree to extend the contract/delivery date of assignment as may be reasonable but without prejudice to other terms and conditions of the contract.

#### **REJECTION OF GOODS**

**A.** In the event of any of the supplied equipment /machinery is found defective in material /workmanship /performance or quality compromised or otherwise, and/or not in conformity with the requirements /standards /specifications of this tender document, GPS by written notice shall inform the supplier to rectify the same within **15 (Fifteen) days** from the date of receiving of goods at delivery location.

Failing to which the GPS may:-

- Reject the supplied equipment /machinery and it may be returned back to supplier at his own cost and risk.
- Suspend the contract if the bidder fails to perform any of its obligations under this Contract (including the carrying out of the post installation services)
- Performance security and/or EMD shall be forfeited in full.
- Impose penalty for such rejection up to the 50% cost of the PAC.
- **B.** The successful bidder on receipt of such notices shall rectify or replace the defective equipment /machinery in full and/or part without compromising the performance /warranty at free of cost within 15 (Fifteen) days from the date of notice. If the successful bidder fails to do so GPS may :-
  - Not accept the equipment /machinery if sent back to supplier for repairs /maintenance.
  - At its option replace or rectify such defective equipment /machinery and recover the actual cost involved for the said purpose from the supplier plus **25%** service charges of the cost of such rectification/replacement, from the supplier and/or terminate the contract for balance work /supplies with enforcement of penalty as stated above.
  - Defective materials /workmanship will not be accepted under any conditions and shall be rejected outright without compensation. The successful bidder shall be liable for any loss /damage sustained by GPS due to defective work with enforcement of penalty as stated above.

#### PENALTY FOR DELAY IN COMPLETION OF CONTRACT

- A. If Authority is not satisfied regarding the genuineness of delay in the supply, installation and commissioning of the equipments /machinery or any extension granted thereto, bidder shall be liable to pay per week penalty of **Two percent (2%)** of the PAC excluding GST/any other applicable tax for every delayed equipment /machinery. For this purpose, the date of taking over shall be reckoned as the date of completion. The total penalty shall not exceed Ten **Percent (10%)** of the PAC. The penalty shall be recoverable from the performance security /invoice provided by the supplier.
- **B.** The delivery period given in purchase order will be the date of submission of delivery report by DTC and not the date of dispatch of the equipment by the supplier or date of receivingequipment at delivery location.
- **C.** In case of delay in delivery of goods, GPS reserves the right to terminate the contract and get all the jobs and/or delayed jobs completed through another agency of its choice. Any extra expenditure that GPS will have to incur for completion of the balance job/s through another agency on account of higher rates quoted by the agency shall be recoverable from the performance security /invoice provided by the supplier. Moreover, GPS shall be entitled to all other legal proceedings as may be required for shortfalls in recovery.
- **D.** If bidder fails to carry out installation /demonstration within **10 (Ten) days** of supply of equipments at GPS, the Authority shall levy a penalty of Rs. 500 per day.
- E. If bidder fails to replace defective items within 15 (Fifteen) days of intimation by GPS the

Authority shall levy a penalty of Rs. 1000 per day.

**F.** The decision of Authority regarding the reasons for delay, if any, completion of the supply /services shall be final and binding on the bidder.

#### PENALTY DUE FROM THE SUCCESSFUL BIDDER

All costs of damages and delays for which the successful bidder is liable to the GPS will be deducted from any money due to the successful bidder including the performance security and/or bill/s to be paid for any assignment under GPS.

#### **NON-ASSIGNMENTS**

- **A.** The successful bidder shall not assign /transfer /sub-contract the supply orders issued as per this contract or any part thereof to any third party without the prior approval of GPS.
- **B.** If successful bidder transfers /assigns /sublets full or any part of work allocated to him without prior permission from GPS in writing to any third party shall be liable to debar /black listed from any Tender/ Financial Activity of GPS till further orders.

#### **TERMINATION OF THE CONTRACT**

- **A.** In case the bidder commits breach of any or all conditions of the contract, GPS without prejudice to any other remedy for breach of contract, will have the right to cancel /terminate the contract in whole or in part by written notice within **07 (Seven) days**. Breach of contract includes, but not limited to the following:-
  - If the successful bidder fails to deliver any or all of the goods within the period(s) specified in the order, or within any extension thereof granted by the GPS; or
  - If the successful bidder fails to perform any other obligation(s) under the Contract. or
  - If the bidder, in the judgment of GPS has engaged in corrupt or fraudulent, undesirable practices or has made any misrepresentations etc at any stage of the bidding process, selection or during the execution of the contract.
- **B.** Without prejudice to any action that may be taken by GPS for non performance or short performance or breach etc, in the event the GPS terminates the contract either in whole or in part, it may procure, upon such terms and in such manner, as it deems appropriate, goods or services similar to those undelivered or short delivered or unperformed services or performed unsatisfactory services as per the quality and standards desired, and the bidder shall be liable to the GPS for any excess costs for such similar Goods or Services. However, the bidder shall continue the performance of the contract to the extent not terminated.

#### **NO CLAIM CERTIFICATE**

The Bidder shall not be entitled to make any claim, whatsoever, against the State Government /GPS, under or by virtue of or arising out of this contract, nor shall the State Government /GPS entertain or consider any such claim if made by the bidder.

Bidder shall sign a "No Claim" Certificate in favor of the State Government /GPS within 10(Ten) Days of the supply and services are finally accepted by GPS.

# I/We have read all the terms and conditions detailed in chapters 01 to 03 & accept to comply with it in total.

Authorized Signature [In full and with date]: Name and Title of Signatory: Designation: Name of Firm:

#### **ANNEXURE - 01**

#### **TECHNICAL PROPOSAL SUBMISSION LETTER**

(Proposal must be submitted only on the official letter head of the Firm)

[Location, Date]

Τo,

#### The Principal,

Government Polytechnic, Sukma At Kumharras, Sukma, Malkangiri Road Tah-Sukma Dist -Sukma – 494111 (C.G.)

Dear Sir,

We / I, the undersigned, offer to **Supply, Installation, Commissioning of Laboratory Equipments at Government Polytechnic, Sukma, Chhattisgarh**, as per the guidelines, terms & conditions mentioned in NIT No./GPS/Store/Tender-EE/2021/295, Sukma, Dated 30.10.2021. We/I are/am here by submitting our Proposal which includes the Technical Proposal i.e. **ANNEXURE – 08**.

The enclosed technical proposal includes the authority document of the Authorized Signatory and Consent letters in Original. (We are submitting our Proposal in association with: [Insert the list of partners Member with full name and address of each associated Consultant])

We/I confirm that we/I are qualified as per the Pre-Qualification Criteria specified in tender document. We/I hereby declare that all the information and statements made in this Proposal are true and accept that any misinterpretation contained in it would lead to my/our disqualification.

If negotiations are held during the period of validity of the Proposal, i.e. One Hundred & Eighty (180) calendar days from the last date of proposal submission, we/I undertake to negotiate without any alteration in the staff proposed for the assignment. Our/My Proposal is binding upon us/me and subject to the modifications resulting from Contract negotiations.

We/I undertake, if our/my proposal is accepted, to initiate the services related to the assignment not later than a week from the date of issue of Letter of Intent (LOI).

Thanking You,

Yours Sincerely,

Authorized Signature [In full and with date]: Name and Title of Signatory: Designation: Name of Firm:

## **PROFILE OF THE BIDDER**

Sr.	Particular	
01	Full Name and	
	Complete Postal Address	
	of Bidder	
02	Full Name and	
02	Complete Postal Address	
	of the Firm	
03	Type of firm:	Proprietary/ Partnership/ Put Ltd. (Public Ltd. Company/ Society/NCO
	Society registration as applicable	r vi Eta / r ubite Eta Company/ Society/100
	shall be attached)	
04	Year of Incorporation/ Registration number	
	(Incorporation certificate /	
	Registration details as	
05	Applicable shall be allached)	
05	Complete Postal Address	
	of Head Office	
	Complete Destel Address	
	of Local Office (if Any)	
	Mobile Number(s)	
	Landline Number(s)	
	Fax Number(s)	
1	Email id	
	Website	
06	Nature of Business	1. OEM with manufacturing facility in India
		2. Authorized Dealer /Supplier /Agency
		/Distributor /Stockiest of OEM)
07	Firm PAN Card (attach a copy)	
08	GST Registration(attach a copy)	
09	Confirm whether Bidder is Manufacturer	Yes/No
	Only OEM has to giv	e following particulars
10	Full Name and Complete	or or
	Postal Address of factory	
11	Year of starting manufacturing	
12	Whether same/similar materials	
	Manufactured earlier	
	(if yes, give reference)	
13	Yearly/monthly production capacity	

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14 Maximum yearly production achieved so far	
Only Authorized Dealer /Supplier /Age to give follo	ency /Distributor /Stockiest of OEM has wing particulars
15 Full Name and Complete Postal Address of the Firm	
16 Year of association with OEM (Authorization Certificate shall be attached)	
Only SSI Unit of Chhattisgarh Stat	te has to give following particulars
18 Whether the firm is SSI Unit of Chhattisgarh State If yes, write registration No.	Yes/No
19 Whether documentary evidence Regarding registration enclosed	Yes / No
20 List of registered Items (Attach list)	
22 Validity Period of registration	
23 Whether latest copy of Competency Certificate furnished	Yes/No

#### Note:-

- Non disclosure or hiding of information /providing wrong or erroneous or false information /non-acceptance of any of the terms and conditions of tender shall result into the disqualification of the firm.
- Change of the name of company or firm shall be supported by legal resolution as per applicable norms.

Authorized Signature [In full and with date]: Name and Title of Signatory: Designation: Name of Firm:

#### PROFORMA OF GENERAL POWER OF ATTORNEY

#### (To be submitted in ORIGINAL)

#### (Notarized and executed on non-judicial stamp paper of ₹ 100/- or above)

#### **GENERAL POWER OF ATTORNEY**

Be it known all to whom it concerns that: -Mr./ Ms/ Mrs.\_\_\_\_\_S/o OR D/o OR W/o \_\_\_\_\_\_ .....Residing at \_\_\_\_\_

Mr./ Ms/ Mrs.\_\_\_\_\_S/o OR D/o OR W/o \_\_\_\_\_ .....Residing at \_\_\_\_\_

Mr./ Ms/ Mrs.\_\_\_\_\_S/o OR D/o OR W/o \_\_\_\_\_ Residing at \_\_\_\_\_

In short, s/he is fully authorized to do all, each and everything requisite for the above purpose concerning M/s\_\_\_\_\_and I/We hereby agree to confirm and ratify his/her all and every act of this or any documents executed by my/our said attorney within the scope of the authority hereby conferred on him/her including references of cases to arbitration and the same shall be binding on me/ us and my/ our company/ Corporation/ society/ trust/ firm as if the same were executed by me/ us individually or jointly.

Signatures and Name of the Partners /Directors/Board members/trustees/ Executive council members/ proprietors/ Leaders

Witness (with address) 1. 2. 3.

ATTESTED ACCEPTED

Signature: (Seal and Signature of authorized signatory of Tender offer for the company/ Corporation/ society/ trust/ firm)

#### AFFIDAVIT ABOUT UNDERTAKING BY BIDDER

#### (To be submitted in ORIGINAL)

#### (Notarized and executed on non-judicial stamp paper of ₹ 100/- or above)

Name of the firm..... through its authorized signatory Mr./Ms/Mrs.

.....aged......years......resident of ....... (Complete postal address .......) (for and on behalf of), do hereby and herewith solemnly affirm /state on oath about Tender submitted in response to Notice Inviting Tender No ....... of Govt. Polytechnic, Sukma that: -

- **A.** All documents and Information's furnished in tender document, all annexure and supporting documents are complete, correct and true in all respects to the best of my knowledge and belief.
- **B.** I have not suppressed or omitted or hided any information as is required.
- **C.** I am/we are/none of our partner or director is never blacklisted or debarred or terminated by Govt. of India /Other State Govt. / Chhattisgarh State Govt. Departments/Semi Govt. Departments and/or organizations(CG & Other Govt.) / Any institutes of national importance /Universities /Any client in India.
- **D.** At present date there are No judgment, claim, arbitration proceeding or suit pending or outstanding against the firm or its officers at any court of India.
- **E.** The firm never filed any law suits or requested arbitration with regard to any contract within the last five years. (1<sup>st</sup> April 2016 Onwards)
- **F.** Bankruptcy was never filed by the firm /its subsidiaries /its parent companies.
- **G.** The firm was never cited by any regulatory agency for a safety violation in the last five years. (1<sup>st</sup> April 2016 Onwards)
- **H.** I hereby authorize Officials of Government Polytechnic, Sukma -494111, and Chhattisgarh to get all the documents verified from appropriate source.
- I. I have read carefully and examined the notice inviting tender, general rules and terms and conditions of the contract, special conditions, all annexure and other documents and rules referred to in the tender document for the Supply, Installation, Commissioning of Laboratory Equipments/Machinery at Government Polytechnic, Sukma 494111, Chhattisgarh.
- J. I hereby tender my rates for the execution of the work for Government Polytechnic, Sukma -494111, Chhattisgarh as specified within the time stipulated in the tender document in accordance with all aspects with the specifications, designs, drawings and instructions with such conditions so far as applicable.
- **K.** I agree to keep the tender valid for **One Hundred & Eighty (180) calendar days** from the due date of submission thereof and not to make any modifications in its terms and conditions.
- L. A sum of ₹ 75,000/-(In words Rupees Seventy Five Thousand only) is hereby forwarded as Earnest Money Deposit in the form of Demand Draft. If I/We fail to commence or complete the sanctioned order in specified time or fail to fulfill any condition of tender document, I/We agree that the GPS shall, without prejudice to any other right or remedy, be at liberty to forfeit the said Earnest Money Deposit absolutely.

The said Earnest Money Deposit shall be retained by Government Polytechnic, Sukma -494111, Chhattisgarh towards performance security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be required by GPS.

**M.** I/we hereby declare that I/we shall treat the all documents related to this tender and other records connected with this work as private and confidential and shall not publish /disclose /sell the same or any particulars like information derived from

tender documents or supply order for any commercial exploitation or research work OR use the information in any manner prejudicial to the safety of Government Polytechnic, Sukma -494111, Chhattisgarh /State Government of Chhattisgarh without the previous consent in writing of the authority.

- **N.** I/we shall abide to all the laws and shall be responsible for making payments of all the taxes, duties, levies and other Govt. dues etc. to the appropriate authorities.
- **0.** My/our Firm's GST Registration No. is\_\_\_\_\_& The PAN No. under the Income Tax Act is\_\_\_\_\_.
- **P.** I/we shall be responsible for the payment of the respective taxes to the appropriate authorities and should I/we fail to do so, I/we hereby authorize Government Polytechnic, Sukma -494111, Chhattisgarh authorities to recover the taxes due from us and deposit the same with the appropriate authorities on their demand.

Deponent

(Signature of the Authorized signatory)

#### VERIFICATION

I.....do hereby affirm that the contents stated In Para A to P above are true to the best of my knowledge and belief and are based on my / our record.

Verified that this .....at (place) Notary with date.

Deponent ( ) Authorized signatory/for and on behalf of ..... (Affix s e a l)

#### **Certificate for TDF and EMD**

I/We have attached Tender Document Fees and EMD (Bid Security) in the form of Demand Draft of Nationalized Bank in the favor of Principal, Government Polytechnic, Sukma – 49411 payable at Sukma, Chhattisgarh as per the following details:-

Sl. No.		Description				
1.	Non Refundable 7	'ender Document Fee of ₹ 1,000/-				
	Demand Draft No					
	Dated	/ /2021				
	Name of Branch					
	Name of Branch					
2.	Earnest Money Deposit of ₹ 75,000/-					
1	Demand Draft No					
1	Dated	/ /2021				
1	Name of Branch					
	Name of Branch					

I/We Agree to following terms and conditions regarding Tender Document Fees and/or EMD:-

- **A.** Tender fees and EMD will be acceptable only in the form of Demand Draft of Nationalized Bank in the favor of Principal, Government Polytechnic, Sukma payable at Sukma, Chhattisgarh.
- **B.** If bidder submits Tender Document Fees and EMD in any other form than described in point on above then bid will be rejected out rightly.
- **C.** DD must be valid for minimum next 90 days from the date of issue.
- **D.** Tender fees is non refundable.
- **E.** EMD shall be returned back to the unsuccessful bidders by speed post only after issue of Letter of Intent (LoI) to the successful bidder.
- **F.** EMD submitted by the successful bidder shall be converted to a part of Performance Security and shall be retained by Government Polytechnic, Sukma.
- **G.** EMD shall be forfeited either in full or in part, at the discretion of Authority on account of one or more of the following reasons :-
  - If any information or document furnished by the bidder turns out to be misleading/ forged /incomplete or untrue in any material respect.
  - > If it is found that bidder has been black listed or barred by any of past clients.
  - > If it is found that bidder has indulged into fraudulent and/or corrupt practices.
  - > If bidder withdraws/amends their bid in any respect during the period of bid validity.
  - > Bidder does not respond to requests for clarification regarding proposed Bid.
  - ▶ Bidder fails to co-operate in the Bid evaluation process, and
- **H.** In case of a successful Bidder, EMD shall be forfeited either in full or in part, at the discretion of Authority if successful bidder fails to comply one or more of the following :-
  - > To execute the prescribed Contract Agreement on their quoted rates within the stipulated time or any extension thereof provided by authority.
  - > To furnish Performance Security in prescribed form within stipulated time.
  - To execute assigned works within stipulated time or any extension thereof provided by authority
- I. Authority's decision regarding forfeiture of EMD will be final and binding on the firm.
- J. No interest shall be paid on EMD and performance security.

Authorized Signature [In full and with date]: Name and Title of Signatory: Designation: Name of Firm:

#### FORMAT FOR CERTIFICATE OF AVERAGE TURNOVER

(On CA's Official Letter Head)

#### TO WHOM SO EVER IT MAY CONCERN

On the basis of verification of books of accountants and other documents produced before me/us and maintained by the Firm, I/we certify that M/s.....is engaged in Supplying/manufacturing of Laboratory Equipments /Machinery.

This is to certify that they have turned over from manufacturing/ supplying of Laboratory Equipments /Machinery in the last three consecutive financial years ending on **31st March, 2021**. (I.e. for FY 2018-19, 2019-20 and 2020-21) as follows:-

Sr.	Financial Year	Turnover from supplying/manufacturing of Laboratory Equipments / Machinery (in INR)
01	2018-19	
02	2019-20	
03	2020-21	
Average of 03 consecutive FY		

UDIN for this certificate is \_\_\_\_\_

Signature and Seal of CA

#### FORMAT FOR EXPERIENCE CERTIFICATE

(On CA's Official Letter Head)

#### TO WHOM SO EVER IT MAY CONCERN

On the basis of work completion certificates and other relevant documents produced before me/us and maintained by the Firm, I/we certify that M/s------ have Supplied **Laboratory equipments /Machinery** in last three consecutive financial years ending on **31st March, 2021**. (I.e. for FY 2018-19, 2019-20 and 2020-21) as per following details:-

Sl.	FY of Supply	Name of Client/	Total Cost of	No. of Laboratory Equipments
No.		Buyer	Supply /	/Machinery supplied
			Contract in INR	
01				
02				
03				
04				
05				

This is to certify that above details are based on work orders along with work completion certificates from same client/buyer produced by the firm and any document (like work order / LoI/ LoA) which is not supported by work completion certificate from same client/buyer has not been considered for this purpose.

UDIN for this certificate is \_\_\_\_\_

#### NOTE:

- A. Each of the listed works shall be supported with the copy of work order & Work completion certificate. Work order should clearly indicate the number of Laboratory equipments/ Machinery supplied.
- **B.** Work/Supply order, LoI /LoA etc., will not be acceptable under any conditions unless and until supported by completion certificate from the same buyer.
- **C.** Work/Supply order along with work completion certificate will be considered only i.e. Work orders not supported with work completion certificate will not be considered under any conditions.
- **D.** Non-disclosures of any information related to work/supply order specified above will result in disqualification /black listing of the firm.

Signature and Seal of CA

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# TECHNICAL BID

# **ANNEXURE -08**

# :: List of Laboratory Equipment/ Machinery for Electrical Engineering Department::

Equip ment/ Machi nery Code	Name of the Equipment / Machinery	Detailed Technical Specifications	Deviations if any	Technical Literature in support of offered specifications and/or Deviations	Extra but Essential for successful working of equipment	Extra but not essential for successful working of equipment
EE01	Single Phase and Three Phase Capacitive Load	<ul> <li>Mains Supply: 230V AC ±10%, 50Hz (Single Phase) 415V AC ±10%, 50Hz (Three Phase).</li> <li>Current: 4.6A Each phase (in Star connection) 13A each phase (in Delta connection). Star/ Delta Switch: 415V, 32A.</li> <li>MCB: 16A (Four Pole) 1 No. 10A (One Pole) 30 Nos.</li> <li>Suitable for Single and Three Phase Operation.</li> <li>Star/Delta switches for easy conversion.</li> <li>Suitable for balanced and unbalanced load Conditions.</li> <li>MCBs are used to switch loads and provide protection at the same time.</li> <li>Provide with trolley for flexible movement.</li> <li>Equipped with Supply Indication Lamps.</li> <li>The capacitors can be selected in different combinations with the help of MCBs on front panel.</li> </ul>				
EE02	Single and Three Phase Resistive Load	<ul> <li>Single Phase Operation: Voltage: 240V AC ±10%, 50Hz Current: 15A Power: 3.5kW.</li> <li>Loading steps: 15, MCBs Current rating: 10A (SP) No. of MCBs: 15.</li> <li>Three Phase Star Operation: Voltage : 415V AC ±10%, 50Hz Current : 5A (per Phase)Power:3.5kW</li> <li>Loading steps: 5 (per Phase) MCBs (acts as a switch): 10A (SP).</li> <li>Three Phase Delta Operation: Voltage : 415V AC ±10%, 50Hz, Current:15A(per Phase)</li> </ul>				

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		• Power : 10.5kW Loading steps : 5 (per Phase)		
		MCBs: Current rating: 10A (SP) No. of MCBs: 15		
		Auxiliary Supply for fan: 230V AC, 50Hz		
		Star/Delta Switch: 415V, 25A kMCB: 16A (TPN).		
EE03	Single and Three Phase Inductive Load	• Single Phase Operation Voltage: 230V AC ±10%, 50Hz,		
		Current: 15A, Power: 3.5 KVAR.		
		• Three Phase Star Operation: Voltage: $415V \text{ AC} \pm 10\%$ , $50 \text{ Hz}$ ,		
		Current: 5A (per Phase) Power: 3.5 KVAR.		
		• Three Phase Delta Operation: Voltage: 415V AC ±10%,		
		50Hz. Current: 15A (per Phase), Power: 10 KVAR.		
		• Star/Delta Switch: 415V, 25A, MCB: 16A.		
		• Suitable for loading Single Phase and Three Phase supply.		
		• Suitable for both static & rotating machines.		
		• Star/ Delta switch provides easy switching.		
		• MCBs are used to switch values and provide protection at the same time.		
		• Heavy duty wheel for easy movement.		
		• Suitable for balanced and unbalanced loading conditions.		
		• Designed by considering all the safety precautions.		
		• DC Variable Rectifier, (Input : 1Ph. 230V AC, 50Hz, Output :-		
	D.C Supply	230V DC) Current Rating 20A		
		• SCR based with analog meters for V & I measurements		
EE04		Enclosed in powder coated cabinet with indications, Over		
EEU4		current trip, Smooth start & Short circuit protection		
		Power Capacitors for Pure DC Output		
		• Input 230V AC Single phase 50Hz		
		Output Variable from 0 to 230V DC with potentiometer		
EE05	Transformer lab	• Facilitates study of transformer operation, determine its		
	trainer	equivalent circuit, use of tertiary winding to suppress		
		harmonics etc.		

	Partial list of Experiments to be conducted :- 1. Study of Manufacturing Quality Tests. 2. Study of Insulation resistance test. 3. Study of Turns ratio	<ul> <li>Facilitates easy &amp; safe wiring by students due to 4mm sturdy shrouded banana patch cords &amp; shrouded socket arrangement for high voltage circuits.</li> <li>Each of following standalone Electrical trainers may need a set of associated panels which are mounted in a light weight sturdy aluminium flat demo panel system.</li> <li>Each panel has ABS molded plastic sturdy enclosure, &amp; colorful screw less overlays showing circuit diagram &amp; its connection tag numbers for easy understanding &amp; connections.</li> <li>Set of Instructor Guide &amp; Student Workbook.</li> </ul>		
t 2 1 1	test 4. Study of Polarity test. 5. Study of Performance tests. 6. Study of Open circuit	<b>Technical Specifications</b> Aluminum profile Sturdy Modular Flat Panel system, carrying various high voltage components housed in plastic enclosures (panel) to minimize shock possibility.		
	test 7.Scott connection : Using 2 nos. of 1 phase Transformer 8. Study of Load regulation test.	<ul> <li>Input 3 phase DOL Starter panel</li> <li>4 pole MCB of 415 V/4A.</li> <li>DOL 9A Contactor with 230V / 50 Hz / 11VA COIL.</li> <li>Bimetallic thermal O/L relay with range 1.4A - 2.3A for 300VA or 3A -5A for 1KVA/3kVA.</li> </ul>		
	<ul> <li>9. Study of Back to back test (sumpner test)</li> <li>10. Study of Winding temperature rise test.</li> <li>11. Measurement of winding resistance by DC V–I method.</li> <li>12.Study of effect of</li> </ul>	<ul> <li>3 Phase Bidirectional power cum Energy meter panel x 3 nos.</li> <li>Bidirectional Multifunction Meter</li> <li>3 Phase 3/4 wire, 415V CT Input 5A</li> <li>LCD/LED display, Aux supply 230V, 45-65 Hz, 5W</li> <li>V.I., Hz, Pf, KVA, KW,KWH</li> <li>Modbus RTU RS 485 (optional)</li> </ul>		
	type of load on transformer output waveform 13.Study of Parallel operation of single-	<ul> <li>FWD-OFF-REV switch panel</li> <li>FWD/REV, 3 pole 3 way switch with centre OFF, 6A/440V.</li> <li>1 phase AC Input supply panel</li> <li>1 phase MCBs of 4A/1.6A - 2nos.</li> </ul>		

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phase transformers	• Bulb Load.		
14. Study of Scott			
connection for 3phase	AC voltmeter panel		
to 2 phase conversion	• Voltage range: 500V.		
15. Three phase	• 1 pole 4 way switch to select line voltage for three phase		
transformers - basic			
configurations – their	Dual range AC ammeter panel		
effect on capacity	• Current range: 2A/6A selectable.		
utilization regulation.	• 1 pole 7 way switch to select phase current for three phase		
16.Study of Phasor			
Groups in 3 Phase	Milliohm (V-I method) / Rect/ CAP Load Panel		
Transformer	• Transformer: 230V/14V/3A.		
connections	• DC Voltmeter: (0 –10Vdc).		
17. Study of Phasor	• DC Ammeter: (0 –10A).		
Group1 connections in	<ul> <li>Diode bridge rectifier with Rectifying capacitor</li> </ul>		
3 phases Transformer.			
18. Study of Phasor	Resistive Load		
Group2 connections in	• AC Resistors		
3 phase Transformer.	10K/5K/3.5K/2.5K/2K/1.5K/OFF (6 taps+1 OFF) 200W x 3		
19. Study of Phasor	phase		
Group3 connections in			
3 phase Transformer.	• DC Resistors		
20. Study of Phasor	750E/600E/300E/212E/162E/ 125E/112E/100E/400W /8 taps +		
Group4 connections in	OFF + separate 60E tap for DC series Gen.		
3 phase Transformer.			
21. Study of using	Lamp Load		
Tertiary winding on 3	• 230V/100W X3 bulbs with individual ON/OFF using 6A		
phase transformers for	toggle.		
suppressing harmonics.			
22. Study of Load	Parameters :		
regulation, efficiency &	• VA rating : 300VA		
Temp. rise test on 3	• X mer type: 1 Phase/ 3 Phase		
phase Transformers	• Construction: Double wound iron core EL STEP DOWN		
23. Study of	xmer/ Iron core strip lamination type step down Delta primary /		
Manufacturing Quality	Star secondary design.		

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		➢ power rating -5kw	
		<ul> <li>Rugged construction, phosphor bronze sliding contact,</li> </ul>	
		silicon coated to prevent loosing of wire	
		Choice of movement-	
		manual hand sliding	
		Screw assisted wheel sliding	
		• 3 Point Starter specification	
		Body Material :- Mild Steel	
		Gradual Acceleration Of Motor With Adjustable Ramp Time Of 2 To 30 Seconds	
		<ul> <li>Adjustable Current Limit 0-150%</li> </ul>	
		Input AC Supply Variations Up To $\pm 15\%$ Permitted	
		Make of Motor Preferably: - Crompton Greaves or Bharat Bijlee	
		• DC Machine Type : Series Rating : 2 HP	
		• Voltage rating : $220V \pm 10\%$	
		• Speed : $1500 \text{ RPM} \pm 5\%$	
		• Insulation : Class 'B'	
		Loading Arrangement : Mechanical Brake Drum/Pulley	
	D.C. Series Motor	:Aluminum Casted	
EE07		Digital Meters used	
		• DC Voltmeter : 300V DC	
		• Ammeter: 5A (2 Nos.)	
		Digital Tachometer : 20,000 RPM	
		• DC Power Supply Rheostat 2.8A, 220V.	
		Rheostat:- 02Nos	
		> 0.1 ohm to 220 ohm(variable)	
		> power rating -5kw	
		<ul> <li>Rugged construction, phosphor bronze sliding contact,</li> </ul>	

		silicon coated to prevent loosing of wire		
		Choice of movement-		
		➤ manual hand sliding		
		> screw assisted wheel sliding		
		Make of Motor Preferably: - Crompton Greaves or Bharat Bijlee		
		or Kirlosker or Benn Electricals only Type: DC Motor, Compound		
		wound (it can be rewound as shunt motor and series wound) self-		
		excited, screen protected, horizontal foot mounted, fan cooled,		
	D.C. Compound	provided with inter poles with DC starter face plate type.		
	Motor.	• Capacity :- 5 HP		
	Partial list of	• Winding :- Compound wound		
	Experiments to be	• R.P.M. :- 1500		
	conducted :-	• Armature Volts :- 230+/- 10 %		
		• Field voltage :- 220V dc		
	1. Speed control of DC	• Insulation :- Class 'F'		
	<ul> <li>shunt motor and</li> <li>Swinburne's test on DC</li> <li>shunt motor.</li> <li>2. Speed control of DC</li> <li>shunt motor and</li> </ul>	• Type of mounting :- B3		
		• Degree of protection :- IP 23		
		• Duty Rating :- Continuous (S1)		
<b>EE08</b>		• Double side shaft extension		
		• Loading Arrangement : Mechanical Brake		
	Swinburne's test on DC	Drum/Pulley : Aluminum		
	<ul> <li>shunt motor.</li> <li>Brake test on DC compound motor.</li> <li>Proke test on DC shunt.</li> </ul>	Rheostat: 02Nos		
		$\triangleright$ 0.1 ohm to 220 ohm(variable)		
		> power rating -5kw		
	motor	<ul> <li>Rugged construction phosphor bronze sliding contact</li> </ul>		
	5. Retardation test on DC	silicon costed to provent loosing of wire		
	shunt motor.	Sincon coated to prevent loosing of whe		
	6. Separation of core	Choice of movement-		
	losses in DC shunt motor	manual hand sliding		
		<ul> <li>Screw assisted wheel sliding</li> </ul>		
		Six terminals should be given outside so that it can be rewound as		
		shunt motor and series wound.		

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		Contact and Non contact	et type			
		Measurement Rotation a	and shaft s	urface speed		
		• 5digit digital display(LC	CD)			
		Contact speed range	:-	1 to 19999 R.P.M		
		Optical speed	:-	0.5 to 99999 R.P.M		
FF00	Hand held digital	Sensing distance	:-	2m to 24 m		
EEU9	tachometer	• Temperature	:-	0 to 60c		
		Chargeable battery type	:			
		• Low battery indicator				
		Auto power off function	1			
		Accuracy	:-	(+ -)0.05%		

Equip ment/ Machi nery Code	Name of the Equipment / Machinery	Detailed Technical Specifications		Deviations if any	Technical Literature in support of offered specifications and/or Deviations	Extra but Essential for successful working of equipment	Extra but not essential for successful working of equipment
	Three phase	Make of Motor and Alternator	Preferably: - Crompton Greaves				
EE10	alternator coupled	or Bharat Bijlee or Kirlosker or	Benn Electricals.				
	with dc shunt motor	1) Three phase alternator					
	as a prime mover	• Capacity	зкуа				
	Partial list of	Rated Voltage	415 V - 3 PH				
	Experiments to be	• Speed :	1500 RPM				
	conducted :-	• Voltage Regulation :	5% (slip ring)				
	1. To Perform	• Field voltage :	220V dc				
	OCC and SCC of an	• Insulation :	Class 'H'				
	Alternator.	• Type of mounting :	B3 & B2				
		• Degree of protection :	IP23				
	2. To determine	<ul> <li>Duty Rating</li> </ul>	Continuous				
	voltage regulation of		(S1)				
	an alternator using	Harmonic Distortion Factor	< 3%				
	synchronous	• Double side shaft extension					

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Impedance Method.	• Direction of rotation CW from drive end		
	ase Sequence RYB		
3. To determine	• Over speed 1.2 times normal speed for 2 min.		
voltage regulation of	• Short circuit withstand Capabilities 3 Times		
an alternator using	C for 3 Sec		
ZPF Method.	10% Overload 1 Hour in 6 Hours Continuous running.		
	Both the machines are flexibly coupled and mounted on sturdy m s		
4. To determine	channel base. The terminals of armature, field windings of both the		
Xd and Xq of salient pole	machines shall be brought over to Bakelite plate fixed on CL		
machine using	terminal box fitted on ton of machine		
slip test.	CONTROL PANEL FOR MG SET · DC SHUNT MOTOR &		
*	ALTERNATOR		
5. Performance	With all Measuring instruments (Analog type) to measure various		
of three phase	voltages and voltages currents speed and Three Power Factor		
Alternator.	required as per the Experiment and three point starter fitted on		
	<b>Engraved</b> Bakelite sheet on an ms channel stand. The namel should		
6. Effect of speed	have Indicating Lights Educational Type Insulated terminals MCB		
and field current on	2P		
induced emf.			
	Type DC Motor shunt wound salf avoited some protected		
7. Effects of	horizontal fast mounted and fan gooled provided with inter poles		
Unbalanced loading.	with DC starter face plate type		
C C	Caracitar 5 HD		
	• Capacity: 5 III		
	• winding : Shufit would DDM 1500(ct full load)		
	• R.P.M.: 1500(at 1011 load)		
	• Armature Volts. : $230+7-10\%$		
	• Field voltage $220V dc + 10\%$		
	• Insulation : Class 'F'		
	• Type of mounting B3		
	• Degree of protection IP 23		
	• Duty Rating Continuous (S1)		
	• Double side shaft extension		
	(3) Inductive Load		
	Features:-		

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Compatible for Single and Three Phase Operation.
• Suitable for both static & rotating machines.
• Totally independent banks to allow star or delta configuration
by inbuilt star delta switch.
Load variation can be obtained by movable handle.
• Heavy duty castor wheel for easy movement.
• Equipped with Supply Indication Lamps.
• High class meter being used.
• Exclusive and rugged designed nanel.
<ul> <li>Designed by considering all the safety precautions</li> </ul>
Technical Specifications
Single Phase Operation
Voltage : 230V AC $\pm 10\%$ . 50Hz
Current : 15A
Power : 3.5 KVAR
Three Phase Star Operation
Voltage : 415V AC ±10%, 50Hz
Current : 5A (per Phase)
Power: 3.5 KVAR
Three Phase Delta Operation
Voltage : 415 V AC $\pm 10\%$ , 50HZ Current : 15 (nor Phase)
Power · 10 KVAR
Star/Delta Switch : 415V 25A
MCB : 16A
Single and Three Phase Inductive Load is suitable for loading Single
Phase and Three Phase supplies and generators. It consists three
which are externally
Accessible through an inbuilt star delta switch
All inductive coils are electrically isolated and separate terminals for
each phase are provided on panel through a star/delta switch so that
the students can connect as a star or delta load for three-phase
circuits. A movable handle is used to change the inductance of the
load.

Students can connect the load to experiment circuits using specially designed patch cords on the enclosed front panel. The load is mounted on a trolley to provide facility of easy movement in laboratories.(4) Excitation System for Alternator Excitation system for 3kva three phase alternator for an open circuit variable voltage from 0V to 440V. Digital display for output excitation current and voltage.		
<ul> <li>(5) Excitation System for DC Shunt Motor <ul> <li>Three phase IGBT power module</li> <li>Three phase power module with six IGBTs – 02 Nos.</li> <li>5 HP Three phase rectifier and inverter module with protection and sensing circuit.</li> <li>1200 V, 25 a diode bridge for AC-DC conversion with Electrolyte DC capacitor.</li> <li>Three phase 1200 V, 30 A IGBT power module with heat sink and snubber circuit</li> <li>Isolated driver circuit with inbuilt power supply and having port for connecting 06 gate pulses to drive IGBTs of the inverter circuit.</li> <li>IGBTs with desaturation protection against overload and short-circuit.</li> <li>Indication of READY and FAULT with a provision to latch driver output and reset with RESET button.</li> <li>Sensor Circuit: Sensing circuit for Three AC output currents, One DC current and One DC voltage</li> </ul> </li> </ul>		
<b>Controller Board</b> 32 Bit controller board 09 ADC channels and 02 DAC channels for analogue acquisition and debugging GPIO ports are routed to header on mother board for easy connection. All pins are buffered and are 5V tolerance		

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• Capacity :- 10A in 8 steps		
• Frequency :- $50 \text{ Hz} + -5 \%$		
• Phases :- 3		
• Voltage :- 500		
Both the machines are flexibly coupled and mounted on sturdy m.s.		
channel base. The terminals of armature, field windings of both the		
machines shall be brought over to Bakelite plate fixed on C.I.		
terminal box fitted on top of machine.		
CONTROL PANEL FOR: DC COMPOUND MOTOR		
With all Measuring instruments (Analog type) to measure various		
voltages currents and speed required as per the Experiment and three		
point starter fitted on <b>Engraved</b> Bakelite sheet on an m.s. channel		
stand. The panel should have Indicating Lights. Educational Type		
Insulated terminals		
Speed control and Starting Panel for three phase induction		
motor		
• 1speed control by VFD= Mitsubishi series, standard,		
vashkawa series and other standard verify drive		
proforable for 415y 5HP to 10HP motor		
• 2-input phase=3 phase /output phase=3phase		
• 3-input frequency=50hz or 60hz		
• 4-4-overloading rating= 110% 60sec, 120% 3sec		
Additional overload ratings optional		
• 5- Enclosure= NFMA 1 ventilated enclosure		
• 6 control system - Soft DWM for real valtage		
• 0- control systemsolt r wive for peak voltage		
mitigation at motor terminals and quiet operation		
control power= 120V control power transformer with primary		
fuses, secondary fuses, and isolation relays		
• /- Circuit Breaker-=Padlock able door-interlocked		
circuit breaker standard, 65 KAIC		

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		• 8-22mm door operator switches for Power on and off		
		and make adjustments without energing the namel or		
		and make adjustments without opening the panel of		
		accessing the keypad		
		• Embossed numbering system Each wire is uniquely		
		identified for ease of troubleshooting		
		manual of panel wiring and VFD programming system		
		• Line reactor for protects the VFD from power surges		
		and reduces electrical noise by 65%		
		(4) Resistive Load		
		• Connection type=6 terminal brought out for proper star and		
		delta connection with lead wire and lead terminals		
		• Power rating=10kw.		
		• Voltage rating=415v.		
		fully power coated with switch variable Switch should be provided		
	Single phase as	Make of Motor Proferably: Crompton Croaves or Bharat Billoo		
	single phase ac	ar Kirloskar ar Bann Flactricals		
	induction motor	of Kirlosker of Denn Electricals.		
	trainer Deutiel list of			
	Experiments to be	Motor specification:-		
	conducted :-	• 1 Ph AC Integrated motor Voltage · 230VAC 50Hz		
	1. Perform test to plot	<ul> <li>Canacity :300W/4 nole/ 1500RPM/ 10 terminals</li> </ul>		
	Speed-Torque	Rotor construction :- Die cast squirrel cage Rotor		
	Characteristics of	Stator construction :- Two windings brought out on 4		
<b>EE12</b>	Single Phase	terminals for main & auxiliary, these will be used to configure		
	induction motor	different motors split phase, CSCR, CSIR,		
	2. (Split phase type).	• Frame/mounting : - 100 frame, chassis mounted, 19 mm shaft		
	3. Perform "No Load	dia.		
	Test" and "Blocked	• Loading arrangement: -Friction brake pulley (60.5mm dia) for		
	Rotor Test <sup>2</sup> on single	loading arrangement with 20Kg spring balance for torque		
	motor	measurement.		
	4 Perform test to	• Speed Measurement :- Using hand held tachometer.		
	determine, Efficiency	CONTROL PANEL SPECIFICATIONS:-		

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	and input power	Aluminium profile (4x1) Sturdy Modular Flat Panel (table top)		
	factor of different	system, carrying various high voltage components housed in plastic		
	types of Single Phase	enclosures (panel) to minimize shock possibility.		
	induction motor for	Phase Motor, Alternator & Sync. Motor Panel		
	various loading	1. Single Phase MCBs of 4A/1.6A 1 each.		
	conditions:-	2. Bulb Load		
	i) Split phase type	• Integrated AC 1 phase multifunction measurement		
	ii) Capacitor Start Type	panel		
	111) Capacitor Start-Run	1. Consist of 1 Nos of (96X96mm) Digital meter for 1Phase		
	Type	Measures V, I, PF (0.2 lag – unity 0.2 lead), W, VA, VAR,		
	5. Perform test to	Hz etc.).		
	determine, Speed-	2. Current specs for 1 phase meter = $5A$ .		
	Characteristics of	3. Auxiliary supply = $1/0-250$ VAC.		
	different types of	• Phase wound Rotor & Sync. Motor panel		
	Single Phase	1. Rotor resistors of 30E/SA with 3 taps of 0E, 15E, 21E, 30E		
	Induction Motor :-	(each 3 nos.) 2 Boton magister calenter switch 2 malos 6 Way 6 A /440 W		
	i) Capacitor Start Type	2. Rotor resistor selector switch, 5 poles 6 way 6A/440 v.		
	ii) Capacitor Start-Run	(3  Amp)		
	Type	(SAmp)		
	•	Semi - automatic - motorized oil test kit specifications -		
		• Motorized Meter : 0 - 60KV Voltmeter.		
		• Input Voltage: 220/230VAC 50Hz Single Phase Ac Supply.		
		• Output Voltage: 0-60kv Smooth Operation.		
	0-60 KV Oil Test kit	• Rating of Transformer: 500 VA.		
	Partial list of	• Accuracy $+/-2ky$		
	Experiments to be	• 2kv/s voltage rise rate (+/-10%)		
<b>EE13</b>	conducted	• Less than 4mA trip current		
	1.) Breakdown voltage of	• 0.1kV Resolution		
	insulating oil.	• 0.1KV Resolution.		
	C	• Safety door interiock for HV Chamber.		
		• Short Circuit Fuse protection facilities.		
		• HT ON OFF, MAINS KNOB, Different Indicating Lamps		
		provided. Accessories supplied: Oil Cup with Brass Plated		
		Electrodes, Gap Adjuster Gauge, and Magnetic Stirrer.		

		Make of Motor Preferably: - Crompton Greaves or Bharat Bijlee or Kirlosker or Benn Electricals.		
EE14	Motor fault simulator Partial list of Experiments to be conducted :- 1) Over Voltage 2) Under Voltage 3) Single phasing 4) Reverse phasing 5) Phase interrupt 6) Winding short 7) Winding open 8) Over current 9) Earth leakage 10) High temperature.	or Kirlosker or Benn Electricals. Input 3 phase DOL Starter panel. 4 pole MCB of 415 V/1A.DOL9AContactor with 230V / 50 Hz / 11VACOIL.Bimetallic thermal O/L relay with range 1.4A-2.3A. AC voltmeter panel AC voltmeter of 0-500V for three phase voltage measurement by selector switch. The selector switch facilitates monitoring all three line voltages namely RY, YB and BR as well as 1 phase voltage monitoring. Integrated AC (3/1 phase) measurement panel ((8 Shrouded Banana) Digital meter (96X96mm) for measurement of 30 & 10 parameters. Voltage line to line & line to neutral. Current for all 30 up to 5A.Power factor, frequency, watts, VAR, VA and energy in Kwhr.FWD/REV, Star-Delta starter panel 4A) FWD/REV, 3 pole 3 way switch with centre OFF, 6A/440V.3 Phase sequence indicator Panel Study 3 phase 440V Electric utility supply -Determination of over voltage, under voltage, single phasing and reverse phasing / Displays OV, UV, SP, RP on digital display Single Phasing Panel Provided with three single-phase (SP) fault switches (DPST) one for each phase. It utilizes three 230V bulbs star connected internally for indication of single-phase fault. Each switch is connected in series with each bulb. The bulbs provided are 15W rating. The other pole & way disconnects power to the panel and P30 panel there by simulating single phasing. Grounding & Protection Panel This panel is Re-assembly of where in 2 poles MCB is replaced by 2 poles ELCB (Earth leakage circuit breaker). The NC contacts of ELCB are to be connected in series with coil of main contractor. One push button (NO) in series with SPDT selector switch to select either lo-leakage or hi-leakage simulated earth fault. When push button is pressed live is shorted to earth through bulb to create earth leakage fault. These devices are specifically designed to operate above certain threshold of fault level below which fault will have no effect. 3 Phase Induction Motor Fault Simulator Panel The top display box on the induction motor supports t		

		configuration. This panel also supports 9 numbers of DPST fault switches B) Motor Specifications : 3 phase squirrel cage induction motor, <sup>1</sup> / <sub>2</sub> HP, 4 pole, 1500RPM, 6 terminal (delta 415Vac/star 440Vac) motor with built in thermal cutout (NC contact). Fault simulator built on the panel on top of motor. Sturdy toggle switches to introduce faults.		
EE15	Over Current Relay Training System Partial list of Experiments to be conducted :- 1.) To plot Inverse Definite Minimum Time (IDMT) characteristics of over current relay. 2. )To perform experiment on definite / instantaneous mode setting of the relay	<ul> <li>Make Preferably:- ABB or Siemens or Yashkawa make numerical relay(Not static relay)</li> <li>The Trainer set should consist of the following features:</li> <li>The trainer should consist of built in requisite relay testing kit typically consisting of voltage injector, current injector, elapsed time counter (1 m sec resolution), trip relay logic etc.</li> <li>The trainer should have a few set of associated relay testing (current / voltage injection etc.) panels (7-8 nos. typically) which are mounted in a light weight sturdy aluminum profile flat demo panel system.</li> <li>Should have 4mm sturdy shrouded banana patch cords &amp; shrouded arrangements.</li> <li>Each panel should have ABS molded plastic sturdy enclosure, &amp; colorful screw less overlays showing circuits diagrams &amp; its connection tag numbers for easy understanding &amp; connection</li> <li>Should Facilitates easy &amp; safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords &amp; shrouded socket arrangements for high voltage circuits &amp; Set of Instructor Guide &amp; Student Workbook should be provided</li> <li>Trainer should be modular panels for easy site servicing not close control; panel box no wiring should not be there &amp; shrouded 4 mm banana patch cords &amp; shrouded sockets arrangements for the safety of the students</li> <li>I phase AC Input supply panel</li> <li>Should consist of</li> <li>Iph. MCBs of 4A/1.6A - 2nos.</li> </ul>		

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		<ul> <li>Variable voltage &amp; current injector panel</li> <li>Should consist of</li> <li>1 phase dimmer 230VAC/1A</li> <li>Short circuit transformer with primary 230VAC/1A, secondary 0-2-8V/12A taps.</li> <li>Over current &amp; elapsed time measurement panel</li> </ul>		
		<ul><li>Should consist of</li><li>AC ammeter of 20A</li></ul>		
		<ul><li>Elapsed time counters range 999.001 sec, resolution 1 msec.</li><li>Over Current Relay Panel</li></ul>		
		• All the connecting of relay should brought out on this panel & it should consist of		
		<ul> <li>2 NO trip contacts.</li> <li>Relay Coil Protection relay type (Numerical)</li> <li>Should consist of numerical time IDMT even summarized time.</li> </ul>		
		• Should consist of "numerical type IDM1 over current relay, current rating 5A, with current setting of 2-250% in seven equal steps of 2%, time setting 0.1 to 1.		
	<b>Transmission Line</b> <b>Training System</b> Partial list of Experiments to be conducted :-	<b>SALIENT FEATURES</b> • Facilitates characterization of transmission line, load regulation, efficiency, power circle diagram, VAR Compensation, per unit representation, symmetrical & unsymmetrical faults, power flow,		
EE16	1. Working with bi- directional 3 AC measurement panel, observing flow of real & reactive power & Modbus communication with PC.	<ul> <li>study &amp; effect of Peterson coil etc.</li> <li>Simulates 400 KV, 50 / 60Hz, 3 Phase 1MVA. Transmission Line by scaling it down by 1000:1. Second TL may be supplied for 3 bus experiments.</li> <li>Trainer need a few set of associated panels which are mounted in a light weight sturdy aluminum profile flat demo modular panel system.</li> </ul>		
	<ol> <li>No load test &amp; Ferranti effect.</li> <li>Determination of transmission line constants (ABCD) by</li> </ol>	<ul> <li>Facilitates easy &amp; safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords &amp; shrouded socket arrangements for high voltage circuits</li> <li>Each panel has ABS molded plastic sturdy enclosure, &amp; colorful screw less overlays showing circuits diagrams &amp; its connection tag</li> </ul>		

experimental	numbers for easy understanding & connection.		
measurement using 2-port	Set of Instructor Guide & Student Workbook.		
method as well as by	Technical Specifications		
knowing components	Input 3 phase DOL Starter panel		
values & its verification.	• 4 pole MCB of 415 V/4A.		
4. Load Test &	• DOL 9A Contactor with 230V / 50 Hz / 11VA COIL		
Calculation of Regulation,	• Bimetallic thermal O/L relay with range 2.5A -6A		
efficiency of	FWD-OFF-REV, Switch Panel		
Transmission Line by	• FWD/REV, 3 pole 3 way switch with center OFF, 6A/440V.		
Laboratory measurement	• Integrated AC 3 phase measurement panel		
method.	Bidirectional Multifunction Meter		
5. Working with power	• 3 Phase 3/4 wire, 415V, CT Input 5A		
circle diagram & to find	• LCD/LED display, Aux supply 230V, 45-65 Hz, 5W		
steady state power limit of	• V.I., Hz, Pf, KVA, KW,KWH		
transmission line.	Modbus RTU RS 485		
6. Capacitive VAR	VAR Compensation panel		
compensation	• Consisting of VAR compensating capacitors of 2, 4, 6, 8, 10 &		
7. Per unit representation	$15\mu$ F each of 3 no's with 3 pole 7 way switch for selection.		
8. Symmetrical &	Transmission line Panel Table Top Panel consisting of :		
unsymmetrical faults in	• Simulate model for transmission line constructed using		
transmission line, LG	R (10ohm/600W), L (0.15H/5A) & C (2.2uF/630V) 6 No. each		
fault with & without	component.		
Petersen Coil.	• Can Simulate model for medium/long (125 km/250 km) length		
9. Predicting Power Flow	transmission line for p model.		
in Transmission Line (2	• Can Simulate model for medium/long (125 km/250 km) length		
bus) by Numerical	transmission line for T model.		
method [Newton Raphson	• Fan cooled table top setup for long life.		
/ Gauss-Seidel Method/	RLC load panel		
Fast Decouple Method]	Table Top Panel consisting of :		
	• 3 no's of 1KW resistors with switch selectable 1(off) + 6 nos. of		
	taps at 100, 112, 150, 175, 200 & 225 ohm & SIL tap of 262 ohm.		
	• 3 nos. of inductor $1.5$ H/1A with switch selectable $1(off) + 6$ nos. of		
	taps at 0.3, 0.6, 0.75, 0.9, 1.2 & 1.5H.		
	• Capacitors 440VAC rating (3 no's, one per phase) with switch		
	selectable 7 no's of value of 2, 5, 10, 15, 20, 30 & 50µF.		
	• Fan cooled table top setup.		
	3 phase dimmer panel		
	Table Top Panel consisting of :		

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		• 3 phase dimmer I/P: 415VAC, 50Hz, O/P: 0 - 470VAC, 6A, 3
		phase.
		Trainer should have modular panels for easy site servicing and
		not close control panel box. Wiring should not be there but
		should provide shrouded 4 mm banana patch cords and
		shrouded sockets arrangements for the safety of the students.
		• Mains Supply: $230V \pm 10\% V$ AC, $50$ Hz.
		• In-built Isolated DC output Supply: Rated Voltage: 0-
		$220V, \pm 10\%$ (Variable), Rated Current: 2A.
		• Transformer: Rating: 0.5kVA Primary Voltage: 230V,
	Dadial and Ding Main	Secondary Voltage: 150V.
<b>EE17</b>	Distribution System	• Variac: Input: 230V
	Distribution System	Output: 0-270V, Current: 2A.
		• Digital DC Voltmeters (3 Nos): Range: 20-500V, Display
		Resolution: 1V.
		• Digital DC Ammeters (3 Nos): Range: 0-5A
		Display Resolution: 0.01A.
		• MCB: 2A (SPN)
		Single Phase Operation: Voltage: 240V AC ±10%, 50Hz
		Current: 15A Power: 3.5kW Loading steps: 15 MCBs
		Current rating: 10A (SP) No. of MCBs: 15.
		• Three Phase Star Operation: Voltage: 415V AC ±10%,
		50Hz Current: 5A (per Phase) Power: 3.5kW
	Symmetrical and	Loading steps: 5 (per Phase) MCBs (acts as a switch): 10A
<b>EE18</b>	Unsymmetrical Fault	(SP).
	Demonstrator	• Three Phase Delta Operation: Voltage: 415V AC ±10%,
		50Hz Current: 15A (per Phase)
		Power: 10.5kW Loading steps: 5 (per Phase).
		• MCBs: Current rating : 10A (SP) No. of MCBs : 15
		Auxiliary Supply for fan : 230V AC, 50Hz
		Star/Delta Switch : 415V, 25A kMCB : 16A (TPN)

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EE19	Study of Under Voltage and Over Voltage Relay Testing System Partial list of Experiments to be conducted :- 1) To Plot characteristics of under voltage relay. 2) To Plot characteristics of over voltage relay. 3) Reverse phasing protection 4) Unbalanced voltage protection	Make Preferably:- ABB or Siemens or Yashkawa make numerical relay(Not static relay)         • Over/Under voltage Relay Trainer set should consist of the following features:         • Facilitates characteristics of under / over voltage relay.         • Each of above trainer has built in requisite relay testing kit typically consisting of voltage injector, current injector, elapsed time counter (1 msec. resolution), trip relay logic etc.         • The Trainer need a few set of associated relay testing (current / voltage injection etc.) panels (7-8 nos. typically) which are mounted in a light weight sturdy aluminum profile flat demo panel system. Do not need any separate testing kit.         • Facilitates easy & safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords & shrouded socket arrangements for high voltage circuits         • Each panel has ABS molded plastic sturdy enclosure, & colorful screw less overlays showing circuits diagrams & its connection tag numbers for easy understanding & connection         • Set of Instructor Guide & Student Workbook         • Technical Specifications of interfacing panels:         • Aluminum profile sturdy Flat panel system carrying various high voltage components housed in plastic enclosures to minimize shock possibility.         • Input 3 phase DOL Starter panel         • 4 pole MCB of 415 V/1A.         • DOL 9A Contactor with 230V / 50 Hz / 11VA COIL.         • Bimetallic thermal O/L relay with range 1.4A - 2.3A.         • Integrated AC 3 phase measurement panel         • Consists of 96 x 96 mm digital meters for 3 phase
		<ul> <li>Measures V, I, PF (0.2 lag - unity 0.2 lead), Hz. Hence separate analog wattmeter's [3ph. 1 ph. are not needed.</li> <li>Under / Over / Under / Unbalance Voltage Relay Panel</li> </ul>

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		• All the connection of relay is brought out on this panel.		
		• 1 NO & 1 NC contact		
		Relay Coil		
		• FWD-OFF-REV Switch Panel		
		• FWD/REV, 3 pole 3 way switch with center OFF, 6A/440V.		
		• Over current & elapsed time measurement panel		
		• Consists of AC ammeter of 20AElapsed time counter range		
		999.001 sec, resolution 1 msec.		
		Protection Relay Type Numerical Type IDMT Under / Over		
		Voltage Relay.		
		5KVA, O.C.B, High Voltage tester completed with testing lead		
		Should come with test kit complete in all respect consisting of		
		Oil Circuit Breaker, Digital AC Voltmeter, Digital AC		
EE20	Oil Circuit Breaker	Ammeter, Push Button, Trip time measurement circuit with		
		Digital Timer, Rotary Switch for Amp adjustment, DP Isolator,		
		Multipoint Relay with transformer, Variable Current Source,		
		Digital Time Tantalizer, Indicating Light, Fuse Holder,		
		Battery Operated 2.5KV, 40 Giga Ohms with Battery and LCD		
<b>EE21</b>	<b>Digital Insulation</b>	Measurements range $= 400 \text{mV} = 1000 \text{V}$ DC $_{4}\text{v} = 700 \text{V}$ ACA-		
	<b>Resistance Testers</b>	DCA – 40Ma-400mA		

Equip ment/ Machi nery Code	Name of the Equipment / Machinery	Detailed Technical Specifications	Deviation s if any	Technical Literature in support of offered specifications and/or Deviations	Extra but Essential for successfu I working of equipme nt	Extra but not essential for successful working of equipment
EE22	Characteristics of PN junction diode with meters.	<ul> <li>Built-in power supply DC +5 V @ 500 mA</li> <li>On panel gates : 4 NAND gates (7400), 4 NOR gates (7402),</li> <li>4 AND gates (7408), 4 OR gates (7432) &amp; 6 not gates (7404)</li> <li>5 Logic input switches with green LED display</li> <li>5 Logic output red LED display</li> </ul>				
EE23	Characteristics of Zener & Zener as voltage regulator.	<ul> <li>Variable DC supply 0 to 15 V @ 500 mA</li> <li>On panel zeners 5.1 V, 9 V &amp; 12 V,</li> <li>On panel variable load for voltage regulation,</li> <li>Required numbers of patch cords and operating manual</li> </ul>				
EE24	Transistor characteristics (ce, cc & cb) with meters.	<ul> <li>Two variable DC supplies 0 to 15 V @ 500 mA,</li> <li>On panel transistor &amp; source resistance.</li> <li>Two dual range digital panel meters.</li> <li>Required numbers of patch cords and operating manual.</li> </ul>				
EE25	Rc coupled amplifier trainer.	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram of RC coupled amplifier</li> <li>Required numbers of patch cords and operating manual.</li> </ul>				
EE26	Common collector amplifier trainer (Emitter follower).	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram of CC amplifier,</li> <li>Variable load resistors required numbers of patch cords and operating manual.</li> </ul>				
EE27 <sup>Tender</sup>	Rc phase shift oscillator Document for Field Engineeri	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram of RC phase shift oscillator,</li> <li>Required numbers of patch cords and operating manual</li> <li>ng Department - 2021</li> </ul>				

EE28	Hartley oscillator trainer.	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram with two inductors</li> <li>Required numbers of patch cords and operating manual.</li> </ul>
EE29	Colpitts oscillator trainer.	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram with two sets of capacitor</li> <li>Required numbers of patch cords and operating manual.</li> </ul>
EE30	Crystal oscillator trainer	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram required numbers of patch cords and operating manual.</li> </ul>
EE31	Tuned collector oscillator trainer	<ul> <li>DC supply 12 V @ 500 mA</li> <li>On panel circuit diagram Required numbers of patch cords and operating manual</li> </ul>
EE32	Half & full wave rectifiers with filters.	<ul> <li>On panel AC source of 9V- 0- 9V</li> <li>On panel diodes, Capacitors, resistors &amp; inductor</li> <li>Required numbers of patch cords and operating manual</li> </ul>
EE33	Non-linear wave shaping Circuits ( clippers & clampers )	<ul> <li>Fixed power supplies +/- 1V, +/-2V &amp; +/- 5V @ 500 mA</li> <li>Different diodes, Zener, resistors &amp; capacitors</li> <li>Required numbers of patch cords and operating manual</li> </ul>
EE34	Multi vibrator trainer using transistor (all three).	<ul> <li>DC power supply +/- 12 V @ 500 mA</li> <li>On panel three circuits for Astable, Mono stable &amp; Bistable</li> <li>multi vibrators</li> <li>Required numbers of patch cords and operating manual.</li> </ul>
EE35	Discrete component trainer	<ul> <li>Built-in variable DC power supplies of +45 V, +12 V (2nos) @ 500 mA,</li> <li>One 3 ½ digit LED dual range on panel meter to read voltage,</li> <li>One 3 ½ digit LCD dual range on panel meter to read current,</li> <li>Various range of resistors, capacitors and inductors mounted</li> <li>on panel, Variable source for intensity control of lamp</li> <li>provided on panel, Diodes: IN4007 &amp; OA 79 , Zener: 5v1 &amp; 8v2, Transistors: SL 100 &amp; SK 100</li> <li>UJT: 2N2646 , FET: BFW 11, DIAC: D32, TRIAC: BT 136, SCR:</li> <li>TYN 604</li> <li>LED: 5 mm RED, LDR: 5 mm, Photo diode. Photo transistor:</li> <li>2N5777 DC lamp 12 V with leads.</li> </ul>

		Required number of stackable 2mm patch cords and	
		operating manual	
		• Power supply requirement : 230V AC, 50 Hz, Built in IC	
FF36	Kel Kyl bit	based power supply - +15V/250mA and +5V/250mA,	
LLJU		Different resistors on the board, Screen printed in multi	
		color, Patch cords, connecting wires.	
		• Power supply requirement : 230V AC, 50 Hz, Built in IC	
EE37	Thevenins theorem	based power supply - +15V/250mA and +5V/250mA,	
LL5/	kit	Different resistors on the board, Screen printed in multi	
		color, Patch cords, connecting wires	
		• Power supply requirement : 230V AC, 50 Hz, Built in IC	
<b>EE38</b>	Superposition kit	based power supply $- +15V/250$ mA and $+5V/250$ mA,	
2200		• Different resistors on the board, Screen printed in multi	
		color, Patch cords, connecting wires	
	9 Norton Theorem Kit	• Power supply requirement : 230V AC, 50 Hz, Built in IC	
<b>EE39</b>		based power supply $- +15 V/250 \text{mA}$ and $+5 V/250 \text{mA}$ ,	
		• Different resistors on the board, Screen printed in multi	
		color, Patch cords, connecting wires	
	Maximum Power kit	• Power supply requirement : 230V AC, 50 Hz, Built in IC has a drawing supply $= \frac{15V}{250m}$ A and $\frac{5V}{250m}$ A	
<b>EE40</b>		based power supply $- +15 \sqrt{250}$ and $+5 \sqrt{250}$ mA,	
		• Different resistors on the board, Screen printed in multi	
		Derver supply requirement : 220V AC 50 Hz Puilt in IC	
	Theyenins theorem	• Fower supply requirement 250 v AC, 50 Hz, built in IC based power supply $_{+}+15V/250mA$ and $_{+}5V/250mA$	
<b>EE41</b>	Lit	<ul> <li>Different resistors on the board. Screen printed in multi</li> </ul>	
	KIU	color Patch cords, connecting wires	
		Resistor 16 NOS – Covering all values from 1 ohm to 20	
		Mega ohm	
		<ul> <li>Capacitor : 12 NOS – assorted value from 10pf to 1000</li> </ul>	
	RLC Circuit kit	micro farad	
EE42	(series/parallel)	• Electrolytic, ceramic & polyester capacitor	
	(****** <b>F</b> *******	• Potentiometer :4 no's Coil- 8 no's	
		• Built in Power Supply : +6V,250mA, 0 to 10V,250mA	
		Connecting Patch chords	
<b>EE 42</b>		0.025 to 1500 ohms for ground resistance	
ЕE45	Larth lester	• 0.3mA to 35A for Leakage current.	

<b>EE44</b>	MEGGER	• 250V 500V insulation tester with test lead set and crocodile, test range 999 M ohm		
EE45	LVDT Trainer	Master Unit comprising of: DC supply of +/- 12v/500mA, Variable 7V to 14V / 3A Built In function Generator 1 Hz to 200KHz. On Board Panel Meter and LED Bar graph. Panel Board for Displacement Sensing Transducer: Pressure Measurement Using LVDT Module: Based on bourdon gauge pressure measurement mechanism coupled to LVDT sensor 0- 20mm. Pressure Measurement up to 15psi. Generation of pressure using hand pump one connected to the sensor and other connected to bourdon gauge. Angular Measurement using rotary Pot 0-180 Degree		
EE46	Strain Gauge Testing Kit	<ul> <li>Strain Gauge (350Ω) : 4 nos.</li> <li>Gauge factor : 2.1</li> <li>Maximum bearable weight :500 gm</li> <li>Bridge Voltage :+8 V DC</li> <li>Bridge configuration: Full Bridge</li> <li>Display :3½ Digit LED</li> <li>Test points : 8 nos.</li> <li>Power Supply : 230 V ±10 %, 50 Hz. 60 Hz on request</li> <li>Power Consumption :3 VA (approx.)</li> <li>Accessories Included : Mains cord-1no.</li> <li>Standard Weights-1set,USB cable ,Instruction Manual</li> </ul>		
EE47	PH Meter Kit	<ul> <li>pH Range : 0-14pH</li> <li>Temperature Range : 0-80°C</li> <li>pH Resolution : 0.01pH</li> <li>Temperature Resolution : 0.1°C</li> <li>PC Interface : RS232 and USB</li> <li>Mains Supply : 230V ±10%, 50Hz</li> <li>Accessories Included : Connecting Leads,</li> <li>Instruction Manual etc.</li> </ul>		
EE48	Optical temperature measurement Trainer	<ul> <li>Trainer should be signal conditioning circuit</li> <li>Complete operating manual , training system laser / IR target pointer selection</li> <li>Measurement Range: -50°C to 100°C (accuracy 2%)</li> </ul>		

		Master Unit comprising of: DC supply of +/-12v /500mA,
		Variable7V to 14V /3A.Built in function Generator 1Hz to
		200 KHz. On Board Panel Meter and LED Bar graph.
		Panel Board for Temperature Sensing Transducer :
		Temp.sensors:-
		i) Thermocouple J with room temp. calibration pot.
EE40	Thomassonals	ii) Thermocouple K with room temp. Calibration pot.
EE49	Inermocoupie	iii) Thermistor (100K),
		iv)PT100,
		v) IC sensor(AD590)
		vi)Bimetallic switch
		Built In Instrumentation Amplifier
		Built in Oven/Heater.
		Temp Control up to 90Degrees with close loop control
		DC Power Supply :5V
		Galvanometer Deflection :30-0-30
		• Resistance $:80\Omega$
EE50	Wheatstone Bridge	• Unknown Resistance Type : Variable
EE30	Trainer	• Range :0 - 10kΩ
		• Wire Samples Constantan : 1m, Nichrome:1m • Fuse :500m A
		<ul> <li>Mains Supply '90 - 275V 50Hz</li> </ul>
		<ul> <li>Accessories: Instructional Manual. Patch Cords etc.</li> </ul>
		• DC Power Supply : +5V
		• Known Resistance : $R1=100K\Omega$ , $20K\Omega$ , $10K\Omega$
		$R3=1K\Omega$ , 200 $\Omega$ , 100 $\Omega$
		Unknown Resistance : $0.3\Omega$ , $0.4\Omega$ , $0.8\Omega$
	Kelvin's Bridge	• DPM : 2V
<b>EE51</b>	Trainer	• Mains Supply : $230 \text{ V} \pm 10\%$ , 50 Hz
		Accessories Included : Connecting Leads, Instruction Manual

EE52	Schering Bridge Trainer	<ul> <li>Sine Wave Generator: Frequency Range: 1KHz ±10%, Amplitude Control Output: Up to 15 Vpp,</li> <li>Fuse: 500 mA, S/B,</li> <li>DPM: 200mV,</li> <li>Unknown Capacitor: 0.1μF, 0.22 μF, 0.47 μF,</li> <li>Mains Supply: 230V A.C.</li> <li>Additional Items: Connecting Cords/ probes/ patch cords</li> </ul>		
EE53	Digital Megger	<ul> <li>Broad Range of Testing Voltage:</li> <li>-Testing voltages with broad range can be generated (from 250 V to 5 KV).</li> <li>-Testing voltage can be preset as 250 V, 500 V, 1 KV, 2.5 KV, or 5 KV, or as a voltage increasing or decreasing in steps of 25 V or 100 V.</li> <li>Insulation Diagnosis:</li> <li>-PI and DAR can be automatically calculated and displayed;</li> <li>-Step-voltage measurements and temperature compensation is carried out.</li> <li>Large Storage Memory: up to 100 Manually tested data</li> <li>LCD with Bar graph Display</li> <li>PC Communication: USB Interface</li> <li>Powered by Batteries &amp; Rechargeable Battery.</li> <li>Should come along with DECADE MEGHOHM BOX for Calibration. Voltage Range up to 5KV and Resistance Range up to 1 Tera Ohms</li> <li>Voltage Range from 250V ~5000V.</li> <li>Resistance Range from 0.01M Ohms to 5 T Ohms.</li> <li>Leakage Current from 10nA ~3mA</li> <li>Accuracy 5%</li> <li>Temperature Measurement Range -10Deg. To 70 Degree.</li> </ul>		

		• Mains Supply : Three Phase, 415V ±10%, 50Hz		
		• Load : Resistive Load (R) and		
		• Resistive-Inductive Load (RL)		
		Digital Meters Used		
	Power Measurement	Wattmeter : 1500W (2 nos)		
<b>EE54</b>	by Two Wattmeter	AC Voltmeter : 450V		
	Method Trainer	$AC \wedge mmatar : 5 \wedge$		
		AC AIIIIICICI . JA		
		• MCB (IPN) : $10A$		
		• Accessories Included : Connecting Leads,		
		Instruction Manual etc.		 
		• Orientation of three phase power 2.sources should be over.		
		Graphical multiline LCD should indicate phase orientation.		
		• (Clockwise or counter-clockwise) and whether each of the		
		three phases is live.		
		• Durable housing should be double molded.		
	Phase Sequence Meter	• Easy to open alligator clips with wide jaws.		
		• It should Test phase orientation of three phase power sources.		
EE55		• It should be complete with cable, three large color coded		
LLUU		alligator clins and soft case		
		• Operating Voltage $(40,600 \text{ V}(\Lambda C))$		
		• Operating Voltage .40-000 V(AC)		
		• Operating Temperature $:0^{\circ}C$ to $+40^{\circ}C$		
		• /. Type : Phase Sequence Tester		
		• Frequency Range (Hz):15Hz-400Hz		
		• Accessories Included : Connecting Leads,		
		Instruction Manual etc.		
		• Power supply requirement: 230V AC, 50 Hz.		
		• Built in IC based regulated Power supply +5V DC/200 mA.		
		• Built-in Audio oscillator: - Frequency 1 KHz and Amplitude-		
		5Vpp.		
	Maxwell's	• Built-in Audio amplifier to amplify detected null		
<b>EE56</b>	Inductance Bridge	• EP socket provide to connect external Headphone.		
		• The equation/Formulas are printed on PCB for easy		
		calculation.		
		• The complete circuit diagram should be is screen printed on		
		component side of the PCB with circuit and Parts at the same		
		place. The true value of component is printed on component		

		side. The PCB with components on front side is fitted in		
		elegant wooden box having lock and key arrangement		
		• The acrylic cover is fitted on PCB to safeguard parts. It has		
		holes for alignment and repair.		
		• The testing points are provided with 1.25" tags to connect		
		CRO probe All Trainers are operated on 230V AC mains and		
		must be self-contained unit.		
		• Standard Accessories : 1. A Training Manual., 2.		
		Connecting Patch cords		
		• Variable DC supply 0 to 5 V @ 500 mA on panel built-in		
		variable load resistance, on panel whetstone bridge &		
<b>EE57</b>	Thermistor kit	temperature calorimeter. Required numbers of patch cords,		
		operating manual & thermometer.		
		1 8		
	Power electronic	Complete kits containing of master unit and all other units required		
	trainer kit	for doing all the experiments related to power electronics.		
		Master unit carrying useful experiment resources like line		
	Partial list of	synchronized firing circuit, power supplies, Lamp load, RLC loads,		
	Experiments to be	Battery charging supply etc. While the central slot will hold		
	conducted :-	replaceable experiment panels		
	1. Thyristor SCR	Connection through Sturdy 4mm Banana Sockets & Patch Chords.		
	based - Converters,	DC supply: +/- 12V, 500mA,		
	Inverters,	Power supply 17V / 750mA,		
	Cycloconverters,	Regulated 13.5V/3A O/P must be provided as 12V Battery charging		
	Choppers etc.	supply. In absence of battery, same may be used as simulated battery		
EE58	2. MOSFET/IGBT	source to run experiments on inverters etc.		
	based - Chopper,	Isolated DC supply $\pm 12V/300$ mA with isolated common.		
	Inverters etc	On board inverter transformer of Primary: 250V & Secondary 12-11- 0.11.12/2.4		
	3. Study of firing	0-11-12/JA On board Lamp load of 15W (100W) should be provided		
	schemes of SCR and	On board Lamp load of 15 w (100 w) should be provided. AC supply: $230V$ AC line voltage must be made available on two		
	I KIAC.	hanana Amm sockets		
	4. Study of Forced	LSPT Panel consisting of		
	techniques A P C D	Must have Two pulse transformers of 1:1:1 are provided for isolation		
	E and F	& supplying firing pulses along with required DC Power supply to		
	5 Study of Triggering	experiment panel under test through 15 pin female 'D' connector.		
	5. Study of Higgering			

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Protection	Must have Load resistor of 10W / 40W 1no.		
6. Switching	Must have Centre tapped 3A choke 4mH/ 16mH each2nos.		
characteristics of	Must have Commutation capacitors of 10mF/100V4nos.		
MOSFET / IGBT	Must have AC Paper capacitor of 4mF/440V1no.		
7. MOSFET / IGBT			
based 4 types of			
Chopper - Buck,	CON / INV Panel with sturdy 800V/12A SCRs (4nos) with		
Boost, Buck boost,	uncommitted snubber, 6A diodes (2nos) commutation switch,		
Cuck.	47µF/450V cap, Ramp Cosine firing circuit. However actual working		
8. MOSFET / IGBT	currents are limited to 3A (max) for safety		
push pull and half	Half Wave & Full Wave Fully Controlled converter, AC Voltage		
bridge inverter	Controller using Lamp optionally Universal motor foot mounted.		
200/2000Hz.	SCR Controlled Converter 1 phase with R-L Load Effect of Free		
9. Open and close	Wheeling Diode on SCR converter performance with Inductive load.		
loop DC motor	Study of SCR converter (Open Loop) output with Inductance Input		
(200V/200W) PWM	and Capacitance Input filters Effect of Source Impedance on		
speed control, P/PI	performance of SCR converters. Study of closed loop SCR		
closed loop control	converters with Resistive Load. Study of closed loop SCR converters		
PM DC optional	with Motor Load. Study of full wave -half controlled SCR bridge.		
	Resonant DC- DC converter.		
	PMDC motor (200W/2000RPM) with Tacho feedback (10V per		
	1000RPM) loading arrangement using spring balances (10kg).		
	IGB1 / MOSFET Inverter Panel with uncommitted MOSFET		
	(800 V/.8A, 2No.) IGBT (600 V/6.5A, 2 No.) brought out on Banana		
	sockets, LM3525 based PWM converter to generate 200-2000Hz		
	inverter frequency as well as duty cycle control, I No. opto isolated		
	channer et al Switching characteristics of MOSEET/ICDT 1		
	MOSEET / ICPT based 4 types of Chapper - Duck Deast Duck		
	hoost Cual: 1 MOSEET / ICDT much multion d half herd as inventor		
	200/2000Hz 1 Open and close loop DC motor (200V/200W) DWM		
	speed control P/PL closed loop control PM DC antional		
	speed control, 1/11 closed loop control 1 w DC optional		

EE59	Three Phase Half Full Controlled Bridge Converter Trainer	Input 3 phase DOL Starter panel [10 Shrouded Banana] 4 Pole MCB of 415V/4A.DOL 9A contactor with 230V/50HZ/11VA COIL. Bimetallic thermal O/L relay with range 1.4A-2.3A.DC voltmeter and DC ammeter panel 6 Shrouded Banana] DC voltmeter (0-600V). DC Ammeter (0-5A) with polarity protection diode Lamp Load) 230V/15/40/60/100W X3 bulbs with individual ON/OFF using 6A toggle switch. Inductive (L) Load 18 Shrouded Banana] Inductive load 0.75W/3H/300mAX3Nos 3 Ph. Bidirectional power cum Energy meter panel [8 shrouded Banana] Bidirectional Multifunction 3 Phase 4wire, 415V CT Input 5A, LCD LED display Aux supply 230V, 45-65 Hz, 5W V, I &Hz PF, KVA, KW KWh, Modbus RTU RS 485 (optional) 6SCR Firing Synchronizing Panel [8 Shrouded Banana] Cosine firing scheme to facilitate linear control for better		
		harmonic ripple control. Cyclo converter frequency generator 25Hz/12.5Hz 6 SCR/Diode Power Module 36 Shrouded Banana]Consist of 6 SCR [Body Anode Type] with PIV rating 200V/25A		
		6 Diode with PIV rating of 1200V/16AMP 6 No. of uncommitted Snubber for protection of thyristors consisting of capacitor 0 1uF/1000V & 100E/5W ceramic resistors		
		Should come along with 3 Phase FHP Induction motor. Complete kit on should be on ABS shock proof body housed on		
		vertical Aluminum Rack Structure. be Provided		
EE60	Thyrister Kit	DC Chopper Control Circuit Using Thyrister Experiment Trainer Kit Power supply 0-24V DC/2A, ±12V Variable PWM Generator Inbuilt R Load Manual to be Provided		
	Speed control of	On board firing circuits:		
	induction motor	DIAC firing circuit		
<b>EE61</b>	using triac	Kamp & Pedestal firing circuit Firing angle variation: Gradual variation from 0 to up to 180 degree		
	Partial list of	using firing control Pot		
	Experiments to be	Pulse transformer : PT4502, 1:1		

	conducted :-	Fuse : 1A		
	1.) To show firing of a	Mains Supply : 230 V ±10 %, 50 Hz .		
	TRIAC circuit.	Power Consumption: 2VA (approx.)		
		Universal motor specifications: Single Phase-230V,1.2A, No load		
	2.) To test performance	RPM-17000 without load		
	of TRIAC.	Built in LCD Display for RPM and other parameter display.		
EE62	3 ½ digital multimeter – auto ranging with protective holster	Functions Range Accuracy DC Voltage 200mV/2V/20V/200V/1000V $\pm(0.5\% + 4)$ AC Voltage 200mV/2V/20V/200V/750V $\pm(0.8\% + 5)$ DC Current 200uA/2mA/20mA/20mA/2A/20A $\pm(1.0\% + 5)$ AC Current 200uA/2mA/20mA/20mA/2A/20A $\pm(1.5\% + 5)$ Resistance 200 $\pm(0.8\% + 1)$ Temperature -40 ~ 1000 C / 0 ~ 1832 F $\pm(1.0\% + 5)$		
EE63	Digital Oscilloscope 20MHz or higher	<ul> <li>20 MHz or higher bandwidth Dual Channel</li> <li>200 MS/s or higher sample rate on all channels</li> <li>2.5k or higher point record length on all channels</li> <li>Provision to enable/disable Auto set</li> <li>7 inch WVGA (800X480) Active TFT Color Display</li> <li>20 or higher automated measurements</li> <li>frequency counter</li> <li>Zoom Function</li> <li>Auto set and signal auto-ranging</li> <li>USB Interface.</li> <li>Should come along with Current Probes.20A or higher AC/DC</li> </ul>		
EE64	<b>UJT Relaxation</b> <b>Oscillator</b> 1. To show SCR firing using UJT triggering	<ol> <li>Power supply requirement: 230V AC, 50 Hz.</li> <li>Built in Regulated Power supply: +15V DC/100mA.</li> <li>Following parts provided on Single PCB with Connecting terminals.</li> <li>UJT - 2N2646 - 1 No.</li> <li>The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place. The true value of component is printed on component side.</li> <li>The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainer s are operated on</li> </ol>		

		230V AC mains and must be self -contained unit.		
		5. Standard Accessories: 1. A Training Manual.		
		2. Connecting Patch cords.		
		6. E-Books for Power Electronics : 10 Nos in pdf		
		Format		
		7. Mp4 Video Class for Power Electronics : 40 Classes in Mp4 on		
		DVD / Pen Drive		
		1. Power supply requirement: 230V AC, 50Hz.		
		2. Built in IC based regulated Power supply : 0 to 10V DC/100		
		mA continuously variable		
		0 to 10V DC/100 mA continuously variable		
		3. Following parts provided on Single PCB with connecting		
		terminals.		
		IGBT - IRG4PC40W -1 No		
	Characteristics Of	Different Load Resistors		
		A The complete circuit diagram should be is screen printed on		
	IGBT	4. The complete chedit diagram should be is selech printed on		
		The tree service of the PCB with circuit and Parts at the same		
	Partial list of	place. The true value of component is printed on component		
EE(5	Experiments to be	side.		
EE05	conducted :-	The PCB with components on front side is fitted in elegant		
	1) Test the	wooden box having lock and key arrangement		
	1.) Test the	The acrylic cover is fitted on PCB to safeguard parts. It has holes		
	IGBT and plot the	for alignment and repair.		
	output characteristic.	The testing points are provided with 1.25" tags to connect CRO		
	1	probe All Trainers are operated on 230V AC mains and must be		
		self -contained unit.		
		5. Standard Accessories: 1. User Manual with practical and		
		circuit diagrams		
		2 Connecting patch cords		
		6 E-Books for Power Electronics : 10 Nos in pdf Format		
		Mn4 Video Class for Power Electronics · 40 Classes in Mn4 on		
		DVD / Pen Drive		

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ľ		1. Power supply requirement: 230V AC, 50Hz.		
		2. Built in Regulated Power supply : +12VDC		
		Following parts provided on Single PCB with connecting		
		terminals, SCR BT 151 - 9 Nos, 1N4002 Diode - 3 Nos, OA79		
ſ	Force Commutation	Diode - 1 No.		
ľ	Of SCR Circuit	6 The complete circuit diagram should be is screen printed on		
ľ	of servencuit.	component side of the PCB with circuit and Parts at the same place		
ľ	Partial list of	The true value of component is printed on component side		
ſ	Experiments to be	The DCD with components on front side is fitted in clagent wooden		
FF()	conducted :-	her hering lost and her even sevent		
LEOO		box having lock and key arrangement		
ſ	1.)To test the	The acrylic cover is fitted on PCB to safeguard parts. It has noies		
ľ	performance of a	for alignment and repair.		
ľ	forced commutation	The testing points are provided with 1.25" tags to connect CRO		
ſ	circuit (A,B, C, D and E)	probe All Trainers are operated on 230V AC mains and must be self		
ſ	L)	-contained unit.		
		5. Accessories : 1. A Manual		
ſ		2. Patch cord		
ſ		6. E-Books f or Power Electronics : 10 Nos in pdf Format		
		7. Mp4 Video Class for Power Electronics :40		
l	Chopper using SCR	1. Power supply requirement: 230V AC, 1 phase 50 Hz.		
	Trainer	2. Following parts provided on Single PCB with connecting		
	Partial list of	terminals.		
	Experiments to be	SCR BT151 - 1No.		
	conducted :-	Diode By 298 - 1no. 22E, 5W Load		
	conducted .	Resistor		
		3. Built -in UJT firing circuit.		
	1.) Test the	4. AC Mains Transformer with step down AC Voltage: 0 -		
<b>EE67</b>	performance of a buck	20V/250 mA with auxiliary 0 -20V/250 mA.		
	converter at different	5. The complete circuit diagram should be is screen printed on		
	duty cycle for a given	component side of the PCB with circuit and Parts at the same		
	resistive load and	place. The true value of component is printed on component side.		
	resistive-inductive load.	The PCB with components on front side is fitted in elegant		
		wooden box having lock and key arrangement		
	2.) Test the	The acrylic cover is fitted on PCB to safeguard parts. It has holes		
	performance of a boost	for alignment and repair.		
	dutes avala for a sizer	The testing points are provided with 1.25" tags to connect CRO		

	resistive load and resistive-inductive load.	<ul> <li>probe All Trainers are operated on 230V AC mains and must be self -contained unit.</li> <li>6. Standard Accessories: 1. a manual with practical details.</li> <li>2. Patch cord.</li> <li>7. E-Books for Power Electronics : 10 Nos in pdf Format</li> <li>3. Mp4 Video Class for Power Electronics : 40 Classes in Mp4 on DVD / Pen Drive</li> </ul>		
EE68	<ul> <li>Inverter using SCR</li> <li>Partial list of Experiments to be conducted :-</li> <li>1.) Test the performance of a single phase half bridge VSI feeding R and R-L load.</li> <li>2.) Test the performance of a single phase full bridge VSI feeding RL load.</li> </ul>	<ol> <li>Power supply requirement: 230V AC, 50Hz.</li> <li>Built in firing circuit with UJT Oscillator</li> <li>DC supplies for inverter (Half bridge) to converter it to AC.</li> <li>Following parts provided on Single PCB with connecting terminals SCR TYN612 - 2 Nos.</li> <li>25 Watt Lamp Load</li> <li>Inverter ON/OFF Control circuit</li> <li>All parts are soldered on single PCB of size 12"x 9" with complete circuit diagram Screen printed.</li> <li>The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place. The true value of component is printed on component side.</li> <li>The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainers are operated on 230V AC mains and must be self -contained unit.</li> </ol>		

EE69	<ul> <li>Single Phase To Single Phase Cyclo Converter Trainer</li> <li>Partial list of Experiments to be conducted :-</li> <li>1.) Measure the input to output frequency of a single phase to single phase step down Cyclo- converter.</li> <li>2.) Measure the input to output frequency of a single phase step up Cyclo-converter.</li> </ul>	<ol> <li>Power supply requirement: 230V AC,         <ol> <li>Phase 50Hz.</li> <li>Following parts provided on Single PCB with connecting terminals.</li> <li>SCR BT151: 4 Nos.</li> <li>Load Resistors: 1K10W.</li> <li>AC Mains Transformer with step down AC Voltages : 20 -0-20V/250mA</li> <li>Variable firing angle Load SCRs.</li> <li>All parts are soldered on single PCB of size12" x 9" with complete circuit diagram Screen printed.</li> <li>The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place. The true value of component is printed on component side.</li> <li>The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainers are operated on 230V AC mains and must be self -contained unit.</li> </ol> </li> </ol>		
EE70	AC to DC Converter Panel Partial list of Experiments to be conducted :- 1.) Test the performance of a given SCR and Plot the VI characteristics. 2.)Test and analyze the performance of a full wave controlled rectifier comprising of SCR for R and RL load with Freewheeling diode and calculate the ripple factor.	SCR Converters must be Provided with sturdy 800V/12A SCRs (4nos)with Uncommitted snubber, 6A diodes (2nos) commutation switch, 47m/450Vcap, Ramp cosine firing circuit. However actual working currents are limited to 3A (max) for safety. Must have facility to study Advanced firing Schemes. Load:- R load and R-L load		

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	Logic Gate Trainer	On board NOT, AND, OR, NAND, XNOR, XOR & NOR gates	
	Partial list of	5 input switches to give High & Low i/p	
	Experiments to be	5 output LEDs	
	conducted :-	ON/OFF switch and LED for power indication.	
		Bare board Tested Glass Epoxy SMOBC PCB is used.	
DD <b>7</b> 1	1.) Use various	Block Description Screen printed on glassy epoxy PCB	
EE/I	logic Gates and	All interconnections are made using 2mm banana Patch cords	
	understands their	Supplied with User manual and patch cords	
	applications.	With built-in power supply	
	11	Enclosed in a wooden/plastic box	
	2.) Verify the		
	Boolean algebra.		
		DC Regulated Power Supply 5V/150mA,	
<b>DD53</b>	Universal Gates	2 logic 1 & 2 logic 0 inputs are provided on sockets,	
EE72	NAND and NOR	2 Red LED output indicators.	
	Trainer	circuit diagram printed for 4 NAND & 4 NOR gates	
		Built-in power supply DC +5 V @ 500 mA	
	De Morgan's Theorem Trainer	4 Logic input switches with green LED display.	
<b>EE73</b>		4 Logic output red LED display	
		On panel diagram with ICs	
		Required numbers of patch cords	
		Built-in clock generator & pulse generator on panel	
		8 Logic input switches with green LED display	
	Understanding	8 Logic output red LED display	
<b>EE74</b>	Experiments with	One bread board & two 18 pin IC base mounted on panel	
	Digital Ics	Two 7-segment display on panel	
	Digital Its	On panel 3 sockets each for +5 V & GND, +12V@500mA	
		Required numbers of patch cords	
		Built-in power supply DC +5 V @ 500mA	
		On board circuit to study:	
	Flip Flop Trainer	S-R flip flop	
		J-K flip flop	
EE75		D-flip flop	
		T-flip flop	
		Master-slave flip flop	
		On board pulsar switch	
		On board clear switch	ļ
		On board Low & High inputs	

		On board Output LEDs		
		ON/OFF switch and LED for power indication.		
		Bare board Tested Glass Epoxy SMOBC PCB is used.		
		Block Description Screen printed on glassy epoxy PCB		
		All interconnections are made using 2mm banana Patch cords		
		Supplied with User manual and patch cords		
		With built-in power supply		
		Enclosed in a wooden/plastic box		
		On board circuit to study:		
		4:1 MUX		
		8:1 MUX		
		16:1 MUX		
<b>EE76</b>	Multiplexer Trainer	On board switches for Data, select lines and strobe		
		On board Output LEDs		
		ON/OFF switch and LED for power indication		
		Block Description printed on the board		
		All interconnections are made using 2mm banana Patch cords		
		On board circuit to study:		
		1.4 DEMILY		
		1.4 DEMOX		
	Do multiployor	1.6 DEMUX		
<b>EE77</b>		0.10 DEMOX		
	1 rainer	On board Switched for Data, select lines and Strobe		
		On board Output LEDs		
		ON/OFF switch and LED for power indication.		
		All interconnections are made using 2mm banana Patch cords		
		1. Power supply requirement: 230V AC, 50 Hz.		
		2. Built in IC based regulated Power supply: +5V DC/200 mA.		
		3. Following parts provided on Single PCB with connecting		
		terminals.		
		Binary Adder - IC 7486 - 1 No., Binary Adder - IC 7408 - 1 No.		
	4 Bit Half Adder	4. High /Low switches : 9 Nos provided to apply 0 and 1 level		
<b>EE78</b>		5. Logic output Indicators: 4 LEDs provided for output level		
		indication.		
		6. The complete circuit diagram should be is screen printed on		
		component side of the PCB with circuit and Parts at the same place.		
		The true value of component is printed on component side. The		
		PCB with components on front side is fitted in elegant wooden box		
		having lock and key arrangement The acrylic cover is fitted on PCB		
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		to safeguard parts. It has holes for alignment and repair. The testing		
		points are provided with 1.25" tags to connect CRO probe All		
		Trainers are operated on 230V AC mains and must be self-		
		contained unit.		
		7. Standard Accessories: 1. A Training Manual. 2. Connecting		
		Patch cords.		
EE794 Bit Full Adder1. Power suppl 2. Built in IC b 3. Following terminals. Binary Adder - 4. High /Low s 5. Logic outp indication. 6. The comple component sid The true valu PCB with cor having lock an The acrylic cov alignment and The testing po probe All Tra self-contained 7. Standard Acc cords		<ol> <li>Power supply requirement: 230V AC, 50 Hz.</li> <li>Built in IC based regulated Power supply: +5V DC/200 mA.</li> <li>Following parts provided on Single PCB with connecting terminals.</li> <li>Binary Adder - IC 7483 - 1 No.</li> <li>High /Low switches : 8 Nos provided to apply 0 and 1 level</li> <li>Logic output Indicators: 6 LEDs provided for output level indication.</li> <li>The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place. The true value of component is printed on component side. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainers are operated on 230V AC mains and must be self-contained unit.</li> <li>Standard Accessories: 1. A Training Manual. 2. Connecting Patch cords</li> </ol>		
EE80	4 Bit Half Subtractor	<ol> <li>Power supply requirement: 230V AC, 50 Hz.</li> <li>Built in IC based regulated Power supply: +5V DC/200 mA.</li> <li>Following parts provided on Single PCB with connecting terminals.</li> <li>Binary Subtractor IC 7404 - 1 No.</li> <li>IC 7486 - 1 No.</li> <li>IC 7408 - 1 No.</li> <li>High /Low switches : 8 Nos provided to apply 0 and 1 level</li> <li>Logic output Indicators: 4 LEDs provided for output level indication.</li> <li>The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place.</li> </ol>		

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		<ul> <li>The true value of component is printed on component side. The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainers are operated on 230V AC mains and must be self-contained unit.</li> <li>7. Standard Accessories: 1. A Training Manual. 2. Connecting Patch cords.</li> </ul>		
EE81	4 Bit Full Subtractor	<ol> <li>Power supply requirement: 230V AC, 50 Hz.</li> <li>Built in IC based regulated Power supply: +5V DC/200 mA.</li> <li>Following parts provided on Single PCB with connecting terminals.</li> <li>Binary Subtractor IC 7404 - 1 No.</li> <li>IC 7486 - 1 No.</li> <li>IC 7408 - 1 No.</li> <li>High /Low switches : 8 Nos provided to apply 0 and 1 level</li> <li>Logic output Indicators: 4 LEDs provided for output level indication.</li> <li>The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place. The true value of component is printed on component side. The PCB with component side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainers are operated on 230V AC mains and must be self-contained unit.</li> <li>Standard Accessories: 1. A Training Manual. 2. Connecting Patch cords.</li> </ol>		

		1. Power supply requirement: 230V AC, 50Hz.		
		2 Built in IC based regulated Power supply +5V DC/200 mA		
		2. Built in to bused regulated rower supply 57 Dol200 in t.		
EE82	4-Bit Magnitude Comparator	<ul> <li>3. Following parts provided on Single PCB with connecting terminals.</li> <li>Magnitude Comparator IC 7485 - 1 No.</li> <li>4. High /Low switches : 11 Nos provided to apply 0 and 1 level</li> <li>5. Logic output Indicators: 4LEDs provided for output level indication.</li> <li>6. The complete circuit diagram should be is screen printed on component side of the PCB with circuit and Parts at the same place. The true value of component is printed on component side.</li> <li>The PCB with components on front side is fitted in elegant wooden box having lock and key arrangement</li> <li>The acrylic cover is fitted on PCB to safeguard parts. It has holes for alignment and repair.</li> <li>The testing points are provided with 1.25" tags to connect CRO probe All Trainers are operated on 230V AC mains and must be self -contained unit.</li> </ul>		
		diagrama Connecting notes conda		
		diagrams. Connecting patch cords		
		<ol> <li>Power supply requirement: 250 V AC, 50HZ.</li> <li>Built in IC based regulated Power supply +5V DC/200 mA</li> </ol>		
		3 Following parts provided on Single PCB with connecting		
		terminals		
		Decade Counter - IC 74C93 - 1 No		
		4. Logic output Indicators: 4LEDs provided for output level		
<b>EE83</b>	4 Bit Binary	indication.		
	Counter Trainer	5. Seven segment output Indicator: 1No.		
		6. Pulsar Switches: 1 No. provided.		
		7. Clock generator: 1 No with variable frequency.		
		8. The complete circuit diagram should be is screen printed on		
		component side of the PCB with circuit and Parts at the same place.		
		The true value of component is printed on component side. The		

		PCB with components on front side is fitted in elegant wooden box		
		having lock and key arrangement		
		The acrylic cover is fitted on PCB to safeguard parts. It has holes for		
		alignment and repair.		
		The testing points are provided with 1.25" tags to connect CRO		
		probe All Trainers are operated on 230V AC mains and must be self		
		-contained unit		
		9 Standard Accessories: User Manual with practical		
		And circuit diagrams. Connecting natch cords		
		1 Power supply requirement: 230V AC 50Hz		
		2 Built in IC based regulated Power supply: +5V DC/200 mA		
		3 Following parts provided on Single PCB with connecting		
		terminals.		
		Binary Counter IC: 74LS76 - 2 Nos.		
	4 Bit Binary Ripple Counter Trainer	4. Logic output Indicators: 4 LEDs provided for output level		
		indication.		
		5 Pulsar Switches: 1 No provided		
		10 The complete circuit diagram should be is screen		
		Printed on component side of the PCB with circuit and Parts at the		
EE84		same place. The true value of component is printed on component		
LLUI		side The PCB with components on front side is fitted in elegant		
		wooden box having lock and key arrangement		
		The acrylic cover is fitted on PCB to safeguard parts. It has holes for		
		alignment and renair		
		The testing points are provided with 1.25" tags to connect		
		CRO probe All Trainers are operated on 230V AC mains and must		
		be self –contained unit.		
		7. Standard Accessories: User Manual with practical and circuit		
		diagrams.		
		11. Connecting patch cords		
		1. Power supply requirement: 230V AC, 50Hz.		
		2. Built in IC based regulated Power supply: +5V DC/200 mA.		
EE05	4 Bit Decade	3. Following parts provided on Single PCB with connecting		
EE85	<b>Counter Trainer</b>	terminals.		
		Decade Counter - IC 74C90 - 1 No.		
		4. Logic output Indicators: 4LEDs provided for output level		

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		indication.		
		5. Seven segment output Indicator: 1No.		
		6. Pulsar Switches: 1 No provided.		
		7. Clock generator: 1 No with variable frequency.		
		8. The complete circuit diagram should be is screen printed on		
		component side of the PCB with circuit and Parts at the same		
		place. The true value of component is printed on component		
		side. The PCB with components on front side is fitted in elegant		
		wooden box having lock and key arrangement		
		The acrylic cover is fitted on PCB to safeguard parts. It has		
		holes for alignment and repair.		
		The testing points are provided with 1.25" tags to connect CRO		
		probe All Trainers are operated on 230V AC mains and must be		
		self -contained unit.		
		9. Standard Accessories: User Manual with practical and circuit		
		diagrams. Connecting patch cords		
		1. Power supply requirement: 230V AC, 50Hz.		
		2. Built in IC based regulated Power supply +5V DC/200 mA.		
		3. Following parts provided on Single PCB with connecting		
		terminals.		
		Universal Shift register - IC 7495 - 1 No.		
		4. High /Low switches : 6 Nos provided to apply 0 and 1 level		
		5. Logic output Indicators: 4LEDs provided for output level		
		indication.		
		6. Pulsar Switches: 1 No provided.		
<b>EE86</b>	Shift Registers	7. Clock generator: I No with variable frequency from I Hz to 10Hz.		
	Irainer	8. The complete circuit diagram should be is screen printed on		
		component side of the PCB with circuit and Parts at the same		
		The PCP with components on front side is fitted in elegent		
		wooden box having lock and key arrangement		
		The acrylic cover is fitted on PCB to safeguard parts. It has holes for		
		alignment and renair. The testing points are provided with 1.25"		
		tags to connect CRO probe All Trainers are operated on 230V AC		
		mains and must be self -contained unit.		
		9. Standard Accessories: 1. A Training Manual. 2.		

		10. Connecting Patch cords.				
EE87	8-Line To 1-Line Multiplexer & Demultiplexer	<ul> <li>8- Line to 1 -Line multiplexer using 74153/74152 On panel address generator</li> <li>4 Logic input switches with green LED display 4 Logic output display</li> <li>On panel bounce less pulser</li> <li>Built -in power supply DC +5 V @ 500 mA</li> </ul>				
Equip ment/ Machi nery Code	Name of the Equipment / Machinery	f the Equipment / Detailed Technical Specifications Deviations if any Offered specifications and/or Deviations		Technical Literature in support of offered specifications and/or Deviations	Extra but Essential for successful working of equipment	Extra but not essential for successful working of equipment
EE88	Advanced Coil Winding Machine3 in 1 for ceiling fan, stator and field winding, operated with 230 volt, 50 Hz supply.					
EE89	Choke coil winding MachineBase plate 21''x14'', 230 volt, 50 Hz AC, wire size 10 to 38 swg					
EE90	Board Cutter MachineOperated with 1 phase 50 Hz, 230 volt supply, size 42 inch X 62 inch, cutting length 42 inch					
EE91	MCB and HRC fuse testing systemInput Voltage : 0 - 220 V AC ± 10% 50Hz MCB : 3A , HRC fuse : 6A, Fusing Element : 5A Features: Panel design should be Exclusive and rugged considering all the safety precautions; Diagrammatic representation for all ease of connections.					
EE92	Megger 1000 Volt	1000 Volt, hand driven				
EE93	Bearing Puller, inch (External)         (1) 6 inch, 150-25 mm.           (2) 12 inch, 300-50 mm.					
EE94	Internal Bearing Puller KitSupplied with 4 extractors covering bore dia from 7 mm to 28 mm (0.2 inch to 1.1 inch)					
EE95	Taparia Home Tool Kit	Make : Taparia (Product no 1021) or equivalent; Specification: Adjustable 1171 PF, 200 BP Hammer with handle, Screw driver set 821, Screw driver 725, Three in one tester 817 + 1413, Pliers 1621 6j, Rowel punch, Rowel plug 5 x 20mm				

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		Lubricating oil bottle, Knife, Nylon washer, Fuse wire 5 amp & 15amp, Insulation tape 20mm, Araldite- Hardener + Resin, M seal, Oil stone 1/2tri x 50mm, Nails 1/2 & 1, Nails 1 1/4, Nails 1 3/4, Woods screw 1/2, Woods screw 1		
EE96	Crimping Tool for 0.5 to 6 mm <sup>2</sup> wire size	Connector Type: Insulated Terminal, Suitable for wire size 0.5 to 6 mm <sup>2</sup>		
EE97	SWG-Standard Wire Gauge	Wire Gauge measuring tool for dia of wires from SWG 1-36. Round Tool. It should include conversion chart (Gauge/ mm/ inch)		
EE98	Battery charger	Battery Charger (15.5 V Output 6 Ampere (Max),Constant Current, Heavy Crocodile Connector, Pure Copper Transformer, Battery Reverse Protection, Sample Battery For Charging- Lead Acid Battery & Alkaline Battery, 12V/10Ah, 12V/5Ah Supported Battery Range:- 12V 5Ah, 12V 10Ah, 12V 20Ah, 12V 32Ah, 12V 40Ah, 12V 45Ah, 12V 50Ah, Reverse Battery Indicator)		

### **Certified that:-**

- A. Except aforesaid deviations, the entire order, if placed, with us shall be executed in accordance with your specifications and other term and conditions.
- **B.** Variation/deviations etc. if found, elsewhere in our offer should not be given any considerations while finalizing the tender.

Place:

Authorized Signature [In full and with date]: Name and Title of Signatory: Designation: Name of Firm:

Seal of Firm

### ANNEXURE – 09

#### FINANCIAL BID

# (For supply, installation and commissioning of Laboratory Equipments/machinery for Electrical Engineering Department)

As per Specifications specified in APPENDIX-08 of NIT No./GPS/Store/Tender-EE/2021/295, Sukma, Dated 30.10.2021

Equipment Code	Basic price in INR	GST Amount in INR	Applicable Percentage/ Composition ratio of GST	Net Price in INR
1	2	3	4	5=2+3
EE01				
EE02				
EE03				
EE04				
EE05				
EE06				
EE07				
EE08				

Certified that:-

- **A.** Above rates are inclusive of all extra but essential accessories/spares/parts/set-ups which are required for successful functioning and best performance of the equipment/machinery.
- **B.** Above rates are for door delivery basis inclusive of GST and all other applicable taxes and duties, roadworthy packing, forwarding, freight, insurance, loading/unloading, installation, commissioning, demonstration, training, training material, hardware, software or training media and all types of incidental charges and with minimum onsite warranty of 02 year from the date of installation as mentioned in tender document.
- C. No other cost will be claimed other than above quoted price & the applicable GST.
- **D.** If there is any change in composition ratio of GST by any authority/court, same shall be applicable during the period of contract.

Place:

Authorized Signature [In full and with date]: Name and Title of Signatory: Designation: Name of Firm:

Seal of Firm