

**NCCF  
BHOPAL**

NCCF/BPL/GM/2023-24

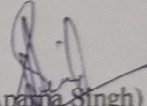
Date: 06-07-2023

Tender Notice

NCCF Bhopal branch intends to participate in the tender floated by CRISP, Bhopal vide tender no:- CRISP/NIT/LAB-EQPT/ITI MUGHALIYA CHAAP/2023-24/488 Date: 26.06.2023, for "the Equipment, Software and accessories required for various ITI Trades including installation and commissioning in Madhya Pradesh. Interested, well experienced business associates /suppliers of NCCF are requested to submit their sealed bids on or before 12-07-2023 up to 3.00pm.

Selection of supplier will be made on the basis of acceptance of all terms & conditions of tenders and NCCF guidelines .Conditional offer will not be accepted.

NCCF ,Bhopal branch reserved the right to accept or reject at any stage without assigning any reason thereof.

  
(Aparna Singh)  
Branch Manager

## Centre for Research and Industrial Staff Performance (CRISP), Bhopal

Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)

Invitation for e-Tender No.: CRISP/NIT/LAB-EQPT/ITI MUGHALIYA CHAAP/2023-24/488 Date: 26.06.2023

Title: **NOTICE INVITING e-TENDER FOR SETTING UP OF VARIOUS LABS AT MUGHALIYA CHAAP ITI BHOPAL.**

Deadline of Submission of Bids: 17.07.2023 at 15:30 hrs. (IST)

1. The “**The Managing Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)**” represented by The Director (“the Purchaser”) invites sealed bids from eligible Bidders for the Equipment, Software and accessories required for various ITI Trades including installation and commissioning at the Mugaliya Chaap Campus in Bhopal, Madhya Pradesh.
2. National Competitive Bidding will be conducted in accordance with CRISP’s Single-stage: Two- envelope bidding procedure and is open to all Bidders from eligible countries as described in the Bidding Document to be submitted through e-Procurement portal : <https://mptenders.gov.in/nicgep/app>.
3. To obtain further information and inspect the bidding documents, Bidders should contact: The Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)
4. Telephone & Email: 0755-2661401, Email - [procurement@crispindia.com](mailto:procurement@crispindia.com).
5. To purchase the bidding documents in English, eligible Bidders should write or visit at the office of the Purchaser at address stated above and pay a non-refundable fee of INR 5,000 in the form of Bank Demand Draft. In case of written request, the document will be sent by post and no liability will be accepted for loss or late delivery.
6. The eligible bidders may otherwise purchase the bidding document in English language by downloading the document from the website <https://mptenders.gov.in/nicgep/app> / [www.crispindia.com](http://www.crispindia.com). Such bidders shall be required to submit INR 5,000 with their bid in the form of Bank demand draft in the name of The “CRISP Society” Bhopal’ towards the cost of purchasing the bidding document following provisions in the bidding document.
7. Deliver your bid to the address above on or before the deadline: 17.07.2023 at 15:30 hrs. (IST) together with a Bid Security as described in the Bidding Document.
8. Bids will be opened on 17.07.2023 at 16:00 hrs. (IST) in the presence of Bidders representatives who choose to attend.
9. The Purchaser will not be responsible for any cost or expenses incurred by the bidder in connection with the preparation or delivery of bids.
10. Compliance with Laws and Regulations: State that bidders must comply with all applicable laws, regulations, and industry standards throughout the project. This may include compliance with environmental regulations, labor laws, safety standards, and anti-corruption measures.
11. CRISP reserves the right to reject any or all bids received without providing any reasons. CRISP is not obligated to accept the lowest-priced bid and may consider other factors such as quality, capability, and reliability.
12. CRISP reserves the right to make amendments to the tender documents and provide clarifications or interpretations as necessary.

Director  
CRISP, Bhopal

## QUALIFICATION CRITERIA

*All required documents should be submitted in a hard copy as a technical bid.*

1. The bidder must be a registered original Manufacturer/Authorized Dealer/Authorised Agent. The bidder shall have with minimum 05 years of experience in supplying of similar equipment / Items across India. Bidder shall have ISO Certificate. The tenderer should upload relevant documents of all past supplies. Hands on training for operation and maintenance of items to be provided by the supplier.
2. *GST Registration Certificate & PAN Card copy*
3. Audited Balance Sheets for the financial years 2020 - 21, 2021- 22 and 2022 – 23 should be provided. In case if the balance sheets of the financial year 2022 – 23 are not yet audited, GSTR – 3B records for entire financial year (2022 – 23) should be submitted.
4. Average annual turnover for last three financial years 2020 - 21, 2021- 22 and 2022 – 23 should be more than INR 23.8 Crores (Gross). In case if the balance sheets of the financial year 2022 – 23 are not yet audited, GSTR – 3B records for entire financial year (2022 – 23) should be considered for turnover calculation and relevant certificate from the CA should be provided
5. Bidder should have a single purchase order from any of the government institutions for the supply of relevant items with a value of **INR 19.04 Crores** (Total Value) or above in any one of the previous 3 years. Bidders with MSME certificate should have a single purchase order from any of the government institutions for the supply of relevant items with a value of INR 9.52 Crores (Total Value) or above in any one of the previous 3 years.
6. Affidavit for not having Blacklisted earlier by the Firm / Company represented by its Proprietor / Partners / Directors / Chairman / Managing Director / Office Bearers in the Business Transactions of any Government / Semi-Government / Government Undertaking / Public Sector Organizations / any other Departments.
7. Bidder shall quote for all the items. Partial quote is not accepted.
8. The quoted price shall include (Taxes, transportation, unloading & Installation at site and any other charge), Item shall be delivered to Mughalai Chaap ITI campus in Bhopal, Madhya Pradesh. Overall Lowest Price will be L1 bidder.
9. Supply shall be completed within 90 days from the date of issue of Purchase order. The supplier shall submit 3% of basic order value as performance security
10. Bidder shall hold the price for minimum period of 01 year from the date of purchase order in case any further additional quantity is required.
11. Payments terms:
  - (i) **Eighty** (80) Percent of the invoice value on Delivery of the items at the purchaser's site.
  - (ii) Balance: Twenty (20) percent within 30 days after Commissioning, Training & acceptance certification by the competent authority & upon submission of Bank Guarantee for 10% of basic order value as performance warranty for a period of 12 months from the date of commissioning.

## Information to Bidders

- Place to get information :  
**The Managing Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)**
- Bids called in two stages - Technical bid & Commercial bid
- EMD of INR 24,00,000/- should be paid (in the form of a DD in favour of CRISP Society, Bhopal, payable at Bhopal.)
- In addition to the EMD, the bidder shall pay a tender processing fee as per -procurement rules. The payment shall be made by a Demand Draft drawn ( in favour of CRISP Society, Bhopal, payable at Bhopal.).
- Hard copy of the Technical Bid along with other documents. must be submitted within the bid submission deadline and late bids will be rejected.
  - Kindly note that the hard copy of **the price bid should NOT** be submitted with the technical bid.
- Last date of submission: 17.07.2023 at 15:30 hrs. (IST)
- Opening of Technical Bids: 17.07.2023 at 16:00 hrs. (IST)
- Pre-Bid Meeting: 04.07.2023 at 15.00 hrs (IST)
- The bidders can visit the site from 01/07/2023 to 04/07/2023.

**Important Notes on Requirement:**

**Bidder:**

- a) The supplier must be a principal company (Original Equipment Manufacturer, OEM).
- b) The supplier must be an Authorized Dealer of the OEM, Bidding on behalf of the OEM. They must have Direct Sales & After Sales Service Center operative in Bhopal (M.P.) for at least 3 years as on Date of Tender publication.
- c) Bidder shall quote for all the items & Services in ANNEXURE- A.1 & A.2. Partial quote and Bidders who are not having Experience and in the Specific Technologies/Domain OR who have not been in the same or similar Business may not be considered.

**Technical Requirement:**

- a) The Detailed Requirement with Specifications have been listed in **Annexure-A.1 & A.2, Technical Requirements & Services Requirements** respectively.
- b) This is a TURNKEY project. Supplier has to Supply, set-up, Install, Commission, and Train the CRISP officials / Faculty / Technicians / Engineers in order to operate these machines / equipment.
- c) Design & drawing, preparation of specification, submission of operation and maintenance manual for all the supplied Items to be submitted.
- d) Complete solution including Programming, installation, commissioning and Training of entire project shall be responsibility of the Bidder
- e) List of recommended mandatory Spares for a period of 2 years to be provided by the supplier along with the Technical Bid.

**Technology & Specification Compatibilities**

- a) The Equipment/Items offered for supply must be of the most recent series models meeting the requirements, incorporating the latest improvements in design. The offered Models / Series should have been in satisfactory operation for ONE year or more as on date of Tender publication.
- b) The Supply shall also be suitable for any Technology/Specifications/Capacity upgradation in Future for at least 3 years from the Date of Supply.
- c) With reference to Technical specifications / Technologies used, Bidder/Supplier should carefully go through all the items mentioning the equipment & quantity required and Bid the Tender with complete clarity mentioning and explaining the Technologies / Design / Specifications and be able to demonstrate the Superiority / Advantage of the same through Presentations/Demonstrations at appropriate stage of Tendering Process as demanded by CRISP.
- d) Bidder shall be able to demonstrate the satisfactory working of the offered System/Equipment/Models on demand from CRISP at any stage of Tendering process..
- e) The technical evaluation committee of CRISP will take a decision about the technology, specification & suitability offered by the bidder, CRISP's decision will be final in this regard.

**Delivery, Location/s of Supply and Services:**

- a) The System/Equipment should be supplied in properly packed conditions with Packing List and installed, commission at Mughaliya Chaap ITI, Bhopal, Madhya Pradesh. The exact Delivery location along with contact details of the same shall be made available to successful Bidders before signing of the Contract of Execution.
- b) Supply shall be completed in all respect within 90 days from the date of issue of Purchase order.
- c) Delays, if any due to Force Majeure conditions such as Pandemic / Lockdowns / War etc shall be properly communicated to CRISP with proof.
- d) A consideration of delays acceptable and supply delay penalty waiver consideration and decision rests with CRISP Committee

**Pricing / Currency and Considerations:**

- a) The Bidder shall quote Total Lump sum Price only in Indian Rupees (including any imported Items/components) and the quoted price shall include (Taxes, transportation, Insurance, Loading, unloading & Installation at site and any other charge). No additional Billing or Quoting will be entertained.
- b) Bidder shall hold the price for minimum period of 01 (One) year from the date of purchase order in case any further additional quantity is required.
- c) Bidder shall quote a separate Quote for recommended mandatory Spares for a period of 2 years with Price Validity of 2 years from the date of Installation.
- d) For comparison purpose overall Pricing for entire scope of work of Tender will be considered
- e) Successful Bidder shall be required to submit a Performance Security of 3% of the PO Value before the release of the PO against commitment of completing the Main Supply within 90 days from the date of issue of Purchase order.

**Payment Terms and Mode of Payment:**

- a) 80% of the P O Value will be paid on Delivery of all the items as per Specifications & Quantity in ANNEXURE-A.1 at the purchaser's site.
- b) Balance 20% of the PO Value will be paid within 30 days after Commissioning, Training & acceptance certification by the competent authority & upon submission of Bank Guarantee for 5% of basic order value as performance warranty for a period of 12 months from the date of commissioning.
- c) Payments for Services as per ANNEXURE-A.2 shall be as per specified details and break-ups mentioned,
- d) Modes of Payment – Bank Transfer/Cheques/Pay Orders

**Documentation:**

- a) The Tenderer is expected to examine all instructions, forms, terms, and specifications in the tender document. Failure to furnish/upload all information required by the tender document and Conditions or submission/uploading of a tender not substantially responsive to the tender document in every respect, will be at the Tenderer's risk and

may result in rejection of its tender.

- b) Wherever Compliance / Confirmation / Acceptance is demanded/required to substantiate, Bidder should furnish the same signed by Company Authorised representative and supported and substantiated by competent Government Authorities.
- c) All and any of the Documents will not be returned or replaced after once submitted.
- d) It is also expected that the Tender Documents shall be arranged and filed in proper sequence as per the Check List Format and Sequence and in a professional manner for easy and accurate verification and evaluation by the Tender Committee. Unprofessional or improperly marked or segregated Documentation may result in rejection of Tender for want of Clarity and availability.
- e) Submission of properly updated and signed Check List in FORMAT- J is mandatory and shall be on top of the Bid.
- f) Bidder shall also be obligated to submit any additional and /or supportive Documentation/Proof/Substantiation for acceptance of the Bid

**Entire Document & Scope of this Tender Document:**

- a) All the Information, Instructions and Specific Terms and Conditions (STC) shall be read in conjunction with the General Terms and Conditions (GTC) of this Document.

**Tender Summary:**

<b>Tender Information Summary</b>	
<b>(a) Basic Tender Details</b>	
1) Tender Reference Number	<b>CRISP/NIT/LAB-EQPT/ITI MUGHALIYA CHAAP/2023-24/488 Date: 26.06.2023</b>
2) Tender Title	<b>“SETTING UP OF VARIOUS LABS AT MUGHALIYA CHAAP ITI, BHOPAL”</b>
3) Tender Category & Type	Goods <span style="float: right;">2 Bid System</span>
4) Bidding System	Two Envelope Submission Type – Technical & Financial
5) Tender Inviting Authority (TIA)	<b>The Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)</b>
6) Authority on whose behalf Tender is invited	<b>The Managing Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)</b>
<b>(b) Important Dates :</b>	
1) Tender (Bid) Publication Date	<b>26.06.2023</b>
2) Date & Time before which Written queries for the Pre-bid Meeting must be received and Pre-Bid Meeting Date & Time	<b>04.07.2023 at 15 Hrs. Conference Hall, at Old Admin Building, CRISP, Bhopal</b>
3) Dates for Demo/Proof of Concept presentation to CRISP, If applicable and /or Demanded	<b>Will be communicated after Technical Evaluation</b>
4) Last Date & Time for submitting the tender bidsPortal	<b>17.07.2023, 15.30 hours</b>
5) Last Date and Time for submitting the EMD and Tender Fees	<b>17.07.2023, 15.30 hours</b>
6) Technical Tender Opening Date & Time	<b>17.07.2023, 16.00 hours</b>



7) Financial Tender Opening Date & Time	Shall be conveyed separately, only for the Technically qualified bidders.
8) Place, time, and date of the Pre-bid Meeting	04.07.2023, 15: 00Hrs. Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)
9) Address of Physical Submission of EMD and Tender Fee	The Managing Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)
10) Earnest Money Deposit, Amount & Currency & Mode	Rs 24,00,000/- (Rupees Twenty Four Lakhs Only) in the form of a DD in favour of CRISP Society, Bhopal, payable at Bhopal.
11) Tender Currency	Indian Rupees Only
12) Performance Security amount to be deposited by successful bidders before accepting the Contract	3% of the final Order Value
13) eProcurement Portal and helpdesk for Document availability	<a href="https://mptenders.gov.in/nicgep/app/">https://mptenders.gov.in/nicgep/app/</a> www.crispindia.com
14) Office/ Contact Person/ email for clarifications	Mr. Amol Vaidya Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)
<b>(c) Requirement Details</b>	
1) Contract Period:	One Year from the Date of Award
2) Schedule for Supply of Hardware/Software	The detailed Requirement has been listed out in <b>Annexure-A.1</b>
3) Schedule for Services	The detailed Requirement has been listed out in <b>Annexure-A.2</b>
4) Schedule for Deliveries	90 Days
5) Schedule for completion of Project Closure with Documentation	6 Months from the Date of Contract Execution signing

<b>(d) Eligibility to Participate</b>	
1) Status of Bidders eligible	Manufacturer(OEM) / OEM Authorised Dealer
2) Quality Certification	The Bidder and /Or the OEM represented by the Dealer must have valid and latest ISO Certification
3) Minimum Average Turnover qualifying Criteria	Not less than Rs 23,80,00,000 (Twenty Three Crore and Eighty Lakhs Only)average turnover over the last three financial years
4) Similar Nature of work execution in a single contract	Not less than Rs 9,52,00,000for MSME Bidders Not less than Rs 19,04,00,000 for non-MSME Bidders
5) Entities from countries not eligible to participate (Make in India Policy)	As per the GO No FD455 Exp-12 2020 Dated 25-08-2020
<b>(e ) Documents relating to Bid Security and Performance Security</b>	
1) Performance Security Deposit	3%
2) Price Variation Clause	Not Allowed
3) Advance Payments Provided	No
4) Bid for Partial Supply accepted?	No
5) Price should include and cover the Cost of	A. All Hardware, Software, Accessories and Attachments as detailed in Annexure-A.1 but not limiting from Proper Operation point of view. B. Any Civil/Electrical/Mechanical works related & required for successful installation & Operation of the Supplies. C. Min one year Warranty D. Transportation/Insurance/Loading and Unloading to Mugaliya Chaap ITI, Bhopal. E. On-site Installation, Commissioning, Configuration, Testing & Documentation F. Demonstration, Usage/Operation Training for staff on site G. Services listed in <b>Annexure-A.2</b>
6) Price Validity commitment for additional / repeat Orders	<ul style="list-style-type: none"> <li>Minimum One Year from the Date of supply</li> </ul>
7) Payment Terms	<ul style="list-style-type: none"> <li>80% of the P O Value on Delivery of the items at the purchaser's site.</li> </ul>

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|--|---|
|  | <ul style="list-style-type: none"><li>• Balance 20% of the PO Value within 30 days after Commissioning, Training &amp; acceptance certification by the competent authority &amp; upon submission of Bank Guarantee for 5% of basic order value as performance warranty for a period of 12 months from the date of commissioning.</li><li>• Payment for Services in Annexure-A.2 as per specific Terms and Conditions</li><li>• Modes of Payment – Bank Transfer/Cheques/Pay Order</li></ul> |
|--|---|

**Bids Opening & Evaluation :**

- a) Technical Bids received on or before the stipulated last dates, will be opened in order of Technical and Financial Bids.
- b) All the Bids which are complete in all respect with respect to Documentation and Eligibility criteria and Procedure received only on or before the stipulated Time and Date will be evaluated based on Bidder meeting the minimum Eligibility Criteria, Documentation and EMD submission.
- c) Bids not complying with respect to Documentation/all the Stipulated Date & Time of Submissions and minimum eligibility criteria will not be considered for evaluation.
- d) The Tender Evaluation Committee of CRISP will evaluate every Bid carefully and with respect to all the Technical and qualifying eligibility criteria besides suitability of the Proposed Supply/Services by CRISP.
- e) Decision of the Committee will be final and binding.

**Manufacturing Authorisation Requirements:**

If bidder is not a manufacturer, Manufacturer's Authorisation letter has to be submitted by the bidder for following items.

<b>Sr No</b>	<b>Description</b>	<b>Trade</b>
1	CAD CAM Software	ADVANCED CNC MACHINING TECHNICIAN
2	Vertical CNC Machine	
3	CNC Simulator	
4	CNC Turning Machine	
5	Electro-Pneumatic control trainer kit using PLC with required components	TECHNICIAN MECHATRONICS
6	Electro-Hydraulic control trainer kit using PLC with required components	
7	Mechatronics Design and Simulation Software	
8	Parametric Design Software	
9	PLC and HMI Training Kit	
10	Welding Simulator	WELDER

**FORMAT - J – Check List Compliance/Confirmation:**  
**(Appropriate attested Documentary Proof for each of the**  
**Compliances to be furnished with clear identification)**

Sl. No.	Required Information	Bidders Response	Confirming / Compliant?	Proof Attached? Page No/s
1.	Name of Tendering Company /Firm/ Agency as registered			
2.	Full Address of Office with Mobile No.			
3.	E-Mail:			
4.	Details of Registration			
5.	Income Tax Registration No /PAN No.			
6.	GST Registration Number			
7.	Manufacturing Authorising Letters for required components			
8.	Details of EMD	Amount		
9.	Details of Bank	Bank		
		Account No		
		IFSC Code		
		MICR Code		

10.	Name of proprietor / Director of Company/ Firm & address:			
11.	Classification of the bidder (a) Manufacturer (b) Manufacturer-MSME (c) Authorized Dealer  (Attach copy of proof)			
12.	Name of Major OEM (Original Equipment / Goods Manufacturer)			
13.	Brochure / Leaflets / Technical Information, including Make & Model, of the item(s) must be attached.			
14.	Name, address, designation phone, cell number and E Mail address of the Contract Person			
15.	Whether quoted item confirms to OR Exceeds all the specifications of Tender?	Yes / No		
16.	Price Inclusion Confirmation	a) All Hardware, Software, Accessories and Attachments as detailed		
		b) in Annexure-A.1 but not limiting from Proper Operation point of view.		
		c) Any Civil/Electrical/Mechanical works related & required for successful installation & Operation of the Supplies.		
		d) Min one year Warranty		
		e) Transportation/Insurance		
		f) /Loading and Unloading to designated locations across Bhopal (M.P.)		

		g) On-site Installation, Commissioning,				
		h) Configuration, Testing & Documentation				
		i) Demonstration, Usage/Operation				
		j) Training for staff on site				
		k) Services listed in <b>Annexure-A.2</b>				
17.	Whether firm have certifications: ISO 9001?					
18.	Whether firm agrees to give security deposit / Performance Bank Guarantee against warranty obligations?					
19.	Segments to which major supplies were done in the last 3 years with Order value equal to or more than the minimum Turnover	1) 2) 3)				
20.	List of Customers during last three years.					
	<b>Customer/End User</b>	<b>PO Value</b>	<b>Billing Financial Year</b>			
A						
B						
C						
D						
E						
21.	Annual Turnover in Lacs for each of the last three years as specified with proof of document by a qualified Chartered Accountant along with PAN & IT Certificates for all the years	<b>2020-21</b>	<b>2021-22</b>	<b>2022-23</b>		
22.	Is organization / any of its subsidiaries not blacklisted by any Govt. / Govt. Departments / Academic Institutions / reputed organizations to be submitted with Notarized document.					



23.	Is the bid valid for 90 days / or as Specified			
24.	The Bidder should bear all the transportation & insurance risk till the delivery point.			
25.	Is Bid document duly signed wherever necessary			
26.	Scanned Hardcopy of the technical bid Documents to be submitted to the designated Office before opening of technical bid			
27.	<p>Payment Terms agreed as Specified</p> <p>a) 80% of the P O Value on Delivery of the items at the purchaser's site.</p> <p>b) Balance 20% of the PO Value within 30 days after Commissioning, Training &amp; acceptance certification by the competent authority &amp; upon submission of Bank Guarantee for 5% of basic order value as performance warranty for a period of 12 months from the date of commissioning.</p>			
28.	Non-Conforming / Compliant / Disagreement Response, if any with explanation and supporting Documents			

**FORM- A**

**Ref.No.....**

**Date.....**

To,

**The Managing Director,  
Centre for Research and Industrial Staff Performance (CRISP),  
Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)**

I/We (Name of authorized signatory)..... Name of Firm

.....Address.....

..... have read the tender rules for the supply of various ITI Campus as per tender notice to the Govt. Industrial Training Institutes in Madhya Pradesh and I/We full accept the Bidding rules supplied terms/us with the Bidding Documents.

**Date:**

(Authorized Signatory) Signature:Name:

Designation:Address:Seal:

EmailDate:

**Certificate for Own Manufactured Items**

e-Tender No.: CRISP/NIT/LAB-EQPT/ITI MUGHALIYA CHAAP/2023-24/488

Date: 26.06.2023

To

**The Managing Director,  
Centre for Research and Industrial Staff Performance (CRISP),  
Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)**

Dear sir,

We here by certify and confirm that following items/equipments are being manufactured by us. We here by extend our guarantee and warranty for one year for the items mentioned below which is an integral part of the package to be offered by us as a part of bid against the Tender No. Date: published by you. \_

S. No.	Item	Model No.

(Authorized Signatory) Signature: Name:

Designation:

Address:

Seal:

Email

Date:

**Manufacturer's Authorization Form**

To,  
The Managing Director,  
Centre for Research and Industrial Staff Performance (CRISP),  
Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)

e-Tender No.: CRISP/NIT/LAB-EQPT/ITI MUGHALIYA CHAAP/2023-24/488

Date: 26.06.2023

Date: [insert date (as day, month, and year) of bid submission]

NCB No.: [insert number of bidding process]

To: [insert complete name of the Purchaser]

**WHEREAS**

We [insert complete name of the manufacturer], who are official manufacturers of [insert type of goods manufactured], having factories at [insert full address of manufacturer's factories], do hereby authorize [insert complete name of the bidder] to submit a bid the purpose of which is to provide the following goods, manufactured by us [insert name and/or brief description of the goods], and to subsequently negotiate and sign the Contract.

We hereby extend our full guaranty and warranty as per contract for the goods and services offered by the above firm against this tender.

Signed: [insert signature(s) of authorized representative(s) of the manufacturer]

Name: [insert complete name(s) of authorized representative(s) of the manufacturer]

Title: [insert title]

Duly authorized to sign this Authorization on behalf of [insert complete name of the manufacturer]

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ [insert date of signing]

(Authorized Signatory) Signature:Name:

Designation: Address:

Seal:

Email:

Date:

**Certificate of the items which are not manufactured by the bidder and are not authorized by the manufacturer**

No.....

Dated.....

To,  
The Managing Director,  
Centre for Research and Industrial Staff Performance (CRISP),  
Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)

Dear sir,

We hereby declare that the below mentioned items/equipments will be supplied by us which are not manufactured by us and we are not the authorized dealer also. We extend full guarantee and warranty for one year.

Sl. No.	Name of the item	Brand/Model No.
1		
2		
3		

(Authorized Signatory)

Signature:  
Name:  
Designation:  
Address:  
Seal:  
Email Date:

If bidder is not a manufacturer, Manufacturer's Authorisation letter (Form C) or if the bidder is a manufacturer, Certificate of Own Manufactured Items (Form B) has to be submitted by the bidder for following items. For all other items which are not specifically mentioned below, Form A / Form B / Form C needs to be submitted by the bidder.

<b>Sr No</b>	<b>Description</b>	<b>Trade</b>
1	CAD CAM Software	ADVANCED CNC MACHINING TECHNICIAN
2	Vertical CNC Machine	
3	CNC Simulator	
4	CNC Turning Machine	
5	Electro-Pneumatic control trainer kit using PLC with required components	TECHNICIAN MECHATRONICS
6	Electro-Hydraulic control trainer kit using PLC with required components	
7	Mechatronics Design and Simulation Software	
8	Parametric Design Software	
9	PLC and HMI Training Kit	
10	Welding Simulator	WELDER

**No Deviation Certificate**

No.....

Dated.....

To,  
The Managing Director,  
Centre for Research and Industrial Staff Performance (CRISP),  
Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)

Dear sir,

This is to certify that the bid submitted by us is exactly inline with your tender (including amendments) no. dated. This is to certify that our offer contains no deviation against the specifications of the item mentioned in Annexure-9.

(Authorized Signatory)

Signature:

Name:

Designation:

Address:

Seal:

Email

Date:

**CONTRACT AGREEMENT**

**THIS AGREEMENT** made the.....day of.....,2023 Between.....  
(Name of purchaser) of.....(Country of Purchaser) (here in after called " the Purchaser")  
of the one part and.....(Name of Supplier)of .....(City  
And Country of Supplier) (here in after called "the Supplier") of the other part:

**WHEREAS** the Purchaser is desirous that certain Goods viz.,..... (Brief  
Description of Goods ) and has accepted a bid by the Supplier for the supply of those goods in the sum of  
..... (Contract/P.O. Price in Words and Figures)(here in after called  
"Contract/P.O. Price").

**NOW THIS AGREEMENT WITNESSED AS FOLLOWS:**

1. In this Agreement words and expressions shall have the same meanings as are respectively ~~given~~ <sup>agreed</sup> to the min the Conditions of Contract/P.O. referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
  - (a) The Form A and the Price Schedule submitted by the Bidder;
  - (b) The quantity of items;
  - (c) The Technical Specifications;
  - (d) The Conditions of Tender/Purchase order;

Security Deposit of 3% of the total value of the order in the form Bank guarantee will have to be deposited by the successful bidder before the final orders are placed with him. Security Deposit (Bank guarantee) should be submitted in favor of **The Managing Director, Centre for Research and Industrial Staff Performance (CRISP), Bhopal, Opposite Manas Bhawan, Shyamla Hills, Bhopal-462002 (M.P.)**

3. If the demanded security deposit of 3% is not deposited by the bidder in the specific period the Earnest Money already deposited with the tender is liable to be forfeited.
4. Delivery Period should be 90 days from the date of purchase order.
5. The successful bidder should supply full ordered quantity of items for a particular institute within the prescribed delivery period specified in the order. If the bidder faces difficulty in supply of ordered quantity within the delivery period then he should submit the representation indicating the appropriate reasons of delay. Power to extend delivery period would remain with Purchaser. If the delivery period is not extended by the purchaser then the order pertaining to the particular institute may be cancelled and the security deposit equivalent to 3% of the value of the order for that particular Institute will be forfeited.
6. The Tender and rates quoted by the bidder will be valid up to 75 days from the date of opening of the tenders. All order placed up to this date on the rates quoted will be binding on bidder. The Performance Security should have the validity period of 30 months.



7. 80% payment will be released after the safe receipt, as per specifications and installation and demonstration. Remaining 20% of Payment will be made after successful running of the machine for 1 month. Therefore the invoice should be prepared separately for 80% and 20% of the cost of the item.
8. All consignment must be dispatched freight paid to Mugalia Chaap ITI" To pay" Railway Receipt/Freight Receipts will not be accepted.
9. In consideration of the payments to be made by the Purchaser to the Supplier as here in after mentioned, the Supplier hereby covenants with the Purchaser to provide the goods and to remedy defects therein in conformity in all respects with the provisions of the Contract.
10. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the goods and services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

Brief particulars of the goods and services which shall be supplied/provided by the Supplier are as under:

S.No.	Description of Goods	Qty. to be supplied	Unit Price	Total Price	Delivery Terms
1					
2					

**Total Value of Contract/P.O.:- Delivery Schedule:-**

**IN WITNESS** where of the parties hereto have caused this Agreement to be executed in accordance with their respective laws the day and year first above written.

Signed, Sealed and Delivered by the said (For the Purchaser)

in the presence of:.....

Signed, Sealed and Delivered by the said (For the Supplier)

in the presence of:.....

# Technical Specifications

### Technical Specifications for ADVANCED CNC MACHINING TECHNICIAN Lab

Sr No	Name of the Tool & Equipment's	Specification	Quantity
<b>A. TRAINEES TOOL KIT</b>			
1	Steel rule	30 cm & 60 cm graduated both in English & Metric units	24
2	Hand Gloves	-	24
3	Safety Shoes	-	24
4	Helmet	-	24
<b>B. GENERAL MACHINERY / SOFTWARE INSTALLATIONS</b>			
5	Vertical Machining Center	Refer Annexure 1	1
6	CNC Simulator - Turning and Milling	Refer Annexure 2	2
7	Tool Trolley	Tool Trolley with minimum 4 drawers	1
8	CNC Toolroom Lathe	Refer Annexure 3	1
<b>C. TOOLS, INSTRUMENTS AND GENERAL SHOP OUT FITS</b>			
9	"V" block	V-Block pair 7 cm with clamps	5
10	"V" block	V-Block 15 cm with clamps	5
11	Micrometer Outside	0-50 mm outside	10
12	Vernier Caliper	0-15 cm	10
13	Micrometer Inside	up to 20 mm	10
14	Metal L	Metal - L - 15cm	5
15	Metal L	Metal - L - 30cm	5
16	Angle Plate	10 x 20 cm.	5
17	Spirit Level	15 cm metal	5
18	File warding	15 cm smooth	10
19	File knife edge	15 cm smooth	10
20	File cut saw	15 cm smooth	10
21	File feather edge	15 cm smooth	10
22	File triangular	15 cm smooth	10
23	File round	20 cm second cut	10
24	File square	15 cm second cut	10
25	File square	25 cm second cut	10
26	File triangular	20 cm second cut.	10
27	File flat	30 cm second cut.	10
28	File flat	20 cm bastard	10
29	File flat	30 cm bastard.	10
30	File Swiss type	Needle set of 12.	10
31	File half round	25 cm second cut.	10
32	File half round	25 cm bastard.	10
33	File round	30 cm bastard.	10
34	File hand	15 cm second cut.	10
35	Card file.	-	10
36	Oil Stone	15 cm x 5 cm x 2.5 cm	10
37	liers combination	15 cm	10

38	Blow Lamp	0.50 liters.	10
39	Spanner	D.E. 6 -26 mm set of 10 pcs.	10
40	Spanner adjustable	15 cm	10
41	Box spanner	Set 6-25 mm set of 8 with Tommy bar.	10
42	Glass magnifying	7 cm	10
43	Clamp toolmaker	5 cm and 7.5 cm set of 2.	10
44	Clamp "C"	5 cm	10
45	Clamp "C"	10 cm	10
46	Scraper flat	15 cm.	10
47	Scraper triangular	15 cm.	10
48	Scraper half round	15 cm.	10
49	Chisel	cold 9 mm cross cut 9 mm diamond.	10
50	Chisel	cold 19 mm flat	10
51	Chisel	cold 9 mm round nose.	10
52	Motorized +Tennon Saw	-	10
53	Hand hammer	1 kg. with handle Ball Peen	10
54	Hacksaw	frame fixed 30 cm.	10
55	Mallets Wooden	-	10
56	V-Block, Files, mallets, screwdrivers, chisels, etc.	-	10
57	Hand Drilling Machine	Rated input power: 600W, Power output: 301W, Rated torque: 1.8 Nm	10
58	Metal Saw	No-Load Speed: 3,800 rpm, Saw blade diameter 355 mm, Saw blade bore 25.4 mm	10
59	Straight Grinder HEAVY DUTY with attachments	No-Load Speed: 10000 – 30000 rpm, Rated power output: 380W	10
60	Professional Air Blower	Power consumption: 820 W, No-load speed: 16000rpm, Flow rate: 0-4.5 m3/s	10
61	Jig Saw Portable	Input Power: 900W, No- load speed: 11,000 rpm, Disc Diameter: 100	10
62	Hammer Drill Wired	Drill type: hammer, optimum power transfer	10
63	Hand Held Sander / Polisher	No Load Speed: 11000 rpm	10
64	Digital Dial Torque Wrench	Range: 20 to 280 Nm	10
65	Lifting Tackle/Sling	1 Ton×2mtr	10
66	Impact Wrench	1/2 inch drive	10
67	Laser Light Pen	-	10
68	Surface Plate	Cast iron	1
69	Digital Screw Pitch Gauge	Working voltage: 3.0 V / DC, Measure precision: 0.1 degree	5
70	Laser Distance Measurement Instrument	Levelling Accuracy (Vial): +/- 0.2degree, Measuring Accuracy Typical: +/- 1/16 inch (1.5mm)	5
71	Palm Scale	Capacity-500gms, Least Count-0.1g	5
72	Allen Screwdriver Wrench Tool	6 Pcs T Handle Ball Ended Hex Key	5

73	Universal Quick Adjustable Multi-function Wrench Spanner	Range: 6-32mm	5
74	Double Ended Wrench Hex Socket Spanner	8 In 1, Range: 6-32mm	5

**Annexure 1 for ADVANCED CNC MACHINING TECHNICIAN Lab  
Detailed Specifications for Vertical Machining Centre**

<b>Sl No</b>	<b>Description</b>	<b>Specifications</b>
<b>Capacity</b>		
1	Table size (L X B )	650 ~ 750 X 450 ~ 550 mm
2	Distance from table top to spindle face	115 ~ 140 (min) / 610 ~ 660(max) mm
3	Load capacity on table	350 ~ 450 kg
4	Longitudinal X-axis	500 ~ 525 mm
5	Transverse Y-axis	425 ~ 475 mm
6	Vertical Z-axis	500 ~ 525 mm
<b>Spindle</b>		
7	Power	5.5 / 7.5 Kw
8	Speed	60 - 6000 Rpm
9	Maximum tool weight	Up to 7 kgs
10	Nose	BT40 / ISO 40
<b>Axis Drive</b>		
11	Feed rates	3 ~ 10,000 mm/min
12	Rapid Traverse (X/Y/Z)	20,000 mm/min
<b>Accuracy</b>		
13	Positioning	12 µm as per ISO 230 or equivalent
14	Repeatability	10 µm as per ISO 230 or equivalent
15	Power Supply	415V, 3Phase, 50Hz
<b>CNC Controller</b>		
16	Suitable for Universal CNC Milling Machine	
17	Computer Numerical control ensures full automation of the machine	
18	Should offer numerous features necessary for easy & efficient program set up	
19	Contour programming	
20	Fast presetting	
21	Milling cycles for complex contours	
22	Cycles for Drilling, Boring & Spindle alignment	
23	Cycles for linear & circular point patterns	
24	Clearly understandable dialogs enable workshop oriented programming in plain text DIN/ISO standard.	
25	The movement of all machines axes are controlled by digital drives	
26	Tool life management	
27	Cutter compensation	
28	Canned cycles for simplified part programming	
29	NC programming using DIN/ISO code	
30	Online ladder display of easy diagnostics	
<b>Features</b>		
31	Standard cycles for milling, drilling, rigid tapping	
32	Suitable Counter balance to control drop of Z-axis during power failure	

33	Dampening system for enhanced accuracies
34	Simulation on machine control
35	Manual pulse generator for work piece setting
36	Centralised lubrication system
37	Spindle auto tool clamp & de-clamp
38	Levelling pads
39	Hardened & ground sturdy linear motion guide ways & ball screws.
40	Coolant system
41	Chip conveyor system
42	Machine lamp
43	Test Mandrel
44	Suitable Stabiliser along with suitable Isolation transformer
45	Control panel should be provided with A.C. unit
46	All General & Geometrical tolerance shall be as per IS standards/ International standard
<b>Accessories Required</b>	
47	Collets dia.3, 4, 6, 8, 10, 12, 16, 20 & 25 – 2 nos. each suitable to adaptors
48	Collet adaptor- Short & long (each 2 nos.)
49	a) Collet Adaptor- Short, to Hold 3.0 - 16.0 Dia – 2 sets
50	b) Collet Adaptor- Short, to Hold 16.0- 25.0 Dia – 2 sets
51	Hydraulic vice opening: 200mm with 5 $\mu$ accuracy – 1no.
52	Key less drill chuck – 2 nos. to suit BT40 / ISO 40 Adaptors with set of sleeves.
53	One set of Tool kit shall include :
54	a) Clamping kit-geese neck, strap
55	b) T-bolts, tenons, Allen key, Washers, Studs, hexagonal nut
56	c) Spanner-Ring, flat & C
57	L- angle plate 150mm x 150mm & 250mm x 250mm (Each 1no)
58	Face mill Arbor 1no.
59	CNC Tool clamping fixture – 1no.
60	Pull Studs – 10 Nos.
61	Edge finder – 1no.
62	First fill of lubricants

**Annexure 2 for ADVANCED CNC MACHINING TECHNICIAN Lab  
Detailed Specifications for Hardware CNC Simulator for Turning and Milling:**

<b>CNC Simulator Specifications:</b>	
1	Simulator should be equipped with a controller from either Fanuc or Siemens
2	Switchable mill and lathe system in one simulator
3	MPG should be of the same make as of CNC Controller
4	MOP / MCP should be of the same make as of CNC Controller
5	The simulator should be a self contained unit which should only require single phase electrical power supply for operation
6	Complete 3D Simulation should be shown on the controller screen
7	Minimum 10.4 inch colour screen
8	Computer based simulators are not acceptable
9	The simulator should not be a completely imported unit. At least some part of the simulator such as outer fabrication should be done in India. Confirmation regarding the same should be clearly provided by the OEM of the CNC Controller
10	Tower Lamp /operation indicator with minimum 3 different colours should be mounted on the top of the simulator
11	USB Drive of at least 8 GB memory capacity should be accessible to the simulator

**Worktable for CNC Simulator:**

Worktable should be made in a fabricated structure of Mild steel as well as Aluminum extrusions. Top surface should be made in the MDF with minimum thickness of 25mm. Minimum dimensions of the top surface should be 1200mm x 800mm.

Control panel with provision for 230V connections should be provided at the top. Minimum height between the panel and the worksurface should be 1000mm.

Voltage indicator (Digital) should be provided to display the input voltage (Single Phase)

Minimum height of the MDF surface from the ground level should be 750mm.

Castor wheels with brakes should be provided to the structure.



**Annexure 3 for ADVANCED CNC MACHINING TECHNICIAN Lab  
Detailed Specifications for CNC Toolroom Lathe:**

SI No	Description	Specifications
<b>Capacity</b>		
1	Capacity: Distance between centres	230 – 260mm
2	Swing over bed	280 – 320mm
3	Maximum turning diameter	110 – 150 mm
<b>HEAD STOCK</b>		
4	Maximum Through bore	32 – 40mm
5	Chuck diameter	135 mm
6	Spindle speed	100 – 4000rpm
7	Spindle nose	A – 4
<b>AXES SLIDES</b>		
8	Transverse stroke: X-axis	80 -130mm
9	Transverse stroke: Z-axis	250 -300mm
<b>Accuracy</b>		
10	Positioning	6 µm as per ISO 230 or equivalent
11	Repeatability	4 µm as per ISO 230 or equivalent
<b>FEEDS</b>		
12	Variable feeds X-/Z- axis	0 – 5000 mm / min
13	Rapid feed X-/Z- axis	15 / 15 m / min
<b>TOOLING SYSTEM: TURRET</b>		
14	No. of tool stations	8
15	Spindle motor power	3.5 – 5.0 Kw (415V, 3 Phase & 50 hz)
16	Speed	3000 - 4000 rpm
17	Standardized fixing of tool holders	16 square
18	Maximum tool size (boring bar)	25 mm
<b>CNC CONTROLLER</b>		
19	Siemens 828D / Fanuc OiTF	
20	Computer Numerical control ensures full automation of the machine	
21	Should offer numerous features necessary for easy & efficient program set up	
22	Contour programming	
23	Cycles for Drilling, Boring & Spindle alignment	
24	Cycles for linear & circular point patterns	
25	Clearly understandable dialogs enable workshop oriented programming in plain text DIN/ISO standard.	
26	The movement of all machines axes are controlled by digital drives	
27	Tool life management	
28	Cutter compensation	
29	Canned cycles for simplified part programming	
30	NC programming using DIN/ISO code	
31	Online ladder display of easy diagnostics	

<b>Standard Features &amp; Accessories</b>	
32	Fully enclosed guards
33	Centralized lubrications unit
34	Coolant equipment
35	Alarm lamp
36	Work lamp
37	3 jaw chuck ( one set each of soft & hard jaws) & Tail stock
38	Set of reduction sleeves
39	Set of boring bar holders
40	Foot switch for Hydraulic chuck & Hydraulic tail stock quill
41	AC for electrical control cabinet
42	Chip tray
43	Linear motion guide ways
44	Hardened & Ground pre- loaded ball screws for axis
45	8 station turret
46	All General & Geometrical Tolerance shall be as per IS standards / International standard
<b>Accessories required</b>	
47	Suitable Stabilizer along with isolation transformer
48	Axial tool holder
49	Revolving centre
50	First fill of lubricants
51	Start-up tool kit

## Technical Specifications for TECHNICIAN MECHATRONICS Lab

<b>LIST OF TOOLS AND EQUIPMENT</b>			
<b>TECHNICIAN MECHATRONICS (For batch of 24 Candidates)</b>			
<b>Sl. No</b>	<b>Name of the Tool &amp; Equipments</b>	<b>Specification</b>	<b>Quantity</b>
<b>A. TRAINEES TOOL KIT</b>			
1	Steel Rule	150 mm English and Metric combined	24+1 Nos.
2	Engineer's Square	150 mm with knife edge	24+1 Nos.
3	Bevel Straight Edge	80 X 100 mm	24+1 Nos.
4	Centre punch	100 mm	24+1 Nos.
5	Dot punch	100 mm	24+1 Nos.
6	File flat bastard	300 mm	24+1 Nos.
7	File flat 2 <sup>nd</sup> cut	250 mm	24+1 Nos.
8	File flat safe edge	200 mm	24+1 Nos.
9	File triangular rough	200 mm	24+1 Nos.
10	Hammer	½ lb ball peen	24+1 Nos.
11	Scriber	6 inch	24+1 Nos.
12	Vernier Caliper	150mm with 0.02 mm least count	24+1 Nos.
13	Micrometer (outside)	0-25 mm	24+1 Nos.
14	Safety goggles (Personal Protective Equipment)		24+1 Nos.
15	Screw driver electrician	150 mm	24+1 Nos.
16	Screw driver	Nos. 860,862	24+1 Nos.
17	Long nose plier	150mm	24+1 Nos.
18	Combination plier	150mm	24+1 Nos.
19	Diagonal cutter	150mm	24+1 Nos.
20	Screw driver Philips	Nos. 860,862	24+1 Nos.
21	Tweezers		24+1 Nos.
22	Knife	100mm	24+1 Nos.
23	Wire Stripper		24+1 Nos.
24	Neon Tester		24+1 Nos.
25	Scissors	150mm	24+1 Nos.
26	Soldering iron	25watts	24+1 Nos.
27	Bread Board		24+1 Nos.
<b>B: TOOLS AND EQUIPMENTS:</b>			
1	Caliper outside	150mm	4 nos.
2	V-block	50 mm X 100mm and 75 mm X 100 mm each	2 Nos
3	Divider – 150 mm		4 Nos.
4	Screw driver	150 mm and 200mm each	4 Nos.
5	Circlip plier (inside and outside) each		4 Nos.

6	Centre gauge	55° and 60°	4 Nos.
7	Oil can		4 Nos.
8	Oil Gun and Grease Gun each		4 Nos.
9	File flat smooth	200 mm	4 Nos.
10	File flat smooth	safe edge 200 mm	4 Nos.
11	File half round bastard	300 mm	4 Nos.
12	File half round smooth	250 mm	4 Nos.
13	File triangular smooth	200 mm	4 Nos.
14	File round bastard	250 mm	4 Nos.
15	File square smooth	250 mm	4 Nos.
16	Knife edge file	150 mm	4 Nos.
17	Needle file assorted (12 nos.)	150 mm	4 Nos.
18	File card (spattle)		4 Nos.
19	Scraper flat	250 mm	4 Nos.
20	Hammer Ball Peen	0.5 kg with handle	4 Nos.
21	Hammer Cross Peen	0.75 kg with handle	4 Nos.
22	Chisel cold flat	18 x 150 mm	4 Nos.
23	Chisel Cross Cut	10 x 3 x 200 mm	4 Nos.
24	Chisel Half Round	10 x 250 mm	4 Nos.
25	Chisel diamond point	10 x 200 mm	4 Nos.
26	Scribing block	300 mm	4 Nos.
27	Cast Iron Surface plate	300 x 300 mm	1 No.
28	Granite Surface plate	450 X 450 X 80 mm minimum	1 No.
29	Tap extractor	3 mm to 12 mm x 1.5 mm (ezzy out)	3 set
30	Screw extractor	sizes 1 to 8	3 set
31	Hand Taps and dies	Stock metric 5 mm to 12 mm complete set in a box	2 sets
32	Bench Vice	100 mm jaw	24+1 Nos
33	Machine reamer	set up to 12 mm	2 sets
34	Machine tap set	upto M12mm ( with std. pitch )	2 sets
35	Twist Drill	straight Shank $\varnothing$ 5 to $\varnothing$ 12 mm in steps of 0.5 mm	2 sets
36	Twist Drill	straight Shank $\varnothing$ 8 mm to $\varnothing$ 12 mm in steps of 2 mm	2 sets
37	Taper shank drills	$\varnothing$ 6 mm to $\varnothing$ 20 mm in steps of 1mm	2 sets
38	D.E spanners	3-4 , 6-8, 10-12, 13-14, 15-16, 18-19, 20-22, 24-26 (8-spanners)	2 sets
39	Letter punch	5 mm set	2 sets
40	Number punch	5 mm set	2 sets
41	Parallel block Standard sets		2 sets
42	Allen key metric	3 to 12 mm set	4 sets
43	Centre drills	3, 4, 5 mm	4 each
44	Parallel hand reamer	6 mm to 12 mm in steps of 1 mm with handle	4 sets.

45	Star dresser		1 No.
46	Diamond dresser with holder		2 Nos
47	Surface gauge		2 Nos.
48	Angle plate-adjustable	250x250x300 mm	2 Nos.
49	Micrometer –inside – outside	depth range up to 75mm each	3 sets
50	Vernier caliper with 0.02mm least count	150mm and 200 mm each	4 Nos.
51	Digital Vernier caliper	150mm and 200mm each	1 No each
52	Digital micrometer ( inside, outside and depth )		1 No
53	Height Gauge	300mm with 0.02 mm least count	1 no.
54	Vernier bevel protractor	150 mm blade	1 no.
55	Sine bar and Sine Centre each		1 No each
56	Sprit level		1 No.
57	Slip gauge set ( STD )		1 Set
58	Magnetic stand	magnetic base 60 x 47.5 mm and with universal swivel clamp, dial holding rod (150 mm) scriber	2 Nos
59	Dial test indicator	Lever type- Range 0-0.8 mm – Graduation 0.01mm, reading 0-50-0 with accessories	2Nos
60	Dial test indicator	Plunger type-Range 0-10 mm , Graduation 0.01 mm, Reading 0-100 with revolution counter	2 Nos.
61	Bore gauge	dial indicator (1 mm range, 0-0.01 mm graduation)-Range of bore gauge 18-70 mm	1 set
62	Straight edge-Single beveled	Size 150 mm and 250 mm each	1 No
63	Tool maker's clamp	50 mm and 75 mm each	4 Nos.
64	C – clamp-	50 mm and 75 mm	4 Nos.
65	Bearing Puller	10 mm to 100 mm	2 Nos.
66	Ammeter	0 - 500mA	3Nos.
67	Ammeter	0 – 1 Amp DC	3Nos.
68	Voltmeter	0 – 300/600V AC	4Nos.
69	PF Meter		2 Nos.
70	Phase Sequence Meter		2 Nos.
71	Digital multi Meter	2.5 Amps / 5Amps	3 Nos.
72	Energy meter, Single / Three phase		2 Nos.
73	Clamp on meter	0 – 50 Amps	2 Nos.
74	Ammeter portable type	0 – 15 Amps AC	4 Nos.
75	Test lamp		3 Nos.
76	Tong-Tester		3 Nos.
77	Line Tester		5 Nos.
78	Batter Tester		4 Nos.

79	Electrician Tool Kit		3 Nos.
80	Rechargeable Battery		5 Nos.
81	Pressure Transducers panel board to demonstrate pressure gauge, Load cell, Bourdon tube, Capacitive transducers.		5 Nos.
82	Flow Transducers panel board to demonstrate Flow nozzle, Vane Anemometer, Rota meter.		5 Nos.
83	Temperature Transducers panel board to demonstrate Bimetallic strip, RTD, Thermocouple, Thermistor.		5 Nos.
84	Level Transducers panel board to demonstrate capacitive and float switch.		5 Nos.
85	Insulated Screw Driver	200 mm	5 Nos.
86	Insulated combination cutting plier	200 mm	5 Nos.
87	Small Screw Driver		5 Nos.
<b>C. TOOLS &amp; EQUIPMENT OF ELECTRICAL &amp; SENSORS</b>			
<b>i) Electrical</b>			
88	Digital Multimeter	0 – 400 Volt	2 nos.
89	Variable Resistance Box, Resistors	With 220 $\Omega$ , 150 $\Omega$ , 1k $\Omega$ , 33 $\Omega$ , 100 $\Omega$ , 1.2 $\Omega$	1 each
90	9V DC Battery With Cap		1 no.
91	Dual Power Supply	(230V, 50Hz, Fuse-800mA)	1 no.
92	Solder Iron, Solder Lead, PCB Board (Groove Board), Solder Wick		1 set
93	Inductor	(400 Turns, 200 Turns, 600 Turns, 1200 Turns) , I-Core , E-Core, U-Core, Laminated Core	1 each
94	Relay, LED	(5V)	1 no.
95	Function Generator	(230V, 50Hz, Watts-12VA, Fuse-150mA)	1 no.
96	Bread Board		1 no.
97	Synchronous Motor, Capacitor For Synchronous Motor	(240V, 60rpm), (0.8mf $\pm$ 5% 450 VAC)	2 nos.
98	Power Chord, Connecting Probes, Single Strand & Multi strand		1 each

	Wires		
<b>ii) Sensors</b>			
99	Power Supply	(0-30V DC, 3A)	1 no.
100	Sensor Kit		1 set
	i. Mounting Plate		
	ii. Power Distribution Box	(24V DC, 4A)	
	iii. Counter Box	(10-30V DC/0.05A)	
	iv. Indication Box	(24V Dc)	
	v. Material Box		
	vi. Inductive Sensor	(10-30 V DC, PNP, NO, 5mm (Range))	
	vii. Capacitive Sensor	(10-30 V Dc, PNP, NO, 2-8mm(Range))	
	viii. Magnetic Sensor	(10-60 V DC , PNP, NO, 60mm Range))	
	ix. Ultrasonic Sensor	(20-30 V DC, PNP, NO, 80-300mm (Range))	
	x. Connecting Wires		
xi. Motor With Control Unit	(24V DC,1A)		
<b>D. MECHATRONICS LAB OUTFIT</b>			
1	Discrete component tester Trainer kit		2 nos.
2	Analog circuit trainer kit		3 nos.
3	Soldering and de soldering Station		5 nos.
4	Power Electronic Trainer	(with all components for performing control rectifiers, Converter, Inverter experiments)	2 nos.
5	AC Squirrel cage Induction Motor	DOL Starter and star –Delta starter assembly	1 no.
6	DC motor Trainer board.		1 no.
7	Auto transformer	0 – 300 v, 8 Amp	2 nos.
8	C.R.O , 50 M Hz		2 nos.
9	Digital and Analog IC Tester		1 each
10	Digital Tachometer		2 nos.
11	Signal Generator		2 nos.
12	DC Power supply unit	0 - 30 v , 2 Amps	4 nos.
13	Digital Earth Tester		1 No.
14	Firefighting equipment		As required
15	Linear IC Trainer Kit		1 No.
16	AC / DC Motor speed control trainer kit		1 No. each
17	Optical Transducer Trainer kit.		2 Nos.
18	Simple Servomotor trainer kit.		2 Nos.
19	Simple stepper motor trainer		2 Nos.

	kit.		
20	Linear scale setup for positional accuracy check		1 No.
21	A/D and D/A Trainer kit		1 No
22	UPS		As required
23	Stabilizer Trainer kit		1 No
24	AC Drive		4 Nos.
25	DC Drive		1 No.
26	Digital circuits trainer Kit.		2 Nos.
27	8051 Microcontroller trainer board with LED, Switches, Buzzer, DC motor and Stepper motor interfacing circuits.		3 Nos.
28	PLC and HMI Training Kit	Annexure 3	2
29	Encoder Trainer Kit		1 No.
30	Panel Wiring Work bench		3 Nos.
31	Protection Devices Trainer Board.		1 Nos.
32	Limit switch, Pressure switch, Micro switch, Float switch, Foot switch		2 each
33	Application trainer kit of proximity sensor, float switch, and reed switch.		1 No
34	LVDT Trainer kit.		2 Nos.
35	Actuators Application Trainer (Servo, stepper motor, and Solenoid)		1 No
36	Simple Servomotor trainer kit.		1 No.
37	Simple stepper motor trainer kit.		1 No.
38	Piezoelectric transducer/actuator trainer kit.		1 No.
39	Electro-Pneumatic control trainer kit using PLC with required components.	Annexure 1	1
40	Electro-Hydraulic control trainer kit using PLC with required components.	Annexure 2	1
41	Linear scale setup for positional accuracy check		2 Nos.
<b>E. GENERAL SHOP OUTFIT</b>			
42.	Sensitive drilling machine	Capacity 12 mm Motorized –with drill chuck and key with Standard and optional accessories.	1No.



43.	Pillar/column type Drilling machine	25 mm capacity-motorized with drill chuck and Key with Standard and optional accessories.	1No.
44.	Power hacksaw machine	21" or more length blade with Standard and optional accessories.	1 No.
45.	Double ended Pedestal Grinder	178 mm wheels(one fine and one rough wheel)	1 No.
46.	SS and SC centre lathe (all geared) with minimum specification as:	Centre height 150 mm and centre distance 1000 mm along with 3 and 4 jaw chucks, Auto feed system, safety guard, taper turning attachment, motorized coolant system, lighting arrangement with standard accessories and optional accessories with set of cutting tools	1 No.
47.	Shearing machine (lever type) hand operated complete	300 mm blade length.	1 No.
48.	Universal Milling Machine	Standard and optional accessories and set of cutters.	2 Nos.
49.	Horizontal and Vertical milling machine	Standard and optional accessories and set of cutters each.	1 Set
50.	Hydraulic Surface Grinding Machine	standard and optional accessories and set of wheels	1 No.
51.	Universal cylindrical grinding machine	Standard and optional accessories and set of wheels.	1 No.

## Annexure 1: Advance Electropneumatic Training

Description	Qty
<b>Structure</b>	
Advance Pneumatic Trainer Base with Aluminum extrusion based work surface (Double Sided) of 1200mm x 900mm. MDF based wooden base of 1200mm x 800mm. MS based structure with castor wheels and load bearing capacity of 300 KG	<b>1</b>
<b>Basic Pneumatic Module 1</b>	
FRL Unit with Pressure Gauge	1
Junction Box with 8 ports	2
Isolation box with 8 ports	1
Three Way Two Position Hand Slide Valve	1
Two way Flow control valve	4
Single acting cylinder (Stroke: 50 mm, with One Way Flow Control Valve)	1
Double acting cylinder (Stroke: 200mm, with One Way Flow Control Valve)	2
PU Tube Dia 6mm - Blue Color	10 Meter
PU Tube Dia 6mm - Red Color	10 Meter
PU Tube Dia 6mm - Black Color	10 Meter
Blanking Plug Dia 6	12
Union Tee Dia 6mm	5
Union Y Dia 6mm	5
Tube Cutter	1
<b>Basic Pneumatic Module 2</b>	
Two Pressure Valve	2
Shuttle Valve	2
Quick Exhaust Valve	1
Three Way Two Position Way Push Button (Three Port) Valve	2
Three Way Two Position Knob Operated Direction Control Valve (NC Type)	1
Three Way Two Position Roller Operated Direction Control Valve (NC Type)	2
Five Way Two Position Mushroom Head Switch Operated Direction Control Valve	1
Five Way Two Position Lever Operated Direction Control Valve	1
Five Way Two Position Lever Operated Direction Control Valve (Spring Return)	1
Five Way Three Position Lever Operated Direction Control Valve	1
<b>Basic Pneumatic Module 3</b>	
Three Way Two Position Pilot Operated Direction Control Valve (NC Type)	1
Five Way Two Position Single Pilot Direction Control Valve	1
Five Way Two Position Double Pilot Direction Control Valve	4
Five Way Three Position Double Pilot Direction Control Valve	1
Three Way Two Position idle return Valve	1
<b>Basic Pneumatic Module 4</b>	
Pneumatic Motor	1
Pressure Regulator	1
Vacuum generator	1
Vacuum Cup	1
Vacuum Generator based pick and drop assembly module	1
Three Way Two Position Time Delay Valve	1

<b>Design and Circuit Simulation software:</b>	
Software should be able to simulate / design a complete pneumatic circuit	01 Seat
All components used in the trainer kit should be available in the software library	
Students should be able to design a Pneumatic circuit that they are executing on the Pneumatic trainer kit	
Software should completely simulate the circuit and mention the flaws in the designed circuit	
An exe file should be generated of the simulated Pneumatic circuit which can be opened on any computer (Even on computers without the license of this software)	
All circuits performed on the training kit should be dynamically demonstrated on the software. Students should be able to simulate the circuits on the software before executing them on the hardware kit.	
Software License Type: (perpetual)	
<b>Advance Pneumatics (Electropneumatic) Module 1</b>	
Three Way Two Position Solenoid Operated Direction Control Valve (NC Type)	1
Five Way Two Position Single Solenoid Direction Control Valve	1
Five Way Two Position Double Solenoid Direction Control Valve	3
Five Way Three Position Double Solenoid Direction Control Valve	1
Magnetic Reed Switch with bracket for Cylinders	6
Digital Pressure Switch with Analog Output	1
<b>Advance Pneumatics (Electropneumatic) PLC Based operation module</b>	
PLC with 24 digital inputs and 16 digital outputs	1
Power supply and control panel for PLC	1
Control panel box with mounting for Advance Electropneumatic Training Kit (1200 x 400 x 300mm)	1
PLC Input module with input override switches (24 inputs)	1
Field input module (24 inputs)	1
PLC output module (24 outputs)	1
Field output module (24 outputs)	1
Remote operation unit with 2 selector switches, 2 push buttons and 2 mushroom head switches	1
2mm Patch cord connector set	1 set
<b>Workstation with Simulation software and licensed PLC software</b>	
Intel Mother board Computer with 21 inch LED Monitor (Acer / Dell) and bluetooth keyboard and mouse	1
Pneumatic circuit design and simulation software with perpetual license	1
Software should be able to simulate / design a complete pneumatic circuit	01 Seat
All components used in the trainer kit should be available in the software library	
Students should be able to design a Pneumatic circuit that they are executing on the Pneumatic trainer kit	
Software should completely simulate the circuit and mention the flaws in the designed circuit	
An executable file should be generated of the simulated Hydraulic circuit which can be opened on any computer (Even on computers without the license of this software)	
All circuits performed on the training kit should be dynamically demonstrated on the software. Students should be able to simulate the circuits on the software before	

executing them on the hardware kit.

Software License Type: (perpetual)

Necessary interface for direct operation of training kit from simulation software (Dynamic realtime simulation and operation). Software should be able to upload the PLC ladder directly without any other software.

#### **Compressor**

1HP, 50 Ltr capacity Twin cylinder Silent Compressor (Single Phase Supply)	1
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#### **Automation Module - Color based sorting with conveyor**

Rotary Motor with Sorting Arm (16mm Bore)	1
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Rejection Bin	1
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Guided Cylinder	1
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Vacuum Generator with Vacuum Cup	1
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Rotary Motor (20mm Bore)	1
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Color Sensor	1
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Guided Cylinder for job loading (60mm) - Auto Loader	1
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Photo Sensor for job loading	1
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Photo Sensor for job unloading	1
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Conveyor 70 x 500mm	1
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AC Motor for Conveyor Drive with Gearbox	1
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Sorting Bin (Vertical)	1
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#### **Manuals for Advance(Electro) Pneumatics**

Operation Manual	1
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Electrical Connection Manual	1
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Experiment Manual with at least 35 experiments	1
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#### **IIOT Module - HMI**

IIOT HMI with remote operation facility and 2 GB cloud space (Perpetual) should be provided.	1
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User should be able to operate the entire kit from a mobile / tab / computer from anywhere in the world (Necessary internet connection will be provided by the institute
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IIOT HMI should be Wifi Enabled
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## Annexure 2: Advance Electrohydraulic Training

Description	Qty
Advance Hydraulic Trainer Base with Aluminum extrusion based work surface (Double Sided) of minimum dimensions:	<b>1</b>
Horizontal work area on front face : 1200mm x 450mm	
Horizontal work area on back face : 1200mm x 450mm	
Vertical work area on front face : 1200mm x 720mm	
Vertical work area on back face : 1200mm x 720mm	
MS based structure with castor wheels and load bearing capacity of 380 KG	
Drip Tray: 1200mm x 850mm	
<b>Hydraulic Power Pack Module</b>	
Hydraulic tank with 60 Litre capacity, Oil cleanliness: Level 8	1
Three Phase flange mounted electric motor 2 HP -1500 rpm	1
Gear Pump (Flow Rate: 8 LPM, Max Pressure: 70 Bar)	1
Pressure Gauge 0 to 100 Bar, Glycerin filled, 2 inch	2
Pressure Relief Valve (Subplate Mounted) with Locking Arrangement	1
Suction Line Filter	1
Return Line Filter	1
Pressure Line Manifold with 4 Ports (Hard piped with powerpack and mounted on the front work surface)	1
Pressure Line Manifold with 2 Ports (Hard piped with powerpack and mounted on the rear work surface)	1
Return Line Manifold with 4 Ports (Hard piped with powerpack and mounted on the front work surface)	1
Return Line Manifold with 2 Ports (Hard piped with powerpack and mounted on the rear work surface)	1
Test Line Manifold with 2 Ports (Hard piped with powerpack and mounted on the front work surface)	1
Pressure Gauge 0 to 100 Bar, Glycerin filled, 4 inch	1
Tray for Hydraulic Powerpack	1
<b>Basic Hydraulic Module 1</b>	
Pressure Relief Valve (Direct operated relief valve)	2
Flow Control Valve (Non Pressure Compensated) with Check Valve .	2
Flow Control Valve (Pressure Compensated) with Check Valve	1
Four way Three position manually operated direction control valve - Tandem Center	2
Four way Three position manually operated direction control valve - Closed Center	1
Three way Two position manually operated direction control valve - Closed Center	1
Vertical Weight loading arrangement for hydraulic cylinder	1 set
Set of weights for loading arrangement	1 set
Single Acting Cylinder (Stroke: 100mm, Dia: 25mm, Test Pressure: 70 Bar)	1
Double Acting Cylinder (Stroke: 200 mm minimum Test Pressure 130 Bar)	2
Proximity Sensor Assmbly for Hydraulic Cylinder	6
Cut Section models for Hydraulic components	1
1. Double Acting Hydraulic Cylinder	
2. Pressure Relief Valve	

Direction Control Valve	
<b>Basic Hydraulic Module 2</b>	
Hydraulic Motor Bidirectional .	1
Needle Valve	2
Pressure Sequence Valve	1
Pressure Reducing Valve	1
Four way Two position manually operated direction control valve	1
Check Valve Direct Operated	1
Single Pilot Operated Check Valve	1
<b>Manuals for Basic Hydraulics</b>	
Operation Manual (Basic Hydraulics)	1
Experimentation Manual (Basic Hydraulics)	1
Hydraulics Text Book (Basic Hydraulics)	1
<b>Advance Hydraulics (Electrohydraulic) Module 1</b>	
Pressure Switch	1
Four Way Three Position Double solenoid operated direction control valve	3
Four Way Two Position Single solenoid operated direction control valve	1
<b>Advance Hydraulics (Electrohydraulic) PLC Based operation module</b>	
PLC with 24 digital inputs and 16 digital outputs. Perpetual License to operate the PLC.	1
Power supply and control panel for PLC	1
Control panel box with mounting for Advance Electrohydraulic Training Kit (1200 x 400 x 300mm)	1
PLC Input module with input override switches (24 inputs)	1
Field input module (24 inputs)	1
PLC output module (24 outputs)	1
Field output module (24 outputs)	1
Remote operation unit with 2 selector switches, 2 push buttons and 2 mushroom head switches	1
2mm Patch cord connector set	1 set
<b>Workstation with Simulation software and licensed PLC software</b>	
Intel Mother board Computer with 21 inch LED Monitor and bluetooth keyboard and mouse	1
Hydraulic circuit design and simulation software with perpetual license	01 Seat
Software should be able to simulate / design a complete hydraulic circuit	
All components used in the trainer kit should be available in the software library	
Students should be able to design a Hydraulic circuit that they are executing on the Hydraulic trainer kit	
Software should completely simulate the circuit and mention the flaws in the designed circuit	
An executable file should be generated of the simulated Hydraulic circuit which can be opened on any computer (Even on computers without the license of this software)	
All circuits performed on the training kit should be dynamically demonstrated on the software. Students should be able to simulate the circuits on the software before executing them on the hardware kit.	
Software License Type: (perpetual)	

Necessary interface for direct operation of training kit from simulation software (Dynamic realtime simulation and operation). Software should be able to upload the PLC ladder directly without any other software.	
<b>I IOT Module</b>	
I IOT HMI with remote operation facility and 2 GB cloud space (Perpetual) should be provided.	1
User should be able to operate the entire kit from a mobile / tab / computer from anywhere in the world (Necessary internet connection will be provided by the institute	
I IOT HMI should be Wifi Enabled	
<b>Mobile Hydraulics Module - Proportional Direction Control Valve (Hydraulic Steering)</b>	
This module should be designed to offer understanding as well as hands on experience of proportional hydraulic direction control valve. Separate PLC should be provided along with this training module. Basic design is to convert the mechanical movement of steering into hydraulic movement of Bi - Direction Hydraulic motor.	
The movement as well as the speed of the movement of steering wheel should be transmitted to the hydraulic motor with the help of proportional valve and incremental encoders with necessary PLC ladder logic	
Minimum requirements:	
Hydraulic Proportional Direction Control Valve Acceptable Makes: EATON / YUKEN / Argo / Atos	
Incremental Encoder with minimum 1000 PPR	2
Mechanical steering with locking arrangement at every 30 degrees or less	1
Hydraulic Bidirection Motor with clear indication of rotation in degrees	1
PLC with necessary requirement of Digital Inputs - Outputs as well as Analog Inputs - Outputs	1

### Annexure 3: Detailed Specifications for PLC and HMI Training Kit

<b>Structure</b>	
Tabletop structure with minimum work surface of 800mm width and 600mm height. Aluminum extrusions for the complete height of the training kit with minimum cross section of 40mm x 120mm. Handles to be provided on both sides of the training kit. Mounting arrangement (Minimum 4 Qty) to be provided for rigidity during operation.	1
<b>Basic PLC Module</b>	
Siemens S7 1200 / Mitsubishi FX / Allen Bradley Micro Logix	1
Perpetual Operating software for PLC and HMI (1 of the 3. The software should be supplied in accordance with the PLC and HMI. The software should be able to operate the PLC). Software supplied should be of the same make as of PLC.	1
One of the following three HMIs to be supplied: Siemens KTP 700 / Mitsubishi GS 700 / Allen Bradley Panel View 800	1
Perpetual software to operate the supplied HMI. Software should be of the same make as of HMI.	1
5 port industrial Ethernet switch (Unmanaged) with 24V input supply. Switch should be of the same make as of PLC and HMI.	1
Power supply and control panel for PLC	1
PLC Input module with input override switches (24 inputs)	1
Field input module (24 inputs)	1
PLC output module (24 outputs)	1
Field output module (24 outputs)	1
2mm Patch cord connector set	1
Profinet cable for PLC to switch communication	1
Profinet cable for HMI to switch communication	1
<b>Sensor Module (Digital)</b>	
Capacitive Sensor (PNP, NO Type)	1
Photo Sensor (PNP, NO Type)	1
Proximity Sensor (PNP, NO Type)	1
Proximity Sensor (PNP, NC Type)	1
<b>Switchgear Module</b>	
Push Button (NO Type)	2
Push Button (NC Type)	2
Selector Switch (NO Type)	1
Selector Switch (NC Type)	1
Emergency Switch (Mushroom Head)	1
Mushroom Head Push Button (For Both Hand Operation)	1
Indicators (Red and Green)	1
Buzzers	1
<b>Automation Module: Pneumatic Operation with Solenoid valves and Cylinders</b>	
Double Acting Solenoid Valve	3
Single Acting Solenoid Valve	1
Double Acting Pneumatic Cylinder (Stroke: 30mm)	3
Pneumatic Motor	1
Hand slide valve for Pneumatic connection	1



Pneumatic Junction box (5 Port)	1
Pneumatic Pushpull connectors for pneumatic components	1 set
<b>Automation Module: Pneumatic Pressure Switch Application (Analog Control)</b>	
Pneumatic Pressure Switch with digital display and analog output	1
5/3 Way hand lever operated pneumatic valve	1
5/2 way double acting solenoid valve	1
Double acting cylinder with reed switches	1

**Compressor:**

Compressor with minimum 7 Ltr tank capacity should be supplied along with the training kit

**Work Table:**

Necessary work table in MDF with minimum dimensions of 1200mm x 750mm x 750mm (Height) along with castor wheels and brakes should be provided along with the system

### Technical Specifications for WELDER Lab

SI No	Name of the Tools & Equipment	Specifications	Quantity
<b>A. TRAINEES TOOL KIT</b>			
1	Welding helmet fiber		21
2	Welding hand shield fiber		21
3	Chipping hammer	with metal handle 250 Grams	21
4	Chisel cold	flat 19 mm x 150 mm	21
5	Centre punch	9 mm x 127 mm	21
6	Dividers	200 mm	21
7	Stainless steel rule	300mm	21
8	Scriber	150 mm double point	21
9	Flat Tongs	350mm long	21
10	Hack saw frame	fixed 300 mm	21
11	File half round	bastard 300 mm	21
12	File flat	350 mm bastard	21
13	Hammer ball pane	1 kg with handle	21
14	Tip Cleaner		21
15	Try square	6"	21
<b>B. INSTRUMENTS AND GENERAL SHOP OUTFIT</b>			
16	Spindle key		4
17	Screw Driver	300mm blade and 250 mm blade	1 Each
18	Number punch	6 mm	2 Set
19	Letter punch	6 mm	2 Set
20	Magnifying glass	100 mm dia.	2 Nos
21	Universal Weld measuring gauge		2 Nos
22	Earth clamp	600A	6 Nos
23	Spanner D.E.	6 mm to 32mm	2 Set
24	C-Clamps	10 cm and 15 cm	2 Each
25	Hammer sledge	double faced 4 kg	1 No
26	S.S tape	5 meters flexible in case	1 No
27	Electrode holder	600 amps	6 Nos
28	H.P. Welding torch	with 5 nozzles	2 Sets
29	Oxygen Gas Pressure	regulator double stage	2 Nos
30	Acetylene Gas Pressure	regulator double stage	2 Nos
31	CO2 Gas pressure regulator	with flow meter	2 Set
32	Argon Gas pressure regulator	with flow meter	2 Set
33	Metal rack	182 cm x 152 cm x 45 cm	1 No
34	First Aid box		1 No
35	Steel lockers	with 8 Pigeon holes	2 Nos
36	Steel almirah / cupboard		2 Nos
37	Black board and easel with stand		1 No
38	Flash back arrester (torch mounted)		4 Pairs
39	Flash back arrester (cylinder		4 Pairs

mounted)

**GENERAL SHOP OUTFIT**

40	Welding Transformer	with all accessories (400A, OCV 60–100 V, 60% duty cycle)	1 Set
41	Welding Transformer (or) Inverter based welding machine	with all accessories (300A, OCV 60 – 100 V, 60% duty cycle)	1 Set
42	D.C Arc welding rectifiers set with all accessories	(400 A. OCV 60 – 100 V, 60% duty cycle )	1 Set
43	GMAW welding machine	400A capacity with air cooled torch, Regulator, Gas pre-heater, Gas hose and Standard accessories	1 Set
44	AC/DC GTAW welding machine	with water cooled torch 300 A, Argon regulator, Gas hose, water circulating system and standard accessories.	1 Set
45	Air Plasma cutting equipment	with all accessories, capacity to cut 12 mm clear cut	1 Set
46	Air compressor suitable for above air plasma cutting system.		1 No
47	Auto Darkening Welding Helmet		2 Nos
48	Spot welding machine	15 KVA with all accessories	1 Set
49	Portable gas cutting machine	capable of cutting Straight & Circular with all accessories	1 Set
50	Pedestal grinder fitted with coarse and medium grain size grinding wheels	300 mm dia.	1 No
51	Bench grinder fitted with fine grain size silicon carbide green grinding wheel	150 mm dia.	1 No
52	AG 4 Grinder		2 Nos
53	Suitable gas welding table	with fire bricks	2 Nos
54	Suitable Arc welding table	with positioner	6 Nos
55	Trolley for cylinder (H.P. Unit)		2 Nos
56	Hand shearing machine capacity	cut 6 mm sheets and flats	1 No
57	Power saw machine	14''	1 No
58	Portable drilling machine	(Cap. 6 mm)	1 No
59	Oven, electrode drying	0 to 350°C, 10 kg capacity	1 No
60	Work bench	340x120x75 cm with 4 bench vices of 150 mm jaw opening	4 Sets
61	Oxy Acetylene Gas cutting blow pipe		2 Sets
62	Oxygen, Acetylene Cylinders **		2 Each
63	CO2 cylinder **		2 Nos
64	Argon gas cylinder **		2 Nos
65	Anvil 12 sq. inches working area with stand		1 No
66	Swage block		1 No

67	Die penetrant testing kit		1 Set
68	Magnetic particle testing Kit #		1 Set
69	Fire extinguishers (foam type and CO2 type)		1 No
70	Fire buckets with stand		4 Nos
71	Portable abrasive cut-off machine		1 No
72	Suitable Gas cutting table		1 No
<b>C. CONSUMABLE</b>			
73	Leather Hand Gloves	14"	20 Pairs
74	Cotton hand Gloves	8"	20 Pairs
75	Leather Apron leather		20 Nos
76	S.S Wire brush	5 rows and 3 rows	20 Nos each
77	Leather hand sleeves	16"	20 Pairs
78	Safety boots for welders		20 Pairs
79	Leg guards leather		20 Pairs
80	Rubber hose clips	½"	20 Nos
81	Rubber hose oxygen	8 mm dia X 10 Mtr. long as per BIS	2 Nos
82	Rubber hose acetylene	8 mm dia X 10 Mtr. long as per BIS	2 Nos
83	Arc welding cables multi cored copper	400/ 600 amp as per BIS	45 Mts Each
84	Arc welding single coloured glasses	108 mm x 82 mm x 3 mm. DIN 11A &12 A	34 Nos
85	Arc welding plain glass	108 mm x 82 mm x 3 mm.	68 Nos
86	Gas welding Goggles	with Colour glass 3 or 4A DIN	34 Nos
87	Safety goggles plain		34 Nos
88	Spark lighter		6 Nos
89	AG 4 Grinding wheels		10 Nos
<b>D. Automated and AI - VR Based Welding Lab</b>			
90	Welding Simulator	Annexure 1	2

## Annexure 1: Detailed Specifications for Welding Simulator

Description	Specifications
Simulation Methodology	Augmented Reality
Base Material	Carbon Steel, Stainless Steel, Aluminium
Welding process	GMAW/MIG, GTAW/TIG, SMAW, FCAW-G/S
Real Torches and Helmet	3 torches , GMAW, GTAW, SMAW
Hyperrealsim	Yes
Welding joints	T , Lap, Butt , Pipe to plate and Pipe to Pipe.
Position	1F to 6F and 1G to 6G.
Screen	HDMI external screen can be attached
Real Torches and Helmet	Yes
work piece parameter	Work angle, travel angle, speed, CTWD
Difficulty level-	Beginner, Intermediate and Advance
Language of Unit	English , Hindi
Connectivity	Wi-Fi/ LAN
Provision of Multi pass	Yes
Polarity selection option	DC and AC
Ability to track complete history of students	Yes
Evaluation results	Marks or graphs or both. Software must suggest pass/fail after completion of each course
Input Supply	220-240 V, AC , 1 Ph , 50-60 Hz
Bend TEST	Yes
Replay of practice	Yes
Learning Management System - 1. Teacher and Student access . 2. Monitor the progress of student. 3. Realtime monitoring of the student. 4.Anylysis tool. 5.Welding curricular etc	Yes

## Technical Specifications for IoT TECHNICIAN (SMART CITY) (INTERNET OF THINGS)

### List of Tools & Equipment

#### IoT TECHNICIAN (SMART CITY) (For batch of 24 candidates)

Sl. No.	Name of the Tools and Equipment	Specification	Quantity
<b>A. TRAINEES TOOL KIT</b> ( For each additional unit trainees tool kit Sl. 1-12 is required additionally)			
1	Connecting screwdriver	10 X 100 mm	12 Nos.
2	Neon tester 500 V.	500 V	8 Nos.
3	Screwdriver set	Set of 7	12 Nos.
4	Insulated combination pliers	150 mm	8 Nos.
5	Insulated side cutting pliers	150mm	8 Nos.
6	Long nose pliers	150mm	8 Nos.
7	Soldering iron	25 Watt, 240 Volt	12 Nos.
8	Electrician knife	100 mm	8 Nos.
9	Tweezers	150 mm	12 Nos.
10	Digital Multimeter	(3 3/4 digit) ,4000 Counts	12 Nos.
11	Soldering Iron Changeable bits	15 Watt, 240 Volt	8 Nos.
12	De- soldering pump electrical heated, manual operators	230 V, 40 W	12 Nos.
<b>B. SHOP TOOLS, INSTRUMENTS</b> – For 2 (1+1) units no additional items are required			
<b>Lists of Tools:</b>			
13	Steel rule graduated both in Metric and English Unit	300 mm,	4 Nos.
14	Precision set of screw drivers	T5, T6, T7	2 Nos.
15	Tweezers – Bend tip		2 Nos.
16	Steel measuring tape	3 meter	4 Nos.
17	Tools makers vice	100mm (clamp)	1 No.
18	Tools maker vice	50mm (clamp)	1 No.
19	Crimping tool (pliers)	7 in 1	2 Nos.
20	Magneto spanner set	8 Spanners	2 Nos.
21	File flat bastard	200 mm	2 Nos.
22	File flat second cut	200 mm	2 Nos.
23	File flat smooth	200 mm	2Nos.
24	Plier - Flat Nose	150 mm	4 Nos.
25	Round Nose pliers	100 mm	4 Nos.
26	Scriber straight	150 mm	2 Nos.
27	Hammer ball pen	500 grams	1 No.
28	Allen key set (Hexagonal -set of 9)	1 - 12 mm, set of 24 Keys	1 No.
29	Tubular box spanner	Set - 6 - 32 mm	1 set.
30	Magnifying lenses	75 mm	2 Nos.
31	Continuity tester	With 4 ½ Digit Display and 20k Count	6 Nos.
32	Hacksaw frame adjustable	300 mm	2 Nos.
33	Chisel - Cold - Flat	10 mm X 150 mm	1 No.
34	Scissors	200mm	1 No.
35	Handsaw 450mm	Hand Saw - 450 mm	1 No.

36	Hand Drill Machine Electric with Hammer Action	13 mm	2 Nos.
37	First aid kit		1 No.
38	Bench Vice	Bench Vice - 125 mm	1 No. each
		Bench Vice - 100 mm	
		Bench Vice - 50 mm	
<b>List of Equipments</b>			
39	Multiple Output DC regulated power supply	0-30V, 2 Amps, $\pm 15V$ Dual Tracking, 5V/5A, Display digital, Load & Line Regulation: $\pm (0.05 \% + 100 \text{ mV})$ , Ripple & Noise: 1 mV rms. Constant Voltage & Current operation	4 Nos.
40	DC Regulated Variable Programmable DC Power Supply	0-30V/3A with numeric keypad, PC interface and LCD for Voltage, Current & Power	2 Nos.
41	LCR meter (Digital) Handheld	It can Measure six basic parameters R,C,L equipped with SMD Component Test Fixture	1 No.
42	70 MHz Mixed Signal Oscilloscope ( 4 Analog + 16 Digital Channel )	With more than 20Mpt memory Real time Sampling 1GSa/sec , having LAN Interface with, I2C , SPI, Runt etc .. And RS232/UART, I2C and SPI trigger decoding functions , two channel 25MHz awg plus math functions like differentiation, integration, abs, AND,OR,NOT etc.	1 No.
43	25 MHz Arbitrary Waveform Generator with Digital Display for Frequency and Amplitude	Two Channel , 200MSa/Sec and 2Mpt memory with more than 150 different arbitrary waveforms and built-in 8 <sup>th</sup> order harmonic generation and 150MHz Frequency counter PC Connectivity USB Device/Host and LAN	1 No.
44	6 1/2 Digit Digital Multimeter	Measurement Functions: DC & AC Voltage, DC & AC Current, 2-wire & 4-wire Resistance, CAP, Diode, Connectivity, Frequency, Period, Any Sensor. Temperature: RTD, THERM, TC (B/E/J/K/N/R/S/T) PC Interface USB Host, USB Device, LAN(LXI- C) Measurement Speed 10k readings/sec	1 No.
45	3GHz Spectrum Analyzer with built-in Tracking Generator	Frequency Range 9 kHz to 3.2 GHz Resolution Bandwidth(-3 dB): 10 Hz to 1 MHz Built in tracking generator Min. -148 dBm DANL Display 8" TFT or more PC Interface: USB Host & Device, LAN(LXI)	1 No.
46	Multi Function Test & Measuring Tool for Field Applications and Testing compatible with Laptop	300 MHz Bandwidth 2 Channel Digital Storage Oscilloscopes, Spectrum Analyzer. Arbitrary Waveform Generator Sine 50MHz ,Square 15MHz, Triangle 100KHz , AM -FM Modulation, 16 Channel Logic Analyzer Frequency and Phase Meter USB 2.0/ 3.0 Interface	1No.
47	Electrical Safety Trainer	Demonstration of importance of earthing in any electrical device. Arrangement to study role of fuse and types of slow blow, high blow fuse in any electronic circuit. Arrangement to study the importance of MCB and it's working.	1No.
48	Analog Component Trainer with following Seven Basic Modules • Diode Characteristics (Si, Zener, LED) • Rectifier Circuits • Diode as Clipper Circuit • Diode as Clamping Circuit • Zener as voltage regulator. • Transistor Type NPN & PNP and CE Characteristics • Transistor as a switch	Breadboard for Circuit design DC power supply: +5V, 1A (Fixed); +12V, 500mA (Fixed); $\pm 12V$ , 500mA (Variable) AC power Supply: 9V-0V-9V, 500mA Function Generator: Sine, Square, Triangle (1Hz to 100KHz) Modulating Signal Generator: Sine, Square, Triangle (1Hz to 10KHz). Voltage, current and frequency on board LCD display. PC Interface – Acquisition from two analog input channel Simulation Software	1 No.
49	Digital IC Trainer	Breadboard: Regular DC Supply: +5 V/1 A +12V/1A Clock Frequency 4 different steps from 1Hz – 100KHz Amplitude: (TTL), 128x64 Graphical LCD, Pulser Switches, Data Switches: 8 Nos, LED: 8 Nos. (TTL), Seven Segment Display, Teaching & Learning Simulation Software	1 No.

50	IT Workbench for computer hardware and networking	The bench comprises with Computer Hardware Training System (02 Nos.) The different circuit boards of PC/AT Computer are exposed on a PCB, LAN Training System with Wireless LAN as well to study Peer to Peer, STAR, RING Topology. Protocols: CSMA /CD, CSMA /CA, Stop N Wait, Go back to N, Selective repeat, Sliding Window, Token Bus, Token Ring, Colored representation of data in transmission & reception. Data transmission speed: 10/100 Mbps, Smart managed 3 Layer and 2 Layer Switch, Media converter, POE Switch, Wi-Fi LAN card, IP Camera, Energy meter, LED tube light, Voltmeter and Ammeter will be fitted. Networking Fundamentals Teaching Simulation Software DSO 50MHz 4 Channel , 1GSa/Sec ,more than 20 Mpt memory DSO DMM : 4 <sup>1/2</sup> Digit with LCD Display	1 No.
51	Laptop latest configuration		1 No.
52	Laser jet Printer		1 No.
53	Internet Broadband Connection		1 No.
54	Electronic circuit simulation software with five user licenses	Circuit Design and Simulation Software with PCB Design with Gerber and G Code Generation, 3D View of PCB, Breadboard View, Fault Creation and Simulation.	1 No.
55	Different types of electronic and electrical cables, connectors, sockets, terminations.		As required
56	Different types of Analog electronic components, digital ICs, power electronic components, general purpose PCBs, bread board, MCB, ELCB		As required
57	SMD Soldering & De soldering Station with necessary accessories	SMD Soldering & Desoldering Station Digitally Calibrated Temperature Control SMD Soldering & Desoldering Power Consumption: 60 Watts I/P Voltage : 170 to 270 V De-soldering : 70 Watt Temperature Range : 180 to 480° Centigrade Power Consumption : 270 Watts Hot Air Temperature : 200 to 550° Centigrade	1 No.
58	SMD Technology Kit	SMD component identification board with SMD components Resistors, Capacitors, Inductors, Diodes, Transistors & IC's packages. Proto boards with readymade solder pads for various SMD Components. SMD Soldering Jig.	1 No.
59	Microcontroller kits (8051) along with programming software (Assembly level Programming) With six important different application modules 1. Input Interface Switch, Matrix Keypad, ASCII Keypad 2. Display LCD, Seven Segment, LED Matrix 3. ADC & DAC 4. PC Interface module 5. Motor DC, Stepper, Servo 6. DAQ	Core 8051 MCU clocked at 11.0592 MHz., supporting both programming modes Keypad and computer ,LCD for both programming and run mode, ready to run programmer to support family of controllers AT89C52 ,DC Power Supplies +12V, -12V, +5V & -5V, Breadboard to make circuits, Learning content through simulation Software and following application modules 1. Input Interface : 4x4 Matrix Keypad, ASCII Key PAD, Four Input Switch 2. Display 16X2 LCD, Seven Segment, LED Bar Graph 3. ADC/DAC with ADC/DAC0808 4. PC Interface: RS232 & USB 5. Motor Drive: DC, Servo, Stepper 6. DAQ: 4ch analog 10bit, 22 DIO resolution,6MHz Frequency Counter (square wave), DAQ with PC interface software	1 No.
60	Sensor Trainer Kit Containing following Sensors a) Air humidity and Temperature b) RTD c) Atmospheric Pressure d) Air Quality e) Smoke Detector Sensors f) Limit Switch g) Photo sensors h) Capacitive	IoT enabled Android based 7" Graphical touch LCD with inbuilt cortex processor & DAQ for acquiring analog data and software for viewing the output waveforms with USB storage and HDMI output. Ethernet port to connect real world. Inverting, Non – Inverting, Power, Current, Instrumentation and Differential Amplifier, F to V, V to F, I to V, V to I Converter, High Pass and Low Pass Filter, Buffer, LED, Buzzer, LED Bar Graph, Touch Switch Included Sensors: RTD, NTC Thermistor, LM35,	2 Nos.



	displacement	Photovoltaic, Air humidity and Temperature, Gas (Smoke), Air Quality, Atmospheric Pressure, Limit switch, Capacitive displacement	
61	Different types of electronic and electrical cables, connectors, sockets, terminations.		As required
62	Different Microcontroller/Processor Training and Development Platform for AVR, PIC, ARM and Arduino.	MCU PIC16F877A , 4MHz, Onboard programmer will program PIC Devices, USB Port MCU ATMEGA8515 ,8MHz, onboard programmer will program ATMEGA series microcontroller, USB Port MCU LPC2148 , 12MHz,LED 8Nos, ADC 10 bit 10Nos, DAC 10bit ,USB and RS232, RTOS support, JTAG Connector, USB2.0,Onboard Zigbee, I2C,SPI,RTC,DC motor, PWM, Sensor LM35 , Display 16X2 LCD Display , Motor Drive: L293D 600mA (5-12V),Programmer USB Interface. Microcontroller ATmega328p ( <b>Arduino Based</b> ), 16MHz, Digital I/O Pins : 14 (of which 6 provide PWM output) , Flash Memory : 16KB (of which 2KB used by boot loader) Each platform should have Bread DC Power Supplies +12V, -12V, +5V & - 5V, Breadboard to make circuits.	1 No.
63	Internet of Things Explorer	Processor : 64bit ARMv7 with 1GB RAM , Memory 32GB ,OS: Open source Linux, Connectivity: Wireless LAN, Bluetooth, Zigbee, USB & Ethernet, HDMI interface, 1.77" Color TFT LCD , Driver for Stepper and DC Motor, six 16 bit Analog Input, RTC and 4-20mA input. Zigbee: 2.4GHz, Sensors: Temperature and Humidity, Air Quality, Soil Moisture, Ambient Light, Soil/Water temperature, PIR Sensor. GSM IoT Gateway -Quad-Band 850/900/1800/1900 MHz - GPRS multi-slot class, Control via AT commands. Explore physical and application layer protocols like RS232, RS485, GSM, Ethernet and MQTT, CoAP, HTTP, FTP. Cloud/server configuration includes HTML, Java, php and mySQL. IoT Node: Wireless 2.4GHz Zigbee, 5 Analog Inputs and at least 3 Digital Outputs, At least one I2C Channel, support OTA. Online Cloud/Server Services for 2 years.Battery 3.7V/4400mAH with Solar Panel, USB interface.	1 No.
64	Field Interface and Protocol Simulation Kit	A console including :Any Branded Desktop Computer with Windows Operating System 1. Ethernet Devices with Isolated Supply and port ▪ 4 AI(0.1% FSR), 4 AO (0-10VDC), Ethernet Port – Qty 1 ▪ 8 Relay Outputs, Ethernet Port – Qty 1 ▪ 8 Pulse Outputs, Ethernet Port – Qty 1 ▪ 8 Digital Inputs, Ethernet Port – Qty 1 ▪ 4 RS485 Slave ports, 1 Ethernet Port – Qty 4 2. 16 Port Ethernet Switch for networking of field ethernet devices 3. SMPS to power up multiple ethernet based field simulation devices 4. Required Connectors, Switches and LED indicators for Field Interface circuits such as Digital Inputs, Relay Outputs, Analog Inputs, Analog Outputs, Pulse Signals 5. Software ▪ Communication with simulation device on ethernet MODBUS TCP Protocol ▪ Field Interface simulation using HMI replica of Console for easy understanding of students ▪ Port Simulation – Serial Port Terminal, TCP/IP, UDP, HTTP ▪ Protocol Simulation – MODBUS RTU Master/Slave, MODBUS TCP Master/Slave, DLMS Client IoT Protocol Simulations – MQTT topic publish subscribe simulation	1 No.
65	Solar Power Lab	Solar PV Modules. Open Circuit Voltage Voc 10V, Short Circuit Current Isc.60m A Maximum Power Voltage (Vmp) 8.80V, Maximum Power Current (Imp): 0.57A, Batteries, Voltage 6V, 4Ah. Buck & Boost Converter, Dusk to Dawn Sensing, LCD for	1 No.

		Voltage and Current. Interactive Solar Training Software	
66	Solar PV Module Analyzer	Micro-controller Based with 16X2 LCD, PC Interface, mains & battery operated. Capable to measure Open Circuit Voltage and Short Circuit Current, Maximum Voltage and Current at Maximum Power DCV Range 0-50V, DCA Range 10A	1 No.
67	Wireless Communication modules for interfacing with microcontrollers a) RFID Card Reader b) Finger Print c) Zigbee d) GPS e) GSM f) Bluetooth g) WiFi	Core 8051 MCU clocked at 11.0592 MHz, supporting both programming modes Key Pad and PC ,LCD for both programming mode and run mode, ready to run programmer to support family of controllers AT89C51/52 & 55 ,DC Power Supplies +12V, -12V, +5V & -5V,Breadboard to make circuits, detailed learning content through simulation Software and following application modules : RFID Card Reader ,Finger Print, Zigbee, GPS, GSM, Bluetooth and WiFi	1 No.
68	Sensors for Smart EnvironmentApplication	All should be compatible with Sensor Training Platform & IOT Explorer mentioned above: CO2: Range: (0-2000ppm), O2 Range: (025%), Air Temperature & Humidity, Atmospheric Pressure, PM2.5 and PM10(UART and PWM output), Solar Radiation, UV Index, All Sensors should in IP65 Packing	1 No.
69	Sensors for Smart Parking	All should be compatible with Sensor Training Platform & IOT Explorer mentioned above: CCTV Camera , Motion Sensor, RFID, Relays, Hooter, Magnetic Hall Sensor, Ultrasonic, Application Software for SMART Dashboard	1 No.
70	Sensors for Smart Water & Waste water Management & Monitoring	All should be compatible with Sensor Training Platform & IOT Explorer mentioned above: Conductivity Sensor, PH Sensor Cupric (Cu <sup>2+</sup> ), Silver (Ag <sup>+</sup> ), Lithium (Li <sup>+</sup> ) with 10, 100 and 1000 ppm solution calibration kit. Level Sensor, Flow Sensor, Ultrasonic Sensor & Temperature.	1 No.
71	Weather Monitoring System	Temperature Range : -10°C to 90°C, Relative Humidity Operating Range 0 to 95% ,Wind Speed Sensor Speed : 0 to 20m/S Resolution 1m/S ,Wind Direction, Rainfall Bucket collector, Solar Radiation, UV Index, Atmospheric Pressure, Air Quality PM2.5, GSM based cloud connectivity, Application Software for Dashboard for remote monitoring and analysis. Power Supply Battery : 12V/42AH Solar Panel : 100W	1 No.
72	Smart Solar Street Lighting Training Platform	Microcontroller based Wireless connectivity using WiFi TFT LCD Display to display various parameters Connectivity: USB (04 nos.) The system should come with following Sensors Temperature, Humidity, Air Quality, PIR, and Auto diming Solar Panel: 40 W (01no), Polycrystalline type, Battery: SMF type for rating 12V, 26Ah (01 no) Charge Controller: PWM type LED Light: 10 Watt (01no) Application Software for SMART Street Light Dashboard	1 No.
73	IoT based Smart Streetlight System	1. IoT based Smart Streetlight Controller with Three Phase 415 VAC input, Single RS485 Communication Port, 4 Digital Inputs for Door sensors as well as contactor feedback, 3 Relay outputs for switching of streetlight circuits, Local Ethernet connectivity, SD Card Storage, Remote GSM/GPRS connectivity using Quad Band GSM/GPRSModule 2. Overvoltage protection 3. Over current protection 4. Three phase MODBUS energy meter with class 1.0 accuracy and IS13779 certification 5. SMC box with IP65 and IK10 ratings Responsive Web application for Smart streetlight management system having with map view based dash board and individual system details	1 No.
74	Smart Transportation Monitoring System	Processor : 32 Bit, Modem : Quad-Band 850/900/1800/1900MHz GPS Frequency : 1575.45 MHZ Built in Sensors : Temperature, humidity, Accelerometer, Speed tracker Input Supply : 12V DC software Front End : Zend Framework 1.12.1(PHP) Back End : MySQL OS : Windows and	1 No.

		Linux Compatible	
75	Sensors for Smart Building	All should be compatible with Sensor Training Platform & IOT Explorer mentioned above: CCTV Camera , Motion Sensor RFID, Smoke, Fire, LPG Gas, Air Quality, Ambient Temperature & Humidity, CO <sub>2</sub> . Light, Relays, Hooter, Touch Panel Smart Capacitive Touch Switch Board with 3 Light controls, 1 humming free FAN control, 1 16A AC control, 3 IR Channels for controlling IR appliances, 8 Capacitive Touch Buttons, 2 Digital Sensor Inputs, 1 Digital Output Application Software for SMART Building Dashboard	1 No.
76	IoT Data Acquisition Systems & Protocol Converters	Connectivity to Cloud (IBM, Microsoft, Amazon) 24 VDC Isolated Supply, 4 Analog Inputs (0.1% FSR), 8 Pulse Inputs (up to 1 kHz), 8 Digital Inputs, 4 Relay Outputs Ethernet IOT DAQ, WiFiIoT DAQ, Cellular (GSM / GPRS) IoT DAQ MODBUS RTU to MODBUS TCP 24 VDC Isolated Power Supply, 4 Isolated MODBUS RTU Master Port Serial to Ethernet, Serial to Wi-Fi, Serial to GPRS	1 set
77	IoT EDGE Computing Device	Embedded SCADA for 500 Tags, 24 VDC Isolated Power Supply, 4 MODBUS RTU Master, 32 GB Built in SD Card, 1 Wi-Fi Port, 1 Ethernet Port, 1 GPRS Port, 4 Analog Inputs (0.1% FSR), 8 Pulse Inputs (up to 1 kHz), 8 Digital Inputs, 4 Relay Outputs	1 No.
78	Cloud Based IoT SCADA	1000 Tag License for Cloud based SCADA to connect IoT Devices and IoT based Smart Systems with Device Manager, IO Server, Alarm Server, Historian and Reporter, Web Server. Cloud Hosting Services for 20 devices for 7 years	1 No.
<b>D. Shop Floor Furniture and Materials</b> - For 2 (1+1) units no additional items are required.			
79	Instructor's table		1 No.
80	Instructor's chair		2 Nos.
81	Metal Rack	100cm x 150cm x 45cm	4 Nos.
82	Lockers with 16 drawers standard size		2 Nos.
83	Steel Almirah	2.5 m x 1.20 m x 0.5 m	2 Nos.
84	Fire Extinguisher		2 Nos.
85	Fire Buckets		2 Nos.

## Technical Specifications for ELECTRICIAN Lab

<b>LIST OF TOOLS AND EQUIPMENT FOR ELECTRICIAN (CITS)</b>			
<b>Forbatch of 25 candidates</b>			
<b>S No.</b>	<b>Name of the Tool &amp; Equipment</b>	<b>Specification</b>	<b>Quantity</b>
<b>A. TRAINEES TOOL KIT</b>			
1	Steel Tape	10 mtr length	25+1 nos.
2	Plier Insulated	150 mm	25+1 nos.
3	Plier Side Cutting	150 mm	25+1 nos.
4	Screw Driver	100 mm	25+1 nos.
5	Screw Driver	150 mm	25+1 nos.
6	Electrician Connector, screw driver insulated handle thin stem	100 mm	25+1 nos.
7	Heavy Duty Screw Driver	200 mm	25+1 nos.
8	Electrician Screw Driver thin stem insulated handle	250 mm	25+1 nos.
9	Punch Centre	150 mm X 9 mm	25+1 nos.
10	Knife Double Bladed Electrician		25+1 nos.
11	Neon Tester		25+1 nos.
12	Steel Rule	300 mm	25+1 nos.
13	Hammer, cross peen with handle		25+1 nos.
14	Hammer, ball peen With handle		25+1 nos.
15	Gimlet	6 mm.	25+1 nos.
16	Bradawl		25+1 nos.
17	Scriber (Knurled centre position )		25+1 nos.
18	Pincer	150 mm	25+1 nos.
19	Wire Stripper		25+1 nos.
20	Tennon Saw	250 mm	25+1 nos.
21	Firmer chisel wood	12mm	25+1 nos.
<b>B. INSTRUMENT AND GENERAL SHOP OUTFIT</b>			
22	C- Clamp	200 mm, 150 mm and 100 mm	2 Nos each
23	Spanner Adjustable	150 mm, 15 degree	2 Nos
24	Blow lamp	0.5 ltr	2Nos
25	Melting Pot		1No
26	Ladel		2Nos
27	Chisel Cold firmer	25 mm X 200 mm	2 Nos
28	Chisel	25 mm & 6 mm	4 Nos each
29	Hand Drill Machine	0 to 6 mm capacity	1No
30	Portable Electric Drill Machine	6 mm capacity	1No
31	Pillar Electric Drill Machine	12 mm capacity	1No
32	Allen Key		1 set
33	Oil Can	0.12 ltr	2 Nos
34	Grease Gun		1 No
35	Out Side Micrometer	0 to 25 mm	1No
36	Motorised Bench Grinder		1No
37	Rawl plug tool & bit		2 sets
38	Pulley Puller	3 legs 250 mm adjustable	2Nos

39	Bearing Puller le	3 legs 120 mm flexi	2Nos
40	Hydrometer		2 sets
41	Thermometer	0 to 100 deg Centigrade	1 No
42	Scissors blade	150 mm	4 Nos
43	Crimping Tool		1 set
44	Crimping Tools Heavy duty		2 Nos
45	Chisel Cold flat	12 mm	2 Nos
46	Mallet hard wood	0.50 kg	4 Nos
47	Hammer Exeter type	0.40 kg	8 Nos
48	Hacksaw frame	200 mm 300 mm adjustable	4 Nos
49	Try Square	150 mm blade	4 Nos
50	Outside & Inside Divider Caliper		2 Nos each
51	Pliers flat nose	100 mm	4 Nos
52	Pliers round nose	100 mm	4 Nos
53	Plier longnose	150 mm	4 Nos
54	Tweezers	100 mm	4Nos
55	Snip Straight & Bent	150 mm	2 Nos each
56	Spanner D.E. metric standard		4 Nos
57	Drill hand brace	0 to 100 mm	4 Nos
58	Drill S.S. Twist block	2 mm, 5 mm 6 mm set of 3	4 sets
59	Plane, smoothing cutters	50 mm	4 Nos.
60	Gauge, wire imperial(SWG)		4 Nos
61	File flat	200 mm 2 <sup>nd</sup> cut	8 Nos
62	File half round	200mm 2 <sup>nd</sup> cut	4 Nos
63	File round	200 mm 2 <sup>nd</sup> cut	4 Nos
64	File flat	150 mm rough	4 Nos
65	File flat	250 mm bastard	4 Nos
66	File flat	250 mm smooth	4 Nos
67	File Rasp, half round	200 mm bastard	4 Nos
68	Soldering Iron	25 watt, 65 watt, 125 watt	4 Nos each
69	Copper bit soldering iron	0.25 kg.	4 Nos
70	De soldering Gun		4 Nos
71	Hand Vice	50 mm jaw	4 Nos
72	Table Vice	100 mm jaw	8 Nos
73	Pipe Cutter to cut pipes	up to 5 cm. dia	2 Nos
74	Pipe Cutter to cut pipes	above 5 cm dia	1 No
75	Stock and Die set for	20 mm to 50 mm G.I. pipe	1 No
76	Ohm Meter; Series Type & Shunt Type		1 No each
77	Stock and Dies conduit		4 Nos
78	Multi Meter (analog)	0 to 1000 M Ohms, 2.5 to 500 V	1 No
79	Digital Multi Meter	3 ½ digit	8 Nos
80	A.C. Voltmeter	M.I. 0 –500V A.C	1 No
81	Milli Voltmeter		6 Nos
82	D.C. Milliammeter	0 -500m A (Digital+ Analog)	1 No
83	Ammeter	MC 0-1A, 0-5 A, 0- 25 A	1 No

84	A.C. Ammeter		2 Nos each
85	A.C. Ammeter	M.I 0-10 -20 A, 0-15-25 A	2 Nos each
86	Kilo Wattmeter	0-5 kw (CC-0-5-10 A,PC-0-250-500V)	2 Nos
87	A.C. Energy Meter,	Single phase 5 amp. Three Phase 15 amp	2 Nos
88	Power Factor Meter	single phse-230 volt (Analog+ Digital)	1 No each
89	Frequency Meter (Analog+Digital)	Analog + Digital	1 No each
90	Tachometer with stop watch	Analog + Digital	1 No each
91	Current Transformer Primary-	0-10-20 A, Sec- 5 A)	2 Nos
92	Potential Transformer	0-230-400V/110V	2 Nos
93	Growler Internal+ External		1 No each
94	Tong Tester / Clamp Meter	0 – 100 amp. AC Analog+ Digital)	1No
95	Megger	500 volts	1No
96	Wheat Stone Bridge with galvanometer & battery		1No
97	Earth Tester	0-30 Ohm	2 Nos
98	Contactor & auxiliary contacts	3 phase, 440 volt, 32 amp.	1 No each
99	Load Bank 5 KW( Lamp / heater Type)		1No
100	Brake Test arrangement with two spring balance 0 to 25 kg rating		2 sets
101	DC Power Supply 0-440v , 15A		2 Nos
102	Inverter- Input- 12 volt DC, Output- 220 volt AC	1 KVA with 12 V Battery	1No
103	Voltage Stabiliser Input: AC Output:	150 – 230 volt 220 volt AC , 1 KVA	1 No
104	Rheostat :	0 -1 Ohm, 5 Amp 0 -10 Ohm, 5 Amp 0- 25 Ohm, 10Amp 0-300Ohm,3Amp	2 Nos each
105	Flux meter		2 Nos
106	Laboratory Type Induction Coil		1 no
<b>C. MACHINERIES</b>			
107	Used DC Generators-series, shunt and compound type for overhauling practice		2 Nos
108	D.C. Shunt Generator with control panel,	2.5 KW, 230 V	1No
109	D.C.Compound Generator with control panel including fitted rheostat, voltmeter, ammeter and breaker,	2.5KW,230V	1No
110	DC Series Motor coupled with mechanical load	0.5 to 2 HP, 220 Volts	1No
111	DC Shunt Motor	2 to 3 HP, 220 volts	1No
112	DC compound Motor with starter and switch	2 to 3 HP, 220 volts	1No
113	<b>Electrical Machine Trainer</b> – Suitable for demonstrating the construction and functioning of different types of DC machines and AC machines (single phase and three phase). Should be fitted with friction brake arrangement, dynamometer, instrument panel and power supply unit.		1No

114	<b>Motor-Generator (AC to DC) consisting of:</b> SquirrelCageInductionMotorwithstardelt astarteranddirectlycoupled to DC shunt generator and switch board mounted with regulator, air breaker, ammeter, voltmeter, knifebladeswitchesandfuses,setcomplete withcaseironandplate, fixing bolts, foundation bolts and flexiblecoupling. <u>Induction Motor rating: DC Shunt Generator rating:</u>	7 HP, 400V, 50 cycles, 3 phase 5 KW, 440V	1No
115	<b>Motor Generator(DC to AC) set consisting of-</b> ShuntMotorwithstartingcompensatorand switchdirectlycoupledtoAC generator with exciter and switch board mounted with regulator, breaker, ammeter,voltmeter frequencymeter,knife bladeswitchandfusesetc.Set complete with cast iron bed plate, fixing bolts, foundation bolts and flexible coupling. <u>Shunt Motor rating : AC Generator rating :</u>	5 HP, 440V 3-Phase, 4 wire, 3.5 KVA, 400/230 Volts, 0.8 pf, 50cycles	2 Nos.
116	Thyristor /IGBT controlled D.C. motor drive with Tacho- generatorfeedback arrangement.	2 HP	1 No
117	Thyristor /IGBT controlled A.C. motor drive with VVVF control	3 Phase, 2 HP	1 No
118	DieselGeneratorSetwithchangeoverswitc h,overcurrentbreakerand water-cooledwitharmature,star- deltaconnectionsAC.	3phase,5KVA, 230 volt	1No
119	AC Squirrel Cage Motor with star delta starter and triple pole iron clad switch fuse.	2 to 3 HP, 3-phase ,400 volts, 50 cycles	2Nos
120	AC phase-wound slip ring Motor with starter and switch.	5 HP, 400 volts, 3-phase, 50 cycles	1No
121	A.C. Series type Motor with mechanical load.	¼ HP, 230V, 50 cycles	1No
122	Single Phase Capacitor Motor with starter switch.	1 HP 230 volt 50 cycles	1No
123	Universal Motor with starter/switch	230 volt, 50 cycles ¼ HP	1No
124	Stepper Motor with Digital Controller		1No
125	Shaded Pole Motor		1No
126	Servo Motor with Control		1 No
127	Cut model	3 phase induction motor	1 No
128	Cut model of watermill and hydro power		1 No each
<b>D. GENERAL INSTALLATIONS</b>			
129	Oscilloscope Dual Trace,	30 MHZ	1No
130	Function Generator		1No
131	Discrete Component Trainer		1No
132	3- point D.C. Starter		2 Nos
133	4- point D.C. Starter		2 Nos
134	Single phase Transformer, core type, air cooled		3 Nos
135	Three phase transformer, shell type oil cooled		1 No
136	Variable Auto Transformer		1 No
137	Linear I.C.Trainer		1No
138	Digital I.C.Trainer		1 No
139	Bath Impregnating		1 No
140	Oven Stove		1 No
141	Oil Testing Kit		1 No
142	Battery	12 v	1 No
143	Battery Charger		1 No
144	Solar panel with Battery	18watt	1 set

145	Hygrometer		1 No
146	Domestic Appliances-a.Electric Hot Plate b. Electric Kettle, c. Electric Iron d. Immersion Heater e. A.C. Fan f. Geysers (Storage type) g.Mixture &Grinder. h. Microwave Oven i. Washing Machine j. HairDrier k. Induction Heater	1500 watt,220v with temp.control 1750watts,230v 1500 watts,230v with temp.Control 750/1000/1500 watt,230V 230v 25 ltrminimum,230V. 20 lpltrconvection. 6.5 kg fullyautomatic.	2Nos 2Nos 2Nos 2Nos 1 No 2 Nos 2Nos 1 No 2 Nos
147	<u>Relays</u> - a. Cutout b. Reverse current c. Overcurrent d. Under voltage		1 no.each
148	<u>Starters for</u> - a. Resistance typestarter b. Direct on lineStarter c. Star Delta Starter-manual, semiautomatic andautomatic d. Auto Transformertype	<u>2 to 5 H.P. A.C Motors</u>	1 No each
149	Synchronous scope Meter		2 Nos
150	Phase Sequence Meter		2 Nos
151	Component of Typical small hydro power unit		1 set
152	Component of Typical water mill		1 set



## Technical Specifications for CIVIL ENGINEERING ASSISTANT Lab

<b>LIST OF TOOLS &amp; EQUIPMENT</b>			
<b>CIVIL ENGINEERING ASSISTANT (For batch of 24 Candidates)</b>			
S No.	Name of items	Specification	Quantity
<b>A. THEORY ROOM &amp; DRAWING HALL</b>			
1	DualDesk		12Nos.
2	DrawingBoards measuring	1250mm x900mm fixed over adjustable stand	24+1Sets
3	Draughtsmanstoolwithback	Revolvingtype	24Nos.
4	StudentsLockers	with8compartments	3Nos.
5	Wooden ChestofDrawers		4Nos.
6	Steelbookcase(withlockableglassshutters)		1No.
7	Instructor'stablewithglasstop		2Nos.
8	RevolvingChairforClassroom		2Nos.
9	Instructor'srevolvingwitharmchair		2Nos.
10	Visitor's chair		2Nos.
11	SteelAlmirah		2Nos.
12	MagneticWhiteBoard		2Nos.
13	Pin-upboard(withorwithoutstand)		6Nos.
14	Workingtablesize	1250x950	2nos
15	Tracing Table with plain glass	1250x900	1No.
<b>B. CAD LAB</b>			
16	Plotter	A0 size	1 No.
17	Laser Jet color printer	A4 size	As Required
18	Inkjet/ Laser Jet Printer	A3 size	1 No.
19	Color Scanner/printer with Latest Configuration		1 No.
20	Printer Table	module type	1 No.
21	Instructor 's Lab table		1 No.
22	Instructor's chair with arm		3 Nos.
23	Book shelf with glass shutters		1 No.
24	Air conditioner		As per requirement
25	LAN connectivity		As per requirement
26	Internet connection		1 No.
27	Visualizer		1 No.
28	Vacuum Cleaner		1 No.
<b>C. AUDIO VISUAL AIDS</b>			
29	LCD Projector		1 No.
30	Interactive Board		1 No.
<b>D. EQUIPMENTS FOR PRACTICAL LABS</b>			

31	Box drawing instrument one 15 cm compass with pin point, pin point & lengthening bar, one pair spring bows, rotating compass with interchangeable ink and pencil points, drawing pens with plain point & cross point, screw driver and box of leads.		5 nos.
32	Protractor celluloid 15 cm semi-circular.		5 nos.
33	Scale card board-metric set of eight	A to H in a box 1:1, 1:2, 1:2: 5, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500, 1:1000, 1:2000, 1:1250, 1:6000, 1:38 1/3, 1:66 2/3.	24 Nos.
34	Set square transparent	2 mm thick with beveled edges 45 degrees 20 cm.	24 sets.
35	Set square celluloid	2mm thick beveled edges 60degrees 20cm.	24 Nos.
36	Drawing Board with facility of parallel bar		24 Nos.
37	Mini drafter / T - Square		24 Nos.
38	Erasing shield small size		5nos.
39	Template – Architects and builders		5 nos.
40	Pantograph		1no.
41	Geometrical Models (wooden) as per given below		
	Cube	08 mm sides.	2 nos.
	Rectangular parallel piped	8 cm x 15 cm.	2 nos.
	Sphere	8 cm dia.	2 nos.
	Light circular core	8 cm x 15cm vertical height	2 nos.
	Square pyramid	8 cm side base and 15 cm vertical height.	2 nos.
	Cylinder	8 cm dia. 15 cm height.	2 nos.
	Prisms triangular length.	8 cm side base and 15 cm	2 nos.
	Prism hexagonal	8 cm sides hexagon and 15 cm length.	2 nos.
42	French curves-transparent plastic set of 12.		5nos.
43	Flexible curves	80 cm long.	5 nos.
44	Calculator (pocket size)	1 (FX)	5nos.
45	Proportional dividers	15 cm.	5 nos.
46	Stencils-complete set	6 H.	2 sets
47	Print Trimmer cutting edge	100 cm.	1 no.
<b>E. SURVEYING INSTRUMENTS</b>			
48	Land measuring chain	30 mm with arms.	5 nos.
49	Steel tape	20 meter long.	2 nos.
50	Ranging rods wooden	2m long	24 nos.
51	Optical square PWD pattern.		5 nos.
52	Optical square box type circular		1 no.
53	Off set rod.		5 nos.
54	Steel tape	5m & 2.5 m.	1 no.
55	Gunter's chain		1 no.
56	Engineer's chain		1 no.
57	Dumpy level builder	25 cm focal length x 23 mm completes with box and accessories and stand.	2 nos.
58	Levelling staff	4 meters reading to 5mm telescopic type.	2 nos.
59	Surveyor's umbrella.		4 nos.
60	Spade		2 nos.

61	Pickaxe.		2 nos.
62	Gloves (canvas and plastic)		24 Pair each
63	Gum boots		24 Pair
64	Chains		3 sets
65	Prismatic compass with stand and all accessories		3 sets
66	Plane tables		3 sets
67	Auto level latest model with all accessories		3 sets
68	Theodolites latest model with all accessories		3 sets
69	Total station latest model with all accessories		2 sets

#### **F. CARPENTRY LAB**

70	Flexible tape role steel	3 meter	24 Nos.
71	Try Square	20 mm	24 Nos.
72	Square bevel		24 Nos.
73	Marking Gauge	Wooden	24 Nos.
74	Hand Saw	450 mm	24 Nos.
75	Saw tenon	300 mm	24 Nos.
76	Jack plane metal	335 mm X 50 mm cutter	24 Nos.
77	Plane smoothing metal	250 mm X 50 mm cutter	24 Nos.
78	Chisel firmer (bevel edge)	6, 10, 15, 20, 25mm with (5 nos.)	24 Nos.
79	Chisel mort ice	6,10,15,	24 Nos.
80	Screw driver	300 mm	24 Nos.
81	Wooden mallet	medium size	24 Nos.
82	Hammer claw	500gms	24 Nos.
83	Carborandom stone	200x 50x 25mm	24 Nos.
84	Hand brush for bench cleaning	400mm	24 Nos.
85	Screw Driver	250 mm	24 Nos.
86	Pincer	50mm	5 No.
87	File Half Round 2nd Cut	250mm	12 Nos.
88	File half wood rasp bastard	300mm	12 Nos.
89	File slim taper	100 mm	12 Nos.
90	Card File (Steel) wire brush for file		12 Nos.
91	Electrically operated motorized		cutter 5 Nos.
92	Boring tools		1 set
93	Fastenings		1 set
94	Hinges and locks		1 set each

#### **G. PLUMBING LAB**

95	Steel Rule	300 mm both in inch and mm	25 Nos.
96	Hacksaw frame adjustable	250 to 300 mm	25 Nos.
97	Chisel cold flat	20 x 250 mm	25 Nos.
98	Hammer ball peen	800 gms.	25 Nos.
99	File flat rough	300 mm	25 Nos.
100	Level spirit wooden	300 mm	25 Nos.
101	Plumb bob	50 gms.	25 Nos.
102	Stilson wrench	200 & 350 mm	25 Nos.

103	Wooden mallet small		25 Nos.
104	Cutting pliers		25 Nos.
105	Chisel cold flat	20 mm x 300 mm	2 Nos.
106	Tap and die set to cut BSP Thread		1 set.
107	Spanner monkey	up to 50 mm	2 Nos.
108	Cutter, pipe wheel type	6 mm to 25 mm.	1 No.
109	Inside caliper	150 mm	5 Nos.
110	Caliper outside	150 mm	5 Nos.
111	Plumbers ladle		2 Nos.
112	Plumbers metal melting pot	10 kg.	1 No.
113	Pipe vice to grip pipes up to	77 mm.	2 Nos.
114	Tool caulking	set of 2	2 Sets
115	Stillson pattern pipe wrenches	450 mm to take pipe up to 52 mm dia.	2 sets
116	Stillson pattern pipe wrenches	300 mm to take pipe to 20 mm to 32 mm.	2 sets
117	Chain pipe wrenches	90 mm-650 mm	2 sets
118	Flat Smithy tong.		2 Nos.
119	Working Bench	2400 x 1200 x 750 mm	2 Nos.
120	Ratchet rack	with post and clamp flat 5 drill 6 to 35 mm by 0.2 mm.	1 Set
121	Ratchet pipe die	15 mm to 32 mm	2 No.
122	Double face hammers		5 Nos.
123	Monkey Plier (gas pliers)		5 Nos.
124	Electric handling machine	6 to 35 mm by 0.2 mm. for drilling	1 No.
125	Trowel 125		2 Nos.
126	Saw plumber	300 mm	2 Nos.
<b>H. ELECTRICAL LAB</b>			
127	Rule wooden	4 fold 60 mm	24 Nos.
128	Scriber	150 mm (Knurled Centre position)	24 Nos.
129	Pincer	150 mm	24 Nos.
130	Plier insulated	150 mm	24 Nos.
131	Screw driver	150 mm	24 Nos.
132	Punch Centre	150 mm x 9 mm	24 Nos.
133	Knife double bladed electrician		24 Nos.
134	Hammer, cross pane	115 grams with handle	24 Nos.
135	Electrician connector, screw driver	100 mm. Insulated handle thin stem	24 Nos.
136	Electrician testing pencil	I I neon Tester	24 Nos.
137	Heavy duty screw driver	200 mm	24 Nos.
138	Electrician screw driver	250 mm thin stem insulated handle	24 Nos.
139	Saw tenon	250 mm	24 Nos.
140	Hammer ball pane	0.75 kg with handle	24 Nos.
141	Firmer chisel	wood 12 mm	24 Nos.
142	Gimlet	6 mm	24 Nos.
143	Bradawl		24 Nos.
144	Plier sued cutting	150 mm	24 Nos.
145	C. Clamps	200 mm, 150 mm, 100 mm	2 Nos.
146	Spanner	150 mm adjustable 15 degree as cly-burns	2 Nos.

147	Blow lamp	0.5 liter	2 Nos.
148	Melting pot		1 No.
149	Ladder		2 Nos.
150	Chisel cold flat	12 mmx 200 mm	2 Nos.
151	Chisel firmer	25 mm and 6 mm	4 Nos.
152	Drill machine hand	0 to 6 mm capacity	2 Nos.
153	Electric drill machine	12 mm capacity	1 No.
154	Out side micrometer	0 to 25 mm	1 No.
155	Bench grinder motorized		1 No.
156	Raw plug tool and bit		2 Nos.
157	Bearing puller		1 No.
158	Multi meter	0 to 1000 M ohms 2.5 to 5000 volt	2 Nos.
159	K.W. meter.	0 to 1 K.W. capacity with C.T.1: 2	1 No.
160	Milli voltmeter Centre	zero 100-0-100m volt.	1 No.
161	Spring balance	0 to 15 kg. And 0 to 2.5 kg.	2 Nos.
162	Screw driver	100 mm	5 Nos.
163	Square try	150mm blade	5 Nos.
164	Divider	150 mm, out side and inside caliper	4 Nos.
165	Tweezers	100 mm.	5 Nos.
166	Snip straight	150 mm	2 Nos.
167	File flat	200 mm 2nd cut	3 Nos.
168	File half round	200 mm 2nd cut	5 Nos.
169	File half round	200 mm smooth	5 Nos.
170	File round	200 mm 2nd cut	5 Nos.
171	File flat	250 mm rough	5 Nos.
172	File flat	250 mm bastard	5 Nos.
173	Rasp, half round	200 bastard	5 Nos.
174	Iron, soldering	225 grams 125 watt with bits	5 Nos.
175	Vice hand	50mm jaw	5 Nos.
176	Megger	500 volts	1 No.
177	Fan A.C.	230 volt 1200 mm	2 Nos.
178	Fan D.C.	220 volt 1200 mm	2 Nos.
179	Bench working	2.5x 1.20x 0.75 meters	5 Nos.
180	Almirah	2.5x1.20x0.50 meter	1 No.
181	Metal rack	180x150x47 cm.	5 Nos.
182	Wire stripper	20 cm.	1 No.
183	Domestic appliances: (a) Electric hot plate	1500 watt. 220v with temperature control.	2 Nos.
	(b) Electric kettle,	1000 watts, 230v	2 Nos.
	(c) Electric iron	1200 watts, 230v with temperature control.	2 Nos.
	(d) Immersion heater	750/1000/1500w-230v	2 Nos.
	(e) Geyser	25 liter 240v (storage type)	2 Nos.
	(f) B.A. taps and dies	0-2-4-6-8 sizes	2 Nos.
	(g) Mixture grinder		2 Nos.
184	Spring balance	0 –1 kg.	1 No.

185	Motor A.C. series type	230 v, 50 cycles, ¼ HP with starter and switch	1 No.
186	Multi meter digital		12 Nos.
187	Motor AC single phase	230 volt, 50 cycles capacitor type with starter switch 1HP	1 No.
188	Motor universal	230 volt, 50 cycles with starter/switch 1 HP	1 No.
189	Variable auto transformer	0-250 V, amps	2 Nos.
190	Earth leakage ckt. Breaker		1 no.
191	M.C.B. 5 KVA		1 no.
192	Voltage stabilizer manual and automatic		1 no. Each
193	Multi meter		3 sets
194	Meger		2 sets
195	Earth tester		2 sets
196	Electric tool kit		4 sets
197	Multi meter		3 sets
<b>FOR BUILDING CONSTRUCTION LAB</b>			
198	Measuring tape	15 mtr. (steel)	4 nos.
199	Land measuring steel tape	30 mt long	12 Nos.
200	Land measuring plastic tape	30 mt long	12 Nos.
201	Steel tapes	3 mt long	24 Nos.
202	Steel tapes	5 mt long	24 Nos.
203	Try square		4 Nos.
204	Marking point		4 Nos.
205	Tenon saw, dovetail saw		4 each
206	Chiesel	different suitable sizes	4 sets
207	Hammer	500 gm.	4 Nos.
208	Hammer	1 kg.	4 Nos.
209	Hammer	5 kg.	4 Nos.
210	Bar bending table		4 Nos.
211	Bending pipes (suitable diameter and length)		2 each
212	Bar bending lever (suitable diameter and length)		2 sets
213	Manual bar bending machine of suitable size		2 Nos.
214	Portable hand bender of suitable size		2 Nos.
215	Power cutter of suitable size		2 Nos.
216	Safety gloves		8 pairs
217	Safety glass		8 pairs
218	Shovel		5 Nos.
219	M.S pan	45 cm dia.	12 Nos.
220	Farma of mild steel for measuring aggregate	Heaving volume 0.03472 cm	2 No.
221	Bucket G.i.	35 cm dia.	5 No.
222	Mason plumb rule with spirit level		24 Nos.
223	Mason square	30x60 cm	24 Nos.
224	Sieve for sand in adjustable stand	1mm, 100cm x 60cm fixed in steel frame	2 No.
225	Trowel	25 cmx10cm	16 Nos.
226	Brick hammer with handle		12 Nos.
227	pointing Trowel	6"	24 Nos.
228	Line pin corner block		24 Nos.

229	Mortar board	2 mt x 2 mt.	2 No.
230	Wire brushes		12 Nos.
231	Float wooden		24 Nos.
232	Steel float		24 Nos.
233	Sprit level	30 cm long	12 Nos.
234	Bolster		12 Nos.
235	Spade		12 Nos.
236	Ladder aluminium	3m long	3 Nos.
237	Pick axe		5 Nos.
238	Hammer	250 grams	12 Nos.
239	Crow bar	30mm dia 1.5 m long of mild steel	6 Nos.
240	Gloves canvas		12 Pair
241	Gloves plastic		12 Pair
242	Drums	200 liters capacity	2 Nos.
243	Brush for painting & white washing		As required
244	Marking rope & thread	15 m	64 each
245	Bevel		8 Nos.
246	Pan (M.S. or PVC)		16 Nos.
247	Mortar board	2000 x 2000	2 Nos.
248	Measuring box	35 ltr. Capacity	4 Nos.
249	Plumb rule and Bob		8 Nos.
250	Straight edge		8 Nos.
251	Water tube	6 m	8 Nos.
252	Bucket	5 ltr. & 10 ltr.	8 each
253	Concrete mixer		2 Nos.
254	Concrete vibrator	pin type & plate type	2 each
255	Water drum	200 ltr.	4 Nos.
256	Mono block pump set	1/2 HP	4 Nos.
257	Steel / plywood shuttering plates		50 sqm.
258	Telescopic pipes / props		100 Nos.
259	Telescopic/ adjustable spans		25 Nos.
260	Masonry grinder		2 Nos.
261	Scientific calculator		16 Nos.
262	Weighing balance	1 kg., 10 kg. Digital	2 each
263	Bristle brush	25 & 40 mm with 250 handle	2 each
264	Vicat apparatus with plunger, needles and mould		2 set
265	Stop watch		8 Nos.
266	Gauging trowel		4 Nos.
267	Digital compression testing machine		1 No.
268	Cube mould	150 mm size	24 No.
269	Cube mould	70.5mm size	10 Nos.
270	Measuring cylinder	100 ml., 500 ml., 1000 ml.	4 each
271	Non porous plate		16 Nos.
272	Water container	1000 ltr.	1 No.

273	Vibrating machine	12000 ± 400 rpm	2 set
274	Graduated cylinder		8 Nos.
275	Metal tray		8 Nos.
276	Beaker		8 Nos.
277	Oven		1 No.
278	Weighing platform digital	100 kg.	1 No.
279	Slump test apparatus with temping rod		2 set
280	Electronic balance	30kg – 1gram L.C	1 No.
281	IS Brass sieves -	4.75mm,2.36mm, 1.18mm, 600micron, 300 micron, 150 micron, 90 micron, 75 micron, 45micron, pan and cover	1 each
282	Motorised sieve shaker		1 No.
283	Thickness and length gauges (Elongation and Flakiness Index)		1 each
284	Pyconometer for specific gravity		2 Nos.
285	Bulk density apparatus (Cylindrical measure for fine aggregate and coarse aggregate )		1 No.
286	Aggregate impact tester with cylindrical cup and measuring cylinder		1 No.
287	Sample tray- steel and plastic	300x250x40mm	12 Nos. each
288	Mortar cube vibrator	12000±400rpm	1 No.
289	Standard IS sand	Grade 1, Grade 2, Grade 3	2 bagseach
290	Water testing kit – for ph value		2 Nos.
291	Electric heater		1 No.
292	Le Chatelier Mould (for soundness test of cement)		1 No.
293	Le Chateliers flask (For specific gravity test of cement)		1 No.
294	Slump Cone		1 No.
295	Marking rope & thread	15 m	64 each
296	Pan	M.S. or PVC	16 Nos.
297	Sampling scoops	2kg and 5 kg	3 Nos.each
298	Drill and bit set		3 Nos.each
299	Spray painting machine		1 No.
300	Brushes for painting		12 Nos. each
301	Floor polishing machine		1 No.
302	Spanner monkey	up to 50 mm 1	12 Nos.
303	Stillson pattern pipe wrenches	450 mm to take pipe up to 52 mm dia.	2 Nos.
304	Adjustable spanner	A 375	12 Nos.
305	Double face hammers		12 Nos.
306	Screw driver Set		12 Nos.
307	Floats	wooden	8 Nos.
308	Wire brushes		8 Nos.
309	Ladder	3m	8 Nos.
310	Aluminum float		8 Nos.
311	Tile cutter	hand operated	4 Nos.
312	Power operated cutting machine		4 Nos.



313	Wooden mallet		8 Nos.
314	Polishing machine		1 No.
315	Polishing stone	different grade / number	8 set
316	Bending pipes	suitable dia& length	2each

## Technical Specifications for INTERIOR DESIGN & DECORATION Lab

### INTERIOR DESIGN & DECORATION

#### LIST OF TOOLS AND EQUIPMENT (For batch of 20 candidates)

#### A. FURNITURE FOR THEORY & PRACTICAL

S No.	Name of the Tool & Equipments	Specifications	Quantity
1	Modular writing tray chairs with adjustable pad for theory class room		22
2	Drawing Boards fixed over adjustable stand	700mm x 500mm 1	21
3	Draughtsman stool with back (revolving type)	Seat – 450mm (W) x 450mm (D) x 50mm (thick) Back rest – 400mm (W) x 350 (Ht.) Seat Ht. Range – 600mm x 762.5mm	22
4	Students Lockers	with 8 compartments	3 no.
5	Chest of Drawers	Wooden	4 no.
6	Steel book case	with lockable glass shutters	1 no.
7	Instructor's table	with glass top	2 no.
8	Revolving Chair for Class room		2 no.
9	Instructor's revolving with arm chair		2 no.
10	Visitor's revolving chair		2 no.
11	Steel Almirah		2 no.
12	Magnetic White Board with felt board & accessories		2 nos.
13	Pin-up board (with or without stand)		4 no.
14	Working table	Size 1250mm x 950mm	2 nos.
15	Tracing Table with Plain glass	1250mm x 900mm	1 no.
16	Air conditioner (split unit) for theory and practical room	2.0 tons	4 nos.
17	Claw hammer		5 nos.
18	Spirit level	30 cm	5 nos.
19	Metallic tape	30 meter long	2 nos.
20	Display board covered with glass or acrylic sheet		2 nos.
21	Green board		1 no.
22	Lux meter (to measure light)		1 no.
23	Environmental multi meter (to measure temperature, humidity, air velocity)		1 no.

#### B. FURNITURE FOR CAD LAB

24	Anti Virus Software		As required
25	Steel almirah	Small Size	2Nos.
26	3D Plotter		1 No.
27	Laser Jet Printer with Latest Configuration (A4 size)		1 No.
28	Color Scanner cum printer with Latest Configuration (A3 size)		1 No.
29	UPS on line		1 No.
30	Computer work station (module type)		20
31	Printer Table (module type)		2 No.
32	Operator's revolving chair		22
33	Instructor's Lab table		1 No.
34	Instructor's revolving chair with arm		3 No.
35	Book shelf with glass shutters		1 No.

36	Visualizer with accessories (with latest configuration)		1 No.
37	Vacuum Cleaner		1 No.
38	Fire Extinguisher		1 No.
39	Cabinet with drawer		2 Nos.
40	Shoe rack		1 No.
41	Wall clock		3 Nos.
<b>C. AUDIO VISUAL AIDS</b>			
42	Interactive Touch Screen Smart Panel (Minimum 75 inch screen size)		2
<b>D. CONSUMABLE ITEMS FOR ONE BATCH</b>			
43	Adjustable set square with beveled edge	30 cm	21
44	Compass with Long arm & pen holder	1	21
45	Protractor	15 cm	21
46	Calligraphy pens /Graphic Pens / Ink / Stencil		21
47	Roll-n-draw roller scale	30 cm long	21
48	Triangular Scale (feet/ inch, metric)	30 cm	21
49	Clutch pencil	0.5mm , 0.2 mm , 2mm./drawing pencil (H, HB, B)	21
50	Pencil Sharpener, Adjustable		5No.
51	M.D / Parallel Bar / T scale - 750 mm long		21
52	Plastic French Curve with ink edge - set of 12		4 sets
53	Furniture template 1:50, 1:100,1:200		21
54	Circular and oval template		21
55	Pen Drive		22

**Technical Specifications for FASHION DESIGN & TECHNOLOGY Lab**

**LIST OF TOOLS AND EQUIPMENT**

**FASHION DESIGN & TECHNOLOGY (For batch of 16 candidates)**

<b>S No.</b>	<b>Name of the Tool &amp; Equipments</b>	<b>Quantity</b>
<b>A. SKETCHING LABORATORY</b>		
1	Drawing Table with adjustable top. Desk having facility of keeping tools	17 Nos.
2	Revolving Chair with adjustable height & back support	17 Nos.
3	Faculty Table & Chair set	01 No.
4	Storage Almirah	01 No.
5	Adjustable Set square	17 Nos.
6	White Magnetic Board with Felt board & accessories	01 No.
7	Air Conditioner unit split 2 Ton capacity with Stabilizer	02 Nos.
8	Display board	04 Nos.
9	Dress forms( dummies) • Children • Ladies • Gents	02 nos. each
10	Tracing table	02 Nos.
11	Mannenquins: Childrens, Ladies, Gents	02 nos. each
<b>B. THEORY ROOM</b>		
12	Single desks for trainees with arrangements of keeping Books etc.	16 Nos.
13	Revolving Chairs without arms	16 Nos.
14	Faculty Table & Chair set	01 No.
15	Computer set with UPS & multimedia projector	01 No.
16	White Magnetic Board with Felt board & accessories	01 No.
17	Display Board	02 No.
18	Storage Almirah	01 No.
19	Book Shelf	01 No.
20	A/C unit split type 2 TR capacity with Stabilizer	01 No.
<b>C. DRAFTING/CUTTING /SEWING ROOM TOOLS &amp; EQUIPMENT</b>		
21	Scissors 25 cm	17 Nos.
22	Pinking Shears	05 Nos.
23	Tailors Square	17 Nos.
24	Leg Shaper	17 Nos.
25	Garment Hangers	17 Nos.
26	Screw Driver Set	04 Nos.
27	Cart chop	02 Nos.
28	Table Sharpener	04 Nos.
29	Pressing Table	05 Nos.
30	Blanket for padding of Pressing Table	05 Nos.
31	Rubber mat (Size as per requirement)	05 Nos.
32	Sprayer	05 Nos.
33	Waste Bin Big / Small	10 Nos.
34	Pattern Punch	05 Nos.
35	Pattern Notcher	05 Nos.

36	Pattern Hanging Stand	04 Nos.
37	Water Tub 60 cm dia	01 No.
38	Stand for hanging dresses	05 Nos.
39	Trial room with 3 side mirrors of size 150 cm X 60 cm each with arrangements of hanging Dresses	01 No.
40	Electric Automatic steam press	05 Nos.
41	Sewing Machine - Single Needle Lock stitch Industrial model	16 Nos.
42	Over Lock Machine 3 Thread	01 No.
43	Pick Glass	05 Nos.
44	Zig Zag Multi Purpose Machine	01 No.
45	Machine attachments	01 No.
46	Chairs with low back rest or stools for the machines (one for each machine)	16 Nos.
47	Drafting Table	8 Nos.
48	Display board covered with glass or acrylic sheet 120*90cm	02 Nos.
49	Instructor Table	01 No.
50	Instructor Chair	02 Nos.
51	Steel Almirah 195 X 90 X 60 cm	02 Nos.
52	Pigeon hole Almirah 10 lockers & separate locking arrangements for trainees	02 Nos.
53	Locks for above pigeon hole	16 Nos.
54	Wall Clock	03 Nos.
55	Calculator Desk Type	01 No.
56	White Board with accessories (size as per requirement)	02 Nos.
57	Dummy (Lady)	02 Nos.
58	Mannequins(lady)	02 Nos.
59	Mannequins(Kids)	02 Nos.
60	Mannequins(Gents)	02 Nos.
<b>D. COMPUTER LABORATORY</b>		
61	Laser Printer color A4	01 No.
62	Colored laser Printer A3	01 No.
63	Scanner	01 No.
64	Printer Table	02 Nos.
65	Table for Scanner	01 No.
66	White Magnetic Board with Felt board & accessories	01 No.
67	Display Board	02 Nos.
68	Storage Almirah ( Size as per requirement)	02 Nos.
69	Air Conditioner unit split type 2 Ton capacity with Stabilizer	02 Nos.
70	Wall Clock	01 No.
71	Vacuum Cleaner	01 No.
72	Trainer's Table & Chair	01set

### Technical Specifications for Computer Lab with Software

Sr No	Name of the Tool & Equipment's	Specification	Quantity
<b>Workstations and Servers</b>			
1	Workstations	CPU with intel 10th Generation Processor, 32 GB (16GB x 2) RAM, 1 TB Hard Disk 7200 RPM, NVIDIA P1000 Graphics Card - 4 GB or better, Windows (Latest) Professional, 21 inch LED Monitor	25
2	Server	Intel Xeon Silver 4114 2.2G, 10C/20T, 9.6GT/s, 14M Cache, Turbo, HT (85W) DDR4-2400, 600GB x 5nos. 10K RPM SAS, 12Gbps 512n 2.5in Hot plug Hard Drive	1
3	Unmanaged Switch	Unmanaged Switch / Router - suitable for making the LAN connections with all computers and server in a single room with area of not more than 2000 SQ FT	1 Set
4	LAN Cables and Accessories	LAN Cables - 1000 meter with necessary connector	1 Set
5	Computer tables for workstations	Computer tables along with switchboards for power supply	25
6	Smart Panel	75 inch smart panel with licensed windows software	2
<b>Software</b>			
7	Computer aided design software	Siemens NX / Solidedge / Catia / Solidworks / PTC Creo Perpetual validity, On premise license	25
8	Computer aided manufacturing software	Siemens NX / Solidedge / Catia / Solidworks / PTC Creo Perpetual validity, On premise license	25
9	Electrical design software	<p>Electrical design and simulation software with following features:</p> <ul style="list-style-type: none"> <li>Design and simulate electrical systems, from simple electrical circuits to complex wire harnesses</li> <li>Route wiring and place components in 3D assembly models</li> <li>Prepare 2D industrial control panel layouts</li> <li>Analyze your models to calculate the correct wire lengths and wire harness designs</li> <li>Use virtual simulation to ensure circuitry performs per specification, without waiting for physical prototypes</li> <li>Interactively collaborate between ECAD and MCAD domains, even in disperse locations</li> <li>Visualize electrical aspects of your design in a 3D environment</li> <li>Fully integrate PCB layout and mechanical design environments</li> <li>Access robust libraries and parts repositories</li> </ul> <p>License with perpetual validity</p>	25

10	Mechatronics Design and Simulation Software	<ol style="list-style-type: none"> <li>1. The software should provide 3D modeling and simulation of concepts with multibody physics and automation-related behavior found in mechatronics products.</li> <li>2. Simulate the real machine behavior including programmable logic controller (PLC), Computer Numerical Control (CNC), actuators and sensors.</li> <li>3. Re-use 3D concept model for visualization and CNC program simulation.</li> <li>4. Validate production parameters and test PLC program.</li> <li>5. Integrated detail design in ECAD and MCAD.</li> <li>6. Bring motion into computer aided designs.</li> </ol> <p>License with perpetual validity</p>	25
11	Drafting Software	Drafting Software like AutoCAD, or equiv.	25
12	3D modeling software for interior design lab	3D modeling software like Max or Revit (To be specified by the bidder with exact software details offered with version)	25
13	Antivirus Software	Antivirus software with minimum validity of 3 years	25
14	Corel Draw for Fashion Design Lab	Designing Software Coral Draw Latest Version	25

**Miscellaneous Requirements:**

**Bidder has to complete the cable routing as well as all necessary electrical connections (Raw power will be provided) to make the lab fully functional. Any other items required such as suitable rack for the installation of server to be provided by the bidder.**