



INSTITUTE OF NANO SCIENCE AND TECHNOLOGY

Habitat Centre, Sector-64, Phase-X, Mohali-160062

Tender document for the

NAME OF WORK: SITC OF UPS SYSTEM FOR INSTITUTE OF NANO SCIENCE & TECHNOLOGY AT KNOWLEDGE CITY, SECTOR-81, MOHALI, PUNJAB

(Two Bid System)

Percentage Rate Tender for Works

PART A

Technical / Eligibility Bid

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PART B

Particular Specifications

Approved makes & Tender Drawings

PART C

Financial Bid

December, 2019

PART-A
TECHNICAL/ELIGIBILITY BID
NOTICE INVITING TENDER, ELIGIBILITY CRITERIA,
GENERAL CONDITIONS OF CONTRACT

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INSTITUTE OF NANO SCIENCE & TECHNOLOGY

Habitat Centre, Sector-64, Phase-X, Mohali-160062

1.0. Press Notice

NOTICE INVITING TENDER

The Director, Institute of Nano Science & Technology, Mohali (INST), on behalf of Institute of Nano Science & Technology Mohali invites percentage rate bids from the eligible contractors for the under Mentioned work.

NITNO: 04/INST/2019-20

NAME OF WORK: SITC OF UPS SYSTEM FOR INSTITUTE OF NANO SCIENCE & TECHNOLOGY AT KNOWLEDGE CITY, SECTOR-81, MOHALI, PUNJAB-140306

Estimated cost put to tender : ₹ 3, 73, 50,420/

Earnest Money : ₹ 7, 47,010 /-.

Period of Completion : 03 (Three) Months (90 days)

Uploading of NIT on website : 03-12-2019

Last Date and Time for Submission of Tender: On **or before 30-12-2019 till 3.00 PM**

For NIT/Tender Documents Details/downloads or any other correction /amendments /modification / extension till the last date of submission of bids, can be downloaded free of cost from the website: www.inst.ac.in or www.eprocure.gov.in

2.0. PART-A: TECHNICAL/ELIGIBILITY BID

2.1 NIT/TENDER DOCUMENT

The Director, Institute of Nano Science & Technology, Mohali (INST) invites percentage rate bids from approved & eligible contractors in composite category of CPWD for the under mentioned work :

N.I.T.No.: 04/INST/2019-20

Name of work	NAME OF WORK: SITC OF UPS SYSTEM FOR INSTITUTE OF NANO SCIENCE & TECHNOLOGY AT KNOWLEDGE CITY, SECTOR-81, MOHALI, PUNJAB -140306	
Estimated Cost	₹3,73,50,420/	
Period of Completion	03 (Three) Months	
Earnest Money Deposit:	₹7,47,010 /-	
Performance Guarantee	5% of tendered value of schedule	
Security Deposit	2.5% of tendered value	
Tender to be uploaded on website	On 03-12-2019	
Last date of Submission of queries by e-mail	13-12-2019 up to 5:00 PM	
Date of Pre-Bid meeting	16-12-2019 at 11:00 AM at INST, Mohali	
Uploading of Pre-Bid queries	18-12-2019	
Last Date and time of submission of Tender	30-12-2019 up to 3:00 PM INST shall not be responsible for any postal delay or otherwise.	
Date and time of opening of Technical/Eligibility bid/	30-12-2019 at 3:30 PM	
Date and time of opening of Financial bid	To be intimated later	
Validity of offer	60 days from the date of opening of Tender	

Certified that this NIT contains **Part - A** from page 2 to 42, **Part – B** from page 1 to 25 and **Part - C** from page 1 to 11.

This NIT amounting to ₹3, 73, 50,420/- (Rupees Three Crore Seventy Three Lakh Fifty Thousand Four Hundred Twenty Only) is hereby approved.

PMC,
(Tata Consulting Engineers)

Architect,
(Sikka Architect Associates)

Consultant (Engineering)

Director,

2.2. INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR TENDERING FORMING PART OF BID DOCUMENT.

The Director, Institute of Nano Science & Technology, Mohali (INST) invites percentage rate bids from approved & eligible contractors in composite category of CPWD for the under mentioned work :

S. No.	NIT No.	Name of work & Location	Estimated cost put to Tender	Earnest Money	Period of Completion	Last date & time of submission of tender	Period during which EMD, and other Documents shall be submitted	Time and date of opening of tender
1	2	3	4	5	6	7	8	9
1	04/INST/2019-20	<u>NAME OF WORK:</u> SITC OF UPS SYSTEM FOR INSTITUTE OF NANO SCIENCE & TECHNOLOGY AT KNOWLEDGE CITY, SECTOR-81, MOHALI, PUNJAB	₹ 3,73,50,420/-	₹ 7,47,010 /-	90days	Up to 03:00 PM on 30-12-2019	Up to 03:00 PM on 30-12-2019	03.30 PM on 30-12-2019

- The bidder is required to quote his rate in percentage above / below the estimated cost of work i.e.
₹ 3, 73, 50,420/-
- The tender document consisting of specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be compiled with and other necessary documents can be seen and Downloaded from website www.inst.ac.in or www.eprocure.gov.in free of cost.
- The intending bidder should read the schedule of quantities, additional conditions, additional specifications, particular specifications, CPWD- 6 and other terms and conditions given in the NIT. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required. The bidder should also read the General Conditions of Contract for CPWD Works 2014 with up to date correction slips, which is available with Government of India Publications.
- Information and Instructions for bidders posted on website shall form part of bid document.
- The Tender can only be submitted along with original EMD in the form of Demand Draft or Pay Order or Banker's Cheque or Fixed Deposit Receipts and Bank Guarantee of any scheduled Bank towards EMD in favour of Director, INST, Mohali, or if online submitted, the proof of the remittance to be submitted along with the tender documents.

ELIGIBILITY CRITERIA

The contractors who fulfil any of the following requirements shall be eligible to apply. **Joint ventures are not accepted.**

- 1.1 The Contractors, who fulfil the following requirements, shall be eligible to apply. The definite proof from the appropriate authority not less than Executive Engineer or equivalent rank of having satisfactorily completed the **Electrical works having UPS System and its allied cabling, LT Panels, Earthing at least one work in Central Govt./ State Govt./ Public Sector Undertaking, Projects** as mentioned below during the last Seven years ending previous day of last day of submission of Bid:
- (a) Three similar completed works each costing not less than ₹1.50 Crore of UPS
OR
Two similar completed works each costing not less than ₹ 2.25 Crore of UPS
OR
One similar completed work costing not less than ₹.3.00 Crore of UPS
- (b) **Similar work** shall mean works comprising of:-“Supply, Installation, Testing and Commissioning of Electrical works having UPS System and its allied cabling, LT Panels, Earthing executed under one single agreement.”

For 1.1 above ,the financial value of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the actual date of completion to last date of receipt of eligibility bid . The works should have been executed in the same name in which present bid is made or work experience gained from the works executed by the earlier firm (partnership firm) in the same proportion of share of the applicant in that partnership firm where the applicant was a partner earlier. **The past works as Joint Ventures / SPV / consortiums will not be considered for eligibility.**

- 1.2 The bidder should have had average **annual financial turnover of ₹ 9.00 Crore on** construction works during the last three years ending 31st march of 2019.**The bidder shall submit these details as per Form- ‘A’ attached with NIT.**
- 1.3 The bidder should not have incurred any loss in more than two years during the last five years ending 31stMarch of 2019. **The bidder shall submit these details as per Form- ‘A’ attached with NIT.**
- 1.4 Solvency Certificate issued by a Scheduled Bank for ₹1.50 Crore or more, the solvency certificate should not be **older than six months**. **The bidder shall submit these details as per, Form- ‘B’ attached with NIT.**
2. List of eligible similar nature of works successfully completed during the last seven years in (Form “Performance report of works referred to in form “G” ----In form “H”)
3. **List of Documents to be submitted along with the tender:**

- i. Demand Draft/ Pay order or Banker's Cheque/FDR/ Bank Guarantee of any scheduled Bank against EMD (Applicable to all bidders) as per Para 7 of CPWD -6 (Page-11 of Part A)
 - ii. Enlistment Order of the Contractor
 - iii. Copy of Certificate of Registration for GST & GST return up to **30/09/2019** (Applicable to all bidders)
 - iv. Integrity Pact of the bid document shall be signed between Authorized Signatory /Executive Engineer and the successful bidder after acceptance of bid.
 - v. Solvency Certificate issued by a Scheduled Bank for ₹ 1.50 Crore or more, **the solvency certificate should not be older than six months. The bidder shall submit these details as per, Form- 'B' attached with NIT**
 - vi. The bidder should have had average **annual financial turnover of ₹ 9.00 Crore on construction works during the last three years ending 31st march of 2019.****The bidder shall submit these details as per Form- 'A' attached with NIT.**
 - vii. The bidder should not have incurred any loss in more than two years during the last five years ending 31stMarch of 2019. **The bidder shall submit these details as per Form- 'A' attached with NIT.**
 - viii. List of eligible similar nature of works successfully completed during the last seven years in (Form "Performance report of works referred to in form "G" ----In form "H")
4. It will be mandatory to constitute Dispute Redressal Committee (DRC). The contractor or INST can only seek arbitration if not satisfied with the decision of DRC.
 5. The bid submitted shall be invalid if:
 - i. The bid is submitted late after scheduled date & time.
 - ii. The bidder is found ineligible.
 - iii. The bidder does not deposit original EMD with the office of Director INST, Mohali.
 - iv. The bidder does not submit all the documents as required and as mentioned above in point No-3
 - v. If any discrepancy is noticed between the documents at the time of submission of bid by the lowest contractor the bid shall become invalid.
 - vi. If a bidder does not quote any percentage above / below on the total amount of the tender or any section / Sub head in percentage rate tender, The tender shall be treat as invalid and will not be considered as lowest tenderer.
 - vii. In the event of tender being submitted by a firm, it must signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so, such power of attorney to be produced with the tender and it must disclose that the firm is duly registered under the Indian Partnership Act 1932.
 - viii. If the contractor is found ineligible after opening of bids, his bid shall become invalid.

Receipt of deposition of original EMD

(Receipt No...../ Date.....)

1	Name of work	SITC of <u>UPS System</u> at INST Campus at Sector-81, Knowledge Mohali.
2	NIT No	04/INST/2019-20
3	Estimated Cost	₹ 3,73,50,420/-
4	Amount of Earnest Money Deposit	₹ 7,47,010 /-
5	Last date of submission of bid	Upto 3:00 PM on 30-12-2019

(# To be filled by EMD receiving Officer)

1	Name of Contactor		
2	Form of EMD		
3	Amount Earnest Money Deposit		
4	Date of submission of EMD		

Signature, Name and Designation of EMD

Receiving officer (FO. INST)

Along with Office Stamp

CPWD-6 FOR TENDERING

Percentage rate bids are invited on behalf of Institute of Nano Science and Technology, Mohali. Percentage rate bids from competent specialized agencies having experience in installation and commissioning for the work of “: SITC of UPS System at INST Campus at Sector-81, Knowledge City, Mohali.”

1. The enlistment of the contractors should be valid on the last date of submission of bids.
In case the last date of submission of tender is extended, the enlistment of contractor should be valid on the original date of submission of bids.
- 1.1 The work is estimated to cost ₹ 3,73,50,420/-. This estimate, however, is given merely as a rough guide.
2. Agreement shall be drawn with the successful bidders on prescribed Form No. CPWD 7 (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
3. The time allowed for carrying out the work will be **90 days** from the date of start as defined in schedule ‘F’ or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
4. (i). The site for the work is available.
(ii). The architectural & structural drawing shall be made available in phased manner as per requirement of the same as per approved programme of completion submitted by the contractor after award of the work.
5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen from website www.eprocure.gov.in or www.inst.ac.in free of cost.
6. When tenders are invited in three stage system and if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid.
7. Earnest Money ₹ 7, 47,010 /- can be paid in the form of Demand Draft or Pay order or Banker’s Cheque or Fixed Deposit Receipt (drawn in favour Director, INST, Mohali payable at Mohali) along with Bank Guarantee of any Scheduled Bank wherever applicable in accordance with the Form annexed hereto having validity for 6 months or more from the last date of receipt of tenders shall be submitted with the tender.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money **or ₹ 20 lakh**, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any schedule bank having validity for 6 months or more from the last date of receipt of bids.

The original EMD shall be deposited by the bidder before opening of Eligibility/ Technical Bid in the office of the **Director, Institute of Nano Science and Technology, Mohali**, failing which the tender shall be rejected.

The bank details of INST are as follows:	
1. Account Name :	Director, INST Mohali
2. Name of Bank :	Canara Bank
3. Bank Address :	Sector-34A, Chandigarh-160022
4. Type of Account :	Current Account
5. Account No. :	2452201001102
.6. IFSC Code :	CNRB0002452
7. MICR Code :	160015003

Copy of Enlistment Order and certificate of work experience and other documents as specified in the press notice shall be submitted with the tender. However, certified copy of all the documents as specified in press notice shall have to be submitted by the lowest bidder only within a week physically in the office of the tender opening authority.

Bid/ tender documents submitted by intending bidders shall be opened only of those bidders, whose original EMD deposited along with the tender and other documents placed envelope are found in order.

8.0 “Submission of Tender”

Tender shall be submitted by the bidders in three envelopes along with letter of transmittal as attached with this document in the following manner:

Envelope No- 1 shall contain the EMD

Envelope No-2 shall contain signed and stamped documents confirming the eligibility of the bidder (**Technical Bid**)

Envelope No-3 shall contain signed and stamped price bid (**Financial Bid**).

Bidder shall clearly mention the envelope No. on each envelope. All envelopes shall be put together in one large envelope and submitted. Addressed to the

The Director,

Institute of Nano Science &
Technology Habitat Centre,
Sector-64, Phase-X, Mohali-
160062

Sub: NIT No.: 4/INST/2019-20 for the work “SITC of UPS System for INST at Sector-81, Knowledge City, Mohali (Pb.)

Opening of technical bid and financial

After evaluation of applications of tenders, a list of short listed bidders will be prepared. Whose eligibility documents are found to be in order?

Thereafter the financial bids of only the verified eligible bidders shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives.

The bid shall remain valid for a period of 60 days from the date of opening of Technical bid.

The bid submitted shall be opened at 03:30 PM on 30-12-2019

9. The bid/ tender submitted shall become invalid if:
- i. The bid is not submitted in three envelopes along with letter of transmittal / not mentioning envelope No. on all the envelopes / not submitted as per instruction given above **“Submission of Tender”**
 - ii. The bidder does not deposit original EMD with the office of Director INST, Mohali.
 - iii. The bidder does not submit all the documents as required and as mentioned above in **List of Documents to be submitted along with the tender.**
 - iv. If any discrepancy is noticed between the documents at the time of submission of bid by the lowest contractor the bid shall become invalid.
 - v. If a bidder does not quote any percentage above / below on the total amount of the tender or any section / Sub head in percentage rate tender, The tender shall be treated as invalid and will not be considered as lowest tenderer.
 - vi. In the event of tender being submitted by a firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so, such power of attorney to be produced with the tender and it must disclose that the firm is duly registered under the Indian Partnership Act.
10. **Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.**
11. The competent authority on behalf of the Director, INST Mohali does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all

the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.

Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.

12. The competent authority on behalf of Director, INST Mohali reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
13. The contractor shall not be permitted to bid for works in the INST / CPWD Circle responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Central Public Works Department or in the Ministry of Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
14. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or before submission of the bid or engagement in the contractor's service.
15. The bid for the works shall remain open for acceptance for a period of **Sixty (60) days** from the date of opening of financial bids, if any bidder withdraws his bid before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the bid which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the bidders shall not be allowed to participate in the re-bidding process of the work.
16. This notice inviting Bid shall form a part of the contract document. The successful bidder/ contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:
 - a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto
 - b) Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable.

- c) Standard General Condition of Contract for CPWD 2014 (amended upto last date of receipt of tender).
17. GST or any other tax applicable in respect of inputs procured by the contractor for this contract shall be payable by the contractor and Government will not entertain any claim whatsoever in respect of the same. However, component of GST at time of supply of service (as provided in CGST Act 2017) provided by the contract shall be varied if different from that applicable on the last date of receipt of tender including extension if any.

Pre-Bid conference shall be held on 16-12-2019 at 11:30 AM at Institute of Nano Science and Technology, Habitat Centre, Sector-64, Phase-X, Mohali-160062 to clear the doubts of intending bidders, if any. The tenderers are requested to submit their questions/queries in writing (also in editable excel format) to the Director, Institute of Nano Science and Technology, Mohali and email to: niranjn.singh@inst.ac.in/ varender@inst.ac.in to 5:00 PM on 13-12-2019.

Director, INST, Mohali

GOVERNMENT OF INDIA

INSTITUTE OF NANO SCIENCE, PUNJAB.

STATE: Punjab

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of: SITC OF UPSSystem, at INST Campus at Sector-81, Knowledge City, Mohali (Punjab) **to be submitted the by 3:00 PM on 30-12-2019 to the Director, INST, Habitat Centre Phase-X, Mohali to be opened in presence of tenderers who may be present at 3:30 PM on 30-12-2019 in the office of Director, INST, Mohali.**

TENDER

I/We have read and examined the Notice Inviting Tender, Schedule A, B, C, D, E & F, Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, Clauses of Contract, Special Conditions, Schedule of Rate and other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the Director, INST, Mohali within the time specified in Schedule 'F', viz. Schedule of Quantities and in accordance in all respects with the Specifications, Designs, Drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of Contract and with such materials as are provided for, by and in respects in accordance with, such conditions so far as applicable.

We agree to keep the tender open for 60 Sixty days from the date of opening of tender and not to make any modifications in its terms and conditions.

A sum of ₹ **7,47,010/-** is hereby forwarded in FDR of a Scheduled Bank/ Demand Draft of a Scheduled Bank/ Bank guarantee issued by a scheduled bank as earnest money. If I/we fail to furnish the prescribed Performance Guarantee within prescribed period, I/we agree that the said Director, INST, Mohali or his successor in office shall without prejudice to any other right or remedy be at liberty to forfeit the said Earnest Money absolutely. Further, if I/we fail to commence work as specified, I/we agree that Director, INST, Mohali or his successors in office shall, without prejudice to any other right or remedy available in law, be at liberty to forfeit the said Performance Guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 & 12.3 of the tender form. Further, I/We agree that in case of forfeiture of earnest money or Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

I/ We undertake and confirm that eligible similar work(s) has/ have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of INST, Mohali, then I/we shall be debarred for tendering in INST, Mohali in future forever. Also, if such a violation comes to the notice of INST, Mohali before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/ Performance Guarantee.

I/We hereby declare that I/we shall treat the tender documents, drawings and other records connected with the work as Secret / Confidential documents and shall not communicate information / derived therefrom to any person other than a person to whom I/we am/are may authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

DatedXX
Witness: -XX.
.....
Address: -XX.
Occupation: -XX.

Signature Contractor.....
Postal **Address:** -

Telephone No.
Fax:-
E-Mail:-

ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the INST, Mohali for a sum of ₹.....
(Rupees.....)

The letters referred to below shall form part of

this contract agreement.

For & on behalf of INST, Mohali

i) XXX
Signature.....

ii) XXX

iii) XXX

iv) XXX

Dated:

Authorized Signatory, INST

XXX: To be filled by the INST

XX: To be filled by the Contractor

PERFORMA OF SCHEDULES (A TO F)

SCHEDULE 'A'

Schedule of quantities- As per **Part -C** of Page – 1-11

SCHEDULE 'B'

Schedule of materials to be issued to the contractor.

S. No.	Description of item.	Quantity.	Rate in figures & words	Place
			at which the material will	issue
			be charged to the contractor	
(1)	(2)	(3)	(4)	(5)
		<u>NIL</u>		

SCHEDULE 'C'

Tools and plants to be hired to the contractor

S.No.	Description.	Hire charges per day	Place of Issue
		<u>NIL</u>	

SCHEDULE 'D'

Extra schedule for specific requirements/ documents for the work, if any.

- a) Technical Specifications. - Part – B - Page No. 2 to 22
- b) Tender drawings List - Part–B–Annexure -II

SCHEDULE 'E'

Schedule of component of other materials, Labour, POL etc., for price escalation.

CLAUSE 10C	:	Not Applicable
CLAUSE 10 CA	:	Not Applicable
CLAUSE 10CC	:	Not applicable

Name of work : SITC of **UPS SYSTEM** at **INST Campus at Sector-81, Knowledge City, Mohali.**

1. Reference to General Conditions of Contract: General Conditions of Contract 2014 with amendments issued up to the last date of submission of tender.

2 Estimated Cost of work : ₹ 3, 73, 50,420/-

3 Earnest Money : ₹ 7, 47, 010 /- (To be returned after receiving performance guarantee).

4 Performance Guarantee : **5% of tendered value**

5 Security Deposit : **2.5% of tendered value**

SCHEDULE 'F':

General Rules & Directions:

Officer Inviting Tender : Director, INST, Mohali.

Maximum Percentage for quantity of items

Work to be executed beyond which rates are to be determined in accordance with

Clauses 12.2 & 12.3 : Refer Clause-12 below

Definitions:

Engineer-in-Charge: **Consultant (Engg), INST**

Accepting Authority: **Director, INST, Mohali (Pb)**

PMC (Project Management Consultant) **Tata Consulting Engineers (TCE)**

Architect **Sikka Architects & Associates**

Percentage on cost of materials and labour 15%

To cover all overheads and profits

Standard Schedule of Rates: Delhi Schedule of Rates 2018(E& M) with correction slips upto date of receipt of tender.

Department : Institute of Nano Science and Technology, Mohali.

Standard CPWD Contract Form: Form GCC 2014, CPWD Form 7 modified & duly amended upto date of submission of tender.

Clause-1:

1.	Time allowed for submission of Performance guarantee from date of issue of letter of acceptance, in days.	10 days
----	--	---------

2.	Maximum allowable extension with late fee @ 0.10% per day of performance guarantee amount beyond the period as provided in (i) above	1 to 5 Days
Clause-2: i	Authority for fixing compensation under clause 2	Director, INST Mohali
ii	Whether Clause 2(A) shall be applicable	Not Applicable
CLAUSE 5	Number of days from the date of issue of letter of acceptance for reckoning date of start.	15Days
	Mile Stone	Table of Milestones (Refer Part-A, Page No.-22)
	Time allowed for execution of work	90 days
	Authority to decide	
i	Extension of time	Director, INST, Mohali (Pb.)
ii	Re-scheduling of Mile stone	Director, INST, Mohali (Pb.)
iii	Shifting of Date of Start in case of delay in handing over of site	Director, INST, Mohali (Pb.)
Clause 6, 6A		
	Clause applicable – (6 or 6A)	Clause-6A (Computerize Measurement to be submitted by agency)
Clause 7	Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment.	₹ 40Lakh
Clause-10-B (ii):	Whether clause 10-B (ii) shall be applicable	Yes
Clause-10-C	Component of Labour expressed as percent of total value of work.	Not applicable
Clause-10 CA:		Not applicable
	Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in the next column	Not applicable
Schedule of component of other materials, Labour, POL etc. for price escalation:		

	<p>Component of civil construction materials (except materials covered under clause 10CA) expressed as percent of total value of work</p> <p>Component of Labour expressed as percent of total value of work.</p> <p>Component of P.O.L. expressed as percent of total value of work.</p>	Not applicable
Clause-11	Specifications to be followed for execution of work	<p>As per Part B (Page no. 2-25)</p> <p>&</p> <p>C.P.W.D. Specifications 2009 Vo. I & II with up to date correction slips till receipt of tender</p>
Clause-12:	Type of Work	Project and original works
12.2 & 12.3	Deviation limit beyond which clause 12.2 & 12.3 shall apply for Building work	30%
12.5(i)	Deviation limit beyond which clause 12.2 & 12.3 shall apply for foundation works (except earth work)	100%
(ii)	Deviation limit for items in earth work subhead of DSR or related items	100%
Clause-16:	Competent Authority for deciding reduced rates	Director, INST, Mohali

Clause-17:

Defect Liability Period	1. UPS	24 Months
	2. Battery for UPS	60 Months
	3. LT Panel & Other Associated Electrical Works	24 Months

Clause-18: List of mandatory machinery tools

& Plants to be deployed by the

NA

Contractor at site

Clause-25: Dispute Redressal Committee (DRC)

Constitution of Dispute Redressal Committee (DRC)	Competent Authority to appoint DRC.
DRC Constituted vide No. 15(3)/2019-INST dated 18-03-2019 (Annexure – 2)(Part A page 40)	Director, INST, Mohali

Clause-36 (i)

Sr. No	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical/ Technical Representative)	Minimum Experience	Number	Rate at which recovery shall be made from contractor in the event of non-deployment.	
						Figures	Words
1	Graduate Engineer	Electrical / Electronics	Principal Technical representative	5 Years	1 No	₹ 25,000/- per month	₹Twenty Five thousand only per month
2	Graduate/Diploma Engineer	Electrical / Electronics	Project/Site Engineer	4/3 Years	2 No	₹ 20,000/- per month	₹Twenty thousand only per month

Note:

1. Foremen, Supervisors and Safety Stewards with basic qualification and SHE certificate as per requirement and instruction of Engineer in Charge at site.
2. The recovery, if any, for non-deployment of project manager shall be done from date of start of the project and the recoveries for non-deployment of other staff including technical representatives for E&M works starts 'After 60 days' or 'As per site requirement to be mutually decided in consultation with the EIC', whichever is earlier.
3. Assistant Engineers retired from Government services who are holding Diploma will be treated at par with Graduate Engineer / Diploma holder with minimum 10 year relevant experience with a reputed construction company can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.
4. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form -16 or CPF deduction issued to the Engineers employed by him) along with every account bill/final bill and shall produce evidence if at any times so required by the Engineer-in-charge.

5. The CV of technical persons shall be presented to Engineer in charge before deployment in above work for approval. Once inducted they will not be transferred or removed without the permission on Engineer in Charge.

Clause-42:

i) a) Schedule/ Statement for determining theoretical quantity of cement & bitumen	Delhi Schedule of Rates 2018 with correction slips issued up to the date of receipt of tender and as per nomenclature of the items
--	---

- ii) Variations permissible on theoretical quantities.

a) Cement 2% plus/ minus.

b) Steel Reinforcement and structure steel

Sections for each diameter, section and category. 2% plus/ minus.

c) Bitumen for all work. 2.5% Plus only & Nil on minus side.

d) All other materials Nil

TABLE OF MILE STONE (S)

Name of work: **SITC of UPS System.**

Sl. No.	Description of Milestone (Physical & Financial)	Time Allotted in days(From date of start)	Amount to be withheld in case of non-achievement of milestone (% of Tendered Amount)
1	Approval of Designs of Drawings	20 days	1.00%
2	Work upto 1/6th of the tendered amount	35 days	1.00%
3	Work upto 3/6th of the tendered amount	55 days	1.00%
4	Work upto 3/4th of the tendered amount	75 days	1.00%
5	Full Work Completed in all respect.	90 days	1.00%

Terms of payment:

Stage payment of the contractor for various components of work shall be regulated as per CPWD specifications. For works for which the % payment is not specially mentioned in the specification, the rate of stage payment shall be decided by Engineer- in charge.

Stage Payment for SITC items, shall be as mentioned below:

- a. 50% Payment within 15 days of supply of the system at site in good condition along with test reports etc.
- b. 35% Payment after installation (ready for testing and commissioning)
- c. 10% Payment after testing, commissioning.
- d. 5% after Handing over to the department for beneficial use.

FORM OF EARNEST MONEY DEPOSIT

(BANK GUARANTEE BOND)

WHEREAS, contractor..... (Name of contractor) (Hereinafter called "the contractor") has submitted his tender dated (Date) for the construction of (Name of work) (Hereinafter called "the Tender")

KNOW ALL PEOPLE by these presents that we..... (Name of bank) having our registered office at..... (hereinafter called "the Bank") are bound unto..... (Name and division of Executive Engineer) (Hereinafter called "the Engineer-in-Charge") in the sum of ₹ (₹ in words) for which payment well and truly to be made to the said Engineer-in-Charge the Bank binds itself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank thisday of..... 20.....

THE CONDITIONS of this obligation are:

- (1) If after tender opening the Contractor withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;
- (2) If the contractor having been notified of the acceptance of his tender by the Engineer-in-Charge:
 - (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to contractor, if required; OR
 - (b) fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor,

We undertake to pay to the Engineer-in-Charge either up to the above amount or part thereof upon receipt of his first written demand, without the Engineer-in-Charge having to substantiate his demand, provided that in his demand the Engineer-in-Charge will note that the amount claimed by him is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date* after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the Engineer-in-Charge, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE.....

SIGNATURE OF THE BANK

WITNESS.....

SEAL

(SIGNATURE, NAME AND ADDRESS)

*Date to be worked out on the basis of validity period of 6 months from last date of receipt of tender.

FORM OF PERFORMANCE SECURITY

BANK GUARANTEE BOND

In consideration of the President of India (hereinafter called "The Government") having offered to accept the terms and conditions of the proposed agreement between _____ and _____ (hereinafter called "the said contractor(s)") for the work _____ (hereinafter called "The said agreement") having agreed to production of a irrevocable Bank Guarantee for ₹ _____ (Rupees _____ only) as security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

We _____ (hereinafter referred to as "the Bank) hereby undertake to (indicate the name of the bank) pay to the Government an amount not exceeding ₹ _____ (Rupees _____ only) on demand by the Government.

We _____ do hereby undertake to pay the amounts due and payable (indicate the name of the bank) under this Guarantee without any demure, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding ₹ _____ (Rupees _____ only).

We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

We _____ further agree that the guarantee herein contained shall (indicate the name of the Bank) remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge on behalf of the Government certified that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee.

We _____ further agree with the Government that the government (indicate name of the bank) shall have the fullest liberty without our consent and without effecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).

We _____ lastly undertake not to revoke this guarantee except (indicate the name of Bank) with the previous consent of the Government in writing.

This guarantee shall be valid upto _____ unless extended on demand by Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to ₹ _____ (Rupees _____ only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the _____ day of _____ for _____
—.

(Indicate the name of Bank)

INTEGRITYPACT

To,

.....,

.....,

.....

Sub: NIT No.: 4/INST/2019-20 for the work “SITC of UPS SYSTEMfor INST at Sector-81, Knowledge City, Mohali (Pb.)

Dear Sir,

It is hereby declared that Institute of Nano Science & Technology, Mohali is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender / bid documents, failing which the tenderer /bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the Institute of Nano Science & Technology, Mohali.

Yours faithfully,

Director,

Institute of Nano Science & Technology, Mohali

INTEGRITY PACT

To,
The Director,
Institute of Nano Science &
Technology Habitat Centre,
Sector-64, Phase-X, Mohali-
160062

**Sub: NIT No.: 4/INST/2019-20 for the work “SITC of UPS SYSTEMfor INST at Sector-81,
Knowledge City, Mohali (Pb.)**

Dear Sir,

I/We acknowledge that Nano Science & Technology, Mohali is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which/ We will stand disqualified from the tendering process. I/We acknowledge that the making of the bid shall be regarded as an unconditional and absolute acceptance of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by Nano Science & Technology, Mohali. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/ bid, Nano Science & Technology, Mohali shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully,

(Duly authorized signatory of the Bidder)

To be signed by the bidder and same signatory competent / authorized to sign the relevant contract on behalf of Institute of Nano Science & Technology, Mohali.

INTEGRITY AGREEMENT

This Integrity Agreement is made at on this.....dayof.....20.....

BETWEEN

Institute of Nano Science & Technology (Hereinafter referred as the **Principal/Owner**', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

..... (Name and Address of the Individual/firm/Company) through..... (Hereinafter referred to as the (Details of duly authorized signatory)

"Bidder/Contractor" and which expression shall unless repugnant to the meaning or context here of include its successors and permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No. 4/INST/2019-20) (hereinafter referred to as **"Tender/Bid"**) and intends to award, under laid down organizational procedure, contract for **"Sub: NIT No.: 4/INST/2019-20 for the work "SITC of UPS SYSTEM"for INST at Sector-81, Knowledge City, Mohali (Pb.)"** hereinafter referred to as the **"Contract"**.

AND WHEREAS the Principal/ Owner values full compliance with all relevant laws of and, rules, regulations, economic use of resources and of fairness/ transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as **"Integrity Pact"** or **"Pact"**), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agrees follows and this Pact witnesses asunder:

Article 1: Commitment of the Principal/Owner

- (1) The Principal/ Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason.

The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

- (c) The Principal/Owner shall endeavor to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
- (2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/ Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

- (1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and through out the negotiation or award of a contract.
- (2) The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:
 - (a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
 - (b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
 - (c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contractor(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - (d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participates in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a

subsequent/parallel tender for the same item.

- (e) The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- (3) The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- (4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/ or to influence the procurement process to the detriment of the Government interests.
- (5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Principal/ Owner's absolute right:

- (1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s) Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/ Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.
- (2) Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/ determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.
- (3) Criminal Liability: If the Principal/ Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of Prevention of Corruption Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

- (1) The Bidder declares that no previous transgression so occurred in the last 5 years with any other Company in any country confirming to the anti-corruption approach or with Central Government or State Government or any other Central /State Public Sector Enterprises in India that could justify

his exclusion from the Tender process.

- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/Owner.
- (3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Associate Agencies

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Associate agencies.
- (2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- (3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is later and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, i.e. Institute of Nano Science & Technology.

Article 7- Other Provisions

- (1) This Pact is subject to Indian Law, place of performance and jurisdiction is the head quarters of the division of the Principal/Owner who has floated the tender.
- (2) Changes and supplements need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium member. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- (4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to the original intentions.
- (5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.

Article 8- LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/ Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....

(For and on behalf of Principal/Owner)

.....

(For and on behalf of Bidder/Contractor) WITNESSES:

1.....

(Signature, name and address)

2.....

(Signature, name and address) Place:

Dated:

Annexure –1

(On OEM Letter head withseal)

Dated _____

To,

The Director,

INSTITUTE OF NANO SCIENCE AND TECHNOLOGY

Habitat Centre, Sector-64, Phase-X, Mohali-160062

Subject: Undertaking regarding providing complete technical backup and availability of spares to M/s

Dear Sirs,

For the work of "SITC of **UPS System**, for Institute of Nano Science & Technology at Sector-81, Knowledge City, Mohali (Punjab)". We hereby assure and give an Undertaking that as a manufacturer of _____ make system, we will provide complete technical support to M/s _____ during the execution of work and also ensure technical support and availability of spares during the 5 year maintenance period after successful commissioning of the system.

This is for information and necessary action please.

Thanking you,

Yours faithfully,

(Seal & Signature)

FORM 'A'

FINANCIAL INFORMATION

- I. Financial Analysis-Details to be furnished duly supported by figures in balance sheet / profit & loss account for the last **five years** duly certified and audited by the Chartered Accountants, as submitted by the applicant to the Income Tax Department (Copies to be attached).

S. No.	Description	Financial Years				
		2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
i)	Gross Annual turnover					
ii)	Turnover on construction works					
iii)	Profit / Loss					

SIGNATURE OF BIDDER(S)

Signature of Chartered Accountant with Seal

FORM "B"

FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s./ Sh.....having marginally noted address, a customer of our bank are/is respectable and can be treated as good for any engagement upto a limit ofRs..... (Rupees.....)

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature)

For the Bank

NOTE

Banker's certificates should be on letter head of the Bank, sealed in cover addressed to tendering authority.

In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

FORM 'G'
**DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING THE
LAST SEVEN YEARS ENDING PREVIOUS DAY OF LAST DATE OF SUBMISSION OF
TENDERS.**

S.No.	Name of work / Project and Location	Owner or sponsoring organization	Gross amount of work done of items/ components mentioned in Cost of work in Crore of	Date of Commencement as per contract	Stipulated date of completion	Actual Date of Completion	Whether the work was done on back to back basis—Yes/No	Litigation / arbitration cases pending / in progress with details *	Name and address/ telephone Number of officer to whom reference may be made
1	2	3	4	5	6	7	8	9	10

FORM 'H'
PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS "C"

1. Name of work/project & location :
2. Agreement no. :
3. Estimated cost :
4. Tendered cost :
5. Date of start :
6. Date of completion
- (i) Stipulated date of completion :
- (ii) Actual date of completion :
1. (a) Whether case of levy of compensation
for delay has been decided or not? : Yes / No
- (b) If decided, amount of compensation levied
for delayed completion, if any. :
8. Performance Report :
- (1) Quality of work : Outstanding/Very Good/Good/Poor
- (2) Financial soundness : Outstanding/Very Good/Good/Poor
- (3) Technical Proficiency : Outstanding/Very Good/Good/Poor
- (4) Resourcefulness : Outstanding/Very Good/Good/Poor
- (5) General Behaviour : Outstanding/Very good/Good/Poor

Executive Engineer or Equivalent

LETTER OF TRANSMITTAL (on letter Head of the bidder)

To,
The Director,
Institute of Nano Science &
Technology Habitat Centre,
Sector-64, Phase-X, Mohali-
160062

Sub: NIT No.: 4/INST/2019-20 for the work “**SITC of UPS Systemfor INST at Sector-81, Knowledge City, Mohali (Pb.)**”

Sir,

Having examined the details given in press notice and bid document for the above work, I/we here-by submit the relevant information in three (3) sealed envelopes as required containing the following documents.

1. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.

It is also certified that I/we shall be liable to be debarred, disqualified/cancellation of enlistment in case any information furnished by me/us found to be incorrect.

Enclosures:

Seal of bidder

Date of submission:

Signature(s) of bidder(s).

Composition of DRC under Clause 25

Issued vide office order No. 15(3)/2019-INST, Dated: 18.03.2019

In accordance with Clause 25 of Part 'A' of Tender Document of INST for various packages for Construction and Development of Institute Campus at Sector-81, Mohali, the Director, Institute of Nano Science and Technology has been pleased to reconstitute a Dispute Redressal Committee (DRC) for redressal of disputes arisen between the contractors and the Institute on the matters pertaining to the said project. The reconstituted committee along with ToR is as under:

1. Dr. R.K. Sinha, Director, CSIO, Chandigarh : **Chairman**
2. Dr. S.K. Sardana (Retd. IDES), Member Judge, Chandigarh Disputes Redressal Commission, Chandigarh : **Member**
3. Dr. Sandeep Chatterjee, Registrar, IIT Delhi : **Member**
4. Shri Moloy Roy (Civil Engineer), Former Vice President, M/s. JMC Projects India Ltd., Kolkata : **Member**
5. Shri S.K. Srivastava, (Retd. Spl. D.G., CPWD) 370, Asiad Village Complex, Siri fort, New Delhi-110049 : **Member**
6. Shri J.K. Chowdhary (Retd. Chief Engineer, CPWD), C-2/2369, Vasant Kunj, New Delhi-110070 : **Member**

Terms of Reference:

Tenure: Till the completion of the project of Construction & Development of INST Campus at Sector 81, Mohali, or further orders, whichever is earlier.

Quorum: Chairman and three other members

The above order will take immediate effect.

CONSTRUCTION & DEVELOPMENT OF INSTITUTE OF NANO SCIENCE & TECHNOLOGY AT

MOHALI

NAME OF WORK: SITC OF UPS SYSTEM

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1.0 GENERAL (SPECIFICATIONS FOR MODULAR UPS SYSTEMS)

1.1 Scope

The scope covers supply, installation, testing and commissioning of online UPS systems. Supply of Battery banks with battery mounting racks/cabinets, Supply of cables and inter connection between battery banks and UPS system.

This specification describes the electrical, mechanical characteristics and requirements of three phases, on-line, double conversion, Modular Hot Swappable Uninterruptible Power Supply (UPS).

The UPS should be having VFI (Voltage Frequency Independent) technology, fully DSP controlled power factor corrected rectifier and IGBT inverter capable of providing high quality AC power for sensitive electronic equipment loads. It should also supply clean power without any break in the supply. Under no conditions will the protected system get direct supply from the raw mains unless there is fault in the protected system. The description of the specification includes aspects related to design, manufacturing, fabrication and putting UPS Systems together with all necessary accessories and auxiliaries to make an operational UPS system in a condition acceptable to the end user.

1.2 Standards

The UPS shall be designed in accordance with the applicable sections of the current revision of the following standards. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

Subject	Standard Reference	Standard Title
Safety	IEC/EN 62040-1	Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS
Electromagnetic Compatibility (EMC)	IEC/EN 62040-2	Uninterruptible power systems (UPS) – Part 2: Electromagnetic compatibility (EMC) requirements
Performance	IEC/EN 62040-3	UPS – part 3: Method of specifying the performance and test requirements

1.3 System Description

1.3.1 General characteristics

1. Online Double Conversion – Transformer less Design with 3 Level Inverter Technologies.
2. Modular & Scalable UPS with hot swappable Power Module rating with Hot swappable STS Module, controller & Aux Power Board.
3. Redundant System with redundant controller with two controllers, Dual Aux Power Supply.
4. Dual CAN Bus within frame & redundant CAN Bus between parallel systems to enable UPS to be removed or inserted UPS in parallel configuration without need of transferring it to bypass mode.
5. Integrated Parallel capability.

6. DSP (Digital Signal Processor) / Microprocessor based control, using IGBT devices and high switching frequency PWM.
7. Sleep mode of operation to improve operational efficiency (>96%) on varying & dynamic loading conditions without compromising the redundancy required in the application.
8. Top & Bottom cable Entry options.
9. Capability of independent or common battery bank operation of the UPS when operated in Parallel Redundant System.
10. High Charging Current Capability.
11. UPS Compatibility & Integration with VRLA & Lithium (NMC) Batteries.

1.3.2 Design requirements for 2X250KVA Modular UPS System:

1. The UPS shall be sized for 250 kW load in a 450 kW or Higher sized Cabinet.
2. The parallel system shall comprise of two UPS.
3. Each UPS system shall be capable of delivering for 250 kW load.
4. The UPS battery system shall be sized for 300 kVA at unity power factor for 15 minutes.
5. The UPS shall use a Lithium (NMC) battery, designed for auxiliary power service in an UPS application.

1.3.3 Design requirements for 2X200KVA Modular UPS System:

1. The UPS shall be sized for 200 kW load in a 300 kW or Higher sized Cabinet.
2. The parallel system shall comprise of two UPS.
3. Each UPS system shall be capable of delivering for 200 kW load.
4. The UPS battery system shall be sized for 200 kVA at unity power factor for 15 minutes
5. The UPS shall use a Lithium (NMC) battery, designed for auxiliary power service in an UPS application.

The primary battery cabinet shall be housed in a matching cabinet(s) next to the UPS.

1.3.4 Design requirements for 1X40KVA Modular UPS System:

1. The UPS shall be sized for 40 kW load in a 80 kW or Higher sized Cabinet.
2. UPS system shall be capable of delivering for 40 kW load.
3. The UPS battery system shall be sized for 40 kVA at unity power factor for 15 minutes
4. The UPS shall use a Lithium (NMC) battery, designed for auxiliary power service in an UPS application.

The primary battery cabinet shall be housed in a matching cabinet(s) next to the UPS.

1.3.5 System Characteristics:

A. Input Specifications:

- | | | | |
|----|--------------------------------------|---|----------------------|
| a. | Nominal Input voltage | : | 380/400/415V AC |
| b. | Input voltage Range | : | 305-477V AC |
| c. | Input frequency & variation limits | : | 45-55Hz |
| d. | Input Power factor at Rated Load | : | >0.99 |
| e. | Input power factor at 50% load | : | >0.99 |
| f. | THD (current) at input for 100% load | : | <3% at Input Vthd<1% |
| g. | THD (current) at input for 75% load | : | <5% at Input Vthd<1% |
| h. | THD (current) at input for 50% load | : | <5% at Input Vthd<1% |

B. Output Specifications:

- a. Output Voltage : 220/380, 230/400, 240/415 V
- b. Output voltage variation limits. : +/- 1%
- c. Transient voltage variation for 100% Block loading. : ±5% (10%-90%)
- d. Voltage recovery time : < 20ms
- e. Output frequency variation limit : Synchronized to mains: 50Hz/60Hz ± 3Hz 50Hz/60Hz ± 0.05%
- f. Input to output efficiency at 100% load : >95.5 %
- g. Input to output efficiency at 75% load : >96 %
- h. Input to output efficiency at 50% load : >96 %

C. Environmental conditions:

- a. Temperature:
 - 1. Operating ambient temperature : 0 °C to 40 °C.
- b. Relative humidity (operating and storage) : 0 percent to 95 percent Non-condensing.
- d. Audible noise (300 KW) : <85 dBA at 100% load and 1 m from UPS
- e. Audible noise (200 KW) : <65dBA at 100% load and 1 m from UPS
- f. Audible noise (80 KW) : <65 dBA at 100% load and 1 m from UPS

2.0 MODES OF OPERATIONS

The UPS system shall be designed to operate as a double conversion, on-line system in the following modes.

- a. **Normal:** The UPS system shall continuously supply power to the critical load.
- b. **Battery:** Upon failure of the utility AC power source, the critical load shall be supplied by the inverter, which, without any interruption, shall obtain its power from the battery.
- c. **Recharge:** Upon restoration of the utility AC power source (prior to complete battery discharge), the PFC rectifier shall power the inverter and simultaneously recharge the battery.
- d. **Static bypass:** The static bypass switch shall be used to transfer the load to the bypass without interruption to the critical power load. This shall be accomplished by turning the inverter off. Automatic re-transfer or forward transfer of the load shall be accomplished by turning the inverter on.
- e. **Maintenance bypass:** In maintenance bypass the load is supplied with unconditioned power from the bypass input included in the UPS.
- f. **ECO mode:** The UPS system is configured to use static bypass operation as the preferred mode under predefined. Transfers to battery operation upon utility failure. Efficiency up to 99%.

g. Sleep Mode: UPS is configured for Green Mode to enable automatically transferring some modules to sleep mode in case of applied load is less than certain load percentage. Modules would be switched periodically & in rotational manner under this condition. Once load ramps up to full load or above some load percentage, Modules those were in sleep mode shift to active mode automatically without any command. The Green mode could be activated from front display to improve operational efficiency (>96%) on varying & dynamic loading conditions without compromising the redundancy required in the application.

h. Energy Recycle Mode: UPS should be configurable for Energy Recycle Mode that enables testing of the unit for load testing without external load to test & verify the UPS under site conditions & to help in Load simulation & decreasing the CAPEX, saving in energy cost for test to be done during maintenance.

i. Parallel Mode: Two or more UPS units (up to 8) of same capacity should be capable of working in parallel mode N+1, N+X & N+N of operation providing same voltage & frequency. The output of parallel UPS system should be shorted to provide common output. The UPS units working in parallel mode of operation should share the load equally. In case of failure of redundant UPS, rest of the UPS units should be able to support the critical load without any interruption.

3.0 SYSTEM CONTROL & INDICATORS

Front Panel 10" Color Touch Graphical Display: The UPS control panel shall provide a touch color graphic display for indication of UPS status, metering, battery status, alarm/event log, and advanced operational features.

a. Access : The display shall provide access to:

1. Mimic diagram indicating UPS power flow.
2. Measurements, status indications, and events.
3. Personalization menu protected by a password, used to make specific settings.
4. Event log with time stamping.
5. Access to measurements.

b. System parameters monitored: The visual display shall include, but shall not be limited to, the following system parameters based on true RMS metering:

1. Measurements:
 - i) Input voltage (Ph-Ph and PH-N).
 - ii) Input current per phase.
 - iii) Bypass voltage.
 - iv) Bypass input frequency.
 - v) UPS output voltage (Ph-Ph and Ph-N).
 - vi) UPS output current per phase.
 - vii) UPS output frequency.
 - viii) UPS output percent load.
 - ix) UPS output kVA.
 - x) UPS output power factor.
 - xi) Battery voltage.
 - xii) Battery current.
 - xiii) Battery backup time and remaining service life.

c. Status indications and events:

- 1) Load on battery.
- 2) Load on UPS.
- 3) Load on bypass.
- 4) Low battery warning.
- 5) General alarm.
- 6) Remaining back-up time during operation on battery power.
- 7) Bypass source outside tolerances.
- 8) Main input switch status
- 9) Reserve input switch status
- 10) Manual bypass switch status
- 11) Temperature Inverter & PFC-Warning & shutdown
- 12) DC Bus Abnormal
- 13) INV Output Voltage Abnormal
- 14) INV Overload Warning
- 15) INV Overload Shutdown
- 16) INV Short Circuit
- 17) INV Static Switch Abnormal
- 18) Emergency Power Off
- 19) Inner Communication Fault
- 20) Outer Communication Fault
- 21) Power Module Fan Fail

d. Time-stamped historical events: This function shall time stamp and store important status changes and anomalies.

4.0 BATTERY

The UPS shall use a Lithium (NMC) battery, designed for auxiliary power service in an UPS application.

The primary battery cabinet shall be housed in a matching cabinet(s) next to the UPS.

The UPS shall use a Lithium (NMC) battery, designed for auxiliary power service in an UPS application.

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5.0 SUBMITTALS

- a. Vendor to provide UPS rating, configuration along with distribution scheme.
- b. UPS footprints including weights, dimensions, service access, and airflow requirements of each unit (GA drawings required).
- c. Foot prints of battery racks, type of battery including overall weight of battery proposed for installation (typical layout diagram to be provided)

6.0 WARRANTY

Manufacturer's warranty for UPS Systems against defects in materials and workmanship is for **24 months from the date of handover** to client or **27 months from the date of supply** whichever is earlier. After the expiry of warranty, the product should be supported through comprehensive Annual Maintenance Contract (AMCs).

Manufacturer's warranty for Lithium (NMC) Battery against defects in materials and workmanship is for 60 months from the date of installation or 63 months from the date of supply whichever is earlier.

7.0 PRE-DISPATCH INSPECTIONS:

Before shipment, vendor should completely test the system in its factory. Client can ask for Inspection of LT Panels (Routine tests) and UPS for the major specifications that constitutes routine test. Which are mentioned below:

- Insulation Resistance Test
- Power Frequency Voltage withstand Test
- Operation Test@ uninterrupted Power Supply Testing
- AC output characteristic Test
- Voltage Adjustment Range Test.
- Output Voltage Accuracy Test.
- Output Voltage wave form Distortion Test.
- Temp Rise Test (4 Hours)
- Efficiency and Input Power factor test.

Number of persons for Pre-Dispatch Inspection- 3 numbers.

8.0 FABRICATION:

Materials: Vendor to certify that all materials of the UPS is new, of current manufacture, high grade and free from all defects and will not have been in prior service except as required during factory testing.

Construction and Mounting: The UPS unit should comprise of rectifier/charger, inverter, static transfer switch, maintenance bypass switch, and static bypass input switch housed in a free-standing steel enclosure with key-lockable doors. Also, switch gears to be provided at input, output, static bypass & maintenance bypass of UPS. Front access only is required for servicing, adjustments, and installation. The enclosure should be built to comply with IP20. The UPS cabinet should be cleaned, primed, and painted with the manufacturer's standard colour.

TECHNICAL ANNEXURE FOR MODULAR UPS SYSTEM

Sr. No	Technical Specification for Modular UPS System	250KVA	200KVA	40KVA
	Specification	Requirement		
1	Capacity (in kVA)	250 kVA in Min 450kVA Cabinet, 3-Phase Input / 3-Phase Output UPS	200 kW Modular UPS in min 300 kW Cabinet , 3-Phase Input / 3-Phase Output UPS	40 kW Modular UPS in min 80 kW Cabinet , 3-Phase Input / 3-Phase Output UPS
2	Technology and Capability	a) True Online configuration double conversion UPS with 3-Level Inverter Technology	a) True Online configuration double conversion UPS with 3-Level Inverter Technology	a) True Online configuration double conversion UPS with 3-Level Inverter Technology
		b) Modular & Scalable UPS with hot swappable Power Module	b) Modular & Scalable UPS with hot swappable Power Module	b) Modular & Scalable UPS without swappable Power Module
		c) Hot Swappable STS Module & control Module	c) Hot Swappable STS Module & control Module	c) Hot Swappable STS Module & control Module
		d) Parallel capability up to ten no. of Power Modules for Vertical redundancy & up to six UPS units for capacity	d) Parallel capability up to Six no. of Power Modules for Vertical redundancy & up to six UPS units for capacity	d) Parallel capability up to Four no. of Power Modules for Vertical redundancy & up to six UPS units for capacity
		e) Redundant System with redundant controller with two controllers, Dual Aux Power Supply.	e) Redundant System with redundant controller with two controllers, Dual Aux Power Supply.	e) Redundant System with redundant controller with two controllers, Dual Aux Power Supply.

		f) Dual CAN Bus within frame & redundant CAN Bus between parallel systems for Redundancy & reliability.	f) Dual CAN Bus within frame & redundant CAN Bus between Parallel systems for Redundancy & reliability.	f) Dual CAN Bus within frame & redundant CAN Bus between parallel systems for Redundancy & reliability.
		g) Green mode of operation to improve operational efficiency (>96%) on varying & dynamic loading conditions without compromising the redundancy required in the application.	g) Green mode of operation to improve operational efficiency (>96%) on varying & dynamic loading conditions without compromising the redundancy required in the application.	g) Green mode of operation to improve operational efficiency (>96%) on varying & dynamic loading conditions without compromising the redundancy required in the application.
		h) Top /Bottom cable Entry options	h) Top / Bottom cable Entry options	h) Top / Bottom cable Entry options
		i) DSP (Digital Signal Processor) / Microprocessor based control, using IGBT devices and high switching frequency PWM	i) DSP (Digital Signal Processor) / Microprocessor based control, using IGBT devices and high switching frequency PWM	i) DSP (Digital Signal Processor) / Microprocessor based control, using IGBT devices and high switching frequency PWM
		j) Capability of independent or common battery bank operation of the UPS when operated in Parallel Redundant System	j) Capability of independent or common battery bank operation of the UPS when operated in Parallel Redundant System	j) Capability of independent or common battery bank operation of the UPS when operated in Parallel Redundant System
		k) Brushless DC Fans with speed Control	k) Brushless DC Fans with speed control	k) Brushless DC Fans with speed Control

3	Input			
3.1	Input facility -Phases / Wires	3-Phase / 4-Wire & Gnd (R, Y, B -Phases & Neutral + Ground)	3-Phase / 4-Wire & Gnd (R, Y, B -Phases & Neutral + Ground)	3-Phase / 4-Wire & Gnd (R, Y, B -Phases & Neutral + Ground)
3.2	Nominal Input Voltage	380 / 400 / 415V AC	380 / 400 / 415V AC	380 / 400 / 415V AC
3.3	Input Voltage Range	315 - 470 V AC	315 - 470 V AC	315 - 470 V AC
		246- 470 V AC (< 50% Loading)	246- 470 V AC (< 50% Loading)	246- 470 V AC (< 50% Loading)
3.4	Nominal Input Frequency	50 / 60 Hz (selectable)	50 / 60 Hz (selectable)	50 / 60 Hz (selectable)
3.5	Input Frequency Range	40-70 Hz	40-70 Hz	40-70 Hz
3.6	Input Power Factor	> 0.99 on Full resistive Load	> 0.99 on Full resistive Load	> 0.99 on Full resistive Load
3.7	Input Current Harmonic Distortion (THDi)	< 3% on Full Load (with Mains Vthd less than 1%)	< 3% on Full Load (with Mains Vthd less than 1%)	< 3% on Full Load (with Mains Vthd less than 1%)
4	Output			
4.1	Nominal Output Voltage	380 / 400 / 415V AC (Selectable)	380 / 400 / 415V AC (Selectable)	380 / 400 / 415V AC (Selectable)
4.2	Output Voltage Regulation	+/- 1%	+/- 1%	+/- 1%
4.3	Nominal Output Frequency	50 / 60 Hz (Selectable)	50 / 60 Hz (Selectable)	50 / 60 Hz (Selectable)
4.4	Output Frequency Regulation	+/- 0.05 Hz (Free Running / Self Clocked Mode)	+/- 0.05 Hz (Free Running / Self Clocked Mode)	+/- 0.05 Hz (Free Running / Self Clocked Mode)
		+ / - 5 % (Synchronized to Mains Mode, Selectable)	+ / - 5 % (Synchronized to Mains Mode, Selectable)	+ / - 5 % (Synchronized to Mains Mode, Selectable)
4.5	Output Frequency Slew Rate	1 Hz / s	1 Hz / s	1 Hz / s
4.6	Output Wave Form	Pure sine wave	Pure sine wave	Pure sine wave
4.7	Output Voltage Distortion (Vthd)	<= 2% (For 100% Linear / Resistive Load)	<= 2% (For 100% Linear / Resistive Load)	<= 2% (For 100% Linear / Resistive Load)
		<= 5% (For 100% Non-Linear / RCD Load)	<= 5% (For 100% Non-Linear / RCD Load)	<= 5% (For 100% Non-Linear / RCD Load)
4.8	Crest Factor	Upto 3 : 1 On Full Load	Upto 3 : 1 On Full	Upto 3 : 1 On

			Load	Full Load
4.9		100% unbalanced load should be allowed	100% unbalanced load should be allowed	100% unbalanced load should be allowed
4.10	Displacement angle for 100% balanced Load	120 deg +/- 2 deg	120 deg +/- 2 deg	120 deg +/- 2 deg
5	Transient Response / Recovery			
	Transient response: Dynamic regulation for 0% to 90 % step load	+/- 5%	+/- 5%	+/- 5%
6	Transfer Time			
6.1	Transfer Time (Mode of operation)	Instantly without interruption from Mains mode to Battery Mode	Instantly without interruption from Mains mode to Battery Mode	Instantly without interruption from Mains mode to Battery Mode
6.2	Transfer Time (Inverter to Bypass / Bypass to Inverter)	< 4 ms (Synchronized Mode)	< 4 ms (Synchronized Mode)	< 4 ms (Synchronized Mode)
		< 10 ms (Asynchronized Mode)	< 10 ms (Asynchronized Mode)	< 10 ms (Asynchronized Mode)
6.3	Automatic & Bi-directional static by-pass (In-built)	Uninterrupted transfer of load from Inverter to bypass (under overload / fault conditions) & automatic retransfer from bypass to inverter (on removal of overload / fault conditions)	Uninterrupted transfer of load from Inverter to bypass (under overload / fault conditions) & automatic retransfer from bypass to inverter (on removal of overload / fault conditions)	Uninterrupted transfer of load from Inverter to bypass (under overload / fault conditions) & automatic retransfer from bypass to inverter (on removal of overload / fault conditions)
7	Efficiency (At Nominal Voltage & Resistive Load up to kW rating of UPS)			
7.1	Overall Peak Efficiency	96.5%	96.5%	96%

	(AC to AC) - Online (Double Conversion)			
7.2	Overall Efficiency (AC to AC) - Online (Double Conversion) on 25% Loading	96%	96%	95%
	Eco mode efficiency	99%	99%	99%
8	Overload			
8.1	Inverter Overload capacity (Mains Mode & Battery Mode)	125% for 10 minutes	125% for 10 Minutes	125% for 10 minutes
		150% for 60 seconds, > 150% for 1 sec	150% for 60 seconds, > 150% for 1 sec	150% for 60 seconds, > 150% for 1 sec
9	Display Panel (In-build Touch Display)			
9.1	Measurements (On Touch Display)	Input: Voltage /Current/ Frequency	Input: Voltage /Current/ Frequency	Input: Voltage /Current/ Frequency
		Bypass: Voltage /Current/ Frequency Output: Voltage / frequency / Current	Bypass: Voltage /Current/ Frequency Output: Voltage / frequency / Current	Bypass: Voltage /Current/ Frequency Output: Voltage / frequency / Current
		Battery: Voltage / Capacity	Battery: Voltage / Capacity	Battery: Voltage / Capacity
		Load: In kVA / kW / Percentage	Load: In kVA / kW / Percentage	Load: In kVA / kW / Percentage
		Temperature: STS/Inverter/PFC	Temperature: STS/Inverter/PFC	Temperature: STS/Inverter/PFC
9.2	Event Logging & Statistical Data (On LCD): UPS should capture and display upto 10000 events	Events Logs (10000 events) like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc	Events Logs (10000 events) like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc	Events Logs (10000 events) like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc

		Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc	Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc	Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc
9.3	User Programmable Parameters & Settings (On Touch Display)	Bypass: Voltage / Frequency Range	Bypass: Voltage / Frequency Range	Bypass: Voltage / Frequency Range
		Inverter: Voltage / Frequency / Eco Mode / Frequency converter	Inverter: Voltage / Frequency / Eco Mode / Frequency converter	Inverter: Voltage / Frequency / Eco Mode / Frequency converter
		Battery: Type / Banks / Chargers Current / Manual & Automatic Testing	Battery: Type / Banks / Chargers Current / Manual & Automatic Testing	Battery: Type / Banks / Chargers Current / Manual & Automatic Testing
		Mode selection : online Mode, Green Mode, ECO Mode, Energy Recycle Mode & Frequency conversion mode	Mode selection : online Mode, Green Mode, ECO Mode, Energy Recycle Mode & Frequency conversion mode	Mode selection : online Mode, Green Mode, ECO Mode, Energy Recycle Mode & Frequency conversion mode
		Auto Equalize charge enable/disable option with selectable interval	Auto Equalize charge enable/disable option with selectable interval	Auto Equalize charge enable/disable option with selectable interval
		Alarms: Buzzer Test / Buzzer Mute	Alarms: Buzzer Test / Buzzer Mute	Alarms: Buzzer Test / Buzzer Mute
		Date & Time Setting	Date & Time Setting	Date & Time Setting
		Password: User / Administrator Setting	Password: User / Administrator Setting	Password: User / Administrator Setting
		Information: UPS Serial No. /Firmware	Information: UPS Serial No.	Information: UPS

			/Firmware	Serial No. /Firmware
		Log & Statistical Data Reset & Firmware upgrade	Log & Statistical Data Reset & Firmware upgrade	Log & Statistical Data Reset & Firmware upgrade
10	Alarms			
	Audible Alarms	Mains Failure / Battery Low Alarm / UPS Overload / Fault / Short circuit	Mains Failure / Battery Low Alarm / UPS Overload / Fault / Short circuit	Mains Failure / Battery Low Alarm / UPS Overload / Fault / Short circuit
11	Battery Bank	LiB	LiB	LiB
11.1	Backup Required	15 minutes on 300 kVA @ Unity PF	15 minutes on 200 kVA @ Unity PF	15 minutes on 80 kVA @ Unity PF
11.2	Make, Type, Model No. & Country of Origin	Vendor to Furnish	Vendor to Furnish	Vendor to Furnish
11.3	Model & Cell Type/Cell Configuration	Prismatic , Pouch, cylindrical	Prismatic , Pouch, cylindrical	Prismatic , Pouch, cylindrical
11.4	Chemistry of Cell composition	Lithium Nickel Manganese Cobalt Oxide (NMC)	Lithium Nickel Manganese Cobalt Oxide(NMC)	Lithium Nickel Manganese Cobalt Oxide(NMC)
11.5	Nominal Capacity in Ah	50-100Ah	50-100Ah	50-100Ah
11.6	Nominal Energy per Cabinet	20kWhr-50kWhr	20kWhr-50kWhr	20kWhr-50kWhr
11.7	Cycle Life at 80% DOD at 25deg C	4000 cycles (at 80% DOD at 25degC)	4000 cycles (at 80% DOD at 25degC)	4000 cycles (at 80% DOD at 25degC)
11.8	Battery Management System (BMS)	Module BMS & Rack BMU	Module BMS & Rack BMU	Module BMS & Rack BMU
11.9	Mandatory Safety Certifications/ compliances	UL1642, UN38.3 OR EQUIVALENT	UL1642, UN38.3 OR EQUIVALENT	UL1642, UN38.3 OR EQUIVALENT
11.10	Safety Features in LiB Cabinet	MCCB to be present & Should have inbuilt protection for Over current, short circuit, Overvoltage, under-voltage & over temperature	MCCB to be present & Should have inbuilt protection for Over current, short circuit, Overvoltage, under-voltage & over temperature	MCCB to be present & Should have inbuilt protection for Over current, short circuit, Overvoltage, under-voltage & over

				temperature
11.11	Nominal Operating Temperature	0deg C to +45deg C	0deg C to +45deg C	0deg C to +45deg C
12	Communication Interfaces			
12.1	Drycontact/ communication Ports	Output Dry contact :6 configurable for 21 events including Battery breaker shunt trip, backfeed protection EPO activated Input Dry contact: 4,ParallelPort : 4, REPO, External battery Temperature sensor : 4 ,External switch Breaker status: 4 ,USB Port & RS232 Port ,SMART slot for more no. of Dry contacts, Integrated MODBUS/SNMP card	Output Dry contact :6 configurable for 21 events including Battery breaker shunt trip, backfeed protection EPO activated Input Dry contact: 4,ParallelPort : 4, REPO, External battery Temperature sensor : 4 ,External switch Breaker status: 4 ,USB Port & RS232 Port ,SMART slot for more no. of Dry contacts, Integrated MODBUS/SNMP card	Output Dry contact :6 configurable for 21 events including Battery breaker shunt trip, backfeed protection EPO activated Input Dry contact: 4,ParallelPort : 4, REPO, External battery Temperature sensor : 4 ,External switch Breaker status: 4 ,USB Port & RS232 Port ,SMART slot for more no. of Dry contacts, Integrated MODBUS/SNMP Card
13	Restart / Testing Capability			
13.1	Automatic Restart	UPS should start up automatically on mains resumption after battery low shutdown	UPS should start up automatically on mains resumption after battery low shutdown	UPS should start up automatically on mains resumption after battery low shutdown
		Manual / Scheduled battery test to ensure healthiness of batteries.	Manual / Scheduled battery test to ensure healthiness of batteries.	Manual / Scheduled battery test to ensure healthiness of batteries.
14	Physical			

14.1	Operating Temperature	0 to 40 deg C full load, 0-45degC (output power Derated to 85%)	0 to 40 deg C full load, 0-45degC (output power Derated to 85%)	0 to 40 deg C full load, 0-45degC (output power Derated to 85%)
14.2	Storage Temperature	-25 to 70 deg C	-25 to 70 deg C	-25 to 70 deg C
14.3	Operating Humidity	0 to 95% RH (Non-condensing)	0 to 95% RH (Non-condensing)	0 to 95% RH (Non-condensing)
14.4	Operating Altitude	1000 m (meters above sea level) without derating, Derating 1% for each additional 100m.	1000 m (meters above sea level) without derating, Derating 1% for each additional 100m.	1000 m (meters above sea level) without derating, Derating 1% for each additional 100m.
14.5	Protection Class	IP – 20	IP – 20	IP – 20
14.6	Type of Cooling	Forced Air	Forced Air	Forced Air
14.7	Noise Level	< 85 dbA at 1 meter distance	< 65 dbA at 1 meter distance	< 65 dbA at 1 meter Distance
14.8	Form Factor	Free Standing Floor Mounted UPS	Free Standing Floor Mounted UPS	Free Standing Floor Mounted UPS
14.10	Dimension (w x d x h) in mm	Vendor to Furnish	Vendor to Furnish	Vendor to Furnish
14.11	Weight - in kg	Vendor to Furnish	Vendor to Furnish	Vendor to Furnish
14.12	Reliability	MTBF greater than 200000 hours	MTBF greater than 200000 hours	MTBF greater than 200000 hours
14.13	Connections - Rectifier Input / Output / Bypass Input / Battery	Integrated 4 Switches for Input, Bypass, Output & Maintenance Bypass.	Integrated 4 Breakers for Input, Bypass, Output & Maintenance Bypass.	Integrated 4 Breakers for Input, Bypass, Output & Maintenance Bypass.
15	Certifications			
15.1	Manufacturer	QMS: As per ISO 9001: 2008	QMS: As per ISO 9001: 2008	QMS: As per ISO 9001: 2008
		EMS: As per ISO 14001: 2004	EMS: As per ISO 14001: 2004	EMS: As per ISO 14001: 2004
		OSHAS: As per ISO 18001: 2007	OSHAS: As per ISO 18001: 2007	OSHAS: As per ISO 18001: 2007
15.2	Product	Safety: As per IEC62040-1	Safety: As per IEC62040-1	Safety: As per IEC62040-1
		EMC: As per	EMC: As per	EMC: As per

		IEC62040-2	IEC62040-2	IEC62040-2
		Performance : As per IEC62040-3	Performance : As per IEC62040-3	Performance : As per IEC62040-3
		ESD: As per IEC61000-4-2 Level 4	ESD: As per IEC61000-4-2 Level 4	ESD: As per IEC61000-4-2 Level 4
		RF: As per IEC61000-4-3 Level 3	RF: As per IEC61000-4-3 Level 3	RF: As per IEC61000-4-3 Level 3
		FT/Burst: As per IEC61000-4-4 Level 4	FT/Burst: As per IEC61000-4-4 Level 4	FT/Burst: As per IEC61000-4-4 Level 4
		Surge:As per IEC61000-4-5 Level 4	Surge:As per IEC61000-4-5 Level 4	Surge:As per IEC61000-4-5 Level 4
		CE Declaration of Conformance	CE Declaration of Conformance	CE Declaration of Conformance

SPECIFICATION FOR LITHIUM BATTERY SYSTEM

9.0 GENERAL

9.1 SUMMARY

This specification describes a lithium-(NMC), cabinetized battery backup system including the batteries, switchgear, and management system, hereinafter referred to as a battery cabinet(s). The battery system shall operate in conjunction with a UPS system to provide battery backup times for critical electrical loads. The battery cabinet shall house a single complete battery string, and multiple cabinets may be paralleled for longer backup times, as described in this specification.

9.2 LITHIUM (NMC) BATTERY SYSTEM DESCRIPTION

- A. Battery System Components: The system shall consist of the following main components:
1. Battery cabinet containing multiple battery modules comprised of lithium- (NMC) battery cells.
 2. Battery management system (BMS), The 'rack BMS' is modular, internal to each cabinet, with internal communication capabilities. In each battery system, either a single or multiple-cabinet system, one of the cabinets will house a 'system BMS' for system level and external communications to the UPS and building management system
 3. Switchgear module, for main DC power terminations, protection circuit breaker (MCCB) internal to the cabinet.

- B. Battery System Modes of Operation: The Battery Module shall operate as a constantly connected, fully automatic system in the following modes:
1. Normal: the battery system shall be connected to the DC circuit in the UPS.. The BMS shall monitor voltage, current and temperature at all times.
 2. Discharge: Upon failure of the commercial AC power, the critical load shall continue to be supplied by the UPS Inverter, which shall obtain power from the batteries without any operator intervention. The battery system shall monitor DC discharge current and terminate the discharge [disconnect] if current or temperature limits are exceeded. There shall be no interruption to the critical load upon failure or restoration of the commercial AC source. The battery system shall be applied with UPSes that use 480VDC battery systems.
 3. Recharge: Upon restoration of the AC source, the UPS Charger shall recharge the batteries and simultaneously the UPS Rectifier shall provide power to the Inverter. This shall be an automatic function and shall cause no interruption to the critical load. Battery recharge current shall be limited by the UPS, and monitored by the battery system to disconnect the string if protection limits are exceeded.

9.3 REFERENCES

- A. UL 1642 (Underwriters Laboratories) – Standard for safety for lithium batteries
- B. UN 38.3 (Transport)

9.4 SUBMITTALS

- A. The battery system shall be supplied with sufficient documentation, including the following manuals:

1. Installation Manual, UPS Interface Manual, and Operation and Maintenance Manual: One copy of each these manuals shall be furnished. Together, they shall possess sufficient detail and clarity to enable the owner’s technicians or representatives to install and operate the battery equipment and accessories, including the top wiring kit. The manuals shall include the following major items:
 - a) Battery system description
 - b) Site planning and unpacking
 - c) Battery cabinet(s) installation
 - d) Operating procedures
 - e) System events
 - f) Battery maintenance
 - g) Performance and technical specifications
 - h) Wiring requirements from battery cabinet to and from UPS
 - i) Physical features and requirements
 - j) Cabinet dimensions

9.5 ENVIRONMENTAL REQUIREMENTS

- A. The battery system shall withstand any combination of the following external environmental conditions without operational degradation.

1. Operating Temperature: 25 +/- 5 degrees C recommended.
2. Storage Temperature: 25 +/- 5 degrees C (64 to 82 degrees F) recommended. Storage temperature of less than 10 degrees C (50 degrees F), is optimal. Prolonged storage above + 40 degrees C (104 degrees F) will cause rapid self discharge and permanent damage to the battery, and will impact warranty coverage.
3. Relative Humidity (operating and storage): 95% non-condensing.
4. Elevation:
 - a) Operational: 1000 m maximum without de-rating.

1.6 SAFETY

- A. The battery system shall be Listed by Underwriters Laboratories in accordance with UL 1973/UL 1642.

10.0 PRODUCTS

10.1 BATTERY CABINET STANDARD FEATURES

The battery cabinet shall consist of the following standard components, housed in a metal frame cabinet. Each cabinet contains battery modules, 1 switchgear assembly, and one SMPS assembly. A top wiring provision should be provided at the top of the cabinet to facilitate power and control cable landing.

- A. Battery Module
 - Nominal capacity: As per Manufacturer
 - Nominal voltage: As per Manufacturer
 - Weight: As per Manufacturer
 - Dimension (L x W x H): As per Manufacturer
- B. Switchgear Assembly

The Switchgear assembly consists of protection devices (MCCB)
- C. SMPS Assembly: Rack frame should have AC-DC and DC—DC SMPS.
- D. The rack frame (cabinet), is used to mount modules, switchgear and SMPS assembly.
 - ☐☐Weight: As per Manufacturer
 - ☐☐Dimension (L x W x H): As per Manufacturer
- E. Battery management system, (BMS): Each cabinet shall contain a rack battery management system which has the following features:
 1. The rack BMS shall monitor voltage current and temperature for all battery modules in that rack.
- F. System BMS: In a multi-cabinet system, one cabinet shall contain its rack BMS and additionally, the System BMS. The system BMS assembly provides data to the external systems (i.e. building management system, UPS, etc.) while controlling and monitoring all connected Rack BMS's via CAN bus/MODBUS RTU.

10.2 LITHIUM (NMC) BATTERY SYSTEM RATINGS AND OPERATING CHARACTERISTICS

- A. Acceptable battery cabinet input sources and capabilities:
 1. Nominal DC voltage: As per Manufacturer

2. Float voltage: As per Manufacturer
 3. Nominal input current: As per Manufacturer
- B. Battery cabinet output
1. Nominal voltage: As per Manufacturer
 2. Discharging method: As per Manufacturer
 3. End of discharge voltage: As per Manufacturer

10.3 MECHANICAL DESIGN

- A. Enclosures: The battery rack frame shall be steel construction, and house battery modules, SMPS, switchgear module, and all associated interconnect wiring. The enclosures shall be designed for computer room applications. Front doors shall have locks to prevent unauthorized entry.
- B. Ventilation: The battery cabinet shall be designed for convection cooling.
- C. No rear side clearance or access shall be required for the system.
- D. Cable entry: Standard cable entry for the battery cabinet shall be through the enclosure top.
- E. Front access: All serviceable subassemblies shall be modular and capable of being replaced from the front of the cabinet. Side or rear access for installation, service, repair or maintenance of the system shall not be required.
- F. Service area requirements: The system shall require no more than thirty six (36) inches of front service access room and shall not require side or rear access for service or installation.

10.4 CONTROLS AND INDICATORS

- A. Battery status display: Battery cabinet shall feature a LCD status display. This display shall describe alarms and status conditions.

10.5 COMMUNICATIONS

- A. Communications panel: The battery cabinet shall be equipped a communication panel housed on the front Cabinet.
- B. Remote Monitoring:
1. RS-485 Modbus protocol communication capabilities will be available for all systems.
 2. The battery system communication capability should be able to integrate into industry standard Building Management System (BMS) and/or Network Management Systems (NMS).

10.6 BATTERY MODULE, RACK/STRING/CABINET, AND SYSTEM LEVEL PROTECTION

- A. Module management is provided by the BMS that is included in each battery module. Voltage, current and temperature are monitored, and cell balancing is performed.
- B. Rack management is provided by the rack BMS. It monitors all battery module BMSs. If a major alarm is detected, the BMS will give alarm.

- C. System management is provided by the system BMS. It monitors all rack/cabinet BMS activity, and communicates status or alarms to the UPS, and can receive a disconnect command from the UPS, if available.
- D. To comply with agency safety requirements, the battery cabinet(s) shall not rely upon any disconnect devices outside of the cabinet or system, to isolate the battery cabinet from the UPS module.

11.0 EXECUTION

11.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

11.2 COMMISSIONING

- A. Factory start-up shall be provided on a 5x8 basis (7 x 24 optional). Start-up service shall be provided and shall include one visit to perform all procedures and tests specified within battery system Installation and Operation manual. UPS manufacturer shall also offer the following optional services:
 - 1. Pre-energize visit to inspect installation and provide guidance to installers as required.
 - 2. Post-start-up visit for alarm notification configuration, operator training, generator testing, etc.
- B. The following procedures and tests shall be performed by Field Service personnel during the battery system startup:
 - 1. Visual Inspection:
 - a) Visually inspect all equipment for signs of damage or foreign materials.
 - b) Observe the type of ventilation, the cleanliness of the room, the use of proper signs, and any other safety related factors.
 - 2. Mechanical Inspection:
 - a) Check all the power connections for tightness.
 - b) Check all the control wiring terminations and plugs for tightness or proper seating.
 - 3. Electrical Pre-check:
 - a) Check the DC bus for a possible short circuit.
 - b) Verify all power and control wiring
 - 4. Initial battery system startup:
 - a) Configure battery cabinets and system using Service software.
 - b) Verify that all the alarms are in a "go" condition.
 - c) Energize the UPS module and verify the proper DC, walkup, and AC phase on.
 - d) Check the battery string voltage

- e) Optional on site battery discharge tests using supplier furnished load bank, shall also be offered.
5. Operational Training: Before leaving the site, the field service engineer shall familiarize responsible personnel with the operation of the battery system. The UPS equipment shall be available for demonstration of the modes of operation.

11.3 **WARRANTY**

Manufacturer's warranty for Lithium (NMC) Battery against defects in materials and workmanship is for 60 months from the date of installation or 63 months from the date of supply whichever is earlier.

LIST OF APPROVED MAKES

	EQUIPMENT	APPROVED MAKES
1	MODULAR UPS	SCHNEIDER, ABB, VERTIV, MITSUBISHI
2	LITHIUM CELLS	SAMSUNG/LG/PANASONIC
3	LITHIUM BATTERY SYSTEM	DELTA/ EXICOM / GLOBAL POWER
4	LT CABLES	HAVELLS / POLYCAB / KEI
5	LT PANELS	THE PANELS SHALL BE TYPE TESTED ASSEMBLY (TTA) PANELS FROM ANY OF THE AUTHORIZED CHANNEL PARTNERS OF OEMS- ABB, SIEMENS, SCHNEIDER. THE SUPPLIERS SHALL BE REQUIRED TO SUBMIT TEST CERTIFICATES OF IEC 61439-1&2 FOR ALL RATINGS ALONG WITH TEST CERTIFICATES OF SEISMIC ZONE-IV AS PER IEC.
6	AIR CIRCUIT BREAKERS	L & T / SIEMENS/ ABB / SCHNEIDER ELECTRIC/LEGRAND
7	MOULDED CASE CIRCUIT BREAKERS	L & T/ SIEMENS/ SCHNEIDER ELECTRIC/ ABB / LEGRAND
8	AMMETER, VOLTMETER	AE/ RISHABH / TRINITY
9	KWH, PF, FREQUENCY METER	AE/ RISHABH / TRINITY
10	DIGITAL METERS / INTELLIGENT MULTI-FUNCTIONAL DIGITAL METER	AE/ RISHABH / TRINITY / HPL
11	SELECTOR SWITCH, PUSH BUTTON SWITCH / EMERGENCY SWITCH	KAY CEE / L&T / SIEMENS / SCHENIDER ELECTRICAL.
12	LED INDICATION LAMPS	KAY CEE / SIEMENS / L&T/ SCHENIDER
13	CURRENT TRANSFORMERS (CT'S)	AE / KAPPA / UNIVERSAL / KAYCEE / L&T/ RISHABH/TRINITY
14	PROTECTIVE RELAYS	AREVA / L&T / ABB / SIEMENS / SCHENIDER ELECTRIC / C & S ELECTRIC / ALSTOM
15	PRE FABRICATED CABLE TRAY	BEC / SAI METAL CRAFT / INDEANA ENGG /SUPERMAX

12.0 SCOPE OF WORK

All works / items / activities required for the UPS work, as described in bill of quantities, drawings & technical specifications, shall be executed by the Supplier/ Manufacturer but not limited to the following.

12.1 Scope of work shall include Supply, Installation, testing and commissioning of 2x250KVA Modular UPS & 2 x 200KVA Modular UPS with 15 minutes battery backup for lab Block.

12.2 SITC of UPS of all other rating as per table mentioned below.

S.No.	AREA	UPS RATING
1	LAB BLOCK (A & B)	2 x 200 KVA Modular UPS in Parallel
2	LAB BLOCK (C & D)	2 x 250 KVA Modular UPS in Parallel
3	ADMIN BLOCK	UPS Load supplied from Lab Block (A & B) UPS Panel
4	SEMINAR & LIBRARY BLOCK	40KVA Modular UPS (1No)

Note: Battery bank suitable for providing backup of 15Minutes for each UPS on full load to be provided.

12.3 SITC of following panels.

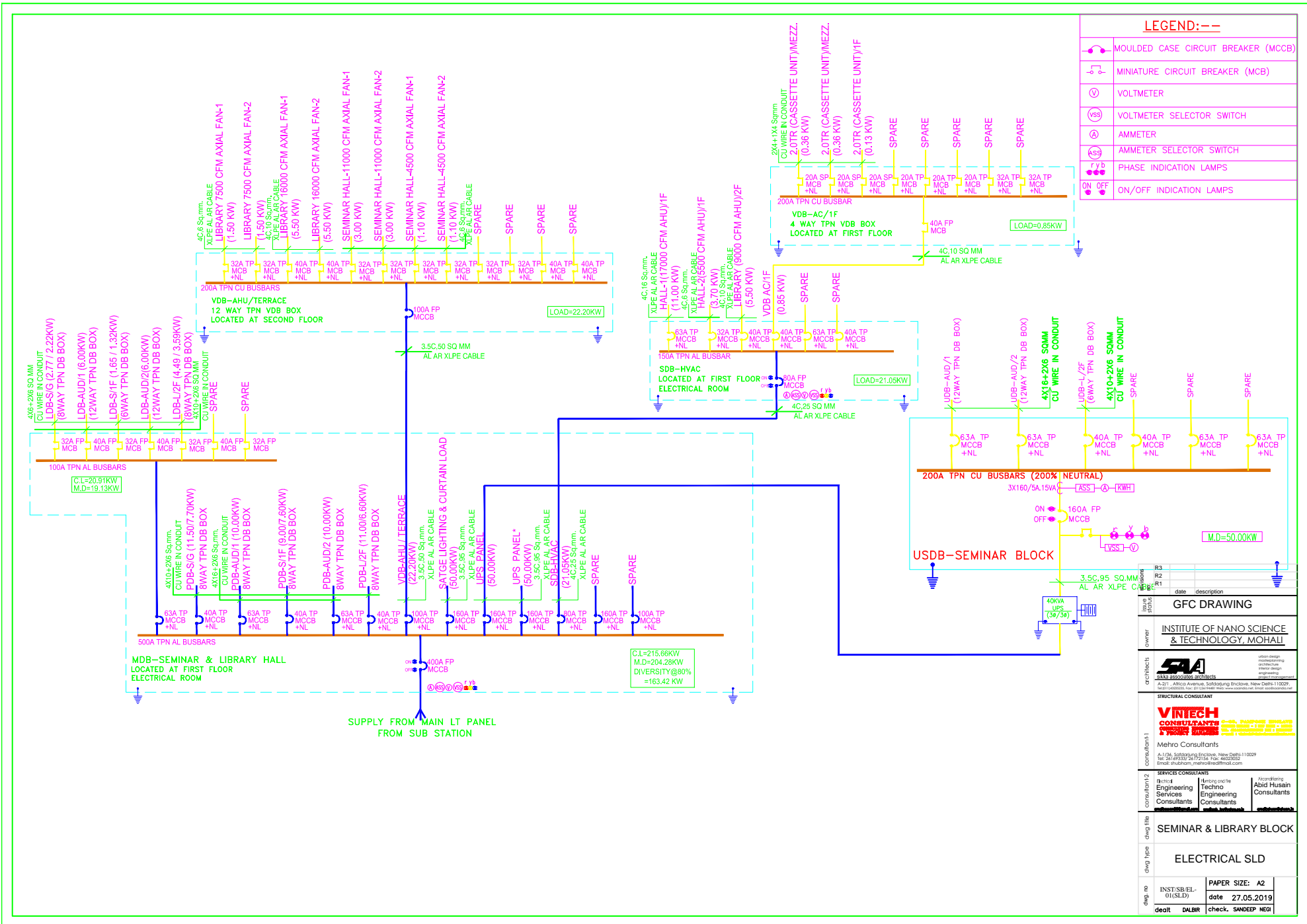
- a) AB/UPS panel-lab block
- b) CD/UPS panel-lab block
- c) AB/MDB-Eqp – UPS
- d) CD/MDB-Eqp-UPS
- e) USDB- seminar block
- f) UPS panel for physical property lab
- g) UPS panel for femto second lab (typical for mass lab / advance bio research lab/ advance material science research)
- h) UPS panel for NMR lab
- i) UPS panel for material testing lab
- j) UPS panel for CD block (for clean room, device testing & fabrication facility)
- k) UPS panel for x-ray lab (typical for electron microscopy)
- l) Raw Power panel for Clean lab, device testing & fabrication facility.
- m) Raw Power Panel for Common furnace facility.
- n) SDB- Basement (Seminar)
- o) SDB- Plant room (Admin)

12.4 SITC of all cabling & accessories between UPS Input and UPS output panels.

12.5 SITC of Following LT Cables:

S. No.	From	To
1	AB / UPS PANEL- LAB BLOCK	200KVA UPS-1
2	AB / UPS PANEL- LAB BLOCK	200 KVA UPS-2
3	200KVA UPS-1	AB / MDB / EQP-UPS
4	200 KVA UPS-2	AB / MDB / EQP-UPS
5	CD / UPS PANEL- LAB BLOCK	300 KVA UPS-1
6	CD / UPS PANEL- LAB BLOCK	300 KVA UPS-2
7	250KVA UPS-1	CD / MDB / EQP-UPS
8	250 KVA UPS-2	CD / MDB / EQP-UPS
9	MDB- Seminar & Library	40KVA UPS
10	40KVA UPS	USDB Seminar Block
11	AB / MDB-EQP-UPS	UPS Panel for Physical Property Lab
12	AB / MDB-EQP-UPS	UPS Panel for Mass Lab
13	AB / MDB-EQP-UPS	UPS Panel for NMR Lab
14	AB / MDB-EQP-UPS	UPS Panel for Femto Second Lab
15	A/ USDB- EQP-2F	UPS Panel for Advance bio Research lab panel
16	A/ USDB- EQP-3F	UPS Panel for Material Testing Lab
17	A/ USDB- EQP-3F	UPS Panel for Advance Material Science Research
18	CD/MDB- EQP -UPS	UPS Panel for Clean Room, Device Testing & Fabrication facility
19	CD/MDB- EQP -UPS	UPS Panel for X-ray Lab
20	CD/MDB- EQP -UPS	UPS Panel for Electron Microscopy
21	AB / MDB / EQP-UPS	63A FP SS ENCLOSURE (Admin Block)
22	63A FP SS ENCLOSURE (Admin Block)	USDB-ADMIN BLOCK

12.6 SITC of earthing for all UPS system as required.



LEGEND:---

	MOULDED CASE CIRCUIT BREAKER (MCCB)
	MINIATURE CIRCUIT BREAKER (MCB)
	VOLTMETER
	VOLTMETER SELECTOR SWITCH
	AMMETER
	AMMETER SELECTOR SWITCH
	PHASE INDICATION LAMPS
	ON/OFF INDICATION LAMPS

revision	date	description			
R3					
R2					
R1					
GFC DRAWING					
owner	INSTITUTE OF NANO SCIENCE & TECHNOLOGY, MOHALI				
architects	 <small>skka associates architects</small>				
structural consultant	 <small>VINECH CONSULTANTS</small>				
consultant 1	Mehro Consultants <small>A-3/26, Satguruji Enclave, New Delhi-110029 Tel: 26169352/36791256 Fax: 46223052 Email: dhruv@mehroconsultants.com</small>				
consultant 2	<table border="0"> <tr> <td> <small>Chief Engineering Services Consultants</small> </td> <td> <small>Lead and the Techno Engineering Consultants</small> </td> <td> <small>Project Management Consultants</small> </td> </tr> </table>		<small>Chief Engineering Services Consultants</small>	<small>Lead and the Techno Engineering Consultants</small>	<small>Project Management Consultants</small>
<small>Chief Engineering Services Consultants</small>	<small>Lead and the Techno Engineering Consultants</small>	<small>Project Management Consultants</small>			
SEMINAR & LIBRARY BLOCK					
ELECTRICAL SLD					
dwg no	INST/SB/EL-01(SLD)	PAPER SIZE: A2			
dwg no	INST/SB/EL-01(SLD)	date 27.05.2019			
dwg no	DALBIR	check, SANDEEP NEGI			

Schedule of Quantities for SITC of UPS System for Institute of Nano Science & Technology at Knowledge City, Sector-81, Mohali, Punjab

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
1.0	<u>MODULAR UPS WITH LITHIUM ION BATTERIES</u>				
1.1	250 KVA/250 kW Modular UPS in Parallel Redundant configuration, IGBT/PWM technology based True Online double conversion and fully DSP based UPS system as per specifications enclosed and along with 2 Years Warranty: 1. IGBT Rectifier UPS and IGBT Inverter UPS 2. Hot Swapable modules 3. Input PF >=0.99 4. Overall efficiency of upto 96.5% 5. SNMP Card & BMS Card to be provided 6. Cabinet size of 450kW or higher	Set	2	3621300.00	72,42,600.00
1.2	Sealed Maintenance Free Li Battery Bank (NMC) with each 250 kVA UPS for 15 Min on 250 kW Load as per specifications enclosed and along with 5 Years Warranty: :- 1. Li Battery Cabintes,Breakers and Battery Monitoring System 2. Battery Interconnecting Links 3. Cabling for UPS to Battery Bank Battery Rating: Minimum 101 kWhr (Maximum 4 Cabinets)	Set	2	5749900.00	114,99,800.00
1.3	200 KVA / 200 kW Modular UPS in Parallel Redundant configuration, IGBT/PWM technology based True Online double conversion and fully DSP based UPS system as per specifications enclosed and along with 2 Years Warranty: 1. IGBT Rectifier UPS and IGBT Inverter UPS 2. Hot Swapable modules 3. Input PF >=0.99 4. Overall efficiency of upto 96.5% 5. SNMP Card & BMS Card to be provided	Set	2	1990300.00	39,80,600.00
1.4	Sealed Maintenance Free Li Battery Bank (NMC) with each 200 kVA UPS for 15 Min on 200 kW Load as per specifications enclosed and along with 5 Years Warranty: 1. Li Battery Cabintes,Breakers and Battery Monitoring System 2. Battery Interconnecting Links 3. Cabling for UPS to Battery Bank	Set	2	3649000.00	72,98,000.00
1.5	40 KVA Modular UPS in Stand Alone configuration, IGBT/PWM technology based True Online double conversion and fully DSP based UPS system as per specifications enclosed and along with 2 Years Warranty: : 1. IGBT Rectifier UPS and IGBT Inverter UPS 2. Hot Swapable modules 3. Input PF >=0.99 4. Overall efficiency of upto 96.5% 5. SNMP Card & BMS Card to be provided	Set	1	663400.00	6,63,400.00
1.6	Sealed Maintenance Free Li Battery Bank with each 40 kVA UPS for 15 Min on 40 kW Load as per specifications enclosed and along with 5Years Warranty: 1. Li Ion Battery Cabintes,Breakers and Battery Monitoring System 2. Battery Interconnecting Links 3. Cabling for UPS to Battery Bank Battery Rating: 1 Bank of min 25 kWhr (Maximum 1 Cabinet)	Set	1	763000.00	7,63,000.00
2.0	<u>LT CABLES</u>				
2.1	Supply of following size of 1.1KV grade multicore Aluminium conductor XLPE insulated & PVC sheathed armoured power cable as per IS: 7098 (Part-1) 1988 complete as required.				
	i) 3.5 core, 400 Sq.mm.	M	170	1597	2,71,490.00
	ii) 3.5 core, 300 Sq.mm.	M	40	1214	48,560.00
	iii) 3.5 core, 95 Sq.mm.	M	150	431	64,650.00
	iv) 3.5 core, 70 Sq.mm.	M	90	353	31,770.00
	v) 3.5 core, 50 Sq.mm.	M	140	267	37,380.00
	vi) 4 core, 16 Sq.mm.	M	130	133	17,290.00
2.2	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 kV grade of following size on cable tray as required.				
	i) Upto 35 sq. mm (clamped with 1mm thick saddle)	M	100	33	3,300.00
	ii) Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	M	380	74	28,120.00

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
	iii) Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	M	180	150	27,000.00
2.3	Suppling and making indoor end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
	i) 3.5 core, 400 Sq.mm.	Set	18	1209	21,762.00
	ii) 3.5 core, 300 Sq.mm.	Set	32	936	29,952.00
	iii) 3.5 core, 95 Sq.mm.	Set	4	473	1,892.00
	iv) 3.5 core, 70 Sq.mm.	Set	4	368	1,472.00
	v) 3.5 core, 50 Sq.mm.	Set	6	329	1,974.00
	vi) 4 core, 16 Sq.mm.	Set	8	250	2,000.00
2.4	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 kV grade of following size in the existing masonry open duct as required.				
	i) Above 35 sq. mm and upto 95 sq. mm	M	30	38	1,140.00
	ii) Above 185 sq. mm and upto 400 sq. mm	M	30	96	2,880.00
2.5	Supplying and installing following size of perforated painted with powder coating M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including bolts & nuts, painting suspenders etc. as required.				
	i) 300 mm width X 50 mm depth X 1.6 mm thickness	M	30	621	18,630.00
2.6	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc..direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
	i) 120 mm dia (OD-120 mm & ID-103 mm nominal)	M	50	341	17,050.00

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
3.0	MAIN DISTRIBUTION BOARDS				
	Supply, installation, testing and commissioning of Main Distribution Board (IP-54) with cubicle type totally enclosed free standing type, duly compartmentalised, dust free, damp and vermin proof fabricated from 2mm thick CRCA sheet steel duly powder coated painted after metal treatment internally wired, interconnection with copper links / wires, copper busbar and having following incoming & outgoing moulded case circuit breakers, ammeters, voltmeters, selector switch, indicating lamps and termination of incoming & outgoing cable complete as per specifications and drawings.				
	Notes : 1) All MCCBs of current rating 250 Amps and above shall be provided with microprocessor based releases and those of rating below 250 Amps shall be provided with thermal magnetic releases or as specified in SOQ. 2) All MCCBs shall be having Ics = 100% Icu 3) All MCCBs shall be provided with front rotary handle and spreader links.				
3.1	AB/UPS PANEL-LAB BLOCK (TOTAL OF A TO D)	Set	1	387400	3,87,400.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 2 Nos. 800Amp FP Moulded case Circuit Breaker 50KA (Ics value= Icu at 433V) with Microprocessor release for O/L, S/C & E/F Protection with RS 485 port complete as required. 				
	(B) INSTRUMENTS (ON EACH INCOMER BREAKER)				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 1 No. 0 to 800Amp digital ammeter 96mm x 96mm with selector switch & CT's. 1 Set of Phase indicating lamps with Single Pole MCB. 1 Set of ON / OFF indicating lamps with Single Pole MCB. 1 Set of Multifunction Meter (MFM) 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN (Four Strip) Aluminium busbars of minimum of 1000 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 2 Nos. 630Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Microprocessor release for O/L & S/C Protection with ON/OFF Indicating lamps. 				
3.2	CD/UPS PANEL-LAB BLOCK (TOTAL OF A TO D)	Set	1	493600	4,93,600.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 2 Nos. 1000 Amp FP Moulded Case Circuit Breaker 50KA (Ics value= Icu at 433V) with Microprocessor release for O/L, S/C & E/F Protection with RS 485 port complete as required. 				
	(B) INSTRUMENTS (ON EACH INCOMER BREAKER)				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 1 No. 0 to 1000 Amp digital ammeter 96mm x 96mm with selector switch & CT's. 1 Set of Phase indicating lamps with Single Pole MCB. 1 Set of ON / OFF indicating lamps with Single Pole MCB. 1 Set of Multifunction Meter (MFM) 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN (Four Strip) Aluminium busbars of minimum of 1250 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
	(D) OUTGOING				
	Page 4 of 11				
	<ul style="list-style-type: none"> 2 Nos.800Amp FP Moulded Case Circuit Breaker of 50KA (Ics=Icu upto 433 volt) breaking capacity with Microprocessor release for O/L & S/C Protection with ON/OFF Indicating lamps. 				
3.3	<u>AB/MDB-EQP - UPS (TOTAL OF A TO D)</u>	Set	1	606200	6,06,200.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 2 No.630Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Microprocessor release, O/L, S/C & E/F Protection with RS 485 port complete as required. 				
	(B) INSTRUMENTS (ON EACH INCOMER BREAKER)				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 				
	<ul style="list-style-type: none"> 1 No. 0 to 630Amp digital ammeter 96mm x 96mm with selector switch & CT's. 				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB. 				
	<ul style="list-style-type: none"> 1 Set of ON / OFF indicating lamps with Single Pole MCB. 				
	<ul style="list-style-type: none"> 1 Set of Multifunction Meter (MFM) 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN (Four Strip) Aluminium (200% Neutral) busbars of minimum of 800 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 4 Nos. 200Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 3 Nos. 125Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 7 Nos. 100 Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 6 Nos.63Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
3.4	<u>CD/MDB-EQP-UPS (TOTAL OF A TO D)</u>	Set	1	797600	7,97,600.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 800 Amp FP Moulded Case Circuit Breaker of 50KA (Ics=Icu upto 433 Volt) breaking capacity with Microprocessor release, O/L,S/C & E/F Protection as required. 				
	(B) INSTRUMENTS (ON EACH INCOMER BREAKER)				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 				
	<ul style="list-style-type: none"> 1 No. 0 to 800Amp digital ammeter 96mm x 96mm with selector switch & CT's. 				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB. 				
	<ul style="list-style-type: none"> 1 Set of ON / OFF indicating lamps with Single Pole MCB. 				
	<ul style="list-style-type: none"> 1 Set of Multifunction Meter (MFM) 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN (Four Strip) Aluminium (200% Neutral) busbars of minimum of 1250 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
	(D) OUTGOING				
	Page 5 of 11				
	<ul style="list-style-type: none"> 3 Nos. 500 Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Microprocessor release, O/L, S/C & E/F Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 1 Nos. 400 Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Microprocessor release, O/L, S/C & E/F Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 2 Nos. 300 Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Microprocessor release, O/L, S/C & E/F Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 1 Nos.200 Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 3 Nos. 160 Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 4 Nos. 125 Amp TP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
	<ul style="list-style-type: none"> 2 Nos.100 Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
3.5	USDB- SEMINAR BLOCK (TOTAL OF A TO D)	Set	1	172500	1,72,500.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.160 Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 				
	<ul style="list-style-type: none"> 1 No. 0 to 200Amp digital ammeter 96mm x 96mm with selector switch & CT's. 				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB. 				
	<ul style="list-style-type: none"> 1 Set of ON / OFF indicating lamps with Single Pole MCB. 				
	<ul style="list-style-type: none"> 1 Set of KWH Meter (96mm x 96mm) with RS 485 Port 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
	(C) BUSBARS				
	Page 6 of 11				
	<ul style="list-style-type: none"> TPN (Four Strip) Aluminium (200% Neutral) busbars of minimum of 200 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 6Nos. 40- 63 Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link & ON/OFF Indicating lamps 				
3.6	UPS PANEL FOR PHYSICAL LAB (TOTAL OF A TO D)	Set	1	152000	1,52,000.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.200 Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB on incomer. 1 Set of ON / OFF indicating lamps with Single Pole MCB on Incomer. 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 250 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 1Nos.80Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 1Nos.63Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 4Nos. 63Amp TP Miniature Circuit Breaker of 10KA 1Nos. 40Amp TP Miniature Circuit Breaker of 10KA 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
3.7	UPS PANEL FOR FEMTO SECOND LAB (TYPICAL FOR MASS LAB / ADVANCE BIO RESEARCH LAB/ ADVANCE MATERIAL SCIENCE RESEARCH) (TOTAL OF A TO D)	Set	4	77100	3,08,400.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.100 Amp FP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB on incomer. 1 Set of ON / OFF indicating lamps with Single Pole MCB on Incomer. 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 200 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 5Nos. 63Amp TP Miniature Circuit Breaker of 10KA with Neutral link 				
3.8	UPS PANEL FOR NMR LAB (TOTAL OF A TO D)	Set	1	155300	1,55,300.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.200 Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB on incomer. 1 Set of ON / OFF indicating lamps with Single Pole MCB on Incomer. 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
	(C) BUSBARS				
	Page 8 of 11				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 250 Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 1Nos.80Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 				
	<ul style="list-style-type: none"> 2Nos.63Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 				
	<ul style="list-style-type: none"> 3Nos. 40Amp TP Miniature Circuit Breaker of 10KA with Neutral link 				
3.9	<u>UPS PANEL FOR MATERIAL TESTING LAB (TOTAL OF A TO D)</u>	Set	1	75700	75,700.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.63Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB on incomer. 				
	<ul style="list-style-type: none"> 1 Set of ON / OFF indicating lamps with Single Pole MCB on Incomer. 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
	(C) BUSBARS				
	Page 9 of 11				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 100Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 4Nos. 40Amp TP Miniature Circuit Breaker of 10KA with Neutral link 				
3.10	UPS PANEL FOR CD BLOCK (FOR CLEAN ROOM, DEVICE TESTING & FABRICATION FACILITY) (TOTAL OF A TO D)	Set	1	184100	1,84,100.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.400 Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB on incomer. 1 Set of ON / OFF indicating lamps with Single Pole MCB on Incomer. 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 500Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 1Nos.200Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 1Nos. 160Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 1Nos. 100Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 4Nos.63Amp TP Miniature Circuit Breaker of 10KA with Neutral link 				

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
3.11	RAW POWER PANEL FOR CD BLOCK (FOR CLEAN ROOM, DEVICE TESTING & FABRICATION FACILITY) (TYPICAL FOR RAW POWER PANEL FOR COMMON FURNACE, SDB PLANT ROOM) (TOTAL OF A TO D)	Set	3	177700	5,33,100.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.250Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 1 No. 0 to 250Amp digital ammeter 96mm x 96mm with selector switch & CT's. 1 Set of Phase indicating lamps with Single Pole MCB. 1 Set of ON / OFF indicating lamps with Single Pole MCB. 1 Set of KWH Meter (96mm x 96mm) with RS 485 Port 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 300Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 1Nos.160Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 1Nos. 100Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 1Nos. 63Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 1Nos. 40Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 				
3.12	UPS PANEL FOR X-RAY LAB (TYPICAL FOR ELECTRON MICROSCOPY) (TOTAL OF A TO D)	Set	2	79700	1,59,400.00
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.125Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 Set of Phase indicating lamps with Single Pole MCB on incomer. 1 Set of ON / OFF indicating lamps with Single Pole MCB on Incomer. 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 200Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 4Nos.40Amp TP Miniature Circuit Breaker of 10KA with Neutral link 				
3.13	MOULDED CASE CIRCUIT BREAKER IN MS ENCLOSURE				
	Supply, installation, testing and commissioning of Moulded Case Circuit Breaker in MS enclosure made out of 2mm thick, suitable for 3 phase 4 wire 50 Hz AC supply complete with incoming/outgoing terminations, internal connections/ links etc as required.				
	(i) 40-63Amp FP Moulded Case Circuit Breaker (25KA)	No.	1	9010.00	9,010.00
	(i) 125Amp FP Moulded Case Circuit Breaker (25KA)	No.	1	12030.00	12,030.00

Item No.	Description	Unit	Qty.	Rate (in ₹)	Rate (in ₹)
1	2	3	4	6	8
3.14	SDB- BASEMENT (SEMINAR BLOCK) (TOTAL OF A TO D)	Set	1	1,90,900.00	190900
	(A) INCOMER BREAKERS				
	<ul style="list-style-type: none"> 1 No.250Amp FP Moulded Case Circuit Breaker of 35KA (Ics=Icu upto 433 Volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection 				
	(B) INSTRUMENTS				
	<ul style="list-style-type: none"> 1 No. 0 to 500 Volt digital voltmeter 96mm x 96mm with selector switch. 1 No. 0 to 250Amp digital ammeter 96mm x 96mm with selector switch & CT's. 1 Set of Phase indicating lamps with Single Pole MCB. 1 Set of ON / OFF indicating lamps with Single Pole MCB. 1 Set of KWH Meter (96mm x 96mm) with RS 485 Port 				
	(C) BUSBARS				
	<ul style="list-style-type: none"> TPN Aluminium busbars of minimum of 300Amps capacity with heat shrinkable coloured sleeves and i/c DMC / SMC busbars supports at required. 				
	(D) OUTGOING				
	<ul style="list-style-type: none"> 2Nos.125Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 2Nos. 100Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 2Nos.40Amp TP Moulded Case Circuit Breaker of 25KA (Ics=Icu upto 433 volt) breaking capacity with Thermal Magnetic release, O/L & S/C Protection with Neutral link 				
4.00	EARTHING SYSTEM				
4.1	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required.	Set	6	11794	70,764.00
4.2	Supply, Installation, Testing and Commissioning of Maintenance free and Environment Friendly Earth Electrode set comprising of 17.2 mm dia 3 mtrs long solid rod of Low carbon steel , molecular Copper Bonded for a thickness of 250 microns, highly conductive ANSI NSF STD 60 Certified, environment friendly carbon based backfill compound (each bag shall contain 20 pounds) or Equivalent , according to BS 7430 & IEEE 80 and suitable Clamp. The backfill compound should not corrode the electrode. The earth enhancement compound shall have resistivity of less than 0.12 OHM MTR as per requirements of IEEE 80 clause 14.5d. complete as required.	Set	18	15000	2,70,000.00
4.3	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	M	460	1009	4,64,140.00
4.4	Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	M	190	1224	2,32,560.00
	TOTAL IN FIGURES				373,50,416.00
	Quoted Rates in Figures (Percentage)	Less(-)/Above(+)			
	Quoted Rates in Words (Percentage)				