Institute of Physics

Sachivalaya Marg
Bhubaneswar-751005

NOTICE INVITING TENDER

Tender No.NIT/IOP/76/2024-25

Name of The Service: *"Operation and Comprehensive maintenance of air-conditioning system and Chilled water systems of Institute of Physics Bhubaneswar-751005"*

PART-A

Notice Inviting Tender

INSTITUTE OF PHYSICS

PO-SAINIK SCHOOL, BHUBANESWAR

Notice Inviting E- Tender

For

Operation and non-comprehensive maintenance of air-conditioning system and chilled water system of IOP

E- Tenders are invited on behalf of the Director, Institute of Physics, Bhubaneswar from the AC service provider or authorized reseller/Indian agent only for the following works:-

Sl. No.	*Name of the Items*	*Tender No.*	*Qnty. No.*	*Estimated Cost in INR*	*Tender Fee in INR*	*EMD in INR*
1.	"*Operation and comprehensive maintenance of air-conditioning system and Chilled water systems of Institute of Physics Bhubaneswar-751005.*" Annual round the clock maintenance & operation of: Central AC plant 1x80 TR capacity and 1 x 40TR capacity. Chilled water plant 2x10 TR capacity.(Presently not Working) 1x60 TR Package central AC Plant at Auditorium Annual comprehensive maintenance of Cassette, Tower window and split Air conditioners(Approximately 190 Nos), as on requirement basis	NIT/IOP/76 /2024-25	1 set.	Rs.15,46,248/- excluding GST	NIL.	Rs.46,387/-

PARTIES HAVE TO QUOTE FOR ALL THE ITEMS OTHERWISE THEIR BIDS WILL NOT BE CONSIDERED.

Tender Enquiry No **: NIT/IOP/76/2024-25**

Last date of submission of E-bid **: 05.09.2024** up to 18.00 hrs

Opening of Technical Bid **: 06.09.2024 at 18.00 hrs.**

PREBID MEETING **: 21.08.2024 AT 11.00 Hours**

The details of general tender terms & conditions can be downloaded from https://eprocure.gov.in/epublish/app or Tender Free View Link from IOP,Bhubaneswar Website- www.iopb.res.in/tenders/

रेजिस्ट्रार/REGISTRAR
भौतिकी संस्थान/INSTITUTE OF PHYSICS
भुवनेश्वर/BHUBANESWAR

Institute of Physics

Sachivalaya Marg

Bhubaneswar-751005

Notice Inviting Tender

Notice Inviting Tender

Tender No.: IOP/76/ 2024-25

Sealed item rate tenders in two-parts in the prescribed form are hereby invited by Director, Institute of Physics, Bhubaneswar-751005, for the following work from contractors having adequate experience and capabilities to execute such magnitude of similar works and who have similar experience with different units of Department of Atomic Energy (DAE), Nuclear Power Corporation of India Ltd, Public Sector Undertakings, etc.

Description: *Operation and Comprehensive maintenance of air-conditioning system and Chilled water Systems of Institute of Physics, Bhubaneswar-751005.*

i. **Estimated Cost: Rs.15,46,248/-excluding GST**

ii. **Period of Completion: One year (12 months)**

iii. **Cost of Tender Document** : **Rs. Nil** (Non-refundable)

iv. **Earnest Money Deposit: Rs.46,387/-**

Note: -

1. Total Earnest Money Deposit (EMD) **Rs.46,387/-** by way of DD/BG of a schedule Bank, drawn in favour of Director Institute of Physics, Bhubaneswar, payable at Bhubaneswar should accompany the Bid in separate envelop along with Technical Bid. Part Bids received without EMD will be treated as invalid and rejected.

2. Tender document is prepared in two parts viz Part-A (Technical Bid) and Part-B (Price Bid). Part-A consists of the tender document that includes form for tender agreement, conditions of contract, special instructions to the tenderers, technical specifications, tender drawings etc. Part-B consists of Tender Document that gives Schedule of Quantities, list of free issue materials, etc. Submission of application for purchase of tender though CPP portal on or before end date.

   (a) Average annual financial turnover during last 5 years from similar type of works preferably in DAE units should be at least Rs. 50,00,000/- (Rs. Fifty lakh). This should be duly audited by a registered Charted Accountant.
   (b) Copy of IT Returns and audited balance sheet and profit and Loss statements for the previous three years

(c) Should not have incurred loss in more than two years during the last five years and shall not be under court receivership or under liquidation.
(d) Year wise list of works carried out during last 5 years as well as list showing the cost of works in progress.
(e) Performance certificates in respect of completed similar works and reasons for delays, if any.
(f) List of available plant & machinery.
(g) List of technical manpower along with organizational structure.
(h) Proof of having satisfactorily completed (based on certification of performance by client of the works)

3 (Three) similar works each of value not less than 40% of estimated value p.a.
or 2 (Two) similar works each of value not less than 60% of estimated value p.a.
or 1 (One) similar work of value not less than 80% of estimated value p.a.
For this purpose, 'cost of work' shall mean gross value of the completed work not including the cost of materials supplied by the Govt./Client, The work completion must not be later than three years.Submission of the proper completion certificate is mandatory.

Similar works means: Operation and comprehensive maintenance work of AC plants, chilled water plant, window , split & tower AC units.

The tender documents (Part-A & B) shall be available from the CPP portal and IOP, web site. A pre-bid meeting will be held on **09.07.2024** at 11:00 hrs at Library Building conference room.

3. Bidders are requested to fill the rates only in the prescribed format of the price bid in CPP portal.

4. Bidders are invariably required to fill up the total rates of each item in both words and figures.

5. Tenders with any condition including conditional rebate shall be rejected. However, tenders with unconditional rebate will be accepted.

6. The time allowed for carrying Out the work will be **Twelve [12]** months (including monsoon period) to be reckoned from the 15th day after date of written order to commence the work.

7. Tender will be kept valid for 90 days from the date of opening the tender (Part-A).

8. In case the last date of sale and/or the date of receipt and opening of tender is declared as holiday, the respective date shall be treated as postponed to the next working day.

9. After opening of Part-A of the tender, bidders shall be evaluated for their techno-commercial capability to carry out the work based on the following:

(a) Financial soundness and turnover during the last 5 years.
1. 3 (Three) similar works each of value not less than 40% of estimated value p.a.
2. or 2 (Two) similar works each of value not less than 60% of estimated value p.a.
3. 1 (One) similar work of value not less than 80% of estimated value p.a.

(b) Technical capabilities in regard to tendered work.

(c) Experience of similar works executed in the last 5 years.
(d) Organizational structure.
(e) Available resources & their deployment to carry out the tendered work.
(f) Quality consciousness.(Declaration of the bidder to provide the best quality work.)
(g) Adherence to time schedule for the completed works.
(h) Tendency of the firm with respect to making extraneous claims and disputes.
(i) Site mobilization and planning ability.
(j) An inspection team duly constituted by Director, IOP may visit selected site(s) of the tenderer and local office and workshop.

10. The contractor whose tender is accepted will be required to furnish by way of security deposit for the due fulfillment of his contract, such sum as will amount to 2.5% of the contract value of work. In addition, the contractor shall be required to deposit an amount equal to 2% of the contract value of the work as Performance Guarantee within 15 days after the date of issuing of letter of acceptance/work order and in any case before commencement of work. Performance Security of 5% can also be accepted in the form of Bank Guarantee Fixed deposit receipts of Scheduled bank or in the form of Government Securities.

The Security Deposit will be collected by deductions 2.5% of the gross amount of the running bill of the contractors till the sum (along with the sum already deposited as Earnest Money if EMD is submitted in the form of Demand Draft) will amount to 2% of the contract value of work. The Security deposit will also be accepted in the form of Governments Securities, Fixed deposit Receipts of Scheduled Bank and State Bank of India. The Security Deposit shall be endorsed in favour of the Director, Institute of Physics.

11. If the successful tenderer, fails to furnish the prescribed performance guarantee on or before stipulated dates of commencement The Director, Institute of Physics, Bhubaneswar or his successors in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if this successful tenderer, fails to commence work within $1/8^{th}$ of the stipulated time, the Director, Institute of Physics, Bhubaneswar or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest, money and the performance guarantee absolutely.

12. The acceptance of tender will rest with Director, Institute of Physics, Bhubaneswar, who does not bind himself to accept the lowest tender and reserves to himself the authority to reject any or all of the tenders received, without assignment of any reason. All Tenders in which any of the prescribed conditions are not fulfilled or are incomplete in any respect are liable to be rejected.

13. All rates shall be quoted on the proper price bid of the tender alone.

14. On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from The Engineer-in-charge shall be communicated to the Engineer-in-charge.

15. The Director, Institute of Physics, Bhubaneswar, reserves the right to accept the whole or only part of the tender and the tenderer shall be bound to perform the same at the rates quoted.

16. Sales Tax or any other Tax on material in respect of this contract shall be payable by the contractor and Government will not entertain any claim whatsoever in the respect. However, any change in the existing taxes and levies or new taxes and levies if introduced by the Government after the receipt of offer as well as during the currency of the contract will be duly considered and paid extra, the subject to documentary proof. For this purpose the tenderer may furnish the details of taxes and levies that have been considered in the offer and rates assumed thereof

17. The tender for works shall remain open for acceptance for a period of 90 days from the date of opening of tenders (Part-A). If any tenderer withdraws his tender within the validity period or make any modifications in the terms and conditions of the tender which are not acceptable to the Institute, then the IOP shall without prejudice to any right or remedy, be at liberty to forfeit 50 % (Fifty Percent) of the Earnest Money absolutely.

18. The tender for the work shall not be witnessed by a contractor or contractors who himself/themselves has/have tendered for the same work. Failure to observe these conditions would render tenders of the contractors tendering as well as witnessing the tender liable to summary rejection.

19. It will be obligatory on the part of the tenderer to seal & sign the tender document for all the component parts.

20. This Notice inviting Tender shall form the part of the contract document.

21. The Contractor shall submit a detailed list of similar works carried by them for the last 5 years including annual turnover and also works in hand (progress) in the following proforma.

Name of work	Name & Address of Establishment under Whom work is being executed	Value of work	Completion Time as per contract	Position Work in Progress	Remarks

22. Please note the following:

(a) Cheques for Earnest Money Deposit will not be accepted
(b) Solvency certificate, when asked for, should of value not less than 40% of the tender amount and should be dated not earlier than January 2023 and may be submitted along with Part-A.
(c) Tender forms are not transferable.
(d) Contractors will be vetted by the Security Section of IOP.

23. Please note that to enter IOP, photo-identity (passport, driving licence, voter's I-card. I-card' issued by the employer, etc.) is a must. Prior confirmation on Phone shall have to be taken by the bidder so as to arrange for an entry to IOP.

24. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be Liable to rejection.

REGISTRAR
INSTITUTE OF PHYSICS
BHUBANESWAR

GENERAL TERMS AND CONDITION OF THE WORK CONTRACT

1. **Contract Period:** The contract period is initially for one year in case of satisfactory performance the contract period may be extended for a further period of one year. The extension of contract is how ever limited to Three years from the date of award of the contract.

2. **Term of Payment:** The payment shall be made on submission of bills in triplicate for a month in full or in part after due certification by IOP, Engineer In Charge. The bill should accompany with the copies of the wages bill, challans in support of deposit of PF and ESI of the previous month in respect of employees deployed at IOP. Income tax and GST TDS shall be deducted at source and deposited as per rule.The Bills will be reimbursed after payment only.

3. **Rights of IOP for Deduction from Monthly Bill:** The payment shall be made monthly on successful completion of each completed month after due verification of the invoice by IOP, Engineer in Charge. Who may affect the deduction for non performance or delayed or improper work if the maintenance activities are not carried out as per the response time indicated in annexure-III(Technical specification and general scope of work)suitable deductions on proportionate basis will be made from your bills and Institute reserves the right to determine the amount of deduction. It is mandatory to submit the employees wage bill and attendance record along with the bill. The payment of wages to all your employees deputed at Institute site should be made through Bank Account within first week of each month. The attendance record of all the employees deployed at IOP has to be maintained in a register. Which will be counter signed by the IOP, EIC. In daily basis. In case of absent / deployment man-power to the site IOP has all the right to deduct wages from your bill as specified in the minimum wages act.

4. **Correspondence:** All the correspondence in respect of tender/ contractual obligation shall be made to " Director, Institute of Physics, Sachivalaya Marg, Bhubaneswar - 751005."

5. **Performance Guarntee:** The Performance Gurantee @ 5% of the tender value and will be released after completion of work and site clearance by the contractor. No, interest will be paid on such PG. The contractor may opt to furnish the security deposit equivalent to 5% of the contract value in shape of bank guarantee valid up to the end of three(3) months from the date of expiry of the contractual period.

6. **Labour Law:** The contractor will abide by the rules and regulations related to the labour laws, accident, workmen compensation act, workman insurance , ESI, PF, etc.. This will be the sole responsibility of the contractor. Institute of Physics, Bhubaneswar-751005 will not be a party at any stage in any of the dispute relating to the above. In case any liability arises due to non conformation by contractor, under no circumstance IOP will be liable for the same. The contractor should submit the copy of the annual PF form 6A in respect of each financial year during the period of the contract as per the PF Act. And also copy of the half yearly ESI return form , to the institute to support the deposit of contribution in respect of employees deployed by the contractor in IOP site.

7. **Rules Governing the Contractor's employees working in the IOP Premises:** The contractors employees working inside the IOP campus will abide by the rules

&regulations of the Institute. Any damage to the IOP Property due to mishandling, carelessness on the contractor's or his work man's part will be recoverable from the contractor's bill.

8. **Liquidated damages:** In case the work is delayed beyond the specified completion period for reasons attributable to the contractor, deductions on account of Liquidated damages @1% of the contract value per month will be deducted subject to a maximum of 10% of the total incomplete work. In such case in complete work shall be worked out by deducting value of the work actually executed form the total work order value. However in case the work is delayed beyond the scheduled completion / contract period, IOP reserves the right to get the work done by any other contractor at risk and cost of the contractor and amount to that effect will be deducted from his bills/dues.

   NOTE: However in case the work progress is not satisfactory or delayed beyond the scheduled completion / contract period specified in annexure-III, IOP reserves the right to get the work done by any other contractor at risk and cost of the contractor and amount to that effect will be deducted from his bills/dues. In this connection the EIC AC report is final.

9. **Work Supervision at IOP Site:** Contractor should depute a qualified supervisor dedicated for this site, who will co-ordinate work execution activities and interact with the IOP representatives responsible for supervision of work. The supervisor is responsible for maintaining the daily, weekly and monthly routine maintaining log book, preventive maintenance register and duly verified from EIC. Arrange a meeting once in a month with the contractor to review the performance and plan maintenance schedule.
10. **Tools and other required materials:** The contractor will provide necessary materials, tools equipments, measuring instruments and working consumables etc. needed for the execution of the work. Safe custody of all such materials will be contractors sole responsibility. No extra charges will be paid for the same.

11. **Watch and Ward of IOP Equipments:** Watch and Ward of all materials till the system is taken over by IOP shall be sole responsibility of the contractor and pilferage etc. shall be entirely to his account.

12. **ESI/ Insurance:** All the persons deployed by the contractor at IOP will have to be covered under ESI/ Insurance against any personal accident and IOP will not be liable for payment of any compensation on that account. The copies of valid insurance cards of the employees, issued by the ESI/ Insurance authority should be submitted to IOP at the time of their deployment.

13. **Norms for the Work at IOP site:** The work shall be carried out as per the norms set by the manufacturer of the respective equipment, specification and specific instructions as may be issued by the IOP engineer responsible for work from time to time. During execution of the work, the contractor should follow all the standard norms of safety measures/ precautions to avoid accidents / damages to man machines and buildings. On non-adherence of this clauses, suitable fines as decided by the IOP shall be imposed.

14. **Entry and Exit of material from IOP Campus:** Materials belonging to the contractor whether consumable or non consumable should be brought inside the IOP

campus with proper entry at the main Gate. Any material to be taken out with IOP campus a proper gate pass need to issued by the Institute.

15. **Water and Electricity for O&M work at IOP:** IOP will provide free water and electricity during O & M work at IOP, at one point. The contractor has to make his own arrangements for installation of power and water from that point as per his requirements.

16. **Termination of the contract:** The Director ,IOP reserves the right to terminate the contract on account of poor workmanship, failure to mobilize site, non compliance of set norms/ specification for the works, delay in progress of work, violation of any contract provisions by the contractor. In such cases the contractor is liable to pay liquidated damages amounting to one month contract fees held with IOP in the form of BG along with the EMD amount held as security deposit with IOP.

17. **Agreement:** You are requested to execute an agreement with Institute of Physics, Bhubaneswar on a non-judicial stamp paper of Orissa, State of appropriate value, with in 7 days of issue of letter of Acceptance(LOA).

Additional Terms and Conditions

1. The Contractor shall not sublet, transfer or assign the Contract or any part thereof or bills or any other benefits, accruing therefrom or under the contract without the prior written consent of the Purchaser. Any breach of this condition shall entitle the Purchaser to cancel the Contract or any part thereof and to purchase from other sources at the risk and cost of the Contractor and shall recover from the Contractor damages arising from such cancellations.
2. The Institute reserve the right to change the supply of man power as mentioned (in annexure IV of Technical Specification and scope of work) with one month notice.
3. The price quoted in the financial bid (Part-B) must be exclusive of tax. The tax component will be calculated as per actual.
4. The experience / work completion certificate is must to consider as experience.
5. The Table given in the clause no -21 of the NIT must be filled properly. If not filled properly then the institute reserve the right to cancel the tender.
6. If a firm quotes NIL charges/consideration, the bid shall be treated as unresponsive and will not be considered.
7. **The Bidder must visit the site and access the condition of the plant and AC units before submitting the bid. The bidder / autherised representative with written autherisation letter should visit the site during the office hour and ensure to make entry in the Gate and the register with EIC, AC. This is a mandatory condition failing which the bid may not be considered.**

SIGNATURE OF THE BIDDER

Price bid

Sl. No.	*Description of the item*	*Rate in Rupees per Month First year*	*Rate in Rupees per Month Second year (If extended in continuation with first year)*	*Rate in Rupees per Month Third year (If extended in continuation with first and second year)*
1	*Annual round the clock* Operation and comprehensive Maintenance *contract for the following items confirming to the terms and conditions mentioned in the technical bid and Annexure I, II, III, IV, V, VI & VII.* *1) 1x 80TR Central AC plant of Library & new extension building.* *2) 1 x 60TR Packaged AC systems of Auditorium (operation of this will be as per the instruction of EIC)* *Noted:- Presently the plant is not functiona,. When it will* ***be repaired, it may be given for operation and maintenance as per the schedule. This item will be required when the plant will be in ready to run condition. However the price quoted for this item will be considered for the comparative purpose of bids. Bidder will be required to quote accordingly.***			
2.	Package, Window & Split AC: 190 nos *Annual Comprehensive* Maintenance *contract. Supply of manpower and carrying out routine maintenance work as per the instruction of EIC.* *1. 1.5TR Window AC - 37 nos* *2. 1.5TR Split AC-62 nos* *3. 2TR Split AC -57 nos* *4. 4.0TR Tower AC -6 nos* *5. 3.0TR Cassette AC -4 nos* *N.B: Qnty as per actual*			
3	**The Split AC systems having warranty on the compressors but not on all other parts.** *Annual Comprehensive* Maintenance *contract. Supply of manpower and carrying out routine maintenance work as per the instruction of EIC.* 1. *1.5TR Split AC-2 nos* 2. *2.0TR Split AC -22 nos*			
4.	*In addition to the above if any additional unit will be* **included** *in the AMC for the Window and Split AC, Price towards each additional unit: Window AC-1.5TR Split AC - 1.5TR Split AC - 2TR Split AC - 3TR, 4TR*			
5	*In addition to the above if any additional unit will be* **included** *in the AMC for the Window and Split AC, Price towards each additional unit: Window AC-1.5TR Split AC - 1.5TR Split AC - 2TR Split AC - 3TR, 4TR,* ***Having compressor in warranty***			
6.	*If any Split or Window AC unit is* **excluded** *from the contract price to be deducted towards the same unit: Window AC-1.5TR Split AC - 1.5TR Split AC-2TR Split AC - 3TR, 4TR*			
7	*If any Split or Window AC unit is* **excluded** *from the contract price to be deducted towards the same unit: Window AC-1.5TR Split AC - 1.5TR Split AC-2TR Split AC - 3TR, 4TR,* ***Having compressor in warranty***			
8	*In addition to the above if any additional central or package plant unit will be* **included** *in the AMC for the, ,60TR,80TR, Price towards each additional tonnage.*			
9	*If any Central or package plant is* **excluded** *from the AMC for the 60TR,80TR, Price towards each exclusion of tonnage..*			

Terms and Conditions:

1. Price is to be filled in both numbers & words in the column as specified above.
2. Both the pages of price bid have to be filled, signed with seal by the bidder and to be submitted in the part (B) envelope of the bid.
3. Both the pages of price bid is to be filled up without any cutting/ overwriting/ inking/ erasing/ white fluid etc.
4. Institute of Physics reserves the right to reject the tender paper of the bidder who has not quoted for all the options mentioned here.

SIGNATURE OF THE BIDDER WITH COMPANY SEAL

NAME DATE

Technical specification and general scope of work for operation and Comprehensive Maintenance of air-conditioning system and Chilled water Systems of IOP

Scope of work: *Round the Clock Operation and comprehensive maintenance of air-conditioning system and Chilled water Systems of Institute of Physics, Bhubaneswar-751005.*

Detailed scope of work, terms and conditions, specifications etc. are enclosed with this tender documents as per Annexure I, II, III, IV,V, VI, VII.

Special note to bidder:

The contractor shall handover the installation in full running condition to Institute, after completion of the contract period. In case, if any faulty component is noticed during handing over/taking over by succeeding contractor, the same shall be made good without any extra cost by him. Alternately suitable recovery shall be made from his final bill.

ANNEXURE-I

Scope of Work in operation and Comprehensive maintenance of AC systems:

The following scope of work is only indicative of minimum requirement and contractor is strongly advised to use his own judgment in evaluating the quantum of work involved in round the clock operation and maintenance of central air conditioning plant, process water plant, window AC, Split AC and all other accessories of these systems etc. The bidder is advised to understand the criticality of the application and the importance of maintaining more than 95% uptime of the systems. The contractor may physically verify the site and plant conditions with prior permission before quoting for the contract.

1. To operate and maintain 2x80 TR, 2x40TR and 2x10TR central AC and process water plant with all equipments (including low side equipments) as per Annexure-II, round the clock throughout the year (365 days of the year).
2. To carry out the maintenance of 2X60 TR packaged chiller units of central AC systems of Auditorium including the low side equipments and operation of the same as per requirement. Details of the system are mentioned in Annexure-II.
3. To check and clean all AHU's, AHU blowers, AHU blower motors and adjust/ replace belt, belt tensions, if necessary to grease the blower motors and pillow blocks once in a fortnight or as per the decision engineer-in-charge, IOP. Balancing of the blowers has to be carried out if required.
4. To check the refrigerant system for leakage of refrigerant and topping up of the same after rectification of the leakage once in a fortnight or as per the decision of engineer-in-charge, IOP.
5. To check/ clean with CRC/ tighten all electrical controls monthly. The heated terminations if required to be replaced with new ones with proper size and by using appropriate size crimping tool once in a month or as required by engineer-in-charge, IOP.
6. To check the performance and if required to replace all the safety devices. This is required to be carried out once in three months or as per the site requirement.
7. To check and clean water system once in a month.
8. To check and clean AHU coils, filters, supply/ return ducts/ grills/ diffusers, dehumidifier coils and filters, fresh air filters etc. once in a month or as per the decision of engineer in charge IOP.
9. To tighten foundation bolts and adjust drive belt tensions as and when required.
10. To check and rectify rotary equipment alignment once in three months (by use of three dial gauges and to an accuracy of 0.05mm on both the axial and radial readings).
11. To check/ grease/ lubricate and if required to replace bearings in all rotating machines like motors, pumps, blowers, compressors etc. Varnishing to be done once in three months or as per site requirement.
12. Repair and maintenance of mechanical equipments such as compressors, pump sets, AHU blowers, motor drives, including minor and major overhauling.

13. To check electrical circuits and rectify the problems if any in the same as and when necessary. To clean, tighten electrical contact points once in a month. To replace electrical contacts and other items in the MCC's as and when necessary.
14. To tighten all the fasteners of the bus-bars as and when necessary. Also to replace the heated up contacts and replace cabling/ wiring as and when necessary.
15. To de-scale condensers, valves, chillers and water line pipes once in three months or as per requirements.
16. To check and top up/ replace oil of the compressor crankcase.
17. To operate and maintain the 40TR central AC plant as and when required to maintain and control a temperature of 18 to 22 degree Celsius round the year or as decided by the engineer in charge, IOP. The extreme critical requirement for IBL, i.e. for 40TR AC plant is to maintain low humidity levels i.e. less than 28%+/- 5% which is to be maintained. In process water 10TR plant the secondary chiller temperature is to be maintained within 10 to 15 Degree Celsius. The 80TR AC plant is to be maintained and operated to maintain a temperature of 20 to 24 Degree Celsius.
18. To check the compressors for refrigerant gas pressure, oil level, vibration, sound and other parameters regularly on each day. If the required temperature is not achieved or any other problems observed in the compressor, same has to be checked thoroughly. If required the compressor has to be dismantled completely for necessary maintenance, rectification of the problem and / or replacement of the spares.
19. The equipments which have the standby ones have to be operated on rotational basis, at a span of maximum 24 hours.
20. To carry out the maintenance of 2X 60TR packaged chiller units of central AC for Auditorium to maintain a temperature of 20 to 22 Degree Celsius.
21. To monitor, ensure and maintain the adequate water level in the makeup water tanks of all the AC plants and process water plant.
22. To clean/ flush cooling tower basin as and when required.
23. To operate and maintain all the cooling towers including the standby cooling towers in good shape and condition. The water wastage, leaking and maintenance of louver plates to be checked once in fortnight.
24. To check/ if required to replace the heaters in the AHU ducts and dehumidifier.
25. To check the desiccant level in the dehumidifier. To top up the same and replace the same if required.
26. To check daily the cassette units (with chilled water circulation from 80TR plant) provided in the ground floor of new office extension building for any type of water leakage or any other problems. Same has to be attended with immediate effect. Complete overhauling of the same units has to be taken up during the major preventive maintenance period.
27. To properly clean all machineries daily.
28. To paint the piping, supports, hangers and equipments as and when required.
29. To plug the leakages in the FRP basin of the cooling tower.
30. To replace the axial fan blade assembly/ motor of the cooling towers. In the process the blade angles have to be finely adjusted, using four-inch precision level.
31. The cooling tower periphery area must be cleaned and maintained. The removal of mush and leaked water is to be carried out as and when required.

32. To arrange for a well equipped first aid box and maintain it in a healthy condition to take care of all first aid eventualities.
33. To attend to M.S. /S.S. pipe leakages by welding.
34. To keep the adequate spares for the window and split unit AC systems. All the problems in connection to the same have to be attended with immediate effect. The window and split unit AC systems have to be maintained in a healthy condition so that the same units have to run smoothly without any type of abnormal vibration and sound.

35. Preventive maintenance of the window, split and multi slit AC units has to be taken up at least at a span of 6 months or as required by the individual units.(The defective compressors of window and split units cannot be repaired need to be replaced)
36. For the above scope of work IOP will provide only the following free of charges to the contractor: (A) Free water and electricity for operation of the plant, (B) Parts required for maintaining the plant that are going permanently into the installation.
37. IOP will not pay any additional charges for machining jobs/ shaft alignment/ repairs, required for condensers, compressor, chiller, AHU systems etc and coil rewinding for any motor burn. The AMC is inclusive of all spares and consumables for the above maintenance work. In certain circumstances the contractor may be asked with written order to procure spare parts not covered within the scope, which will be reimbursed by IOP on production of copy of original invoice raised in favor of Institute of Physics + 10% towards handling charges.
38. To paint all the 2x80TR, 2x40TR central AC plants, 2x10TR chilled water plant, 2x 60TR packaged chiller unit, machineries and pipe lines, electrical panel, with approved color and shade at least once in a year. To paint the window AC units and split outdoor units (including the compressor, fan motor, outside over and base plate) with approved color and shade preferable during winter season.
39. The contractor shall carry out the major preventive maintenance of all the 2x80TR, 2x40TR central AC plants, 2x10TR chilled water plant, 2x 60TR packaged chiller unit machinery and their ancillary equipments, pipe lines, electrical panels etc once in the winter season to avoid any break down during the peak season (Summer). The contractor also required to carry out major preventive maintenance of all windows and split unit AC units once in the winter season to avoid any break down during the peak season (summer).
40. During the major preventive maintenance the AHU of all the systems has to be cleaned properly. ALL the filters have to be cleaned properly by water and after drying the same it has to be fixed back. The duct lines of all the AHU systems also have to be checked and cleaned during the preventive maintenance.
41. Compressor oil is required to be replaced at least once in each year and preferably during the major preventive maintenance period and / or else as per the site requirement.
42. To check all the MS/ SS pipe lines valves connected in the water lines at least once in a week for their proper operation. Necessary rectification/ maintenance of the same have to be carried out if any type of abnormalities observed in the same.

43. The SS pumps in 2x10TR chilled water plant has to be checked on daily basis, if any type of abnormalities observed in the same, it has to be attended on urgent basis. These two pumps have to be maintained properly to achieve 99% up time.

44. AHU rooms, Plant rooms, and cooling tower periphery has to be cleaned on daily basis and any type of debris should not be kept in these places, water accumulation in these areas has to be avoided.

45. To check the 2 inch 1-1/2 inch SS/ Brass valves, Flanges, etc provided in the secondary chilled water line connected to different scientific equipments inside the IBL accelerator hall, Beam hall, Low Energy Lab room on weekly basis. If any water leakage or any other problem found in the same line/ valves it has to be attended with immediate effect.

MAINTAINANCE SCHEDULE

1. **OPEN / SEMI HERMETIC COMPRESSOR (SCREW/RECIPROCATING TYPE)**

   Daily:

   - Cleaning
   - Checking lubrication oil (level & leakage) and maintain the level by make up.
   - Checking operating parameters

   Monthly:

   - Check condition and alignment of compressor drive set.
   - Lubricate motor bearings (quarterly)
   - Check operation of safety controls, shut off valves / angle valves and instruments

   Yearly:

   - Inspect oil for discoloration or contamination after initial charges as per manufacturers
   - The Lubricating oil to be change every year preferably during winter maintenance.
   - Coloring of compressors.

2. **ALL PUMPS (CONDENSOR, CHILLERS, PROCESS, WATER TREATMENT PLANT, ETC)**

   Daily: Check packing and mechanical seals for leakage

   Monthly:

   - Check the alignment and conditions of coupling to prevent damage to shaft and impeller
   - Lubricate bearings with grease gun.
   - Replace gland thread if required
   - Check lubricant oil level / make up the oil (in case of oil lubricated pumps)

   Yearly:

   - Inspect shaft, shaft sleeves, bearing, bearing housing etc.
   - Over hauling of all pumps. At the time of overhauling, the damaged parts need to be replaced by the contractor
   - Coloring with recommended shades

3. **REFRIGERANT PIPING:**

   Monthly: Check for leaks at the joints with soap test.

   Yearly:

   - Check valves.
   - Check the insulation for breaks in all possible locations.
   - Coloring with recommended shades.

4. **WATER PIPING (MS & SS - BOTH ABOVE AND UNDR GROUND PIPINGS)**

   Daily: Check for leakages.

   Monthly:

   - Check for leaks at the joints.
   - Clean valves

   Yearly:

   - Check for the damage in insulation
   - Checks for the rusting in the pipes
   - Check valves for wear at the valve disc and seat
   - Cleaning of pipe header from inside by opening end cover / flange

5. **COOLING TOWER:**

   Daily:

   - Cleaning
   - Check for operation of float valve, quick fill valve, equalizer connection

Monthly:

- Check cooling water being circulated for the suspended particles, algae formation, if. Find so, refill the circuit with fresh water.
- Drain the water and clean the sump of cooling tower
- Clean pot strainer/Y-strainer
- Check the condition of fills, if required, clean the fills with detergent
- Check for operation of shut off valves.
- Check for belt tension, oil level in the gearbox assembly.

Yearly

- Coloring with recommended shade.

6. **ELECTRICAL MAINTAINANCE**

All electrical accessories like MCB, MCCB,SFU, DOL, STAR-DELTA STARTERS etc used for the operation of AC system need to be checked,

Daily:

- Check for any tripping, chattering in the electrical parts, abnormal noise, overheating in the panels
- Check whether indication lamps are working
- All circuit boards for healthy contact minor repairs/services/cleaning etc.

Monthly:

- Check for the proper working of all ammeters, voltmeters, , overload relays, single phasing relay,
contactors malfunction etc.
- Clean the panels from inside with the help of the blower/ vacuum cleaners (Quarterly)
- Check all the cables for overheating, tightness of the glands, lugs & crimping.
- Check the fuse-link & fuse holders.
- Check the control wiring of the panel along with the controls for the proper functioning and tripping at the preset parameters.
- Check and maintain the soft starter, Microprocessors panel of Screw chiller packages.
- Check and maintain variable speed drives for RF cooling pumps

Yearly:

- Check the operation of MCCB, MCB, Isolators, SFU and servicing of the same.

7. **AHU MAINTENANCE**

Daily:

- Check all AHU.

Quaterly:

- All filter and coil of AHU to be cleaned in every three month.

Yearly:

- AHU coil descaling on yearly basis.

ANNEXURE - II

DETAILSTHE EQUIPMENTS COVERDED UNDER THE SCOPE OF WORK

2x40TR Central AC Plant

Sl. No.	Description	Quantity
1	Compressors, make- Utility, capacity-40TRwith condenser, chiller, associated valves, Expansion Valves, controls, refrigerant and water piping, etc, compressor motor capacity - 60HP,make - NGEF	2 sets
2	Condenser water pump set, Mono-block, Make- Beacon, Motor-7.5HP Star-delta starter, RPM-2900, Current-11A	3 sets
3	Chilled Water Pump- Mono block, Make-Beacon, Motor- 5HP, Star-delta starter, RPM- 2900, Current - 8 A.	3 sets
4	AHU no. 1, for IBL Accelerator, Beam Hall, Console Room, Motor - 15HP, Star-Delta starter, RPM-1460, Motor make- Crompton Greaves, and heaters	1 set
5	AHU no .2, for MBE, Low Energy, X-ray, Health Physics Laboratories and office rooms, with heaters Motor - 1OHP Star-Delta Starter, RPM-1440, Motor Make- NGEF	1 set
6	Cooling Tower no. 1, Make- 1868 PS/ Paharpur, Motor- 7.5HP, Motor make- Kirloskar, Current-12A Water Temperature - In-97'F, Out- 90'F. Vertical Forced Draft.	1 set
7	Cooling Tower no.2, Make- 3862 PS/ Paharpur, Motor- 7.5HP, Motor make- Crompton Greaves, Current-11.04A, Water Temperature - In-97'F, Out- 90'F. Axial Forced Draft.	1 set
8	Associated Electrical panels for the above systems	2 sets
9	Thermally insulated MS/SS chilled water pipe lines, Condenser water MS pipe lines, AHU ducts and dampers Water line Valves, safety devices, Makeup water tanks etc	lot

2x80TR Central AC Plant

Sl. No	Description	Quantity
1	Compressor Make Batliboi capacity-80TR with condenser chiller, associated valve, expansion Valve , controls, refrigerant and water piping , etc. compressor motor capacity-100HP, Make: Kirloska	2 sets
2	Condenser water pump set-70MQ/hr.30mt head Motor-15KW, Make Kirloskar, Star delta starter, RPM1450, Current 27.5A	3 Sets
3	Chiller Water Pump Set-55MQ/Hr, 40mtr.head Motor-9.3Kw, make-Kirloskar Star-Delta starter, RPM1450current-17.5A	3 Sets
4	AHU-1 for library ground floor, model-AH-12, Capacity-24,000cfm at 50mmhg, with heaters,Motor15KW(20HP), Make-Kirloskar, current-27.5A	1 set
5	AHU-1 for library First Floor, model-AH-12, Capacity-32,000cfm at 50mmhg, with heaters,Motor18.3KW(25HP), Make-Kirloskar, current-32A	1 set
6	AHU-3 &AHU-4 for New Office Extension building first and second floor, model-VE/AHU/120/05, Capacity-12,000cfm at 50mmhg, with heaters, Motor 5.5KW, Make-Kirloskar	2 sets
7	Four way cassette type indoor unit with chilled water circulation system provided in the ground floor of the New office extension building. Model no- MKA-1200(HRN4), Capacity36040Thu/h, Input-240V, 50Hz,,0.86A. Weight –36kg,	16 sets
8	Cooling Tower- Axial Forced Draft, Make Paharpur Location – Library roof Top, Capacity 80TR Motor- 5.5KW, Make – Kirloskar-14400RPM, 11Amp	1 set
9	Cooling Tower- Natural Draft, Make- Canara Engg Location – Library Backside, Capacity 200TR	1 set
10	Associated Electrical Panels for above systems	5 sets
11	Thermally insulated MS/SS chilled water pipe lines, condenser water MS pipe line, AHU ducts and dampers , Water Line Valves Safety devices , Makeup water tanks etc.	lot

2X10TR Chilled Water Plant

Sl. No.	Description	Quantity
1	Compressor Make Batliboi capacity-10TR with condenser chiller, associated valve, expansion Valve , controls, refrigerant and water piping , etc. compressor motor capacity-15HP Make: NGEF, 1460RPM, 20.6A	2 sets
2	Condenser water pump set-Ono block Motor -03Hp, Make Beacon – 11/2 DM 6HD162, Star delta starter, RPM2850, Current 4.8A	2 sets
3	Chiller water pump set-Ono block Motor -02Hp, Make Beacon – 1 1/2 DM 6HD162, Star delta starter, RPM2850, Current 4.8A	2 sets
4	S.S. Heat Exchanger / Secondary Water Chiller Make –Flowlink	1 set
5	Secondary Chiller Pump (S.S. Pump). Pump Model & make-1.5x1.8/ Chemflo. Motot-7.5HP, Frame Size & Make- AM132SZ2/NGEF. RPM-2875,10.5A	2 sets
6	Secondary chilled water pipe line distributes the chilled water to different scientific instruments in IBL through insulated SS pipe line and 07nos of 2 inch S.S. valves.	1 lot
7	Cooling tower – natural draft, Capacity 10TR, Location – Back side of the IBL	1 set
8	Associated Electrical Panel for the above system	1 set
9	Thermally insulated MS/SS chilled water pipelines, condenser water MS pipe line , Water line Valves, Safety devices, Makeup water Tank etc	1 lot

2X60TR Package AC plant

S. No	Description	Quantity
1	Packaged condensing unit, make- TRANE Model - RAUP-600, capacity - 60TR, Contains 4 no.s of 15TR scroll compressors, Strainers, safety devices, Refrigerant gas, 2 condensing coils, 6 no.s of cooling fans, Electrical circuitry, gas pipe lines, valves, etc.	2 sets
2	AHU for Auditorium, Double skinned AHU Capacity- 35700 cfm at 75mm wg, With heaters, Expansion Valve, safety devices, gauges, AHU ducts Dampers, etc. & blower with motor- 18.5KW (25HP), make-Crompton Greaves, Current-33A	2sets One unit
3	Associated Electrical panel for the above systems.	1set

Cassette, Tower, Window and Split AC systems

Sl. No	Description Comprehensive Maintenance of the following	Quantity
1	1.5 TR Window AC (Make: Voltas, LG, Carrier, Blue Star , Hitachi, VSTAR, Godrej Etc)	37
2	a. 1.5 TR Spilt AC (Make: Voltas, LG, Carrier, Blue Star, Hitachi, VSTAR, Godrej Etc) b. 1.5TR split AC excluding compressor	62 2
3	a. 2.0 TR Split AC(Make: Voltas, LG, Carrier, Blue Star, Hitachi, VSTAR, Godrej Etc) b. 2.0 TR Split AC excluding compressor	57 22
4	4.0 TR Tower AC (Make: Voltas, LG, Carrier, Blue Star , Hitachi, VSTAR, Godrej Etc)	4
5	3.0TR cassette AC	6
		190

ANNEXURE-III

TIME SCHEDULE FOR ATTENDING/ COMPLETION OF PROBLEMS IN THE AC PLANT AND PROCESS WATER PLANT

Sl. No.	Description of the Item	Time	Remarks
1	**General**		
1.1	Minor defects Mechanical and Electrical	Same day	
1.2	Major Electrical problems like repair/ maintenance/ replacement of Starter/ SFU/ Control Circuit etc.	1-2 days	
2	**Compressor Breakdown Problems**		
2.1	Changing Reeds	Same Day	
2.2	Replacement of Shaft Seal	One Day	
2.3	Leakage testing, rectification of the same, pressure testing, Gas Charging and putting back to service	Two days	
2.4	If compressor has to be dismantled due to any type of faults, after necessary repair, putting same back into normal operation	Seven days	
2.5	Changing of main compressor motor, realignment, coupling etc.	Four days	
2.6	Replacement of lubrication oil	Same day	
2.7	Replacement of main bearing bushes	Same day	
2.8	Check up of end- play and rectification of the same	Same day	
3	**Pump problems**		
3.1	Replacement of pump glands	Same day	
3.2	Replacement/ cleaning of suction strainers	Same day	
3.3	Replacement/ repair of coupling	Same day	
3.4	Re-alignment	Same day	
3.5	Replacement of bearing of pumps/ motors	Two days	
3.6	Metal deposition and machining of shaft, sleeve, motor and pump end shields etc. for proper fitting.	Four days	
4	**Air Handling Units**		
4.1	Replacement of bearings	One day	
4.2	Replacement of V belts	Same day	
4.3	Cleaning of cooling coils by air/ water pressure/ vacuum cleaning procedures.	Same day	
4.4	Cleaning of fresh air filters	Same day	
4.5	Cleaning of micro filters	One day	
4.6	Changing blowers	Same day	
4.7	Metal deposition and machining of the AHU shaft, etc	Three days	
4.8	Repair of cooling coils etc.	Three days	
5	**Dehumidifier**		
5.1	Replacement of heaters	Same day	
5.2	Changing of desiccant	Same day	

5.3	Attending to minor problems	Same day	
5.4	Attending to major problems	Three days	
5.5	Replacement bed drive springs	Same day	
5.6	Replacement of filters	Same day	
6	**Cooling Towers**		
6.1	Changing of bearings, fan blades, motors etc.	Two days	
6.2	Cleaning of sump/ cooling tower tray	Same day	
6.3	Changing of nozzles	Same day	
6.4	Change of gear box oil	Same day	
6.5	Re-adjustment of fills/ drift eliminators	Same day	
6.6	Adjustment of fan blade angle	Same day	
6.7	Weather protection of the motor terminals	Same day	
7	**Electricals**		
7,1	Servicing/ replacement of contactor points	Same day	
7.2	Repair of burnt terminals	Same day	
7.3	Replacement of burnt wirings/ cables etc.	Three days	
7.4	Replacement of contactor/ OL relay/ SFU/ timer/ indicating lamps/ push buttons/ motor terminals/ etc	Three days	
7.5	Preventive maintenance of complete MCC	One day	
7.6	Rewinding of burnt motors	Seven days	
8	**Window and Split AC units**		
8.1	Minor problems	Same day	
8.2	Replacement/ repair of fans/ blower motors, bearings/ bushes, burnt wirings, thermostats, capacitors, relays, etc	One day	
8.3	Replacement/' repair of compressor	Three days	
8.4	Repair of refrigerant tubing's, coils, copper pipes for gas leakage, etc	One day	
8.5	Gas charging	Same day	
8.6	Repair/ replacement of electronic circuitry	Two days	
8.7	Electrical problems	Same day	
8.8	Complete overhauling of window/ split AC system	Two days	

PENALTY Clause:

Penalty clauses for unjustified delay caused by the contractor for attending and keep the system up during major and minor break down.

1	Minor Breakdown	Rs.1000/- per day of delay subject to maximum of Rs. 10000/- per fault.
2	Major Breakdown	Rs.500/- per day of delay subject to maximum of Rs. 10000/- per fault.

Note:
The problems can be solved in same day will be considered as minor problem and the problems which will take more than one day as specified above will be considered as major problem. The time will be recorded from of break down.
Recovery:

NOTE: However in case the work progress is not satisfactory or delayed beyond the scheduled completion / contract period specified in annexure-III, IOP reserves the right to get the work done by any other contractor at risk and cost of the contractor and amount to that effect will be deducted from his monthly bills/dues. In this connection the EIC AC report is final.

ANNEXURE-IV

MAN POWER REQUIRENT

Sl. No.	Position of Requirement	Category	Working hours required	No. of Requirement	Qualification and Experience
1.	Central AC Plant Operator *(When central plant is operational)* (To be called in 3 shift basis round the clock 365 days or as per instruction of EIC to attend the operation & maintenance of the Central AC plant)	Skilled	8 Hours a day & six days a week	four	ITI in Refrigeration/ Electrical with 2 years experience or 10th with 5 years experience in the field of operation and maintenance of central AC plants
2.	Window and Split AC Mechanics: (To carry out the day — today maintenance requirement of window and split AC units)	Skilled	8 Hours a day & six days a week	Two	ITI in Refrigeration/ Electrical with 4 years experience or 10th with 7 years experience in the field of maintenance of Window and Split AC systems. Note: Educational qualification can be relaxed in case of exceptionally skilled personal
3.	Central AC plant Mechanic *(When central plant is operational)* (To carry out the day - to-day maintenance requirements of central and packaged AC plants)	Highly Skilled	8 Hours a day & six days a week	One	ITI in Refrigeration/ Electrical with 6 years experience or 10* with 12 years experience in the field of operation and maintenance of central AC plants. He should have profound knowledge of the maintenance of Compressors, Pumps, AHU, cooling towers, safety devices, Valves, etc. used in the central/ packaged AC plants Note: Educational qualification can be relaxed in case of exceptionally skilled personal
4.	Helper (To assist in all types of maintenance work)	Semi Skilled	8 Hours a day & six days a week	One	10th with 2 years experience of maintenance of central AC plants, window/ split Ac units in the helper grade
5.	Supervisor *(When central plant is operational)* (To co-ordinate activities of the contract and carry out all the jobs as per the instructions of ENGINEER IN CHARGE of IOP)	Highly Skilled/ Skilled	8 Hours a day & six days a week	One	Diploma in Refrigeration & AC/ Electrical Engineering with 2years experience/ ITI in Refrigeration/ Electrical trade with 6 years experience.

Other Requirements (within the contract value and no extra cost will be paid for the same):

1. All the staffs employed by the contractor at IOP site has to follow the instructions issued by the EIC of IOP.
2. Above mentioned requirement is only for the day to day regular maintenance and operation of the AC systems at IOP site and of minimum type. The contractor has to keep additional manpower to supply as per requirement to carry out the necessary maintenance work during break down conditions and major preventive maintenance period, also the contractor required to supply additional manpower to paint the total system once in a year as mentioned in the annexure-I, point no.38.
3. The contractor is required to meet the Engineer in Charge/ Chairman AC committee at least once in each month to discuss the details of the plant performance.
4. The supervisor shall be available in all working days between 9 AM to 5.30PM. And report the Engineer in Charge, Institute of Physics.
5. The supervisor/ contractor have to be present whenever required by the ENGINEER IN CHARGE IOP even in holidays or after duty hour for discussing regarding the emergency situation in the plant or systems.
6. The contractor shall depute one qualified engineer once in every month to check-up the plant condition and improve the performance of the plant to ensure trouble free running.
7. In case the person deployed by the contractor is not found up to the standard during the execution of the contract, it shall be the responsibility of the contractor to replace the work man within seven days.
8. In case of the requirement the workman with the supervisor will be required to perform round the clock shift duties.
9. The contractor should note that the staff recruited/ appointed for the purpose of work at IoP site should be of Indian origin and domicile only and should have good moral character and also should not have been in wanted list of criminals.
10. In case any of the persons/ work man wants leave, prior permission of the ENGINEER IN CHARGE, IOP, is necessary for the same. The contractor has to arrange alternate team member of equivalent status as suitable to ENGINEER IN CHARGE, IOP as a substitute for the same.
11. All contractors' personnel must have to wear a particular dress (**Sky blue shirt with Navy blue pant**) with safety shoes and ID-card. Without observing dress code and without safety shoes and ID-card, a contractor's person will not be allowed to enter in the IOP premises in any circumstances.
12. The contractor must have to submit police verification of character of all personnel deputed at IOP. The contractor also must submit an attested copy of any one of the Govt. issued ID card (Aadhar / Voter card/ Driving License/ Passport/ Pan card/equivalent).
13. Complying with the requirements of IOP security for regulating entry of the persons deployed for the contract. Further, in and out time of the persons deployed by the contractor for various activities under this contract shall be recorded in the prescribed register at the Main Gate. The Contractor shall be required to keep a similar register with the.
14. With prior information to the site supervisor the AC system of auditorium should be operated by the existing skilled operator even beyond the office hours as and when required without any additional cost to IOP.
15. Penalty for Failure to provide Manpower as per Clause above
    a) Penalty for absence of **Supervisor**: Rs.500/- per day shall be recovered from the routine bill of the contractor.

b) Penalty for absence of qualified skilled Operator/ Electrician/ Mechanic: Rs.400/- per day shall be recovered from the routine bill of the contractor.
c) Penalty for absence of semiskilled person: Rs.300/- per day shall be recovered from the routine bill of the contractor.
d) Penalty for absence of **Senior Supervisor / Senior Engineer**: Rs.500/- per visit shall be recovered from the routine bill of the contractor.

The above penalty shall be in addition to the consequential loss the Institute may incur for substituting the persons with same number or more for running the system in view of the failure of contractor to provide manpower.

ANNEXURE-V

1. **Chilled water pipe insulation procedure:**
   Insulation material shall be resin bonded fiber glass of K-0.035 Kcal/ hr.m.Deg.C. and a thickness of 50mm in pipe section form or thermo cool blocks of suitable size. Application: The surface to be insulated shall be thoroughly cleaned and allowed to dry. Hot Bitumen of grade 85/ 40 or confirming to IS 702 shall be uniformly applied @< 1.5Kg/Sq.m. on the surface to be insulated. A similar layer shall also be applied on the inside surface to be insulated. A similar layer shall also be applied on the inside surface of the insulation. CPRX compound of STP may also be used instead of bitumen. Insulation sections shall be stuck to the surface with the joints staggered. The adjoining sections shall be tightly pressed together. All the joints shall be sealed with bitumen. Voids will be sealed with suitably cut pieces. A thick vapour seal of hot bitumen at 2.5Kg/sq.m shall be applied on the outer surface of the insulation and allowed to dry. The surface shall then be wrapped with 19mm mesh 24SWG GI wire, butting all the joints and laced down with 22 SWG GI lacing wire 12.5mm sand cement (1:3) plaster shall be applied in two layers, the second layer being brought to a smooth finish. A waterproofing compound shall be added to the cement before its application. Finally it should be painted with the existing colour synthetic enamel paint.
2. **Re-metalizing & machining of the AHU blower shaft:**
   Scope of work briefly covers dismantling of AHU shaft and pillow block bearings transportation of shaft from IOP to works & back, re-metalizing of bearing seats by low temperature/ staggered welding to have a minimum fusion depth of 1.5mm while ensuring the shaft run-out less than 0.02mm, machining and grinding to a surface finish of Rzl.2 micron, assembly of blower/ pillow block bearings/ pulley, alignment of belt drives & commissioning of the same at site.
3. **AHU coil, leak repair/ rectification/ testing:**
   There are four numbers of AHU at 40TR and 80TR AC of different capacity installed at IOP site. Scope of work briefly covers transportation of coil from IOP to works and back, leak testing of coil under pneumatic test pressure of 10Kg/ cm2 in dip tank, rectification of leakages by brazing. Final leak testing/ rectification till no further leak is found. Pressure withstanding test has to be done for minimum of 45 minutes.

Note: The maintenance schedule mentioned above is applicable form the date of handover the plant. Whichever plants or AC system is not handed over to the contractor for AMC, the maintenance schedule will be started from the date of handover.

ANNEXURE-VI

SIMILAR WORKS COMPLETED AND IN PROGRESS DURING THE LAST 7YEARS ADD ADITIONAL SHEETS IF NECESSARY

SL. No.	Description Of Work	Period of Contract	Value Of the Contract	Name, Designation and contact phone and mail Id of the authority for whom the Work was done With work Completion certificate

ANNEXURE-VII

ACCEPTANCE CERTIFICATE

I ..... (designation) ..... of (Name of the Company)

Hereby accept the above-mentioned Terms & Conditions mentioned in NIT, Technical Bid, along with Annexure I to VII for the above Contract of Institute of Physics, Bhubaneswar.

Signature
Company
Seal

Name of the authorized person with telephone number & E-mail address who will deal this contract on behalf of the bidder:

Name & Address of the firm/Bidder
With contact phone number & E-mail address:

Address with phone number & E-mail address of the local office/ workshop in Bhubaneswar:

Signature
Company Seal