National Institute of Technology Mizoram  
Chaltlang, Aizawl-796012.  
Mizoram, India.

Tel:- 0389-2391236 (O)

Ref: No. NIT-MZ/D-14/M.E/2015/7756 Date: 19th February, 2016

NOTICE INVITING TENDER (NIT)

FOR SUPPLY & INSTALLATION OF EQUIPMENTS FOR THERMAL LAB –II OF MECHANICAL ENGINEERING DEPARTMENT AT NIT MIZORAM, AIZAWL

The Dy. Registrar, NIT Mizoram invites quotation for supply & Installation of Equipments as per details at **ANNEXURE-V**, **in Two Bids** to reach the undersigned on or before.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sl No. | Reference No. | Items | Qty | **EMD (Rs.)**  **in the form**  **of** DD | **Tender**  **Document**  **Fee (Rs.)**  **in the**  **form of**  DD only. |
| 01. | As given above | **Supply & Installation of Equipments for Thermal Lab- II to be installed at NIT, Mizoram, Aizawl** | **One**  **Package** | Rs. 7,00,000.00 | 1,000.00  (Non-refundable) |

**1. Last date & Time for Submission: 28 -03-2016 (04.00 PM)**

**2. Date/Time for Opening of Tech. Bids: 28 -03-2016 (04.30 PM)**

**3. Date of notifying the technically qualified bidders by Email: 01 -04-2016**

**4. Evaluation of Financial bids for technically qualified bidders: 07-04-2016**

***VENUE OF BID OPENING AT NIT, MIZORAM, AIZAWL***

**BID INSTRUCTION:**

**01.** Quotations will have to be submitted in TWO Bids. The address of the firm submitting the quotation and the Officer to whom the quotation is addressed must appear distinctly on sealed covers. Further, on sealed cover, the following are to be written:

**QUOTATION FOR SUPPLY & INSTALLATION OF EQUIPMENTS FOR THERMAL LABORATORY -II OF MECHANICAL ENGINEERING DEPARTMENT AT NIT MIZORAM, AIZAWL**.

**REF NO\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE:-\_\_\_\_\_\_\_\_\_\_\_\_\_**

02. Submission ofCompliance Certificate: Duly filled and signed Compliance Certificates (as per formats at Annexure I (A& B)are must with the Technical bid.

03. Bid not transferable: The bid documents are not transferable and the seal and signature of the authorized official of the firm’s must appear on all the papers and envelopes submitted.

**QUALIFICATION REQUIREMENTS**

1. The Bidder should be an Original Equipment Manufacturer (OEM) or anauthorized dealer/Distributor & a firm of reputation having sufficient expertise and experience in the subject tender with sound warranty / service support capability and authorization from Manufacturer/Distributor.
2. The Bidder should have experience of executing at least One Purchase Order of equipments/Machines/IT Products of value of Rupee Fifty Lacs or Higher within the last 3 Years from any IIT /NITs/ Central Govt. Institutions of North East Region of India.
3. The Bidder has to quote for all the items in the Thermal Lab -II, Bidders who do not quote for all the items are subject to be disqualified.
4. The Bidder must have facility for maintenance of Instruments in the NE region for last 1 (One) year.

**NIT TERMS & CONDITIONS:**

1. **Rates:** Rates quoted in the **Price Bid** should be **on DOOR DELIVERY NIT Mizoram basis,** as per details below:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Particulars** | **Rate** |
| **1.** | Basic Price (per unit) |  |
|  | Total |  |
|  | Taxes(pl. give break up) |  |
|  | Grand Total for the item on door delivery at NIT Mizoram |  |

Bidders shall indicate their rates in clear/visible figures as well as in words and shall not alter/overwrite/make cutting in the quotation. In case of a mismatch, the rates written in words will prevail.

1. **Validity of Quotation:** Quoted rates must be valid for **90 days** from the date of quotation.
2. **Warranty:**  The quoted equipment and components must be warranted for a minimum of 1(One)year after satisfactory installation.
3. **Literature a must**: All the quotations must be supported by the printed technical leaflet/literature and the specifications mentioned in the quotation must be reflected/ supported by such printed technical leaflet/literature. The model and specifications quoted should **invariably be highlighted** in the leaflet/literature for easy reference.
4. **After Sales Service:** Vendors should clearly state the available nearest after sales service facilities in the region, without which their offers will be rejected.
5. **Dealership Certificate:**  Dealers or Agents quoting on behalf of Manufacturer/Distributor must enclose valid dealership certificate.
6. **Earnest Money:**Refundable earnest money deposit (EMD) of the Quoted Value through demand draft drawn in favor of “**The Director, National Institute of Technology Mizoram**”, payable at Aizawl, will have to accompany the technical Bid. The EMD of unsuccessful bidders shall be returned after award of contract. EMD of the successful bidder will be released on submission of the Performance Bank Guarantee. Offers received without Earnest Money or valid Certificate shall be summarily rejected.
7. **Performance Bank Guarantee (PBG):** In case of items with order value of Rupees five lakhs (INR 5,00,000/-) and above, the successful bidder shall furnish an unconditional PBG (as per format at **Annexure II**) for 5% of the Purchase Order value from a scheduled Bank of India, after receiving the purchase order**.** Where the PBG is obtained by a foreign bank, it shall be got confirmed by a Schedule Indian bank and shall be governed by Indian Laws and be subject to the jurisdiction of courts at Aizawl. The PBG will be kept till the Warranty Period and The PBG shall guarantee that,
   * The Vendor guarantees satisfactory operation of the Equipment & components against poor workmanship, bad quality of materials used, faulty designs and poor performance.
   * The Vendor shall, at his own cost, rectify the defects/replace the items supplied, for defects identified during the period of guarantee.
   * This guarantee shall be operative from the date of installation till 120 days after the warranty period.
   * The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
   * The Performance Security shall be denominated in the currency of the contract.
   * PS may be submitted either by the principal or by the Indian agent
8. **Delivery:**

* **Time Limit:** Maximum within 12-16Weeks from the date of issue of this purchase order.
* **Safe Delivery:** All aspects of safe delivery shall be the exclusive responsibility of the vendor.At the destination site, the package will be opened only in the presence of NIT user/representative and vendor's representative. The intact condition of the package and the seal/indicators for not being tempered with shall form the basis for certifying the receipt in good condition.
* **Insurance:** The supplier is to establish ‘All Risk Transit Insurance’ coverage till door delivery at NIT Mizoram.

###### Part Delivery: Acceptance ofpart delivery shall be a prerogative of the institute.

* **Penalty for delay in delivery:** The date of delivery should be strictly adhered to otherwise the Director, NIT Mizoram reserves the right not to accept delivery in part or full.

1. **Genuine Pricing**: Vendor is to ensure that quoted price for the particular item is not more than the price quoted to any other customer in India, particularly to IITs/NITs and other Government Organization.
2. **Conditional tenders not acceptable:** All the terms and conditions mentioned herein must be strictly adhered to by all the vendors. Conditional tenders shall not be accepted on any ground and shall be rejected straightway. Conditions mentioned in the tender bids submitted by vendors will not be binding on NIT Mizoram.
3. **Road Permit:** NIT, Mizoram will provide Road Permit to the Vendors of outside Mizoram.
4. **VAT deduction at source:** In case of supply within Mizoram, VAT deduction at source, as per Order/ notification of the Govt. of Mizoram will be applicable.
5. **Late and delayed tender**: Late and delayed tender will not be considered. In case any unscheduled holiday occurs on the prescribed closing/opening date the next working day shall be the prescribed date of closing/opening.
6. **Payment**: 100% payment within 30(thirty) days from date of delivery, Satisfactory installation, acceptance and Training.
7. **Payment for Imported Goods:** By an irrevocable letter of Credit at CIF/CIP Kolkata value negotiable through any overseas branch of State Bank of India/any Schedule Bank of India.

**Note**: Please note LoC will not be opened unless and until Letter of Acknowledgement in original is received at NIT, Aizawl, Mizoram, directly from the principal (Even in case of firms having subsidiary office in India).

1. **Additional term for imported goods:** Following term besides the fore mentioned terms will be applicable in case of foreign purchases. Prices quoted must be for destination including freight and insurance charges inclusive of free delivery up to the door of department/centre NIT, Mizoram premises, as per details below:

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Particulars** | **Rate** |
| **(a)** | **Item** |  |
| I | Basic Price (per unit) |  |
| II | Total |  |
| III | Custom Duty (Approximate) |  |
| IV | Grand Total for the item on door delivery at NIT Mizoram |  |

1. **Free Maintenance & Service for 20 Years**: An agreement is to be executed between the Institute & the **Manufacturer/Distributor/Dealer** for providing **Free Maintenance & Service for 20 Years** after expiry of the Warranty Period of the equipment by the Manufacturer/Distributor/Dealer (Preferably from the Manufacturer) within 30 Days from the day of Complain. The cost of the Spare parts required for the service and maintenance will be paid by the Institute along with the To & Fro charges (The cheapest mode of Travel).
2. **Evaluation of Tender:** Unless specifically mentioned, the overall lowest bid meeting the technical specifications will be selected for placement of purchase order.
3. **Grounds for summary rejection of bid / offer without any further clarification at preliminary evaluation stage:**
4. Unsigned bid
5. Late or delayed bid
6. Bid validity is shorter than the required period
7. The bid is not accompanied by Earnest Money Deposit (EMD) if EMD is required
8. The bidder is not eligible
9. No authorization letter from the manufacturer
10. If there is no mention of packing, forwarding, freight, transportation and insurance charge in the offer
11. Not willing to provide performance security if it is requirement of tender
12. **Grounds to be considered as material deviation for summary rejection of bid / offer without any further clarification at the discretion of the NIT Mizoram authority during intensive technical evaluation stage:** The good(s) quoted which are not meeting the major / essential technical specifications.
13. **Enquiry during the course of evaluation not allowed**: No enquiry from the bidder(s) shall be entertained during the course of evaluation of the tender till final decision is conveyed to the successful bidder(s). However, the Purchase Committee or its authorized representative may make enquiries/seek clarification from the bidders. In such a case, the bidder must extend full co-operation.  The bidders may also be asked to arrange demonstration of the offered items, in a short period of notice.
14. The acceptance of the quotation will rest solely with the Director, NIT Mizoram, who in the interest of the Institute is not bound to accept the lowest quotation and reserves the right to himself to reject or partially accept any or all the quotations received without assigning any reasons.
15. **Applicable Law**:

* The contract shall be governed by the laws and procedures established by Govt. of India and subject to exclusive jurisdiction of Competent Court and Forum in Aizawl / India only.
* Any dispute arising out of this purchase shall be referred to the Director NIT Mizoram, and if either of the parties hereto is dissatisfied with the decision, the dispute shall be referred to the decision of an Arbitrator, who should be acceptable to both the parties, to be appointed by the Director of the Institute. The decision of such Arbitrator shall be final and binding on both the parties.

1. **Cost of Bidding:**The Bidder shall bear all costs associated with the preparation and submission of its bid, and “the Purchaser", will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.
2. **Clarification of bidding documents:**A prospective bidder requiring any clarification of the bidding documents shall contact the Purchaser in writing at the Purchaser’s address. The Purchaser will respond in writing to any request for clarification, provided that such request is received not later than ten (10) days prior to the dead line for submission of bids. Should the Purchaser deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so

Enclosure:**GENERAL CONDITIONS OF CONTRACT, ANNEXURE-I, ANNEXURE-II, ANNEXURE-III, ANNEXURE-IV&ANNEXURE-V**

**DY. REGISTRAR (F& A)**

**NATIONAL INSTITUTE OF TECHNOLOGY MIZORAM**

**GENERAL CONDITIONS OF CONTRACT**

* 1. **Definitions**

In this Contract, the following terms shall be interpreted as indicated:-

The following words and expressions shall have the meanings hereby assigned to them

“Contract” means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.

“Contract Documents” means the documents listed in the Contract Agreement, including any amendments thereto.

“Contract Price” means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract.

“Day” means calendar day.

“Completion” means the fulfilment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract. “GCC” means the General Conditions of Contract.

“Goods” means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.

“Related Services” means the services incidental to the supply of the goods, such as transportation, insurance, installation, training and initial maintenance and other such obligations of the Supplier under the Contract.

“Subcontractor” means any natural person, private or government entity, or a combination of the above, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.

“Supplier” means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.

The final destination, where applicable, means the place named in the “National Institute of Technology Mizoram, Aizawl-796012”

* 1. **Contract Documents:** Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.
  2. **Fraud and Corruption:** The purchaser requires that bidders, suppliers, contractors and consultants, if any, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this policy,

1. The terms set forth below are defined as follows:

* “Corrupt practice” means the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution;
* “Fraudulent practice” means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;
* “Collusive practice” means a scheme or arrangement between two or more bidders, with or without the knowledge of the Borrower, designed to establish bid prices at artificial, non-competitive levels; and
* “Coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract;

1. The purchaser will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract in question.
2. **Joint Venture, Consortium or Association:** If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfilment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.
3. **Scope of Supply:** The Goods and Related Services to be supplied shall be as specified in the Schedule of requirements.
4. **Suppliers’ Responsibilities:** The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with Scope of Supply Clause of the GCC, and the Delivery and Completion Schedule, as per GCC Clause relating to delivery and document.
5. **Contract price:** Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid.
6. **Copy Right:** The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.
7. **Application:** These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the Contract.
8. **Standards:** The Goods supplied and services rendered under this Contract shall conform to the standards mentioned in the Technical Specifications and Schedule of Requirements, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods' country of origin and such standards shall be the latest issued by the concerned institution.
9. **Patent Indemnity**
10. The Supplier shall, subject to the Purchaser’s compliance with GCC Sub- Clause 11.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney’s fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of: The installation of the Goods by the Supplier or the use of the Goods in India; and (b) The sale in any country of the products produced by the Goods.
11. If any proceedings are brought or any claim is made against the Purchaser, the Purchaser shall promptly give the Supplier a notice thereof and the Supplier may at its own expense and in the Purchaser’s name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claims.
12. **Inspections and Tests**
13. The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services.
14. The Purchaser or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the Purchaser. The Technical Specifications shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing in a timely manner of the identity of any representatives retained for these purposes.
15. Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
16. Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
17. The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at final destination shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
18. **Packing**
19. The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.
20. The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided for in the Contract and in any subsequent instructions ordered by the Purchaser.
21. **Delivery:**Delivery of the Goods and completion and related services shall be made by the Supplier maximum within 12-16 Weeks from the date of issue of this purchase order
22. **Transportation** The Supplier is required under the Contract to transport the Goods to a specified destination in India, defined as the Final Destination, transport to such destination, including insurance, unloading and storage, as specified in the Contract, shall be arranged by the Supplier, and the related costs shall be included in the Contract Price.
23. **Incidental Services:** The supplier may be required to provide any or all of the services, if any.
24. **Spare Parts:** The Supplier shall be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:
25. Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
26. In the event of termination of production of the spare parts:

* Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
* Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested.

1. **Warranty**
2. The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.
3. The Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in India.
4. The warranty shall remain valid for twelve months (1 Year) after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination.
5. The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.
6. Upon receipt of such notice, the Supplier shall, within a period of 30 days, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.
7. If having been notified, the Supplier fails to remedy the defect within the period specified above, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier’s risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
8. **Change Orders and Contract Amendments.**
9. The Purchaser may at any time, by written order given to the Supplier pursuant to Clause on Notices of the GCC make changes within the general scope of the Contract in any one or more of the following:

* Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
* The place of delivery; and/or
* The Services to be provided by the Supplier.
* The delivery schedule.

1. If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within fifteen (15) days from the date of the Supplier's receipt of the Purchaser's change order.
2. No variation or modification in the terms of the contract shall be made except by written amendment signed by the parties.
3. **Assignment:** The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.
4. **Subcontracts:** The Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the Supplier from any liability or duties or obligation under the Contract.
5. **Extension of time**
6. Delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser.
7. If at any time during performance of the Contract, the Supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier’s notice, the Purchaser shall evaluate the situation and may, at its discretion, extend the Supplier’s time for performance with or without penalty, in which case the extension shall be ratified by the parties by amendment of the Contract.
8. Except as provided under the Force Majeure clause of the GCC, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of penalty pursuant to Penalty Clause of the GCC unless an extension of time is agreed upon pursuant to above clause without the application of penalty clause.
9. **Penalty clause:** Subject to GCC Clause on Force Majeure, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contractreserves the right not to accept delivery in part or full.
10. **Termination for Default**
11. The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part:

* If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause on Extension of Time; or
* If the Supplier fails to perform any other obligation(s) under the Contract.
* If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent or collusive or coercive practices as defined in GCC Clause on Fraud or Corruption in competing for or in executing the Contract.

1. In the event the purchaser terminates the contract in whole or in part, he may take recourse to any one or more of the following action: a) The Performance Security is to be forfeited; b) The purchaser may procure, upon such terms and in such manner as it deems appropriate, stores similar to those undelivered, and the supplier shall be liable for all available actions against it in terms of the contract. c) However, the supplier shall continue to perform the contract to the extent not terminated.
2. **Force Majeure**
3. Notwithstanding the provisions of GCC Clauses relating to extension of time, penalty and Termination for Default the Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
4. For purposes of this Clause, “Force Majeure” means an event or situation beyond the control of the Supplier that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.
5. If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof within 21 days of its occurrence. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
6. If the performance in whole or in part or any obligations under the contract is prevented or delayed by any reason of force majeure for a period exceeding 60 days, either party may at its option terminate the contract without any financial repercussions on either side.
7. **Termination for Insolvency:** The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.
8. **Settlement of Disputes**
9. The Purchaser and the supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
10. If, after twenty-one (21) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract.
11. The dispute settlement mechanism/arbitration proceedings shall be concluded as under: In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director, NIT Mizoram, Aizawl and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.

In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration In accordance with provision of sub clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.

1. The venue of the arbitration shall be the place from where the order is issued.
2. Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and the Purchaser shall pay the Supplier any monies due the Supplier.
3. **Governing Language:** The contract shall be written in English language, which shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the English language only.
4. **Applicable Law:** The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction of Aizawl, Mizoram, India.
5. **Notices**
6. Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX or e mail and confirmed in writing to the other party’s address.
7. A notice shall be effective when delivered or on the notice’s effective date, whichever is later.
8. **Taxes and Duties**
9. For goods manufactured outside India, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside India.
10. For goods Manufactured within India, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred till its final manufacture/production.
11. If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in India, the Purchaser shall make its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.
12. **Right to use Defective Goods:** If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser’s operation.
13. **Protection against Damage:** The system shall not be prone to damage during power failures and trip outs.
14. **Site preparation and installation:** The Purchaser is solely responsible for the construction of the equipment sites in Compliance with the technical and environmental specifications defined by the Supplier. The Purchaser will designate the installation sites before the scheduled installation date to allow the Supplier to perform a site inspection to verify the appropriateness of the sites before the installation of the Equipment, if required. The supplier shall inform the purchaser about the site preparation, if any, needed for installation, of the goods at the purchaser’s site immediately after notification of award.

**Annexure -I**

1. **COMPLIANCE CERTIFICATE FOR NIT TERMS**

**(To be enclosed in the Technical bid)**

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **NIT Terms and Conditions** | **Yes/No** |
| **01** | **Rate** quoted as per instruction |  |
| **02** | **AMC rate**  after warranty provided |  |
| **03** | **Validity** of quoted rate for 90 days agreed |  |
| **04** | **EMD** submitted (appropriate certificate enclosed) |  |
| **05** | **PBG** term agreed |  |
| **06** | **Payment** term agreed |  |
| **07** | **Delivery terms** agreed |  |
| **08** | **Warranty period** agreed |  |
| **09** | **Literature:** Printed Literature provided |  |
| **10** | **Dealership** / distributorship certificate (in case of dealers/agents) provided |  |
| **11** | **Sales Service**: address of after Sales Service centre in India (for imported goods)/ in the region provided |  |
| **12** | **Applicable law** terms agreed |  |

Signature with Seal:……………….

Vendor: M/s………………………

1. **COMPLIANCE CERTIFICATE FOR SPECIFICATIONS**

**(One for each item must to be enclosed in the Technical bid)**

|  |  |  |
| --- | --- | --- |
| **Item Sl. No.:** | | |
| **Specifications as per Annexure-IV** | **Quoted Item Specs.\*** | **Complied**  **(Yes/No)** |
|  |  |  |

Signature with Seal:..…..………….

Vendor: M/s………………………

**\* Vendor must quote the parameter specification of the quoted product in this column and not just copy the specification from the tender call document. Failure to do so will lead to rejection of the tender.**

##### **Annexure –II**

##### ***PERFORMANCE BANK GUARANTEE***

To:

The Director

National Institute of Technology

Aizawl-796012, Mizoram

**WHEREAS**..................................................................................................................... (Name of Supplier)

hereinafter called "the Supplier" has undertaken, in pursuance of Contract No................. dated,......... 20... to supply...................... ................................................. (Description of Goods and Services) hereinafter called "the order".

**AND WHEREAS** it has been stipulated by you in the said order that the Supplier shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the order.

**AND WHEREAS** we have agreed to give the Supplier a Guarantee:

**THEREFORE WE** hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of........................................................................... (Amount of the Guarantee in Words and Figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the order and without cavil or argument, any sum or sums within the limit of ................................ (Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the ........day of...................20......

Signature and Seal of Guarantors

................................

................................

................................

Date......................20....

Address………….........

......................................

......................................

All correspondence with reference to this guarantee shall be made at the following address: National Institute of Technology Mizoram

**Annexure -III**

***MANUFACTURERS'/ DISTRIBUTOR’S AUTHORIZATION FORM***

No. Dated \_\_\_\_\_\_\_\_\_\_

The Director

National Institute of Technology

Aizawl-796012, Mizoram

Dear Sir:

We**……………………………………………………………………….** who are established and reputable

Manufacturers/distributors of **……………………………………………………………………**having factories/office at----------------------------------------------------------------------------------------------------------

--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------(address of factory/office) do hereby certify that**…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………**(Name of the Authorized Dealer)is our authorized dealer to quote against your tender enquiry no **…………………………………………………………………………………………………………..., Last Date of Submission is:**

Yours faithfully,

(Name)

(Name of Manufacturer/Distributor)

**ANNEXURE-IV**

***CONTRACT FORM***

Contract No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

THIS CONTRACT AGREEMENT is made

The[insert:number] day of [insert:month], [insert:year].

BETWEEN

1. National Institute of Technology, Mizoram, Chaltlang, Aizawl represented by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [insert complete name and address] of Purchaser (hereinafter called “the Purchaser”), and
2. [ insert name of Supplier ], a corporation incorporated under the laws of [ country of Supplier ] and having its principal place of business at [ insert: address of Supplier ] (hereinafter called “the Supplier”)

WHEREAS the Purchaser invited bids for certain Goods and ancillary services, viz.,[insert brief description of Goods and Services] and has accepted a Bid by the Supplierfor the supply of those Goods and Services in the sum of [insert Contract Price in wordsand figures, expressed in the Contract currency] (hereinafter called “the ContractPrice”).

**NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:**

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:
3. This Contract Agreement
4. General Conditions of Contract
5. Technical Requirements (including Schedule of Requirements and Technical Specifications)
6. The Supplier’s Bid and original Price Schedules
7. The Purchaser’s Notification of Award
8. [Add here any other document(s)]
9. This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.
10. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the Goods and Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
11. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Union of India on the day, month and year indicated above.

For and on behalf of the National Institute of Technology, Mizoram

Signed: [insert signature] in the capacity of [insert title or other appropriate designation] in the presence of [insert identification of official witness]

Signed: [insert signature] in the capacity of [insert title or other appropriate designation] in the presence of [insert identification of official witness]

For and on behalf of the Supplier

Signed: [insert signature of authorized representative(s) of the Supplier] in the capacity of [insert title or other appropriate designation] in the presence of [insert identification of official witness]

**ANNEXURE-V**

**LIST OF EQUIPMENTS & SPECIFICATION FOR THERMAL LABORATORY-\_II**

|  |  |  |
| --- | --- | --- |
| Sl No. | Item Description | Qty |
| 01. | **Single Cylinder Optical Access Compression Ignition Research Engine Test Bed (Diesel)**  **Technical Specifications:**   1. Capacity: Above 661cc 2. Compression Ratio: variable 14:1 to 20:1 3. Engine Speed: 800-1500 rpm 4. Number of Cylinders: Two Cylinder(one Cylinder with optical access) 5. Valve train: 4 valves – (VVT Exhaust) independently change inlet and exhaust valve timing, Overhead Cam Shaft. 6. Intake Valves: 20 Sets of non-rotatable modified self-contained intake swirl valves should be provided with the engine. 7. Fuel System: (CRDI open loop System /Electronic Variable Diesel injection Timing Kit with the ability to change the start of injection, injection duration, injection pressure and multiple injection like pilot1, pilot2, main and post injection. Changing of injection parameters should be controlled from the computer) 8. Fuel Type: Diesel 9. Power: 3-5HP 10. Lubrication: Forced 11. Starting: Electric start 12. Sapphire Window: 15mm x 45mm (Three Sides) 13. Transparent Synthetic quartz window on Piston: 25mm Diameter 14. Engine Aspiration: Single Cylinder Optical Access Research Engine should have the ability to run on both natural and turbo charged mode. 15. Dynamometer: The Engine Should be coupled with 5 HP Eddy Current Dynamometer 16. Sensors 17. Engine Combustion Pressure Sensor : Piezeo-electric 0-100 Bar 18. Crank angle : Rotary 360 PPR 19. Air Measurement : DP Sensor 20. Fuel Measurement : Optical constant volume, fully automatic 21. Speed : Encoder 22. Dynamometer Load : Strain Gauge Loadcell 23. Intake Air temperature Sensor 24. Exhaust Air temperature 25. Intake and exhaust camshaft encoder. 26. Flow and Temperature Sensors for Turbo Air charging unit.   17. Data Acquisition System : High Speed DAC with 1 mega samples/sec  18. Controls : Fuel injection System with controls  19. Software: Engine Combustion Analysis and performance Software, Fuel injection and control software. | 01 |
| 02. | **Computerised Variable Compression Ratio Multi-fuel Engine Test Rig with Manifold Gas injection Kit**  **Technical Specifications:**   1. **Engine Capacity** : 552cc 2. **Compression Ratio**:    1. Variable 5:1 to 20:1    2. Changeover of S.I to C.I Mode to be done, without changing the engine head.    3. Direct reading of compression ratio, the compression ratio graduation marking should be spirally engraved on a 170mm Diameter Plate.    4. To change the compression ratio, the engine head along with the bore block should be lifted vertically in 90 degrees without changing the combustion geometry and valve timing. (Tilting of the engine head and bore block should not be done, which may cause change in valve timing) 3. **Engine Speed :** 1500 rpm 4. **Number of Cylinders** : One 5. **Fuel Type** : Diesel: Mechanical injection. 6. **Petrol:** Multi Point fuel injection with programmable map. 7. **Gas:** Manifold Gas injection with programmable map. 8. **Powe**r : 3-5HP 9. **Spark Timing** : The Spark timing of the engine should be variable from 0 to 360° Crank angle and should be easily controlled from computer. 10. **Starting :** Electric start 11. **Dynamomete**r : The Engine Should be coupled with 5 HP Eddy Current Dynamometer Air cooled 12. **Sensors :**     1. Engine Combustion Pressure Sensor : Piezeo-electric 0-100 Bar     2. Crank angle : Rotary 360 PPR     3. Air Measurement : DP Sensor     4. Fuel Measurement : Optical constant volume, fully automatic     5. Speed : Encoder     6. Dynamometer Load : Strain Gauge Loadcell     7. Temperature: “k” Type with inline signal conditioner.     8. Gas Consumption measurement : Loadcell (loss in weight) 13. **Data Acquisition System** : High Speed DAC with 1 mega samples/sec 14. **Controls** : Fuel injection System with controls 15. **Software**: Engine Combustion Analysis and performance Software, Fuel injection and control software. | 01 |
| 03. | **Computerized Two Stroke Single Cylinder Air Cooled Petrol Engine Test Rig with provision for GDI Injection**  **Technical Specifications:**   1. **Engine:** Make : BAJAJ 2. No of Cylinder : Single 3. Cycle : Two Stroke 4. Cooling : Air Cooled 5. Fuel System : Carburetor and 25mm Throttle Body with TPS Sensor suitable for GDI Injection 6. Speed : 2800 rev/m 7. HP : 2.5 HP 8. Starting : Electric Start 9. Engine should be provided with all facility for easy change over to GDI 10. **Dynamometer:** Eddy Dynamometer 3HP 11. Engine Base Frame Size: 12. Length : 1125mm 13. Width :1375mm 14. Height :100mm 15. **Exhaust Gas Calorimeter:** 16. Type : Shell and Single Tube with inbuilt Silencer 17. Material of Construction: Mild Steel 18. No of Temp measuring points in test rig :6 19. Inlet pipe Size : 1 ½” SCH 40 20. Exhaust Pipe Size : 1 ½” SCH 40 21. Exhaust Tapping : Exhaust Gas Recirculation System Stage 1, Emission Analyzer Gun Metal Gate Valve for Both the Tapping’s 22. Temperature Sensor Tapping Size : M12 (4 Nos) 23. Water flow Control Valve : Gate Valve 24. Finish : Powder Coat 25. **Sensors**:     1. Engine Combustion Pressure Sensor : Piezeo-electric 0-100 Bar     2. Crank angle : Rotary 360 PPR     3. Air Measurement : DP Sensor     4. Fuel Measurement : Optical constant volume, fully automatic     5. Speed : Encoder     6. Dynamometer Load : Strain Gauge Loadcell     7. Temperature: “k” Type with inline signal conditioner. 26. **Data Acquisition System :** High Speed DAC with 1 mega samples/sec 27. **Software:** Engine Combustion Analysis and performance Software. | 01 |
| 04. | **Computerized Four Stroke Three Cylinder Water Cooled Petrol Engine Test Rig (MPFI Version)**  **Technical Specifications:**   1. **Engine:**Maruti Suzuki Brand New(The Engine Purchase Bill with Engine Number Should be Provided at the time of inspection) 2. Bore X Stroke : 68.5 x 72.0mm 3. Displacement :796 (cc) 4. No of Cylinders:3 5. Fuel System:MPFI 6. **Dynamometer:** Hydraulic Dynamometer 10HP 7. Engine Base Frame Size: 8. Length : 1125mm 9. Width :1375mm 10. Height :100mm 11. **Exhaust Gas Calorimeter:** 12. Type : Shell and Single Tube with inbuilt Silencer 13. Material of Construction: Mild Steel 14. No of Temp measuring points in test rig :6 15. Inlet pipe Size : 1 ½” SCH 40 16. Exhaust Pipe Size : 1 ½” SCH 40 17. Exhaust Tapping : Exhaust Gas Recirculation System Stage 1, Emission Analyzer Gun Metal Gate Valve for Both the Tapping’s 18. Temperature Sensor Tapping Size : M12 (4 Nos) 19. Water flow Control Valve : Gate Valve 20. Finish : Powder Coat 21. **Sensors :**     1. Engine Combustion Pressure Sensor : Piezeo-electric 0-100 Bar     2. Crank angle : Rotary 360 PPR     3. Air Measurement : DP Sensor     4. Fuel Measurement : Optical constant volume, fully automatic     5. Speed : Encoder     6. Dynamometer Load : Strain Gauge Loadcell     7. Temperature: “k” Type with inline signal conditioner. 22. **Data Acquisition System :** High Speed DAC with 1 mega samples/sec 23. **Software:** Engine Combustion Analysis and performance Software. | 01 |
| 05. | **Computerized Four Stroke Four Cylinder Water Cooled Diesel Engine Test Rig (CRDI Version)**  **Technical Specifications:**   1. **Engine:** Make : Suzuki Swift Brand New(The Engine Purchase Bill with Engine Number Should be Provided at the time of inspection) 2. Fuel System : CRDI 3. Bore X Stroke : 69.9mm X 82mm 4. Displacement : 1248cc 5. No of Cylinder : Four 6. Cooling : Water 7. Fuel : Diesel 8. Speed : 1500-1750RPM 9. HP : 10 HP 10. Starting :Electric Start 11. **Dynamometer**: The Engine Should be coupled with 10 HP Eddy Current Dynamometer Air cooled 12. **Engine Base Frame Size:** 13. Length : 1125mm 14. Width :1375mm 15. Height :100mm 16. **Exhaust Gas Calorimeter:** 17. Type : Shell and Single Tube with inbuilt Silencer 18. Material of Construction: Mild Steel 19. No of Temp measuring points in test rig :6 20. Inlet pipe Size : 1 ½” SCH 40 21. Exhaust Pipe Size : 1 ½” SCH 40 22. Exhaust Tapping : Exhaust Gas Recirculation System Stage 1, Emission Analyzer Gun Metal Gate Valve for Both the Tapping’s 23. Temperature Sensor Tapping Size : M12 (4 Nos) 24. Water flow Control Valve : Gate Valve 25. Finish : Powder Coat 26. Sensors :     1. Engine Combustion Pressure Sensor : Piezeo-electric 0-100 Bar     2. Crank angle : Rotary 360 PPR     3. Air Measurement : DP Sensor     4. Fuel Measurement : Optical constant volume, fully automatic     5. Speed : Encoder     6. Dynamometer Load : Strain Gauge Load cell     7. Temperature: “k” Type with inline signal conditioner. 27. **Data Acquisition System :** High Speed DAC with 1 mega samples/sec 28. **Software:** Engine Combustion Analysis and performance Software. | 01 |
| 06. | **PORTABLE NEAR INFRA RED OCATNE & CETANE ANALYZER**  **Technical Specifications :**   1. **Function :** Quantitative constituent analysis for product research measurement and/or product monitoring 2. **System Capabilities:**  * Precalibrated for ................................................Octane number RON, MON, (R+M)/2 * Optional Calibrations .........................................Diesel cetane index, cetane number * Outputs ..............................................................LCD display, built-in printer * Data Transfer ......................................................Via RS-232 port for interface with PC * Data Analysis .....................................................Includes full calibration software * Results ...............................................................Traceable to CFR Engine or other fuel lab standards * Calibrations ........................................................Stores up to 10 calibration sets * Data Storage ......................................................Stores data for up to 25 samples  1. **Optical Capabilities**  * Measurement Mode...........................................Diffuse transmittance * Spectrum Range ................................................14 filters covering wavelengths from 893 to 1045 nm * Scan Speed .......................................................Up to 10 scans per second * Optical Range ....................................................0 to 6 AU * Resolution ..........................................................0.00001 AU * Stability ..............................................................0.05 Mili-AU * Measurement Time ............................................Variable (Typically under 20 seconds)  1. **Sample Information**  * Sample Size .......................................................200mL with 75 mm path length * Sample Holder ...................................................Reusable glass with chemical seal cover * Sample Preparation ...........................................None required   Sample Destruction ...........................................None | 01 |
| 07. | **Automatic Abel Flash Point Tester According to the standards Confirms to IP 170, ISO 13016, NFT 66009 & DIN 51755.**  FLASH POI BY ABEL CLOSED CUP TESTER **Technical Specifications:**  no IP 170, ISO 13016, NFT 66009 & DIN 51755ibed on annexed leaflet  1. Test Temperature Range: -30°C to 110°C 2. Gas and Electric igniter  3. Double Flash point detection by ionisation ring and thermocouple 4. Data Storage: 200 results 5. Quick access to calibration parameters 6. Auto diagnostic 7. Low gas cartridge to work in all types of environments. 8. Automatic Gas cut-off at the end of the test  9. Cryostat required for samples having a FP below 40°C  10.**Software:** Supervisor software delivered on CD-Rom for real-time data downloading on PC computer running Windows (c) 98 - 2000 - XP / possibility to collect the data for a LIMS  11. **SCOPE OF DELIVERY:**  a. NAB 440 delivered ready to use with  b. SEIKO ticket printer,  c. Cup and cover,  d. Pt 100 probe,  e. Detection cable,  f. Stirrer flexible,  g. Insulated tubing for connexion to cryostat,  h. And RS232C output - Supervisor Software included  i. CRYOSTAT: Cooling Cryostat-( -40/+200°C ±.0.02)  j . Gas cartridge case and 1x 90 ml gas cartridge  k. Abel cup  l. Abel cover with ionisation ring  m. Stirrer flexible  n. Electric ignitor  o. Detection cable  p. Pt 100 probe  q. Tube for propane gas 6 x12 mm (10 m)  r. 90 ml Gas cartridge for optional case  s. Roll of Seyko DPU 414 printer paper | 01 |
| 08. | **Non -Thermodynamics Flow Visualisation Optical Engine**  **Technical Specifications:**   1. Capacity :Above 100cc 2. Compression Ratio : Variable 5:1 to 20:1 3. Engine Speed : 100-300rpm Variable Speed Motor Driven. 4. Number of Cylinders : Single Cylinder 5. Cylinder Linear :Transparent Glass 6. Cylinder Linear Size : Stroke Length of the Engine 7. Valvetrain : 2 valves – (VVT Exhaust) independently change inlet and exhaust valve timing, Overhead Cam Shaft. 8. Intake Valves : 20 Sets of modified self-contained intake swirlvalves should be provided with the engine. 9. Fuel System S.I Mode : Compatible with Existing GDI Injection Kit 10. Fuel System C.I Mode : Compatible with Existing CRDI Injection Kit 11. Fuel Type : Non-Flammable. 12. Piston Type : Optical crown piston with 45° Mirror arrangement. 13. Piston Crown : Quartz 14. Motor : Above 5HP with VFD 15. Data Acquisition System : High Speed DAC with 1 mega samples/sec 16. Controls : Fuel injection System with controls 17. Software: Engine Combustion Pressure Analyser 18. Sensors: 19. Engine Combustion Pressure Sensor : Piezeo-electric 0-100 Bar 20. Crank angle : Rotary 360 PPR 21. Intake Temperature : “K” Type 22. Intake Pressure : Piezeo-resistive 0-2 Bar 23. Speed : Encoder | 01 |