

GOVT. OF NCT OF DELHI
DELHI INSTITUTE OF TOOL ENGINEERING
 Campus II, 50 Main Anandapuri, Vasant
 Vihar, Industrial Area, Phase-I, New Delhi-110020
 Tel: 011-26388920, 2607211
 www.ditc.delhi.govt.nct.ni Email: ditc@delhi.nic.in




NOTICE INVITING TENDER

Bidders are invited under two bid system from invited agencies. Bid documents along with terms and conditions etc. are available on the website <http://govtprocurement.delhi.gov.in> & <http://ditc.dti.govt.nic.in>. Any future corrigendum or addendum would be available on the e procurement website of Govt. of N.C.T of Delhi.

S.N.	E-tender ID / Description	Bid Submission End Date & Time	Bid Opening Date & Time
1	2015 DITE_80082_1 / Supply, Installation and Commissioning of Workshop Equipment(s) (Testing Shop)	27-05-2015 up to 11.00 AM	27-05-2015 at 12.00 PM
2	2015 DITE_81807_1 / Supply, Installation & Commissioning of Equipment(s) for Kinematics & Dynamics of Machines Lab.	03-06-2015 up to 11.00 A.M.	03-06-2015 at 12:00 PM

The above details if necessitated may be changed and notified on the above mentioned website. Bidders are therefore, advised to follow the tender regularly on the website about revised schedule, any corrigendum or addendum. Separate newspaper advertisement for this would not be published. In case the day of bid opening happens to be holiday, the bids will be opened on the next working day at the same time.
 Director's Id
 Director cum Principal



दिल्ली राज्य के औद्योगिक विभाग
दिल्ली औद्योगिक विभाग
 जगत प्रसाद रोड, 50-वीं एन.ए. विला, नई दिल्ली-110020
 तेल: 26388920, 2607211
 www.ditc.delhi.govt.nic.in



सम्बन्धित कॉलर में से खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।
 1. खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।
 2. खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।

क्र.सं.	खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।	खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।	खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।
1	2015 DITE_80082_1 / Supply, Installation and Commissioning of Workshop Equipment(s) (Testing Shop)	27-05-2015 up to 11.00 AM	27-05-2015 at 12.00 PM
2	2015 DITE_81807_1 / Supply, Installation & Commissioning of Equipment(s) for Kinematics & Dynamics of Machines Lab.	03-06-2015 up to 11.00 A.M.	03-06-2015 at 12:00 PM

खरीद करने के लिए आवेदन करने वाले को निम्न सूची में उल्लेखित विवरणों को ध्यान से पढ़ना चाहिए।
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निदेशक के पद पर



TENDER DOCUMENT

e-Tender for “Supply, Installation & Commissioning of Equipment(s)for Kinematics & Dynamics Of Machines Laboratory “ at

DITE campus-II,

e-NIT no.F18(133)/Trg.Br./DITE

Due date & time: 03/06/2015,11 A.M.



Notice inviting Authority

Director cum Principal

DELHI INSTITUTE OF TOOL ENGINEERING

(Govt. of NCT of Delhi)

Campus-I: Wazirpur Ind. Area, Delhi-110052

Campus-II: MaaAnandmayee Marg, Okhla Ind. Area

Phase-II, New Delhi-110020

E-mail: ditepurchase@yahoo.co.in

www.dite.delhigovt.nic.in

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TENDER DOCUMENT

Supply, Installation & Commissioning of Equipments for Kinematics & Dynamics of Machines Laboratory

e-NIT no. F18 (133)/Trg.Br./DITE

Due date & time: 03/06/2015, 11.00 A.M.

SECTION- 1 NOTICE INVITING TENDERS (NIT)

1.1 Invitation for bidding

e-Tenders (online open tenders) under two bid system are invited by Delhi Institute of Tool Engineering (DITE), Okhla Ind. Area, Delhi-110020, from eligible suppliers (manufacturers / authorized dealers) for “**Supply, Installation & Commissioning of Equipment(s) for Kinematics & Dynamics of Machines Laboratory**” to the stores at DITE camps-II on the basis of free delivery at site, as per the schedule of requirements and technical specifications mentioned at **Annexure-6**, within a period of **120 days** from the date of issue of Supply order/Work order/Award of contract whichever is the earliest with the terms and conditions in this tender.

1.2 Schedule of Tenders

Details	Schedule date/ time
Date of release of advertisement of tenders through e-procurement https://govtprocurement.delhi.gov.in	12/05/2015 at 9.00 A.M.
Clarification Dates	12/05/2015 to 02/06/2015
Last Date & Time for submission of Tenders / Due Date & time	03/06/2015 up to 11.00 A.M.
Date & Time of Opening of Tenders (Technical Bids)	03/06/2015 at 12.00 P.M.
Date & Time of Opening of Financial bids	Will be informed later. After completion of phase-1

1.3 The estimated cost of the goods/work/service is Rs. 6,00,000/- only.

1.4 EMD of Rs.18,000/- (Eighteen thousand only) in the form of DD/BC/FDR should be submitted as bid security.

1.5 The validity of bid should be 180 days from the due date of tender.

1.6 The e-procurement web site <https://govtprocurement.delhi.gov.in> is to be used on-line to avail and submit the tender documents & bids.

1.7 The place of clarification, physical submission (as per tender), and opening of bids shall be Delhi Institute of Tool Engineering, Okhla Ind. Area, Delhi-110020.

1.8 Late Tenders are not acceptable.

SECTION- 2

ELIGIBILITY CRITERIA

The bidders should meet the following eligibility criteria to become technically qualified.

- 2.1 Bid Security (EMD):** To be able to secure the bid, bidders should submit EMD amount of **Rs.18,000/- (Rs Eighteen thousand)** only in the form of Account payee Demand Draft/Banker's Cheque/FDR drawn in favour of Delhi Institute of Tool Engineering, Delhi from any nationalized bank or commercial bank. The bid security is normally to remain valid for a period of forty-five days beyond the final bid validity period. In case of Demand Draft/BC the same shall be deposited by the institute in the account of institute within the validity period of the instrument. The original instrument should be submitted in physical form in a sealed envelope not bigger than A-4 size mentioning addressor, addressee, tender ID & due date of tender in the office of Director cum Principal, Delhi Institute of Tool Engineering, Okhla Ind. Area, Phase-II, Delhi-110020 before the last date & time of submission (refer section-1, clause-1.2) of this tender. Scanned copy of EMD is to be submitted online. The bidder having valid NSIC / DGS&D registration for the goods / work/service required in this tender is exempted from submitting EMD. To support this, the scanned copy of such valid registration/exemption certificate is to be submitted online.
- 2.2 Commercial capability**
- 2.2.1 Terms & Conditions:** The bidder should be a manufacturer / authorised dealer for the tendered items & should not be blacklisted by any Govt. deptt. /Autonomous body/PSU etc. to become eligible for tendering. The bidder should submit an undertaking for agreeing Terms & Conditions mentioned in all sections of this tender as per the format given at Annexure-1. The scanned copy of Annexure-1 is to be submitted online.
- 2.2.2 Minimum Financial Turnover:** The bidder should have supplied similar kind of goods/work/service after April, 2011 onwards and having annual average financial turnover of at least Rs.3,00,000/- (Rupees Three lakhs only) during the last three consecutive financial years (2011-12, 2012-13, 2013-14) in the books of accounts. The bidder should submit an undertaking duly filled in the Annexure-1 to this effect. In support, the bidder should submit online the scanned copies of audited accounts showing Annual financial turnover for the last three years (2011-12, 2012-13 and 2013-14). In this tender, the definition of 'similar kind of goods/work/service' is 'supply, installation & commissioning of Laboratories required for Technical Training Institutes / Universities / Colleges /Govt. deptts. / Autonomous Institutions /PSU organizations'.
- 2.2.3 Minimum Work experience:** The bidder in past (starting April, 2011 up to date) should have experience for successful completion of (i) Three similar nature of works each costing not less than the amount equal to 40% of the estimated cost **or** (ii) Two similar nature of works each costing not less than the amount equal to 50% of the estimated cost **or** (iii) One similar nature of works costing not less than the amount equal to 80% of the estimated cost. The bidder should submit an undertaking duly filled in the Annexure-1 to this effect. In support, the bidder should submit online the scanned copies of the 'work order copies with work completion certificates'. In this tender, the definition of 'similar kind of goods/work/service' is 'supply, installation & commissioning of Laboratories required for Technical Training Institutes / Universities / Colleges /Govt. deptts. / Autonomous Institutions /PSU organizations'.
- 2.2.4** The bidder should submit online the scanned copies of latest valid return of I.T.R (Income tax Return) and VAT/Sale tax /service tax return.
- 2.2.5** Bidders should submit signature authorization certificate duly filled in Annexure - 1.

2.3 **Technical capability**

2.3.1 Bidders should submit an undertaking in the format given at Annexure-2. The bidder should be sound in terms of manufacturing facility/ Supplying & Servicing capability, Quality control measure, Inspection facility, installation, commissioning, providing after sale service, warranty facilities, experience & past performance to do the work satisfying the required specifications. The company/product with valid **BIS or ISO certification** shall be mandatory to qualify technically. To fulfil this, s should submit online the scanned copy of the certificate.

2.3.2 Bidders should submit online the scanned copy of the Manufacturer's Authorization Letter, as applicable, as per Annexure-3.

2.3.3 Bidders should submit online the scanned copy of the 'Technical Compliance Statement' as per Annexure-4.

2.3.4 Bidders should submit online the scanned copy of the 'Check list for Technical evaluation' as per Annexure-5.

2.3.5 Bidders should submit in physical form any leaflet/catalogue/Literature/specification sheet/photograph/drawings/sketches etc. in support of their product / service & specifications in the sealed envelope meant for submitting original instrument of EMD (refer section-2, clause-2.1).

2.4 **Original documents:** Bidders should submit following original documents in physical form before the due date & time of this tender.

2.4.1 Original instrument of EMD (As per clause-2.1).

2.4.2 Original copy of leaflet / catalogue /Literature/ specification sheet /photograph/Drawings/Sketches etc. (As per clause-2.3.5)

2.5 **Scanned copies of documents:** Bidder should submit online the scanned copies of following documents duly filled & signed before the due date & time of this tender. The scanned copies should be clearly visible & readable.

1. Scanned copy of EMD or valid EMD Exemption certificate (As per clause-2.1).
2. Scanned copy of latest valid return of ITR (As per clause-2.2.4).
3. Scanned copy of latest valid return for VAT/Sale tax/service tax(As per clause-2.2.4).
4. Scanned copies of audited accounts showing Annual financial turnover for the last three years (2011-12, 2012-13 and 2013-14) (As per clause-2.2.2).
5. Scanned copies of Annexure 1, 2, 3, 4 & 5 duly filled and signed (As per clause-2.2.1, 2.3.1, 2.3.2, 2.3.3, 2.3.4 respectively).
6. Scanned copy of BIS or ISO certification (As per clause- 2.3.1).
7. Scanned copies of the work order copies with work completion certificates (As per clause-2.2.3).

2.6 **Rejection of bid:**Bidders will be liable for rejection of bid at any stage during evaluation due to any of the reasons mentioned below.

2.6.1 **Minimum Financial Turnover:** Bidder fails to meet the criterion of annual average financial turnover of at least Rs.3,00,000/- (Rupees Three lakhs only) during the last three financial years (2011-12, 2012-13, 2013-14) as per clause-2.2.2.

2.6.2 **Minimum work experience:** Bidder fails to meet the criterion of minimum work experience as per clause-2.2.3.

2.6.3 **Certification:** Bidder fails to meet the criterion that the company/product should have valid BIS/ ISO certification as per clause-2.3.1.

2.6.4 **Conditional bids:** The bidder submits a conditional bid document or submits an extra document other than those mentioned in clauses-2.4 & 2.5. Conditional bid shall be summarily rejected without assigning any reason. Bidders should note that 'Price should not be indicated in Technical Bid'. In case any price is mentioned in the technical bid, the Bid will be rejected out-rightly without any further correspondence.

2.6.5 **Incomplete bids:** It is found that there is submission of incomplete, unsigned and uncertified bid document or Non-submission of tender within stipulated time or submission of tender documents in unsealed envelope or Tender envelopes which are not super scribed with details of the tender ID/enquiry or Non-payment of Earnest Money Deposit (if not exempted) or Non-submission of required documents as shown in clause 2.4 & 2.5 or Submission of misleading / contradictory / false statement or information and fabricated / invalid documents.

2.6.6 **Physical hard copy:** Only e-tender shall be accepted & considered. In no case physical hard copy of tender shall be accepted except EMD as per clause 2.1 and any leaflet / catalogue / Literature / specification sheet / photograph / Drawings / Sketches etc. as per clause-2.3.5.

N.B. Competent Authority, DITE, reserves the right to accept or reject any tender without assigning any reason or to cancel the tendering process and reject all tenders at any time prior to award of contract without incurring any liability, whatsoever to the affected or s and can take appropriate action as per Govt. rules.

SECTION-3

INSTRUCTIONS TO S (IT)

- 3.1 Introduction & Eligibility:** Definitions and abbreviations which have been used in these documents shall have the meanings as indicated in the Section-4 (Condition of contract). This Tender Document comprises of contents as mentioned in the 'table of contents' & is as per guidelines of Finance Department, Govt. of NCT of Delhi. This section provides the relevant information, terms & conditions, procedure for tendering, opening of bid, evaluation, award of contract etc. However, bidders should also study and examine all the terms & conditions in rest of this tender document including eligibility criteria, CC, Undertakings & Annexures etc. before submitting the tenders. The tender submitted by bidders, all subsequent correspondence exchanged between the bidders and the Institute and documents related to the tender, shall be written in English language only. The bidders are instructed to ensure that they conform to the eligibility criteria as prescribed in section-2 before submitting the offer/tender.
- 3.2 The validity of bid** should be **180 days** from the due date of tender.
- 3.3 The estimated cost** of the goods/work/service is **Rs.6,00,000/- (Rs Six Lakhs only)**.
- 3.4 Quoting of rate:** Bidders are instructed to refer section-4 (conditions of contract) including price bearing elements before quoting rates/price. Bidders should quote fixed prices/rates and should be at par with the prices quoted by it to any other department of Govt. of India/Govt. of NCT of Delhi/ Institutions.
- 3.5 Tender Sample Inspection:** Bidders must be capable of providing samples of the goods to be procured at DITE; or at its factory; or at the place desired by the Technical Committee, if required, for inspection. The Technical Committee, if required, may visit the factory of the bidder to assess the capabilities and the quality of the goods to be procured during the tender processing as well as during supply.
- 3.6 Clarification before bidding:** Clarification rounds shall be held on dates as mentioned in the section-1, clause-1.2 between 10 AM & 3 PM (except on holidays) for prospective bidders with Technical Committee / Authorized Committee in the office of Purchase, Delhi Institute of Tool Engineering, Okhla Ind. Area, Delhi-20 to seek any clarification in writing & clear any doubt before bidding.
- 3.7 Amendments to the Tender documents:** Director cum Principal, DITE / Authorized Officer of DITE, at any time prior to the deadline for submission of tenders may, for any reason deemed to be fit, modify the tender documents or BOQ by issuing corrigendum or addendum. Such an amendment will be published as Corrigendum at delhi government's e-procurement website: <https://govtprocurement.delhi.gov.in>.
- 3.8 Preparation of Tenders**
- 3.8.1 Availability of Tender Documents:** Tender documents are available on the web site <https://govtprocurement.delhi.gov.in>. Prospective bidders can access the same and they can download the tender documents, free of cost.
- 3.8.2 Technical Bid (TB):** Bidders should submit / upload technical bid containing original & essential requisite documents as per guidelines mentioned in Section-2, of this tender. **It should not contain any price.** Bidders should quote one model per tender. To submit tenders for more than one model, separate tenders with separate EMD's will have to be submitted /uploaded.
- 3.8.3 Financial Bid (FB):** Bidders should quote their prices only in the Financial bid

format and submit the same only in the e-procurement site as per format there in (cover-2- for Financial Bid). All columns shown in the price schedule should be filled up as required and the lowest bidder will be decided on the basis of amount quoted. This tender will be treated as one single **Package**. Bidders must quote for all the items mentioned in the price schedule. Lowest bid will be decided on the basis of Grand Total. Award of Contract will not be split between various parties for individual items. "Award of Contract" will be offered to only one single successful bidder who is overall L1 (in Grand Total).

3.8.4 Earnest money Deposit (EMD): Bidders should submit EMD in INR only as prescribed. No interest shall be payable by the Institute on the EMD. EMD will be returned to the successful bidder after receipt of Performance security. Bid securities of the unsuccessful bidders shall be returned to them at the earliest after expiry of the financial bid validity.

3.8.5 Undertaking for acceptance of terms & conditions: Bidders should submit an Undertaking certifying that they accept all terms & conditions mentioned in this tender document in the format at Annexure-1 as per instruction given in section-2.

3.8.6 Authorization to sign and submit the tenders: The individual signing the tender or any other documents connected therewith should clearly indicate his full name and designation and also specify whether he/she is authorized signatory as per undertaking in Annexure-1.

3.9 Submission of Tenders

3.9.1 Registration: The prospective bidder should be registered with Govt. of Delhi's e-Procurement Portal and should have Digital Signatures & proper training etc., to enable him to submit bids on-line through e-Tendering. For any assistance/training regarding registration & e-tendering, the intending bidders may contact officials as referred in the website mentioned in clause-3.8.1.

3.9.2 Document file: Once the bidder agrees to the terms & conditions of the tender, submission process can be started. The total size of all documents in all the covers put together should be less than 10 MB. The bidders are advised to scan the documents in low resolution (75 to 100 DPI) to reduce the size of the cover to facilitate uploading of all the required pages. If the documents could not be opened due to virus, during tender opening, or if incomplete page/document is opened in incomplete form, then the bid is liable to be rejected. Proper training shall help in proper submission.

3.10 Alteration and Withdrawal of tender: The e-tender system allows bidders to alter/modify/withdraw the tender only within the deadline for submission of tenders. Alterations/modifications to tenders after the prescribed deadline will not be permitted by the system.

3.11 Opening of Bids: Bids will be opened in the office of Director cum Principal, Delhi Institute of Tool Engineering, Okhla Ind. Area, Delhi-110020 by bid opening committee of DITE (DSC holders for e-tenders & purchase committee for tenders other than e-tenders) on date & time as specified under Section-1. The downloadable documents, original documents & submitted documents shall be compiled & attested by the bid openers and presented for evaluation to the competent Purchase Committee/authority.

In case the specified date of tender opening falls on a holiday or declared closed or any unforeseen technical problem in the computer system/server/networking occurs, then tenders will be opened on the appointed time and place on the next working day.

Authorized representatives of the bidders, who have submitted tenders in time, may attend the online tender opening process, on production of letter of authority from the concerned bidders or they can view the process on-line & the result will be informed online. During the tender opening, the tender opening committee will inform bidders

regarding number of uploaded tenders, name of the companies and any other special features, as deemed fit.

3.12 Scrutiny and evaluation of Tenders: The technical bids shall be scrutinized and evaluated by the competent Purchase Committee/authority with reference to the parameters prescribed in the tender document including section-2. No new condition will be brought in while scrutinizing and evaluating the tenders.

The Technical Evaluation summary sheet shall be prepared and approved by the competent purchase committee indicating the technically qualified s & date of financial bid opening. Thereafter, those financial bids (cover-2) that are technically qualified/accepted shall be opened on the day & time as informed in e-procurement platform for further scrutiny and evaluation. Other financial bids will be automatically blocked from opening by the e-procurement system.

3.13 Clarification of Bids: During evaluation and comparison of bids, the purchaser may, at its discretion, ask the bidder for clarification on the scanned documents uploaded by them. The bidder should submit written clarification/documents within the stipulated time. The purchaser may accept such clarification and receive documents related to the clarification sought. No change in prices or substance of the bid shall be sought, offered or permitted. No post-bid clarification at the initiative of the contractor shall be entertained.

3.14 Cartel formation/Pool Rates: Cartel formation or quotation of pool/co-ordinated rates leading to “Appreciable Adverse effect on Competition” (AAEC) as identified in Competition Act, 2002, as amended by Competition(Amendment) Act, 2007, would be considered as a serious misdemeanour and would be dealt accordingly as per the Section-4.

3.15 Negotiations: Normally, there would be no negotiation including price negotiation after financial bid opening. But the Competent Authority, DITE, reserves its right to negotiate with the lowest acceptable contractor (L1) under special circumstances in accordance with CVC guidelines before award of contract/order.

3.16 Award of Contract

3.16.1 Award criteria: An order/contract will be awarded to the lowest evaluated responsive bidder (L-1 bidder) on the terms and conditions laid down in this tender/negotiated as per rule before notification of award of contract/order.

Competent Authority, reserves the option of giving purchase/price preference to the offer from Central / State Government Public sector undertakings in accordance with the policy of Govt. of India.

3.16.2 Notification of award / Acceptance of offer: Before expiry of the validity of tenders, Delhi Institute of Tool Engineering will notify the successful bidder in writing that its tender for supply of goods/work/service has been accepted. The successful bidder should respond satisfactorily as prescribed in the notification within 15 days from the date of issue of the letter of notification of award by the Institute sent by speed post to the address mentioned in its bids. The communication of notification of award sent by Institute to the successful bidder shall be treated to be complete as against the bidder where it is put in the transmission to him/her so as to be out of the power of the Institute. The responsibility entirely lies on the bidder to collect the letter of notification of award released by the Institute & respond to it. Until a formal contract is executed, this tender with written acceptance from purchaser thereof shall constitute a binding contract between the parties.

3.16.3 Conclusion of contract: The successful bidder must furnish the required performance security within **15 days** from the date of issue of notification of award as per Section-4 to conclude the contract.

SECTION-4

CONDITIONS OF CONTRACT (CC)

- 4.1 Definitions, Interpretations and Abbreviations:** Terms and expressions not herein defined shall have the meanings assigned to them in the Indian Contracts Act, 1872 (as amended)/the Indian Sale of Goods Act, 1930 (as amended)/the General Clauses Act, 1897 (as amended)/GFR-2005/ guidelines by Finance Deptt. Govt. of NCT of Delhi as the case may be. Institute/DITE means Delhi Institute of Tool Engineering, Delhi. Supplier/contractor means successful bidder as mentioned in notification of award.
- 4.2 Definition of Contract & other terms:**
(a) "Contract" means the invitation to tender, instructions to s, tender, acceptance of tender, particulars & the conditions specified in the acceptance of tender. No variation in the terms & conditions of a "concluded contract" can be made without the free consent of parties involved. (b) "Acceptance of Tender" means the letter of notification of award by purchaser communicating to the contractor the acceptance of his tender.
- 4.3 Authority:** Director cum Principal & Competent Authority is referred to those of DITE. The Purchaser, Indenter, Consignee, End user, Inspection authority & Paying authority shall be the respective Officers / Committees duly authorized by the Competent Authority of DITE.
- 4.4 Performance Security (in Indian Rupees only):** Within **15 days** from the date of issue of notification of award of contract, the successful bidder shall furnish performance security for an amount equal to 10% of the value of order, valid up to 60 days after the date of completion of all contractual obligations by the contractor. The performance security shall be returned on satisfactory completion of contract without any interest.
The performance security shall be denominated in Indian rupees and shall be furnished in the form of Account payee Demand draft/ Banker's cheque/ Fixed Deposit Receipts from any nationalized bank/Schedule bank / commercial bank in an acceptable form.
- 4.5 Price bearing elements**
- 4.5.1 Scope of supply of goods/work/service:** The goods/work / service along with quantity to be supplied by the contractor under this contract shall conform to the technical specifications and quality control parameters mentioned in Section-5 "Schedule of Requirement & specification" of this tender document.
- 4.5.2 The quoted rates** shall be in Indian Rupees only on the basis of free delivery at sites of DITE in Delhi, which are inclusive of appropriate packing, marking, forwarding, transit insurance, transportation, loading, unloading, installation & commissioning charges, training, after sale service, Repair/ replacement of defective parts during warranty period etc. Amount of any local taxes / VAT etc. should be indicated separately in the tender. All applicable Govt. deductions like ESI, TDS etc. shall be applied at prevailing rates, if applied.
- 4.5.3 Imported goods:** If the goods are to be imported, the contractor will import the same by paying all incidental charges & duties (customs duty etc.) and supply the goods to the indenter. However, applicable local taxes will be paid by the indenter, if quoted.
- 4.5.4 Firm Prices:** Prices quoted by the contractor shall remain firm and fixed during the currency of the contract.
- 4.5.5 Fall Clause:** If at any time during the execution of the contract, the price of the ordered goods/Work/service, are reduced, in respect of supplies to any Govt.

organization (including the purchaser of any department of the Govt. of N.C.T. of Delhi) at a price lower than the price quoted under this contract, the contractor shall immediately inform and forthwith pass such reduction to the purchaser. The price of such item, payable under this tender for the goods/Work/service supplied after the date of coming into force of such reduction, shall stand correspondingly reduced.

4.5.6 Tolerance clause: Director cum Principal of DITE reserves the right to increase or decrease the items / procurement / quantity within plus/minus 15% of tendered items without any change in terms & conditions & quoted price at any time before conclusion of contract without assigning any reason.

4.5.7 Other factors like term of & period of delivery, warranty / guarantee clause & free incidental services etc. that also have bearing on prices are prescribed in the following clauses.

4.6 Delivery of goods /work/service

4.6.1 Terms of delivery: The quoted rates shall be in Indian Rupees only on the basis of free delivery at sites of DITE in Delhi.

4.6.2 Advance Sample: The contractor shall initially deliver a sample item and get it approved by DITE preferably within **30 days** from the date of issue of supply order/work order/award of contract before delivering the balance lot.

4.6.3 Delivery, period & schedules: The delivery of complete goods/work/service in all respects as per order/contract should be made to the concerned store of this Institute on basis of free delivery at site within **120 days** from the date of issue of supply order/work order/award of contract whichever is the earliest. The contractor shall not arrange part-shipments and trans-shipments without permission of DITE. The Insurance cover including insuring the goods against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery/commissioning shall be obtained by the contractor in his own name and not in the name of the Consignee. The Consignee will as soon as possible but not later than 30 days from the date of arrival of goods at destination notify the contractor of any loss or damage to the goods that may have occurred during transit. The date of delivery of goods/work/service stipulated in the order/contract shall be deemed to be the essence of the contract and delivery must be completed before the date of delivery as specified in the supply order/ work order/award of contract.

4.6.4 Actual date of delivery: The date of satisfactory completion of work duly accompanied by certified good receipt note & certificate of completion will only be considered as the actual date of supply/date of delivery of goods/work/service. Part supplies except the samples are not acceptable. The delivery will not be deemed to be completed until and unless goods/work/service are inspected & accepted by the Consignee /end user /Inspecting Authority of DITE with Product information brochure and or Users/operating manual (two copies) supplied with goods/work/service, wherever applicable. The Competent Authority, DITE reserves the right to reject supplied goods/work/service which do not conform to the tendered specifications or received after date of delivery to safeguard Government interests and in the interest of Institute.

4.7 Assignment / Sub-contracts: The contractor shall not assign either in part or whole its contractual duties/responsibilities and obligations to perform the contract to any third person and in all cases, the responsibility of fulfilling the contractual obligations will remain with the contractor only.

4.8 Incidental services: The supplier will provide required jigs & tools, operation manuals, installation, Commissioning, training & after sales service & Warranty/guarantee etc.

4.9 Warranty/guarantee: The contractor shall certify that the goods/work/services

supplied to the Purchaser under this Contract are of best quality and workmanship and new in all respect and are strictly in accordance with the specifications and particulars mentioned under Section-5 "Schedule of Requirement & specification".

Comprehensive Warranty/guarantee is for **Two (2) years** from the date of successful commissioning of the complete work & shall cover each and every part of the item including consumables, parts having limited life and non-consumable parts etc. The Institute is not liable to pay any charges on any account during the warranty period.

The contractor shall pay to the Purchaser such compensations that may arise by reasons of the warranty therein contained but not attended by the contractor.

4.10 Payment terms: 100%Payment shall be made after receipt of complete goods/work/service, subject to due inspection, installation, successful commissioning and take over by the consignee/end user. The contractor has the entire responsibility of collecting/receiving satisfactory completion report from the end user and submitting it along with bills in triplicate at the paying authority. The payments shall be made in the currency authorized in the contract. No advance payment shall be made.

4.11 Amendment / modification of contract: If necessary, the purchaser may notify the contractor regarding modification / amendment of terms & conditions of the contract, by a written order not amounting to either increase or decrease in the accepted prices.

4.12 Default/Delay/penalties

4.12.1 Default after opening of tenders: EMD of bidder will be forfeited in case the withdraws/ modifies / alters / amends its tender or impairs or derogates from the tender in any respect after the due date of tender & within the period of validity of tenders.

4.12.2 Default after notification of award of contract: EMD of successful will be forfeited in case(i) The successful does not furnish Performance security within prescribed time as per tender terms& notification of award of contractor (ii)the successful responds to the notification of award without performance security but with a fresh condition/terms other than the ones in the tender/negotiated as per rule before such notification or (iii) Submission of misleading / contradictory / false statement or information and fabricated / invalid documents is detected after notification of award of contract/order.

(In case of registered contractor with DGS&D / NSIC having exemption from EMD,the Institute may impose a penalty including cancellation of registration and/or blacklisting the contractor as per rule, depending upon urgency of requirement as per final decision by the Competent authority, DITE)

4.12.3 Default after furnishing of Performance security: In the event of any loss to the purchaser, due to contractor's failure to fulfil the contractual obligations etc., the performance security will compensate the loss i.e. the Director cum Principal, DITE will deduct the amount from performance security and release the balance amount as stipulated.

Submission of misleading/false document: The Performance Security of the contractor will be forfeited with termination of contract if submission of misleading / contradictory / false statement or information and fabricated / invalid documents is detected after award of contract/order.

For Non-supply of goods/work/service: The Performance Security of the contractor will be forfeited with termination of contract, If neither supply has been made nor prior extension of date for supply has been obtained. The Institute may procure the goods/work/service on Risk purchase basis at the cost of contractor. The Institute may also impose a penalty and/or blacklist the Contractor, depending upon urgency of requirement as well as the loss of revenue due to non-availability of such store. The time period for making risk purchase shall be 3 months.

For delayed supply of goods/work/service: The delayed supply of goods/work/service, for which prior approval for extension of date for supply has not been obtained,

will be accepted only with penalty. The Competent Authority reserves the right to levy liquidated damages equivalent to 0.5 % of the price of the delayed goods/work/service per week which will be charged / deducted according to the delay in supply of the goods/work/service beyond expiry of the supply period subject to a maximum of 10% of the total value of the order.

Due date extension request: In case, the supply of goods/work/service cannot be delivered within the due date of delivery, the contractor shall have to obtain a prior permission for extension from the Director cum Principal. However, the extension of date of delivery is admissible only with penalty as per rule. In special circumstances, extension may be granted by the Director cum Principal without penalty.

4.12.4 Termination for Insolvency: If the contractor becomes bankrupt or otherwise insolvent, the Institute, reserves the right to terminate the contract at any time, by serving written notice to the contractor without any compensation, whatsoever, to the contractor, subject to further condition that such termination will not prejudice or affect the rights and remedies which have been accrued and / or will accrue thereafter to the Institute.

4.12.5 Force Majeure: In the event of any unforeseen circumstances directly interfering with the supply of goods/work/service arising during the currency of the contract, such as war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes, lockouts, or acts of God, the Contractor shall, within a week from the commencement thereof, notify the same in writing to the Purchaser with reasonable evidence thereof. Either party shall have the option to terminate the contract on expiry of 90 days of commencement of such force majeure by giving 14 days' notice to the other party in writing. In case of such termination, no damages shall be claimed by either party against the other, except those which had occurred under any other clause of this contract prior to such termination.

4.13 Code of ethics: The Institute, as well as the Bidder / Contractors / Manufacturers / Authorised Supplier under the contract shall observe the highest standard of ethics including laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988", during the procurement or execution of such contracts. If bidders /contractors are found in Bid pooling or against law against fraud and corruption then their firms may be black listed.

4.14 Resolution of disputes/arbitration/jurisdiction: In case of any difference/dispute between the Institute and the contractor arising relating to the contract, the parties shall make every effort to resolve the same amicably by mutual consultations. If the Parties fail to resolve within 21 days of its occurrence, then either party may seek to refer the dispute for sole arbitration by any person to be nominated by the Director cum Principal, Delhi Institute of Tool Engineering, Delhi. The award of the arbitrator so appointed shall be final and binding on both the parties. However during the arbitration proceedings the parties shall not delay or postpone the performance of their respective obligations pursuant to the contract. The courts of place from where the notification of award is issued shall alone have the jurisdiction to decide any dispute.

SECTION-5

SCHEDULE OF REQUIREMENT & SPECIFICATION LIST OF REQUIREMENTS:

- 5.1** **Scope of supply of goods/work/service:** The list of Requirement along with technical Specification of the goods/work/service is given in the Annexure-6.
- NOTE:** **Equipment(s) supplied should be able to perform respective experiment(s) completely as mentioned in Annexure-6.**
- 5.2** **Technical compliance:** The bidder should submit a technical compliance statement clearly indicating the deviations (if any) in the prescribed format given under Annexure-4.
- 5.3** **Quality parameters:** With reference to the specifications as per Annexure-6, the Quality, dimensions, adequate fittings, fasteners, weather proofing, edge blunting, aesthetic look, surface finish, injury proof, surface treatment including painting, appropriate packing, proper identification marking of goods including samples are the broad parameters of quality to manufacture, check, test & comply with in line with national/international standards. The Inspection authority/Technical committee of the Institute shall be the final authority to issue the certificate of compliance of the technical requirement.

Section - 6

IMPORTANT NOTE FOR Bidder

The Bidders may substitute alternative standards, Brand names in its Bid, provided that it demonstrates equal or better to the specifications of Bidding Document specifications. DO NOT MENTION BEST QUALITY/GOOD QUALITY/SUPERIOR QUALITY ETC. BUT GIVE MAKE & BRAND OF ITEM QUOTED. Apparatus / items mentioned in annexure – 6 must be supplied with required laboratory manuals and technical documents (as hard copies with proper binding) so as to perform respective experiments easily, soft copy / scanned copy of all such manual must be provided in PDF (preferably) file format or any other format deemed fit for the purpose by the supplier in Compact discs.

The Bidder must be registered with the Value Added Tax/Sales Tax Department of Delhi. The Bidder carrying out all his business activities from outside Delhi is required to be registered with the Taxation Deptt. / Authority of their respective State Government. However, such bidder must ensure that the material shall be supplied by its authorized distributor / dealer of Delhi only and against a sale invoice issued from Delhi. The delivery of goods also should be made from Delhi. The bidder dealer or its authorized distributor, as the case may be, who supplied the material should be registered with the Delhi VAT Department and carry a valid TIN issued by it. The bidder shall, however, be responsible for compliance with all conditions, warranties / guarantees, irrespective of the fact Page 3 of 18 that the materials are supplied by them directly or through their authorized distributor / dealer. Further, the quoted bid price in the tender shall be inclusive of all taxes and duties.

Technical Specification of items quoted w.r.t. Tender Document specification as per Annexure-I. Deviation, if any, should be mentioned in front of the item in the annexure-I.

NOTE: Equipment(s) supplied should be able to perform respective experiment(s) completely as per experiment(s) mentioned for each apparatus in Annexure-6.

Annexure-1

Undertaking (Commercial capability)

(To be submitted in Technical bid)

Tender Enquiry No.....

Due date.....

Sir,

I/we undertake, certify & declare the following-

We have carefully read and understood all terms and conditions/instructions elaborated in all the sections including IT, CC & annexure of this Tender document and we shall abide by them. Also our organization is not blacklisted by any Govt. Department/ Autonomous body/PSU etc.

We are the _____(manufacturers / authorized suppliers) (tick appropriate option) of the goods/work/service required as per this tender document & our Annual average financial turnover during the last three financial years (2010-11, 2011-12, 2012-13) in the books of accounts is Rs._____.

As per clause-2.2.3 following are the details of three similar natures of works with cost not less than the amount equal to 40% of the estimated cost of this tender items, which we have executed successfully _____.

S. No.	Name of Customer/ Address/ phone	Cost, Rs.	Brief description of work done
1			
2			
3			

Our valid
 TIN No. is _____ valid up-to _____
 PAN No. is _____ valid up-to _____
 Service Tax No. is _____ valid up-to _____
 Latest ITR return is filed in the name of _____
 Latest VAT/Sales tax return/
 Service tax return is filed in the name of _____
 Proprietor name(Mr/Ms) _____
 We authorize Mr/Ms _____ designated
 as _____ to sign this offer/tender.

 (Signature with date, name and designation)
 For and on behalf of M/s _____
 (Name, Address & Telephone No & seal of bidder)

Annexure-2

Undertaking (Technical capability) (To Be Submitted in Technical Bid)

Tender Enquiry No _____

Due date _____

Sir,

I/we undertake, certify & declare the following.

If our tender is accepted, we undertake to supply the goods/work/service with required specification and perform the services in accordance to the terms & conditions in this tender document including the delivery schedule.

Our company/product has _____

Certification (BIS/ISO)(Tick the appropriate option).

The details of our local service facility nearest to Delhi/New Delhi/NCR is

_____ (Contact person, Complete address, telephone no's, e-mail I.D. etc.)

The tentative schedule of training (if any) is. _____

The details of Mode of despatch are. _____

The details of instructions for special preparation for installation (if any) are. _____

Details of Infrastructures are as follows:-

S.No.	Parameter	For "Manufacturer"	For "Non-Manufacturers"
1	No. of personnel employed		
2	Manufacturing facilities		
3	Quality control systems		
4	After-sales-service facilities		
5	Any other information		

(Signature with date, name and designation)

For and on behalf of M/s _____

(Name, Address & Telephone No & seal of the)

Annexure-3

Manufacturer's Authorization Letter

(To be submitted in Technical Bid on the Manufacturer's Letter Head)

Tender Enquiry No. _____

Due date _____

Yours faithfully

(Signature with date, name and designation)

For and on behalf of M/s _____ .

(Name, Address & Telephone No & seal of bidder)

Annexure-4

Technical Compliance Statement

(To Be Submitted in Technical Bid on Letter Head)

Tender Enquiry No. _____

Due date _____

Note: should indicate “Yes”, meets or “No” doesn’t meet under appropriate columns in the Technical Compliance Statement.

S.No	Tender Technical Specification	Specifications of the Work Item offered by the	Whether the Offered Work item meets Tender Specifications or not	Deviation(s) from Tender Specifications, if any (in unambiguous Terms)

(Signature with date, name and designation)

For and on behalf of M/s _____

(Name, Address & Telephone No & seal of bidder)

Annexure-5

Checklist for Technical Bid Evaluation (To Be Submitted in Technical Bid)

Tender Enquiry No _____ **Due date** _____
(Note: Please ensure that the following requirements are complied with)

S.N	Information to be provided	To be filled by the Bidder	For office use	
		Fill particulars	Reason for not filling	
1	Original instrument of EMD No. _____ Dated _____ of Amount Rs _____ is submitted in physical form	Yes / No		
2	Leaflets/Catalogues/literature/photographs /Drawings/Sketches for products as per clause- 2.3.5 in physical form are submitted	Yes / No		
3	Scanned copy of EMD/exemption certificate is submitted	Yes / No		
4	Scanned copy of BIS/ISO certification is submitted	Yes / No		
5	Scanned copy of latest Income Tax Return (ITR) is submitted	Yes / No		
6	Scanned copy of latest VAT/Sale tax/service tax Return is submitted	Yes / No		
7	Scanned copies of audited accounts Showing Annual financial turnover for the last three years (2011-12,2012-13,2013-14) is submitted	Yes / No		
8	Scanned copies of 'Work Orders with work completion certificates' as per clause-2.2.3 are submitted	Yes / No		
9	Scanned copies of Annexure 1,2, 3, 4 & 5 duly filled and signed are submitted	Yes / No		
10	Average Annual turnover for last 3 years ending March 2014 is Rs.-----& submitted	Yes / No		
11	Minimum Work experience criteria as per clause- 2.2.3 is met	Yes / No		

Note: Original copies of all requisite documents must be produced for verification of the information provided whenever called for.

(Signature with date, name and designation)
For and on behalf of M/s _____
(Name, Address & Telephone No & seal of bidder)

Annexure-6

Schedule of requirement & Technical Specifications

Note: This Annexure need not be submitted (only for reference)

Name of work: “Supply, Installation & Commissioning of Equipment(s) for Kinematics & Dynamics of Machines Laboratory” at DITE,campus-II.

Equipment Required

Item No 1 APPARATUS: MOTORISED GYROSCOPE APPARATUS

Description: The set up consists of disc mounted on a shaft, rotated by a variable speed motor. Rotor disc can be move about three axis.

Its own axis i.e. axis of spin

Axis of precession

Axis of gyroscopic couple.

Specifications:

Rotor dia.: 250-300mm free about 3 axis of rotation driven by variable speed motor.

Motor: Variable speed of standard make, Motor: FHP AC/DC motor, Speed is controlled by D.C. drive/ electronically

Weights: 2 kg, 1 kg, 500 gm(s).

Technical manual should accompany the unit.

Electricity Supply: 230 V AC, Single Phase,

Tachometer for speed measurement-Tachometer range: 0-9999 RPM (Contact type)

EXPERIMENTS TO BE PERFORMED:

To study the gyroscopic effect of a rotating disc.

To analyse the motion of a motorized gyroscope when the couple is applied along its spin axis.

Item No 2 APPARATUS: Static and Dynamic Balancing of rotating masses apparatus

This equipment should be designed for carrying out the experiment for balancing a rotation mass system.

A set of four blocks/discs with a clamping arrangement are to be provided. For static balancing, each block/ disc should be individually clamped on shaft. For dynamic balancing, a moment polygon is to drawn using relative weights and angular and axial position of blocks is to be determined. The block/discs are to be clamped on shaft is rotated by a motor to check dynamic balance of the system. The system is provided with angular scale and is suspended with chains for dynamic balancing.

Specifications:

Drive motor: FHP Motor, variable speed, Motor: AC-DC motor, Speed is controlled by D.C. drive/ electronically.

Balancing weight(s): 4-8 no(s): (Weights should be provided in range of 100 gm(s) to 400) gm(s)

Technical manual should accompany the unit.

No. of Discs/ Blocks: 4 or equivalent

Services required:

Electricity Supply: 220 V AC, Single Phase, with earth

Bench area/Floor Area-m 0.5-1.0 m x 0.5-1.0 m

Digital Tachometer Tachometer range: 0-9999 RPM (Contact type)

EXPERIMENT TO BE PERFORMED

Static and dynamic balancing of rotating masses

Item No 3 APPARATUS: CAM ANALYSIS APPRATUS

The setup is to have a camshaft driven by a variable speed motor. The free end of the camshaft should have a facility to mount the cam easily.

The follower is to be properly guided in bushes and the type of follower can be changed according to the cam under test. There should be a dial gauge that permits the plotting the follower displacement with respect to cam position. A spring is to be used to provide controlling force to the follower system. An arrangement is to be provided to regulate the speed. The apparatus is to test the cam performance for jump phenomenon during operation and the effect of change of inertia forces on jump action of cam-follower during operation. Three or more sets of cams and followers to be supplied with the apparatus.

Specifications:

Cams: Tangent, Eccentric, Circular Arc, hardened one each

Followers: Roller, Knife edge/ flat faced, Mushroom, hardened

Compression Spring: helical spring

Motor: Variable speed PMDC Motor (FHP), Speed is controlled by D.C. drive, electronically

A dial gauge to note the follower displacement of Baker & Mercer/ standard makes.

Digital stroboscope: To view the jump phenomena

Specifications of Stroboscope

Display – 4” LED, 4 Digits

Stroboscopic flash rate: 100 to 10000 Flashes per Minute (FPM)

Accuracy: 0.05% + 1digit

Resolution: 0.1 FPM/RPM, 1FPM/RPM, 10FPM/RPM

Sampling time: 1second

Range select: high/ low select

Low range: 100 to 1200 rpm approx.

High range: 1000 to 10000rpm approx.

Circuit: one chip of microcomputer LSI Circuit & crystal control time base

Service required

230 V, A.C. stabilized supply along with earthing connection.

EXPERIMENT TO BE PERFORMED:

CAM Analysis - angle Vs displacement and jump phenomenon

Item No 4 APPARATUS NAME: VIBRATION LAB APPARATUS

A universal frame is to be provided upon which quick and easy assembly of various experiments can be done. The unit should be self-contained to safely store spares.

Features:

[I] Pendulum Experiments:

- Simple Pendulum.
- Compound Pendulum.
- Bi-filar Suspension.

[II] Longitudinal Vibration experiment

- Spring Mass System.
- Equivalent Spring Mass study of un-damped system
- Free vibration

[III] Torsional Vibration Experiment.

- Single Rotor System.
- Two Rotor Systems.
- Single Rotor with viscous damping.

[IV] Damped Vibration Experiment.

- Verification of Dukerleys Rule.
- Forced rotor with viscous damping along with frictional HP Motor Strip chart recorder & control unit.

A technical manual accompanies the equipment.

Practical(s) to be performed:

- To determine the natural frequency of un-damped torsional vibration of two rotor shaft system
- To determine the frequency of un-damped free vibration of an equivalent spring mass system
- To determine the frequency of damped force vibration of a spring mass system

Specifications:

Power Supply: 230V AC, with earth

Motor: Variable speed FHP PMDC Motor

Stop Watch: Electronic Stop Watch.

Ordinary Chart recorder: For recording Frequency and Amplitude of Vibration, Motor of chart recorder: Synchronise Reversible Motor having Torque 3-5 kg.

MOC of simple pendulum: Hard plastic/ equivalent

MOC of Compound pendulum: M.S., Length: 800 mm& 600 mm/ equivalent

MOC of Bi-Filar suspension: M.S., Length: 400-600 mm approx.

Motor Speed is controlled by D.C. drive/ electronically

Item No 5 Apparatus Name: Epicyclic Gear Train Holding Torque Apparatus

Description:

It may be a motorized unit consisting of a SUN gear mounted on input shaft. Planet gears meshes with the annular gear. These planet gears should be mounted on a common arm to which output shaft is to be fitted.

Specifications:

Internal Type Epicyclic Gear Train –

- 1 Sun gear with 13 teeth
- 3 planetary gears with 18 teeth
- 1 annular gear with 50 teeth

A Compact gear train

Motor: Variable speed motor, 1 HP (or equivalent).

Speed Control Unit: Variable Speed Drive for varying the speed of motor, Speed is controlled by D.C. drive/ electronically

RPM Measurement: Digital RPM Indicator

Services required:

Electricity Supply: 220 V AC, Single Phase.

Floor Area: 1.5 x 2 m or equivalent

EXPERIMENT TO BE PERFORMED:

Determination of gear- train value of Epicyclic gear trains.

Item No 6 APPARATUS NAME: WHIRLING OF SHAFT APPARATUS

Description:

The set up should be designed to study the whirling of shafts. The set-up should consist of a sturdy frame, bearing holders, variable speed motor etc. to drive the shaft along with speed control unit. Different bearing can be fitted in bearing block to have different end conditions i.e. (i) both end fixed, (ii) one end free and one end fixed etc.

Specifications:

Technical specifications:

Floor area of 2m x 0.5 m approx. or equivalent

Electricity Supply 230 V AC, Single Phase.

Digital Tachometer

Test Shafts

Length: 1000 mm each approx. or equivalent

Diameter: 3.2, 4.8 & 6.4 mm (approx.)

Quantity: Two or more each.

Kinematic coupling bearing for fixed or free ends without restraint.

Drive motor, 5000 rpm, FHP/ 1hp.

Supplied with a speed control unit, Speed to be controlled by D.C. drive / equivalent.

Instruction Manual: An instruction manual should be provided along with the Apparatus

EXPERIMENT TO BE Performed:

To determine whirling speed of shaft theoretically and experimentally

Item No 7 APPARATUS: UNIVERSAL GOVERNOR APPARATUS

Description:

It should consist of a main spindle, mounted vertically on the base plate. This spindle should be driven by a variable speed Motor mounted vertically on the same base plate. One governor assembly out of four can be mounted on spindle. The spindle speed should be controlled by speed control unit. A graduated scale should be fitted to the sleeve to measure the displacement.

(Actual & Theoretical) for all governors

Electricity Supply: 230 V AC, Single Phase,

Floor Space: 1.5 x 1.5 m or equivalent
Digital Tachometer

Governor Mechanism: Two or more different types of governor mechanism with spring and weight(s)

1. Watt Governor
2. Proell Governor

Motor: Variable speed, Standard Make, FHP Motor, PMDC Motor /equivalent

Control Panel: For speed control of motor, Speed controlled by D.C. drive/equivalent

Instruction Manual: An instruction manual will be provided along with the Apparatus.

EXPERIMENT TO BE Performed:

To perform experiment on watt and Porel Governor to prepare performance characteristic Curves, and to find stability and sensitivity