

**INDIAN INSTITUTE OF TECHNOLOGY DELHI**  
**HAUZ KHAS, NEW DELHI-110016**

**Dated:10/04/2015**

**Open Tender Notice No. IITD/CES(SP-175)/2015**

Indian Institute of Technology Delhi is in the process of purchasing following item(s) as per details as given as under.

<b>Details of the item</b>	<b>Gas management system for Hydrogen Fuelled Multi-cylinder Spark Ignition Engine</b>
<b>Earnest Money Deposit to be submitted</b>	<b>Rs. 60,000/- (Sixty Thousand rupees only)</b>

Tender Documents may be downloaded from Central Public Procurement Portal <http://eprocure.gov.in/eprocure/app>. Aspiring Bidders who have not enrolled / registered in e-procurement should enroll / register before participating through the website <http://eprocure.gov.in/eprocure/app>. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at 'Instructions for online Bid Submission'.

Tenderers can access tender documents on the website (For searching in the NIC site, kindly go to Tender Search option and type 'IIT'. Thereafter, Click on "GO" button to view all IIT Delhi tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website <http://eprocure.gov.in/eprocure/app> as per the schedule given in the next page.

No manual bids will be accepted. All quotation (both Technical and Financial should be submitted in the E-procurement portal).

### Schedule

Name of Organization	Indian Institute of Technology Delhi
Tender Type (Open/Limited/EOI/Auction/Single)	Open
Tender Category (Services/Goods/works)	Goods
Type/Form of Contract (Work/Supply/ Auction/Service/Buy/Empanelment/ Sell)	Supply
Product Category (Civil Works/Electrical Works/Fleet Management/ Computer Systems)	Computer Systems
Is Multi Currency Allowed	YES
Date of Issue/Publishing	10/04/15 (16:00 Hrs)
Document Download/Sale Start Date	10/04/15 (16:00 Hrs)
Document Download/Sale End Date	01/05/15 (17:00 Hrs)
Date for Pre-Bid Conference	---
Venue of Pre-Bid Conference	---
Last Date and Time for Uploading of Bids	01/05/15 (17:00 Hrs)
Date and Time of Opening of Technical Bids	04/05/15 (11:00 Hrs)
Tender Fee	NIL
EMD	Rs.60,000/- in the name of Registrar IIT Delhi payable at New Delhi. Offline EMD should be submitted to the office of the purchaser as per address for communication.
No. of Covers (1/2/3/4)	02
Bid Validity days (180/120/90/60/30)	120 days
Address for Communication	Prof. K. A. Subramanian, Room No.414, Block V, Centre for Energy Studies, Indian Institute of Technology Delhi, Hauz Khas, New Delhi-110016
Contact No.	01126591247
Fax No.	---
Email Address	subra@ces.iitd.ac.in

**Chairman Purchase Committee  
(Buyer Member)**

## **Instructions for Online Bid Submission:**

As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal ([URL:http://eprocure.gov.in/eprocure/app](http://eprocure.gov.in/eprocure/app)). The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information useful for submitting online bids on the CPP Portal may be obtained at:

<http://eprocure.gov.in/eprocure/app>

## **REGISTRATION**

- 1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal ([URL:http://eprocure.gov.in/eprocure/app](http://eprocure.gov.in/eprocure/app)) by clicking on the link “Click here to Enroll”. Enrolment on the CPP Portal is free of charge.
- 2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
- 5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.
- 6) Bidder then logs in to the site through the secured log-in by entering their userID / password and the password of the DSC / eToken.

## **SEARCHING FOR TENDER DOCUMENTS**

- 1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective ‘My Tenders’ folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

## **PREPARATION OF BIDS**

- 1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- 2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the

bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

- 3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black and white option.
- 4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use “My Space” area available to them to upload such documents. These documents may be directly submitted from the “My Space” area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

### **SUBMISSION OF BIDS**

- 1) Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- 2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
- 3) Bidder has to select the payment option as “offline” to pay the tender fee / EMD as applicable and enter details of the instrument.
- 4) A standard BoQ format has been provided with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

OR

In some cases Financial Bids can be submitted in PDF format as well (in lieu of BOQ).

- 5) The server time (which is displayed on the bidders’ dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- 6) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.
- 7) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 8) Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
- 9) Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

## **ASSISTANCE TO BIDDERS**

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
- 2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is 1800 233 7315.

## **General Instructions to the Bidders**

- 1) The tenders will be received online through portal <http://eprocure.gov.in/eprocure/app> . In the Technical Bids, the bidders are required to upload all the documents in .pdf format.
- 2) Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through <https://eprocure.gov.in/eprocure/app> . Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the web site <https://eprocure.gov.in/eprocure/app> under the link “Information about DSC”.
- 3) Tenderer are advised to follow the instructions provided in the ‘Instructions to the Tenderer for the e-submission of the bids online through the Central Public Procurement Portal for e Procurement at <https://eprocure.gov.in/eprocure/app>.

**NOTICE INVITING QUOTATIONS**

Dated :10/04/2015

**Subject: Purchase of Gas management system for Hydrogen Fuelled Multi-cylinder Spark Ignition Engine**

**Invitation for Tender Offers**

Indian Institute of Technology Delhi invites online Bids (Technical bid and Commercial bid) from eligible and experienced OEM (Original Equipment Manufacturer) OR OEM Authorized Dealer for **supply, installation & integration of a Gas management system for Hydrogen Fuelled Multi-cylinder Spark Ignition Engine** with three years on site comprehensive warranty from the date of receipt of the material as per terms & conditions specified in the tender document, which is available on CPP Portal <http://eprocure.gov.in/eprocure/app>

**TECHNICAL DETAILS OF THE ITEMS:**

A carburetor based CNG fueled multi-cylinder spark ignition engine needs to be converted into timed port injection based hydrogen fuelled spark ignition engine. The engine has four cylinders and each cylinder has one intake and exhaust valve. The specification of the engine is as follows:

<b>Engine details</b>		
<b>S. No.</b>	<b>Specifications of the item</b>	<b>Description/Values</b>
<b>1</b>	Type of Engine	Spark Ignition Engine
<b>2</b>	Engine Power	28 kW
<b>3</b>	Speed (Two modes)	Variable speed mode : 0 to 5500 rpm Constant speed mode : 1500 rpm
<b>4</b>	No of Cylinders	Four
<b>5</b>	Cooling System	Liquid Cooled
<b>6</b>	Type of Ignition System	Distributor ignition type
<b>7</b>	CNG induction system	Carburetor mode

The item comprises of the following major components:

**Component 1: Hydrogen Gas Injection System**

Each hydrogen gas injector has to be fixed nearby intake valve (port injection) and the total requirement of hydrogen gas injectors is four (4). The type of gas injection is a port injection. Each gas injector operates with different injection timings. The hydrogen gas will be injected using the gas injector during suction stroke of the engine.

The hydrogen gas will be stored in a cylinder at high pressure (100-200 bar). The gauge pressure of hydrogen gas is to be reduced in the range of 1 bar to 4 bar (maximum) using a suitable pressure reducer valve. The hydrogen gas (maximum of 4 bar) will be injected using the gas injector. The start and duration of the hydrogen gas injection will be controlled by an Electronic control Unit (ECU). The hydrogen gas quantity is to be varied with respect to the parameters measuring by load sensor/MAP sensor/throttle position sensor/Lambda Sensor.

The temperatures for lubricating oil, intake air, intake hydrogen gas, exhaust gas, coolant, EGR, need to be measured using suitable thermocouples. Pressure of hydrogen gas needs to be measured. These all measurement shall be recorded using the same system or data logger for post-processing analysis purpose.

**Component 2: Control of Spark Ignition**

The spark is given for initiating the ignition of hydrogen-air mixture during compression stroke (almost end of the stroke). The spark timing of the engine needs to be changed (retarded/advance) using the ECU. The spark timing will vary with respect to load. The entire process will be mapped and the ECU could be able to perform the desired operation as per mapped.

**Component 3: Water Injection System**

This system comprises of water injector, water pump, water rail, valves and piping. The gauge pressure of the water is in the range of 1 bar to 4 bar. The pressurized water will be injected using electronic water injector during suction stroke. A water injector is fixed in nearby intake valve (opposite to gas injector) in each cylinder and total requirement of water injector is four (4). The start and duration of the water injector is to be controlled by the ECU. The quantity of water is to be varied with respect to load/throttle position.

**Component 4: Exhaust Gas Recirculation System**

A small quantity of exhaust gas tapped from exhaust gas is to be recirculated to the in-cylinder through intake manifold. A suitable EGR system needs to be given.

**Component 5: Safety System**

Hydrogen is an explosive gas and highly reactive when it contacts with the hot body (engine cylinder). A suitable leak detector has to be integrated with the engine at appropriate place. The detector should be able to detect the hydrogen while leaking and subsequently hydrogen injection should be shut-off based on the safety signal input. In addition to this, alarm signal is preferable.

**Component 6: Application Software with Laptop**

Dedicated software needs to be written for controlling of the above parameters. The real time data of all parameters should be displayed and recorded.

**Component 7: Diagnostic Tool**

This shall be supplied for diagnosing the fault, calibration, etc.

**Reliability and Robustness of the system**

The supplied system should function satisfactorily at the engine environment of high vibration, noise and temperature.

**Main Role of the item's supplier**

The vendor shall provide the developed dedicated system as per the technical specifications mentioned in this NIQ. The vendor shall provide technical support till successful firing of the engine with their system.

**TECHNICAL SPECIFICATIONS:**

S. No.	Technical Specifications	
<b>Component 1: Hydrogen Gas Injection System</b>		
<b>I.</b>	<b>Electronic control unit (ECU)</b>	
1	ECU type	Closed loop
2	Processor	Minimum of 16 bit
3	A/D Accuracy	Minimum of 12 bit (preferably 24 bit)
4	Data frequency	Minimum of 100 kHz
5	Pulse width control	720 <sup>0</sup> CA _ based pulses/cycle for each cylinder

		Engine speed: 0- 5500 rpm
6	Total No. of Channel	Minimum of 24
7	<i>Outputs</i>	<ul style="list-style-type: none"> <li>• <i>Hydrogen gas injectors (4 No.)</i></li> <li>• <i>Water injectors (4 No.)</i></li> <li>• Hydrogen fuel Cut-Off</li> <li>• EGR control valve</li> <li>• Ignition control</li> <li>• Throttle control valve</li> <li>• Data logger</li> </ul>
8	Pulse width range	2 ms (milliseconds) to 30 ms
9	Operating temperature range	Maximum of 80 <sup>0</sup> C
10	Communication	RS232/Ethernet/USB/K-line with Laptop
11	Hydrogen Gas Rail	1 NO. (preferably Width 500 mm, Diameter 20 mm)
12	Hydrogen gas injection type	Timed port injection
<b>II. Hydrogen gas injectors</b>		
1	Number of injectors	04
2	Injector type	Closed loop, Solenoid peak & hold current
3	Voltage	preferably 5-14V
4	Current -peak Current-hold Current-maximum	preferably 4 -6A preferably 1-3 A preferably 5-10 A
5	Accuracy	≤ 3%
6	Ambient Temperature Range	0 to 100 °C
7	Hydrogen Gas Flow rate Range @ 255 kPa	0 to 200 LPM
8	Starting point of Linearity of gas injector	≤ 3 ms
<b>III. Input sensors</b>		
1	Cam Sensor	<ul style="list-style-type: none"> <li>• Digital pulses/Hall effect</li> <li>• Resolution : ≤1 degree crank angle</li> <li>• Accuracy : ≤ 2%</li> </ul>
2	Crank Sensor	<ul style="list-style-type: none"> <li>• Digital pulses/Hall effect</li> <li>• Resolution : ≤1 degree crank angle</li> <li>• Accuracy : ≤ 2%</li> </ul>
3	Load Sensor (Current)	<ul style="list-style-type: none"> <li>• For current measurement from alternator (3-phase alternator)</li> <li>• Alternator Voltage :440 V</li> <li>• Alternator Current : 0 to 140 amps</li> <li>• Type : Digital ammeter/watt meter</li> </ul>
4	Gas Rail pressure sensor	To measure hydrogen gas common rail pressure
5	Manifold Absolute Pressure Sensor	To measure absolute pressure in intake manifold Measurement Range :0.2 to 2.5 bar Operating current : ≤ 10 mA (preferably) Supply voltage : Preferably 5-6 V
6	Lambda Sensor	To measure oxygen concentration/lambda value in exhaust gas
7	Lube oil temperature sensor	For temperature range of 0°C to 120°C Type : P/K/RTD Resolution :1 °C



		Accuracy : $\leq 2\%$
8	Air temperature sensor	For temperature range of 0 <sup>0</sup> C to 60 <sup>0</sup> C Type : P/K/RTD Resolution : 1 °C Accuracy : $\leq 2\%$
9	Exhaust gas temperature sensor	For temperature range of 0 <sup>0</sup> C to 1000 <sup>0</sup> C Type : P/K/RTD Resolution : 1 °C Accuracy : $\leq 1\%$
10	Engine coolant temperature	For temperature range of 0 <sup>0</sup> C to 120 <sup>0</sup> C Type : P/K/RTD Resolution : 1 °C Accuracy : $\leq 2\%$
11	Hydrogen gas pressure sensor	For measuring hydrogen gas fuel line pressure Type: Dial gauge/Digital type
12	Hydrogen gas temperature sensor	For temperature range of 0 <sup>0</sup> C to 100 <sup>0</sup> C Type : P/K/RTD Resolution : 1 °C Accuracy : $\leq 1\%$
<b>Component 2: Control of Spark Ignition</b>		
1	Existing ignition type on engine New ignition system required	Distributor type ignition Electronic type
2	Ignition voltage	10000 -40000 volts
<b>Component 3: Common Rail Water Injection System</b>		
1	Water injection type	Common rail injection
2	Water type used	De-mineralized (DM) water (Water pump, water injectors, and water supply lines should be compatible with DM water)
3	Water Pressure indicator	Digital indicator
4	Water pump flow rate	0to 1 LPM
5	Water pump pressure (gauge)	1 to 4 bar
6	Water pump Control	Manual and electronic control for various flow rates and pressures
7	Number of water injectors	04 injectors on common rail
8	Type of water injector	Solenoid, peak and hold type
9	Water flow rate per injector	0 to 0.2 LPM
<b>Component 4: Exhaust Gas Recirculation System</b>		
1	EGR Valve Type	Vacuum assisted/Stepper motor based control
2	Input temperature	Maximum of 400 °C
3	Input pressure	Maximum of 3 bar
<b>Component 5: Safety System</b>		
1	PRV (Pressure reducer valve) type	Relay type/Electronic control
2	Hydrogen leak detectors	2NOs.
3	Hydrogen fuel cut off valve	Solenoid/Relay cut off valve
4	Alarming system on failure/malfunctioning of any component of the item. Warning Indicator on computer screen.	
5	The system should function satisfactorily at the engine environment of high vibration, noise and temperature.	
<b>Component 6: Application Software with Laptop</b>		

1	A dedicated software needs to be supplied for controlling of the above parameters. The real time data of all parameters should be displaced and recorded.	
2	<ul style="list-style-type: none"> <li>i. Windows Based application</li> <li>ii. Incorporates Engine Configuration, Engine Diagnostics, Engine Mapping</li> <li>iii. Complete mapping for Start of Injection (SOI) and Injection duration (DOI) and look-up tables.</li> <li>iv. Fail Safe mechanism including warning indicator screen.</li> <li>v. Engine Mapping application</li> <li>vi. Data Logging in MS Excel/other reliable format</li> </ul>	
3	Laptop for monitoring and storing the real time data Configuration : Minimum 8 GB RAM, i7 Processor, 1TB Hard disk,2GB Graphics card	
<b>Component 7: Diagnostic Tool</b>		
1	Vendor should supply diagnostic tool (hardware/software) for diagnosing the system including fault and calibration. Qty: 1 No.	
<b>Other important details</b> <b>(Note: The vendor should provide authentic information/documents for the following aspects, otherwise the vendor may disqualify technically)</b>		
1	Total number of items (complete system including all sensors, injectors, control valves)	02 Sets
2	Spares	One set of following spares should be provided; <ul style="list-style-type: none"> <li>i. Wiring harness</li> <li>ii. Hydrogen gas injectors(4 NO.s)</li> <li>iii. Water injectors (4 NO.s)</li> <li>iv. K-line converter/communication cables</li> <li>v. All sensors</li> <li>vi. Other necessary components</li> </ul>
3	Warranty	3 years
4	All hardware components of the item should be supplied by a single vendor.	
5	The vendor shall provide technical support till successful firing of the engine with their system.	
6	Each and every component of the item (gas management system) must be mutually compatible with the system.	
7	Vendor should be certified by any Govt. agency/National/International agency for supplying of the item.	
8	The hydrogen system developed should be in compliance to the standards mentioned in the documents ISO(Safety of hydrogen systems), ANSI/CSA America (Fuel System Components for Hydrogen Gas Powered Vehicles), NFPA(Vehicle Fuel System Code), etc.	
9	At least two purchase orders/invoices for proof of the past selling of the similar item to OEMs (original Engine Manufacturer) / R&D organizations shall be provided.	
10	Detailed technical specification including calibration chart should be provided	
11	Vendor should provide compliance certificate for the applicable items mentioned in quotation.	

A complete set of tender documents\* may be Download by prospective bidder free of cost from the website <http://eprocure.gov.in/eprocure/app>. Bidder has to make payment of requisite fees (i.e. Tender fees (if any) and EMD) by demand draft in favour of Registrar, IIT Delhi payable at New Delhi.

## Terms & Conditions Details

Sl.No.	Specification
1.	<b>Due date:</b> The tender has to be submitted before the due date. The offers received after the due date and time will not be considered.
2.	<p><b>Preparation of Bids:</b> The offer/bid should be submitted in two bid systems (i.e.) Technical bid and financial bid. The technical bid should consist of all technical details along with commercial terms and conditions. Financial bid should indicate item wise price for the items mentioned in the technical bid in the given PDF format.</p> <p>The vendor should specify all the following items clearly in the Financial Bids;</p> <ul style="list-style-type: none"> <li>➤ System hardware cost</li> <li>➤ Developmental cost</li> <li>➤ All applicable taxes</li> <li>➤ Freight and Insurance</li> <li>➤ Installation and Commissioning cost</li> <li>➤ Cost for 2NOs. items</li> </ul> <p>The Technical bid and the financial bid should be submitted Online.</p>
3.	<b>EMD:</b> The tenderer should submit an EMD amount by way of Demand Draft drawn in favour of “ <b>Registrar, Indian Institute of Technology, Delhi</b> ” and payable at <b>New Delhi</b> from any nationalized bank valid for six months. The Technical Bid without EMD would be considered as UNRESPONSIVE and will not be accepted. The EMD will be returned without any interest to the unsuccessful bidders immediately after the award of contract. Till further notice EMD should be submitted offline of IIT Delhi. Refer to Schedule (at page 2) for its actual place of submission.
4.	<b>Refund of EMD:</b> The EMD will be returned to unsuccessful Tenderer only after the Tenders are finalized. In case of successful Tenderer, it will be retained till the successful and complete installation of the equipment.
5.	<b>Opening of the tender:</b> The online bid will be opened by a committee duly constituted for this purpose. Online bids (complete in all respect) received along with Demand Draft of EMD (Physically) will be opened as mentioned at “Annexure: Schedule” in presence of bidders representative if available, Only one representative will be allowed to participate in the tender opening. Bid received without EMD will be rejected straight way. The technical bid will be opened online first and it will be examined by a technical committee which will decide the suitability as per our specification and requirement. The financial offer/bid will be opened only for the offer/bid which technically meets all our requirements as per the specification, and will be opened in the presence of the vendor’s representatives subsequently for further evaluation. The bidders if interested may participate on the tender opening Date and Time. The bidder should produce authorization letter from their company to participate in the tender opening.
6.	<p><b>Pre-qualification criteria:</b></p> <p>(i) Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed.</p> <p>(ii) An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well.</p> <p>(iii) OEM should be internationally reputed Branded Company.</p> <p>(iv) Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid.</p>
7.	<b>Risk Purchase Clause:</b> In event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from the other source on the total risk of the supplier under risk purchase clause.

8.	<p><b>Packing Instructions:</b> Each package will be marked on three sides with proper paint/indelible ink, the following:</p> <ol style="list-style-type: none"> <li>i. Item Nomenclature</li> <li>ii. Order/Contract No.</li> <li>iii. Country of Origin of Goods</li> <li>iv. Supplier's Name and Address</li> <li>v. Consignee details</li> <li>vi. Packing list reference number</li> </ol>
9.	<p><b>Delivery and Documents:</b></p> <p>Delivery of the goods should be made within a maximum of 08 to 16 weeks from the date of placement of purchase order and the opening of LC. Within 24 hours of shipment, the supplier shall notify the purchaser and the insurance company by cable/telex/fax/e mail the full details of the shipment including contract number, railway receipt number/ AAP etc. and date, description of goods, quantity, name of the consignee, invoice etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company:</p> <ol style="list-style-type: none"> <li>1. 4 Copies of the Supplier invoice showing contract number, goods' description, quantity</li> <li>2. unit price, total amount;</li> <li>3. Insurance Certificate if applicable;</li> <li>4. Manufacturer's/Supplier's warranty certificate;</li> <li>5. Inspection Certificate issued by the nominated inspection agency, if any</li> <li>6. Supplier's factory inspection report; and</li> <li>7. Certificate of Origin (if possible by the beneficiary);</li> <li>8. Two copies of the packing list identifying the contents of each package.</li> <li>9. The above documents should be received by the Purchaser before arrival of the Goods (except where the Goods have been delivered directly to the Consignee with all documents) and, if not received, the Supplier will be responsible for any consequent expenses.</li> </ol>
10.	<p><b>Delayed delivery:</b> If the delivery is not made within the due date for any reason, the Committee will have the right to impose penalty 1% per week and the maximum deduction is 10% of the contract value / price.</p>
11.	<p><b>Prices:</b> The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of taxes &amp; duties shall be clearly indicated. The price should be quoted without custom duty and excise duty, since IIT Delhi is exempted from payment of Excise Duty and is eligible for concessional rate of custom duty. Necessary certificate will be issued on demand.</p> <p><b>In case of import supply the price should be quoted on FOB Basis only.</b> Under special circumstances (eg. perishable chemicals), when the item is imported on CIF/CIP, please indicate CIF/CIP charges separately upto IIT Delhi indicating the mode of shipment. IIT Delhi will make necessary arrangements for the clearance of imported goods at the Airport/Seaport. Hence the price should not include the above charges.</p>
12.	<p><b>Notices:</b> For the purpose of all notices, the following shall be the address of the Purchaser and Supplier.</p> <p><b>Purchaser:</b> Prof. K. A. Subramanian, Centre for Energy Studies, Indian Institute of Technology Hauz Khas, New Delhi - 110016.</p> <p><b>Supplier:</b> (To be filled in by the supplier) <b>(All supplier's should submit its supplies information as per Annexure-II).</b></p>

	<p><b>Progress of Supply:</b> Wherever applicable, supplier shall regularly intimate progress of supply, in writing, to the Purchaser as under:</p> <ol style="list-style-type: none"> <li>1. Quantity offered for inspection and date;</li> <li>2. Quantity accepted/rejected by inspecting agency and date;</li> <li>3. Quantity dispatched/delivered to consignees and date;</li> <li>4. Quantity where incidental services have been satisfactorily completed with date;</li> <li>5. Quantity where rectification/repair/replacement effected/completed on receipt of any communication from consignee/Purchaser with date;</li> <li>6. Date of completion of entire Contract including incidental services, if any; and</li> <li>7. Date of receipt of entire payments under the Contract (In case of stage-wise inspection, details required may also be specified).</li> </ol>
13.	<p><b>Inspection and Tests:</b> Inspection and tests prior to shipment of Goods and at final acceptance are as follows:</p> <ul style="list-style-type: none"> <li>• After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications attached to the purchase order. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser shall be present at the supplier's premises during such inspection and testing if need is felt. The location where the inspection is required to be conducted should be clearly indicated. The supplier shall inform the purchaser about the site preparation, if any, needed for installation of the goods at the purchaser's site at the time of submission of order acceptance.</li> <li>• The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation and ascertaining conformity with the ordered specifications and quality. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified.</li> <li>• In the event of the ordered item failing to pass the acceptance test, a period not exceeding one weeks will be given to rectify the defects and clear the acceptance test, failing which the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser.</li> <li>• Successful conduct and conclusion of the acceptance test for the installed goods and equipment shall also be the responsibility and at the cost of the Supplier.</li> </ul>
14.	<p><b>Resolution of Disputes:</b> The dispute resolution mechanism to be applied pursuant shall be as follows:</p> <ul style="list-style-type: none"> <li>• 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 &amp; 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 <b>Director, Indian Institute of Technology (IIT) Delhi</b> 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.</li> <li>• 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.</li> </ul>

	<ul style="list-style-type: none"> <li>•The venue of the arbitration shall be the place from where the order is issued.</li> </ul> <p><b>Applicable Law:</b> The place of jurisdiction would be New Delhi (Delhi) INDIA.</p>
15.	<p><b>Right to Use Defective Goods</b> 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.</p> <p><b>Supplier Integrity</b> The Supplier is responsible for and obliged to conduct all contracted activities in accordance with the Contract using state of the art methods and economic principles and exercising all means available to achieve the performance specified in the contract.</p>
16.	<p><b>Training</b> The Supplier is required to provide training on training to the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.</p>
17.	<p><b>Insurance:</b> For delivery of goods at the purchaser's premises, the insurance shall be obtained by the Supplier in an amount equal to 110% of the value of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War Risks and Strikes. The insurance shall be valid for a period of not less than 3 months after installation and commissioning. <b>In case of orders placed on FOB/FCA basis, the purchaser shall arrange Insurance. If orders placed on CIF/CIP basis, the insurance should be up to IIT Delhi.</b></p> <p><b>Incidental services:</b> The incidental services also include:</p> <ul style="list-style-type: none"> <li>• Furnishing of 01 set of detailed operations &amp; maintenance manual.</li> </ul> <p>Arranging the shifting/moving of the item to their location of final installation within IITD premises at the cost of Supplier through their Indian representatives.</p>
18.	<p><b>Warranty:</b> 1. Warranty period shall be 36 months from date of installation of Goods at the IITD site of installation. The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the contract. If for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall at its discretion make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests. <b>The warranty should be comprehensive on site.</b> <b>Note:</b> <u>If a different period of warranty has been specified in the 'Technical Specifications' then the period mentioned above shall stand modified to that extent.</u></p> <p>2. The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately within in 02 days arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the replaced parts/goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts/goods thereafter. The period for correction of defects in the warranty period is 02 days. If the supplier having been notified fails to remedy the defects within 02 days, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses and without prejudice to any other rights, which the purchaser may have against the supplier under the contract.</p> <p><b>Downtime:</b> During the warranty period not more than 5% downtime will be permissible. For every day exceeding permissible downtime, penalty of 1/365 of the 5% FOB value will be imposed. Downtime will be counted from the date and time of the filing of complaint with in the business hours.</p>

19.	<p><b>Governing Language</b> The contract shall be written in English language. English language version of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the same language.</p> <p><b>Applicable Law</b> 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</p> <p><b>Notices</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• A notice shall be effective when delivered or on the notice's effective date, whichever is later.</li> </ul>
20.	<p><b>Taxes and Duties</b> Suppliers shall be entirely responsible for all taxes, duties, license fees, octroi, road permits, etc., incurred until delivery of the contracted Goods to the Purchaser. However, VAT in respect of the transaction between the Purchaser and the Supplier shall be payable extra, if so stipulated in the order.</p>
21.	<p><b>Payment:</b> Payment will be made through irrevocable Letter of Credit (LC). Letter of Credit (LC) will be established in the favour of foreign Supplier after the submission of performance security. The letter of credit (LC) will be established on the exchange rates as applicable on the date of establishment.</p> <ul style="list-style-type: none"> <li>• For Indigenous supplies, 100% payment shall be made by the Purchaser after delivery, inspection, successful installation, commissioning and acceptance of the equipment at IITD in good condition and to the entire satisfaction of the Purchaser and on production of unconditional performance bank guarantee as specified in Clause 9 of tender terms and conditions.</li> <li>• For Imports, LC will be opened for 100% FOB/CIF value. 80% of the LC amount shall be released on presentation of complete and clear shipping documents and 20% of the LC amount shall be released after the installation and demonstration of the equipment at the INST site of installation in faultless working condition for period of 60 days from the date of the satisfactory installation and subject to the production of unconditional performance bank guarantee as specified in Clause 9 of tender terms and conditions.</li> <li>• Indian Agency commission (IAC), if any shall be paid after satisfactory installation &amp; commissioning of the goods at the destination at the exchange rate prevailing on the date of negotiation of LC documents, subject to DGS&amp;D registration for restricted items.</li> <li>• All the bank charges within India will be borne by the Institute and outside India will be borne by the Supplier.</li> </ul>
22.	<p><b>Rejection of bids:</b> The Committee reserves the right to reject any or all offers without assigning any reason.</p> <p><b>Termination for Default</b> 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:</p> <ol style="list-style-type: none"> <li>i. If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the order, or within any extension thereof granted by the Purchaser; or</li> <li>ii If the Supplier fails to perform any other obligation(s) under the Contract.</li> <li>iii If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.</li> </ol> <ul style="list-style-type: none"> <li>• For the purpose of this Clause:</li> </ul>

	<p>i. <b>“Corrupt practice”</b> means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution.</p> <p>ii. <b>“Fraudulent practice”</b> means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;”</p> <p>In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or Services. However, the Supplier shall continue the performance of the Contract to the extent not terminated.</p>
23.	<p><b>Discount/Rebates:</b> Special discount/rebate wherever admissible keeping in view that the items are being supplied to an Educational Institution of National importance may be indicated.</p>
24.	<p><b>Installation &amp; Demonstration</b> The supplier is required to done the installation and demonstration of the equipment within one month of the arrival of materials at two sites (for two Engines) (i) IITD site in first phase and (ii) industry in second phase, otherwise the penalty clause will be the same as per the supply of materials.</p>
25.	<p><b>Compliance certificate:</b> This certificate must be provided indicating conformity to the technical specifications.</p> <p><b>Acknowledgement:</b> It is hereby acknowledged that we have gone through all the conditions mentioned above and we agree to abide by them.</p>



## COMPLIANCE SHEET

## TECHNICAL SPECIFICATION

S. No.	Technical Specifications		Compliance (Y/N)
<b>Component 1: Hydrogen Gas Injection System</b>			
<b>I.</b>	<b>Electronic control unit (ECU)</b>		
1	ECU type	Closed loop	
2	Processor	Minimum of 16 bit	
3	A/D Accuracy	Minimum of 12 bit (preferably 24 bit)	
4	Data frequency	Minimum of 100 kHz	
5	Pulse width control	720 <sup>0</sup> CA _ based pulses/cycle for each cylinder Engine speed: 0- 5500 rpm	
6	Total No. of Channel	Minimum of 24	
7	<i>Outputs</i>	<ul style="list-style-type: none"> <li>• Hydrogen gas injectors (4 No.)</li> <li>• Water injectors (4 No.)</li> <li>• Hydrogen fuel Cut-Off</li> <li>• EGR control valve</li> <li>• Ignition control</li> <li>• Throttle control valve</li> <li>• Data logger</li> </ul>	
8	Pulse width range	2 ms (milliseconds) to 30 ms	
9	Operating temperature range	Maximum of 80 <sup>0</sup> C	
10	Communication	RS232/Ethernet/USB/K-line with Laptop	
11	Hydrogen Gas Rail	1 NO. (preferably Width 500 mm, Diameter 20 mm)	
12	Hydrogen gas injection type	Timed port injection	
<b>II.</b>	<b>Hydrogen gas injectors</b>		
1	Number of injectors	04	
2	Injector type	Closed loop, Solenoid peak & hold current	
3	Voltage	preferably 5-14V	
4	Current -peak Current-hold Current-maximum	preferably 4 -6A preferably 1-3 A preferably 5-10 A	
5	Accuracy	≤ 3%	
6	Ambient Temperature Range	0 to 100 °C	
7	Hydrogen Gas Flow rate Range @ 255 kPa	0 to 200 LPM	
8	Starting point of Linearity of gas injector	≤ 3 ms	
<b>III.</b>	<b>Input sensors</b>		
1	Cam Sensor	<ul style="list-style-type: none"> <li>• Digital pulses/Hall effect</li> <li>• Resolution : ≤1 degree crank angle</li> <li>• Accuracy : ≤ 2%</li> </ul>	
2	Crank Sensor	<ul style="list-style-type: none"> <li>• Digital pulses/Hall effect</li> <li>• Resolution : ≤1 degree crank angle</li> <li>• Accuracy : ≤ 2%</li> </ul>	

3	Load Sensor (Current)	<ul style="list-style-type: none"> <li>For current measurement from alternator (3-phase alternator)</li> <li>Alternator Voltage :440 V</li> <li>Alternator Current : 0 to 140 amps</li> <li>Type : Digital ammeter/watt meter</li> </ul>	
4	Gas Rail pressure sensor	To measure hydrogen gas common rail pressure	
5	Manifold Absolute Pressure Sensor	To measure absolute pressure in intake manifold Measurement Range :0.2 to 2.5 bar Operating current : $\leq 10$ mA (preferably) Supply voltage : Preferably 5-6 V	
6	Lambda Sensor	To measure oxygen concentration/lambda value in exhaust gas	
7	Lube oil temperature sensor	For temperature range of 0°C to 120°C Type : P/K/RTD Resolution :1 °C Accuracy : $\leq 2\%$	
8	Air temperature sensor	For temperature range of 0°C to 60°C Type : P/K/RTD Resolution :1 °C Accuracy : $\leq 2\%$	
9	Exhaust gas temperature sensor	For temperature range of 0°C to 1000°C Type : P/K/RTD Resolution :1 °C Accuracy : $\leq 1\%$	
10	Engine coolant temperature	For temperature range of 0°C to 120°C Type : P/K/RTD Resolution :1 °C Accuracy : $\leq 2\%$	
11	Hydrogen gas pressure sensor	For measuring hydrogen gas fuel line pressure Type: Dial gauge/Digital type	
12	Hydrogen gas temperature sensor	For temperature range of 0°C to 100°C Type : P/K/RTD Resolution :1 °C Accuracy : $\leq 1\%$	

### **Component 2: Control of Spark Ignition**

1	Existing ignition type on engine New ignition system required	Distributor type ignition Electronic type	
2	Ignition voltage	10000 -40000 volts	

### **Component 3: Common Rail Water Injection System**

1	Water injection type	Common rail injection	
2	Water type used	De-mineralized (DM) water (Water pump, water injectors, and water supply lines should be compatible with DM water)	
3	Water Pressure indicator	Digital indicator	
4	Water pump flow rate	0to 1 LPM	
5	Water pump pressure (gauge)	1 to 4 bar	
6	Water pump Control	Manual and electronic control for various flow rates and pressures	

7	Number of water injectors	04 injectors on common rail	
8	Type of water injector	Solenoid, peak and hold type	
9	Water flow rate per injector	0 to 0.2 LPM	
<b>Component 4: Exhaust Gas Recirculation System</b>			
1	EGR Valve Type	Vacuum assisted/Stepper motor based control	
2	Input temperature	Maximum of 400 °C	
3	Input pressure	Maximum of 3 bar	
<b>Component 5: Safety System</b>			
1	PRV (Pressure reducer valve) type	Relay type/Electronic control	
2	Hydrogen leak detectors	2NOs.	
3	Hydrogen fuel cut off valve	Solenoid/Relay cut off valve	
4	Alarming system on failure/malfunctioning of any component of the item. Warning Indicator on computer screen.		
5	The system should function satisfactorily at the engine environment of high vibration, noise and temperature.		
<b>Component 6: Application Software with Laptop</b>			
1	A dedicated software needs to be supplied for controlling of the above parameters. The real time data of all parameters should be displayed and recorded.		
2	vii. Windows Based application viii. Incorporates Engine Configuration, Engine Diagnostics, Engine Mapping ix. Complete mapping for Start of Injection (SOI) and Injection duration (DOI) and look-up tables. x. Fail Safe mechanism including warning indicator screen. xi. Engine Mapping application xii. Data Logging in MS Excel/other reliable format		
3	Laptop for monitoring and storing the real time data Configuration : Minimum 8 GB RAM, i7 Processor, 1TB Hard disk, 2GB Graphics card		
<b>Component 7: Diagnostic Tool</b>			
1	Vendor should supply diagnostic tool (hardware/software) for diagnosing the system including fault and calibration. Qty: 1 No.		
<b>Other important details</b> <b>(Note: The vendor should provide authentic information/documents for the following aspects, otherwise the vendor may disqualify technically)</b>			
1	Total number of items (complete system including all sensors, injectors, control valves)	02 Sets	
2	Spares	One set of following spares should be provided; vii. Wiring harness viii. Hydrogen gas injectors(4 NO.s) ix. Water injectors (4 NO.s) x. K-line converter/communication cables xi. All sensors xii. Other necessary components	
3	Warranty	3 years	
4	All hardware components of the item should be supplied by a single vendor.		
5	The vendor shall provide technical support till successful firing of the engine with their system.		
6	Each and every component of the item (gas management system) must be mutually compatible with the system.		

7	Vendor should be certified by any Govt. agency/National/International agency for supplying of the item.	
8	The hydrogen system developed should be in compliance to the standards mentioned in the documents ISO(Safety of hydrogen systems), ANSI/CSA America (Fuel System Components for Hydrogen Gas Powered Vehicles), NFPA(Vehicle Fuel System Code), etc.	
9	At least two purchase orders/invoices for proof of the past selling of the similar item to OEMs (original Engine Manufacturer) / R&D organizations shall be provided.	
10	Detailed technical specification including calibration chart should be provided	
11	Vendor should provide compliance certificate for the applicable items mentioned in quotation.	

I have also enclosed all relevant documents in support of my claims, (as above) in the following pages.

**Signature of Bidder**

**Name :** \_\_\_\_\_

**Designation :** \_\_\_\_\_

**Organization Name :** \_\_\_\_\_

**Contact No. :** \_\_\_\_\_

**<< Organization Letter Head >>  
DECLARATION SHEET**

We, \_\_\_\_\_ hereby certify that all the information and data furnished by our organization with regard to this tender specification are true and complete to the best of our knowledge. I have gone through the specification, conditions and stipulations in details and agree to comply with the requirements and intent of specification.

This is certified that our organization has been authorized (Copy attached) by the OEM to participate in Tender. We, further certified that our organization meets all the conditions of eligibility criteria laid down in this tender document.

The prices quoted in the financial bids are subsidized due to academic discount given to IIT Delhi.

We, further specifically certify that our organization has not been Black Listed/De Listed or put to any Holiday by any Institutional Agency/ Govt. Department/ Public Sector Undertaking in the last three years.	NAME & ADDRESS OF THE Vendor/ Manufacturer / Agent
1 Phone	
2 Fax	
3 E-mail	
4 Contact Person Name	
5 Mobile Number	
6 TIN Number	
7 PAN Number	

**(Signature of the Tenderer)**

**Name :**

**Seal of the Company**

**List of Govt. Organization/Deptt.**

**List of Government Organizations for whom the Bidder has undertaken such work during last three years (must be supported with work orders)**

Name of the organization	Name of Contact Person	Contact No.

**Signature of Bidder**

**Name :** \_\_\_\_\_

**Designation :** \_\_\_\_\_

**Organization Name :** \_\_\_\_\_

**Contact No. :** \_\_\_\_\_

## Bid Submission

**i. Online Bid Submission :**

The Online bids (complete in all respect) must be uploaded online in **Two** Envelops as explained below :-

<b>Envelope – 1</b> (Following documents to be provided as single PDF file)			
Sl. No.	Documents	Content	File Types
1.	Technical Bid	Compliance Sheet as per Annexure – I	.PDF
2.		Organization Declaration Sheet as per Annexure - II	.PDF
3.		List of organizations/ clients where the same products have been supplied (in last two years) along with their contact number(s). (Annexure-III)	.PDF
4.		Technical supporting documents in support of all claims made at Annexure-I (Annexure-IV)	.PDF
<b>Envelope – 2</b>			
Sl. No.	TYPES	Content	
1.	Financial Bid	Price bid should be submitted in PDF format.	.PDF

**<Department/Centre Name>**  
**Indian Institute of Technology Delhi**  
**Hauz Khas, New Delhi-110016**

**Date :XX/XX/XXXX**

**Subject :Purchase of <Item>**

S. No.	Currency	Description of Item & Specification	Qty. in Units	Unit Price (a)	Agency Commission (b)	Discount (c)	Ex-works price (d=a+b-c)	Packing + Handling + DOC + Inland Frieght (e)	FOB Price (f=d+e)	Insurance + Frieght (g)	CIF Price (f+g)
1											

**For indigenous items please quote as per following format.**

S. No.	Description of Item & Specification	Qty. in Units	Unit Price in Rs.	Excise Duty %	CST/VAT%	Octroi%	Total Price in Rs.
1.							
2.							