TENDER DOCUMENTS

Mechanical Lab Equipment

NUTECH / SCM /Mechanical Lab Eqpt - PSDP 2021 / TD-186

NATIONAL UNIVERSITY OF TECHNOLOGY

TENDER NOTICE

National University of Technology (NUTECH)

NUTECH / SCM / Mechanical Lab Eqpt - PSDP 2021 / TD-186,

1. Sealed bids are invited from Government / FBR Registered Firms for the procurement of Lab Equipment for NUTECH on **FOR Basis**.
2. Tender documents containing terms, conditions and detailed specifications of items (including draft contract) can be downloaded from NUTECH website "https://nutech.edu.pk/downloads/procurement/scm-tenders/ w.e.f **08 January 2021.**
3. Quotations shall be submitted as per requirement of the tender documents.
4. Bidders will be required to submit **Bank Draft / CDR** equal to **5%** of quoted value as Bid Bond in favor of National University of Technology (NUTECH).
5. Submit Rs 1500/- as Tender fee in favor of NUTECH NBP Account Main Branch, Civic Center G-6, Islamabad (**Development Project Security A/c No. 0341-00316702674-7).** Please attach bank receipt with technical offer. Offers will not be entertained without payment of processing fee.
6. Details for Submission & Opening of bids for tender are as under:-

Ser	Description	Submission	Tender Opening	Completion Days
a.	Mechanical Lab Eqpt-PSDP 2021 / TD-186	1130 hrs on 27 Jan 2021	1200 hrs on 27 Jan 2021	120 Days

Deputy Director (Supply Chain Management)
NATIONAL UNIVERSITY OF TECHNOLOGY, IJP ROAD, I-12, ISLAMABAD
Tel: 0092-51-5476768, Ext: 227

NATIONAL UNIVERSITY OF TECHNOLOGY

SUPPLY CHAIN MANAGEMENT

INVITATION TO TENDER

Tender submission time: **1130 hours, 27 January 2021**

1. NUTECH desires to procure the list of item(s) / Store(s) on **F O R B a s i s** as per **Annexure-A**. Interested bidders are requested to send their bids through courier or deliver at NUTECH under "Single Stage – Two Envelopes" (two envelopes placed together in third envelope), marked clearly as **"Technical Offer"** and **"Commercial Offer"** respectively to the undersigned, latest by or before above mentioned due date.

2. **Conditions Governing Contracts.** The contract made as result of this IT will be in accordance with the draft contract published on NUTECH University website and other special conditions (Mentioned in this document) that may be added to given contract for the supply of Lab Equipment.

3. **Delivery of Tender.** The offer is to be submitted as under:-

   a. **Technical Offer.** Technical Offer should contain only Annexure-A, Annexure-A-1 & Annexure B duly filled in (supported with relevant technical literature / details / catalogues etc) and receipt of tender processing fee. Copy of bid bond WITHOUT MENTIONING PRICE should be attached with technical offer. Only relevant technical details
   i.e literature/brochures) without mentioning the financial aspect of the offer should be enclosed in an envelope. In technical proposal, all items must have the brand names, model number, manufacturer's name, country of origin, manufacturer's warranty including parts with complete specs and brochures. Re-conditioned and re-furbished equipment shall not be acceptable. Following information will be clearly marked on the envelope:

      (1) Technical Offer
      (2) Original Performa Invoice (without price)
      (3) Tender number
      (4) Date/ time of opening

   b. **Commercial Offer.** Commercial Offer will contain Annexure-C and bid bond (Dully mentioned and placed in separate envelope. The offer indicating the quoted price FE/Local Currency (in Local Currency for FOR

cases & in FE for FOB cases) in figures as well as in words would be enclosed in an envelope. Following information will be clearly marked on the envelope;

(1) Commercial Offer

(2) Original Performa invoice with price

(3) Tender number

c. Both the envelopes i.e. commercial offer and technical offer would be enclosed in yet another properly sealed envelope that will be marked with address of this office only. There should be clear indication that this envelope contains tender documents.

d. The tender duly sealed will be addressed to the following:-

Deputy Director (Supply Chain Management Office)
NATIONAL UNIVERSITY OF TECHNOLOGY (NUTECH) IJ P
ROAD, I-12, ISLAMABAD
Tel: 0092-51-5476768, Ext: 227

4. **Date and Time for Receipt of Tender.** Sealed bids with detailed specifications should reach SCM office latest by **1130 hours on 27 January 2021.** Delay occurring in post shall not be accepted. Tenders received after the appointed / fixed time will NOT be entertained. The appointed time will, however, fall on next working day in case of closed / forced holiday.

5. **Tender opening.** The offers shall be opened **30 minutes** after submission time**.** Commercial offers will be opened at later stage if Technical Offer is found acceptable on examination by technical authorities. Date and time for opening of commercial offer shall intimate later. Only legitimate / registered representatives of firm will be allowed to attend tender opening.

6. **Validity of Offer.** The validity period of quotations must be indicated and should be **90 days** from the date of opening of financial offer.

7. **Withdrawal of offer** If the firm withdraws its offer within validity period the competent authority may place such firm under embargo for a period, which may be extended up to one year. Moreover, the Earnest Money of the firm will be confiscated.

8. **Documents.** Following information / copy of documents must be provided / attached with offer:-

a. A copy of letter showing firm's financial capability.

b. NTN/GST number be mentioned on the offer and copy of registration Certificate issued by Sales Tax Department, attached.

c. Foreign supplier to provide its Registration Number issued by respective Department of Commerce authorizing export of subject stores **(in FOB cases).**

d. Annexes A, A-1, B and C and special conditions must be signed and stamped. ATTACH ONLY RELEVANT DOCUMENTS.

e. Complete all Annexes as per given format. Do not use your format or letter head. Offer may be rejected if given format is not followed.

f. OEM/principal agency agreement must be provided.

9. **Disqualification.** Offers are liable to be rejected if:-

a. Validity of offer is not quoted as required in IT documents.

b. Any deviation from the General/ Special / Technical Instructions.

c. Offers are found conditional or incomplete in any respect.

d. Copy of EM/Bid Bond & Tender processing fee (with tech offer) and original EM/Bid Bond (with fin offer) are NOT attached.

e. Manufacturer's relevant brochures and technical details on major equipment assemblies are not attached in support of specifications.

f. Offer received later than appointed / fixed date and time.

g. Subject to restriction of export license.

h. Offers (Commercial / technical) containing non-initialed / unauthenticated amendments / corrections / overwriting. If the validity of the agency agreement has expired. The commercial offer against FOB / CIF / C&F tender quoted in local currency.

i. If the offer is found to be based on cartel action in connivance with other sources/participants of the tender.

10. **Earnest Money / Bid Bond.** Commercial Offer must be accompanied with a Bid Bond (CDR/Pay Order/Bank Draft) in agreement of faithful compliance of the conditions of Contract. This amount will be equivalent to 5% of the total quoted value. The Bid Bond amount submitted by the successful bidder will however be refunded on effective termination of Contract. (The Bid Bond will be forfeited in case of default by the bidder from his commitments made through his offer). Submission of Bid Bond is mandatory; otherwise

your offer will be rejected. Bid Bond will be used as performance guarantee till the delivery of stores, otherwise separate performance guarantee valued at 5 % of contract will be submitted by successful firm till stores are delivered and inspected.

11. **Return of Earnest Money/Bid Bond.**

a. Bid Bond to the unsuccessful bidders will be returned on finalization of the lowest evaluated bidder.

b. Bid Bond of the successful bidder/bidders will be returned on submission of Bank Guarantee/Bid bond against warranty period OR Bid bond retained for the warranty period as the case may be.

12. **Terms of Payment/ LC Charges**

(In FOB cases)

a. All categories payment will be made through letter of credit (LC). LC opening charges in Pakistan are to be borne by NUTECH. Payment will be made through irrevocable LC in favour of Manufacturer.

In FOR cases

b. 20% advance payment will be made to the Seller on provision of unconditional Bank Guarantee/ CDR/ DD/ Pay order. Advance BG/CDR/DD/Pay order will be submitted at the time of signing the contract.

c. 80% payment will made to the Seller after receipt and confirming the correctness of ordered specifications, installation, commissioning OR as the case may be i.e through Inland LC.

13. **Warranty/ Bank Guarantee (BG)**. **2 Year** against **5% Bank Guarantee/CDR/Pay Order/Bank Draft** of the store value will be required from the successful bidders from the date of commissioning as performance bond. BG submitted shall remain valid for up to 60 days beyond completion of warranty period.

14. **Taxes/ Duties/ Custom clearance** All taxes /duties /import Licenses Fee as applicable under government laws in Pakistan as well as country of supplier shall be on Seller **(in FOR Case).** NUTECH will provide applicable exemption certificates and documents **(In FOB Cases only)**.

15. **Insurance: -** Insurance will be NUTECH's responsibility through NICL **(in FOB Cases)**.

16. **Freight charges /Misc charges:** All charges such as packing, forwarding, local freight, loading and unloading, installation and commissioning, custom clearance, orientations, on job training or any other will be part of quoted price. Delivery till NUTECH will be seller's responsibility and all associated costs will be part of quotation as well.

17. **Delivery Schedule.** Store will be delivered within **120 days** from contract signing date.

18. **Force Majeure.** If non-compliance with the period of delivery or services can be proved to be due to Force Majeure, such as but not limited to mobilization, war, riot, strike, lockout, pandemics/epidemics or the occurrence of unforeseen events, the period shall be reasonably extended.

19. **Subletting** Suppliers are not allowed to sublet wholly or part of the contract to any other firm /company without prior permission by NUTECH. Firm found in breach of the clause will be dealt with as per purchaser's right and discretion.

20. **Arbitration.** Will be as under:-

"All Claims ,disputes ,controversies, differences arising out of or in connection with this contract ,including any question regarding its existence, validity, interpretation performance, breach or termination ,shall be referred to and shall finally be solved by binding arbitration. An Arbitration Committee Shall be constituted comprising Rector NUTECH and two Arbitration to be nominated on mutual agreement by each party. The venue of the Arbitration shall be the place of issuance of this contract or as Rector NUTECH may determine. In case of any difference, the clauses of Arbitration Act 1940, Rules and Regulation made thereof for time being enforce shall prevail. The award shall be final and binding on both parties.

a. Provided that written record of any such arbitration and its award shall be arranged properly. An award of such arbitration may be confirmed in a court of competent jurisdiction at Islamabad.
b. Provided further that incase of any other question /dispute not covered under this clause, the decision of Rector NUTECH shall be final."

21. **Redress Of Grievance.** In case of dispute, case shall be reviewed by 'NUTECH Redress of grievance committee and decision of NUTECH shall be final and binding on both parties.

22. **Export License/Permit /End User Cert.** It shall be the responsibility of the

Supplier to obtain from the Government concerned all permits and export licenses, etc required to enable each consignment to be shipped immediately as per the delivery schedule. In case the supplier fails to arrange export license within 30 days of signing the contract the purchaser reserves the right to cancel the contract on the risk and expense of the supplier without prior notice. The purchaser will provide End User Certificate for acquisition of export license to the supplier (format to be provided by the supplier for respective country within 10 day of signing of the contract).

23. **Technical Specification:** The supplier will provide OEM certificate, quality certificate /inspection document to the purchaser confirming the quality of the product being supplied under this contract .Store must bear the manufacturer's identification marking /monogram.

24. **Inspection /Testing of Store**: Inspection testing will be carried out at NUTECH by the concerned inspection team as detailed by the respective department in accordance with the laid down Acceptance Criteria. (Acceptance Test Procedure (ATPs)/Drawing /Test standard and specification). The supplier will provide ATPs with technical offer. Mutually agreed/approved ATPs will form part of contract to govern the inspection of store subsequently.

25. **Change In Specification /Mfr /Model.** No alternation marked/brand and quality of store will be entertained after the tender have been opened.

26. **Checking of Store at Consignee/User End.** All stores will be checked at Consignee's end in the presence of the supplier's representative. If for some reason, the supplier decides not to nominate his representative for such checking, an advance written notice to this effect will be given by the supplier to the consignee prior to immediately on shipment of store. In such an event the supplier will clearly undertake that decision of consignee with regard to quantities and description of consignment will be taken as final and discrepancy found will be accordingly made up by supplier. In all other cases the consignee will inform the supplier about arrival of consignment immediately on receipt of store through registered email/letter and telephone. If no response from the supplier is received within 15 days from initiation letter the consignee will have the right to proceed with the checking without supplier's representative. User/Consignee's report on checking of the stores will be binding on the seller in such cases.

27. **Packing /Marking.** The supplier shall be responsible for proper packing of the

Store in standard export packing worthy of transportation by sea /air /road rail so as to ensure their content being free from lose or damages due to faulty packing on arrival at the ultimate destination. Packing of stores will be done at the expenses of the supplier. All packing cases, containers and other packing material shall become the property of the NUTECH on receipt. Any loss occurred /demurrage paid due to wrong marking will be made good by the supplier.

28. **Original Performa Invoice**: Original Performa invoice must have following components incorporated:-

a. HS Code
b. Incoterm
c. Payment Terms
d. Origin of good
e. Port of shipment
f. Address of OEM
g. Seller acceptance (on Performa Invoice)
h. Invoice Date
i. Latest date of shipment
j. Seller complete bank detail

Note: Performa Invoice in the name of NUTECH in case of FOB cases & in the name of local partner in case of FOR cases.

29. **General Instructions:** Following must be noted:-

a. The firm should provide point to point acceptance of each clause of IT and special instructions attached with IT.
b. Firm will render a certificate with technical offer that firm is neither defaulter nor blacklisted by any Government / semi Government organization directly or indirectly. (On Judicial Paper)
c. Rates should be quoted on Free Delivery basis at NUTECH Islamabad.
d. The stipulated delivery period should be strictly adhered to. Any anticipated delay that is beyond the control of Seller will be informed (in writing) well in advance of the expiry of the due date of the activity along with reasons thereof, requesting for the grant of extension in delivery period. If the Seller fails to do so, or the Buyer is not convinced with the

rationale provided by the Seller, Liquidated Damages up to/at 2% per month or part thereof, will be imposed. However, the maximum limit of the Liquidated Damages will not exceed 10% of the delayed store value.

e. If even after applicability of 10% LD, the Seller fails to deliver the required stores, the Buyer will be at liberty to Cancel the contract, and /or procure the stores from an alternate source, on the Seller's "Risk & Cost/Expense". In that case, the Seller will be bound to make payment to the new source through NUTECH. The purchaser’s decision under this clause shall NOT be subjected to arbitration.

f. NUTECH reserves the right to cancel the Contract without assigning any reason whatsoever during its currency / execution / after placement, if the firm is found to be involved in any dubious activity, litigation, lacking to meet contractual obligations with the purchaser or is blacklisted with any other Public procurement agency. No claims / loss /damage of whatsoever nature shall be entertained and NUTECH's decision in this regard will be final / binding on the Seller.

g. An appropriate amount may be paid for mobilization against Bank Guarantee/CDR/Demand Draft/Pay Order.

h. Firms with previous pending/outstanding projects/business and unsatisfactory performance with NUTECH may not be considered for award of any further business.

Deputy Director
Supply Chain Management Office

Annex-A

Technical Specifications

NUTECH / SCM / Mechanical Lab Eqpt - PSDP 2021 / TD-186

Ser	Part No	Items	Description	A/U	Country of Origin	Qty	Bidder Compliance	
							Yes	No
1		**Combo Lathe**	• Frequency inverter • V-way bed is hardened and precision ground • Independent lead screw and feed shaft. • Power cross feed function. • Automatic feed and threading to be fully interlocked • Spindle bore35mm or better • MT5 or equivalent spindle hole with approximate Φ 150 mm three-jaw chuck • T-slotted cross slide • Tail stock may be offset for turning tapers • Geared mill head with more torque • Mill head should be tilted ± 90° . • Tolerance test certificate, test flow chart should be included. • Distance between centers: 650 mm or better • Swing over bed 290 mm or better • Swing over cross slide: 160 mm or better • Width of bed: 180 mm or more • Taper of spindle bore MT5 • Number of spindle speeds: Variable • Range of spindle speeds: 50-2000 rpm or better • Range of longitudinal feeds: 0.07-0.20 mm/r or better • Range of inch threads: 10-50T.P.I or better • Range of metric threads: 0.35-3.5 mm or better • Top slide travel: 75 mm or better • Cross slide travel 135 mm or higher • Tailstock quill travel: 65 mm or better • Taper of tailstock quill MT3 • Mill & drill	Nos	Imported	03		

			• Spindle stroke: 55 mm or better • Distance of spindle to table: 350 mm or better • Distance of spindle to column: 185 mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • change gears, • oil tray, • splash guard, • jaw chuck, • dead centers, • oil gun, • Steady rest • Follow rest • Face plate • 4 jaw chuck • Live center • Stand base • Lathe tools • Thread chasing dial • Spindle cover • Lead screw cover • Tool post cover • Side brake • 2 axis DRO • Quick change tool post • Machine vice • Collet chuck kits					
2		**Lathe Manual Bench Top**	• Distance between centers: 350 mm or better • Swing over bed: 240 mm or better • Swing over cross slide: 125 mm or better • Width of bed 120 mm or better • Taper of spindle bore: MT4 or MT5 • Spindle bore 25 mm or better • No. of spindle steps: 08	Nos	Imported	05		

			• Head:D1-4 Metric thread- 21kinds(0.4-7mm) • Inch thread- 34kinds(4-56 T.P.I) • Mouldar thread-16 kinds(0.35-5M.P) • Diametral thread-36 kinds(6-104 D.P) • Variable spindle speeds: • Range of spindle speeds: 125-2000/50-2000 rpm or better • Range of longitudinal feeds: 0.05 -0.20mm /r or better • Top slide travel: 60mm or better • Cross slide travel 140mm or better • Tailstock quill travel: 50mm or better • Taper of tailstock quill MT2 or MT3 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories** • Change gear • 3-jaw chuck • Splash guard • Oil gun • dead centers • Steady rest • Follow rest • Lathe tool • Face plate • 4 Jaw chuck • Live center • Stand base • Side brake • Tool post cover • Thread chasing dial					
3		**Lathe Manual 6 feet**	• Swing over bed: 400mm or better • Swing over carriage: 220mm or better • Swing over gap 600mm or better • Length of work piece: 2000 mm or better • Width of bed 380 mm or better • Section of turning tool 25x25mm or better	Nos	Imported	03		

			• Spindle speed: 20-1400rpm (24steps) or better • Hole through spindle 50 mmor better • No. of feed 64 kinds for each • Range of metric threads 1-192mm 44 kinds or better • Range of inch threads: 2-24tpi 21kinds or better • Range of module threads: 0.25-48 module 39 kinds • Range of diametral pitch threads: 1-96 DP 37 kinds or better • Tailstock spindle travel: 145mm or better • Tailstock spindle diameter: 75mm or better • Taper of tailstock spindle center hole: MT5 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • 3-jaw chuck • 4-jaw chuck • Face plate • Steady rest • Follow rest • Dead centers • Splash guard • Oil tray • Work lamp • Coolant system • Foot Brake • Tools box • Quick change tool post • Live center • Chuck guard • Tool post guard					
4		**Universal Milling Machine**	• Table size: 250*1000mm or better • Table load100 KG or higher • Center distance120mm or higher • Drilling Dia: 50mm or better • T slot qty-size15mm or better	Nos	Imported	03		

			• Spindle speed 40-8000rpm or better
			• Spindle nose to table surface: 50-390mm or better
			• Spindle center to Columns
			  ○ X-axis travel: 800-900mm or better
			  ○ Y-axis travel: 400-370mm or better
			  ○ Z-axis travel: 340mm or better
			• Ram travel: 450mmor better
			• Spindle travel: 127mmor better
			• Head swivel: 90degree and tilting: 45degree
			
			Or Equivalent
			
			Ranges and values are approximate and close values will be acceptable
			
			Accessories:
			
			• step speed milling head
			• Lead screw
			• Mill arbors
			• Drill chuck
			• Guide way
			• Spindle bearing
			• Work light
			• Draw bar
			• Tool & tool box
			• Electric Power feed
			• DRO
			• ISO40 spindle
			• Machine vice
			• Variable/Frequency speed milling head
			• Milling chuck collets
			• 50pcs set clamping kits
			• Coolant system
			• Plastic splash guard
			• Oil collecting plate
			• Air drawbar
			• Ball screw
			• Automatic lubricating pump
			• Spindle protection cover					

			• Hanging control panel					
5		**Surface Grinder**	• Machine stand and body made of cast iron. • The machine should be able to grind all kinds of surfaces • Grinder machine should be installed with permanent magnetic chuck or electro-magnetic chuck • Vertical dial graduations: 0.01mm or better • Cross travel graduations: 0.02mm or better • Working table size: 500x200mm or better • Movement of working table550x250mm or better • T -Slot number x width: 1x14mm or better • Grinding head distance from spindle center to table: 450mm or better • Wheel Size: 170x11x30 mm or better • Wheel speed: 2800 r/min or more • Vertical feed Per revolution: 1.75mm or better • Vertical feed Per graduation: 0.01mm or better • Cross feed Per revolution: 3 mm or better • Cross feed Per graduation: 0.02mmor better • Surface roughness: Ra0.32 or less • Coolant pump • Hydraulic motor **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Wheel exactor • Leveling wedge and bolt • Coolant tank • Wheel dresser stand • Working lamp • Electro-magnetic chuck 150*400 • Extra Wheel flange • Parallel wheel dresser • Dust collector	Nos	Imported	02		

6		**Shaper Machine**	• Shaping length: 630 mm or higher • Horizontal movement of the table630 mm or better • Distance between the ram bottom and table670 mm or better • Vertical movement of table360 mm or better • Displacement of arm 150mm or better. • Travel of tool head: 120mm or better • Number of ram strokes per minute T/ min14-80 or better • Table feed: Horizontal 12 steps 0.4-5mm or better • Table feed: vertical 12 or better steps0.08-1.0 mm or better • Width of the T-slot for center positioning mm 18 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Shaper head • Work lamp • Operate tools • Machine vice 200mm • 2 wheel grinder	Nos	Imported	02		
7		**Band Saw Machine**	• Frame of machine made of Solid steel within a dual-column frame guide. • Should have Manual linear stop for quick and easy setting of the correct work piece length • Powerful drive motor • At the end of the sawing cycle, the saw blade belt should stop and the saw blade should automatically return to the home position • V-belt drive with 4 different speed • Quick clamps for rotation from 0 to 45° or better • Capacity Circular @90° 178 mm or better • Rectangular @90 178x305 mm or better • Circular @45°127 mm or better • Rectangular @45° 120x125 mm or better • Blade speed @ 50Hz 22, 34, 49, 64 MPM or better • Blade speed @ 60Hz 27, 41, 59, 78 MPM or better	Nos	Imported	02		

			• Blade size 19x0.9x2362 mm or better • Motor main • Motor hydraulic • Coolant pump • Spare cutting blade • Tool Box **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***					
8		**Hack Saw Machine**	• Hacksaw machine for cutting bars, tubes and profiles in a wide variety of materials, • Cutting capacity (round/square) φ250/250x250mm or better • Hacksaw blade 450x35x2mmand 500x40x2mm or better • Number of reciprocating motion 91/min or better • Blade stock 152mm or better • Spare Blade • Tool Box **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Imported	02		
9		**Radial Drilling Machine**	• Drilling capacity 40 mm or better • Distance from spindle to column 300 - 1300 mm or more • Distance from spindle to table 250 - 1300 mm or better • Spindle travel 200 mm or better • Spindle taper MT4 • Speed 75-1200 rpm or better • Spindle speed steps 6 steps • Spindle feed 0.1-, 0.16, 0.25 mm/r or better • Rocker rotary angle 360 degree **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Imported	03		

			Accessories: • Box type worktable • Drill chuck • Taper sleeve • Wrench • Spindle guard • Machine vice					
10		**Bench Drilling Press**	• 16-speed settings to accommodate various materials and thicknesses • Cast iron worktable, height adjustable and bevels up to 45 Degree left & right • Scaled steel fence for aligning, guide and brace workpieces, stopping block for repetitive drilling jobs • Chuck 16mmor better • Spindle Travel 85mmor better • Spindle Taper MT2or equivalent • Speed Change 16 or better • Speed 50/60Hz 220-2840/260-3410 r/min 220-2840/260-3410 r/min or equivalent • Swing340mm or better • Working Table size 290x290mmor better • Column diameter 72mm • Distance of spindle nose to stand table 1000 mm or better • Distance of spindle axis to column 250 mm or better • Distance of spindle nose to work table: 700 mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Drill chuck • Tapper sleeve • Wrench • Safety guard • Vice	Nos	Imported	02		

11		**Sheet Bending Machine**	• A compact high-quality engineering and fully welded structure • Air Spring control with foot function • Simple and safe operation. • Hydraulic compensation • Air spring function • Foot control • Press blade and folding blade of segment structure • Working length 1000 mm or better • Working width 80 mm or better • Sheet thickness: 2 mm or better • Clamping bar lift 45 mm or better • Folding angle up to 135° • Press blade • Folding blade • Foot Pedal/Control **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Imported	02		
12		**Tracked Tractor Transmission (on stand with wheels)- Manual**	• Clutch unit • Gearbox • Pinion gear – ring gear • Steering clutch • Final reducer • The transmission to be operated manually through a crank handle • The tractor transmission cutaway model to be mounted on the stand with wheels. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	North America/ Japan/ Europe	01		
13		**Auto Parts (Valve, Clutch, Gaskit, Engine Shaft, Piston, Connecting**	• Set of Auto parts of a 1300cc Toyota GLI (preferably 2019 model or better) vehicle • 2 valves • 1 cutaway complete clutch assembly • 1 gasket set for engine and other parts	Nos	Any	01		

		Road, Crankshaft, Engine Head, Oil Pump, Camshaft, Timing Belt, Spark Plug, Piston Ring)	• 1 crankshaft/engine shaft • 1 cutaway piston • 1 connecting rod • 1 engine head • 1 cutaway oil pump • 1 camshaft • 1 timing belt • 3 piston rings					
14		**Manual Gear Transmission Apparatus with Software**	• Trainer to provide complete manual gearbox for group demonstration • Mounted on a steel plate • Hand operated Gearbox • Sectioned to show all moving components • Cloud-based software, with o Online interactive theory presentations o Investigations and assessments • For demonstrations of the position and mounting of manual gearbox components. • Front and Reverse Gear selection • Differential. • Clutch housing. • Speedo drive. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	North America/ Japan/ Europe	01		
15		**Automatic Gear Transmission**	• Trainer to provide complete automatic gearbox for group demonstration • Mounted on a steel plate • Hand operated Gearbox • Sectioned to show all moving components • Cloud-based software, with o Online interactive theory presentations o Investigations and assessments • For demonstrations of the position and mounting of automatic gearbox components. • Front and Reverse Gear selection • Differential. • Clutch housing.	Nos	North America/ Japan/ Europe	01		

			• Speedo drive. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***					
16		**Self-Starter and Manual Starter Cutaway Models Of Engines**	• Trainer for demonstration, investigation and fault-finding and simulation of a typical automotive ignition and charging system. • Access to a variety of ignition systems and a charging system. • A range of fault-insertion options to simulate typical real-world system malfunctions. • Cloud-based software, with o Online interactive theory presentations o Online practical electronics tasks o Interactive theory investigations and assessments o • Wall mounting brackets, • Bench stands, • Digital Multimeter • Accessory kit. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Experimental Capabilities** • Identification of ignition system components and types. • Identification and investigation of the operation of spark plugs. • Identification and investigation of contact breaker ignition systems. • Diagnosis of faults in contact breaker ignition systems. • Identification and investigation of electronic ignition systems. • Diagnosis of faults in electronic ignition systems. • Identification of starting and charging system components and types.	Nos	Any	01		

17		**Cutaway Model: Engine Oil Pathways**	• Oil pump apparatus with internal gears complete with oil filter. • Pressure bulb • Pressure relief valve • Suction device • Model should be mounted on a suitable base • Sectioned model should be color coded	Nos	North America/ Japan/ Europe	01		
18		**Chassis Layout Complete**	• Car Chassis Front Engine Carburetor with Rear Drive (On Stand with Wheels) -Electrical • 4-stroke 4 in-line cylinders • Displacement: 2000 cu. Cm or better • Gearbox: 4/5 forward speeds + reverse • Hypoid differential • Camshaft in the crankcase • Vertical twin carburetor • Water cooling • Spring single plate clutch • McPherson front suspension • Front disc brakes and rear drum brakes • Rack steering box • Drive shaft with mechanical and flexible joint • Rear leaf spring suspension	Nos	North America/ Japan/ Europe	01		
19		**Steering Mechanisms Apparatus**	• Electrical power steering (EPS) trainer in working conditions • Fully operating McPherson suspension • Instrumentation to show all information concerning the operation. • Operating McPherson struts, rack and pinion • Adjustment of the steering effort directly on the rack • Vehicle speed simulation from 0 to 120 km/h or better • Alternator simulation • Indicator lamp and voltage/current display • Body computer with diagnostic socket (with low speed CAN) OBD 16 pin **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	North America/ Japan/ Europe	01		

20		**Shock Absorber Mechanism Apparatus**	• Steering Unit with McPherson Suspensions (On Stand with Wheels) – Manual • McPherson suspension • Shock absorber • Spring • Rack and pinion steering box • Disc brake • Steering wheel	Nos	North America/ Japan/ Europe	01		
21		**Turbodiesel Engine – Functioning 4 Cylinders Indirect Injection Overhead Camshaft (OHC) Rotating Injection Pump Displacement: 1900 Cu. Cm**	• Vibration-proof frame • Fuel supply (tank, pump, line) and cooling water circuit • Sensors for cooling water flow rate & temperatures (exhaust gas, cooling water, fuel) • Control cabinet with warning lamps (oil pressure, alternator failure) • Operating time counter and ignition key • Water-cooled • 4 stroke, 4 in-line-cylinder diesel engine • Power transmission to engine test stand via elastic coupling and a jointed shaft • Turbocharged Intercooled Displacement: 2.8 L / 1900 cu. Cm or better • Power output: Approx. 72kW/3400rpm • Indirect injection • Rotary injection pump • Overhead camshaft (OHC) • Distribution through a toothed belt • Thermostatic valve • Gearbox: 5 forward speeds + reverse • Alternator **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	North America/ Japan/ Europe	01		
22		**Indirect Injection 4 Stroke Diesel Engine Model (On Base) – Manual**	• Indirect injection complete with: ○ injection pump ○ injector ○ pre- chamber ○ preheating glow plug ○ cooling system	Nos	North America/ Japan/ Europe	01		

			○ distribution circuit, etc • Should be mounted on a moveable, heavy-duty steel frame • Hand operated and sectioned for visualization of all moving parts					
23		**4 Stroke Petrol Engine Model (On Base) – Manual**	• Training model of a 4-stroke petrol engine. • Hand operated through a crank handle • Complete with sectioned ○ carburetor ○ coil ignition, ○ cooling system, ○ distribution system, ○ spark coil, etc. • Indicator for simulation of the mixture ignition.	Nos	North America/ Japan/ Europe	01		
24		**Cutaway Model: VVTI Engine With Transmission**	• Educational Model for VVTI Engine, manual transmission and Break System Structure. • Each incised section should be painted with different colors for education efficiency. • Should be operated as same as a real engine while changing the gear and able to check internal engine movement by precise cutting. • Each part of engine should be painted specifically. • 4 cylinders • Displacement: 1000-1300 cc or better • DOHC - double overhead camshaft • VVTI system with electronically controlled intake valves • 4 valves per cylinder • Roller chain • Multi-point electronic injection with throttle • 12V alternator • Thermostatic valve **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	North America/ Japan/ Europe	01		
25		**Cutaway Model: IVTEC Engine With Transmission**	• Educational Model for IVTEC Engine, manual transmission and Break System Structure. • Each incised section should be painted with different colors for education efficiency.	Nos	North America/ Europe	01		

			• Should be operated as same as a real engine while changing the gear and able to check internal engine movement by precise cutting. • Each part of engine should be painted specifically. • Composition: IVTEC Engine ASSY/4 cylinders • Manual Clutch Break System, • Emergency Switch, Safety • Fuse Light • Steel frame with Heat treatment painting • 4 wheels brake					
26		**Automobile Engine and Transmission Power System Cutaway Model**	• Displacement: 1600/2000 cu.cm or better • 2 overhead camshaft driven by a toothed belt –DOHC • Overhead valves with V-arrangement • Coil ignition • Alternator • Twin-carburetor • Gearbox: 5 forward speeds + reverse • Dry single-plate clutch	Nos	North America/ Europe	01		
27		**Tool and Cutter Grinder**	• Worktable Diameter 340mm or better • Worktable traveling 160mm or better • Worktable area130×675mm or better • Rotating Angle of Wheel head 360° • Face and side cutter • Lathe tool • Hobbing cutter • Reamer bit • Grind spiral milling cutter • Ball end mill “R” type • Graver and other taper milling cutter. **Accessories:** • Complete Grinding attachment for grind spiral milling cutter ball end mill, R type lathe tool, graver and other taper milling cutter • Complete Grinding Attachment for drill bit ,screw tap, side mill, round bar • Complete Grinding Attachment for end mill ,side mill • Complete Grinding Attachment for lot miller, face and side cutter, lathe tool ,hobbing cutter, reamer bit • Tool box	Nos	Any	02		

			• Stand • Center **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***					
28		**Portable Hyd Pipe Bending Machine With Bending Die Set**	• Equipment capable of bending angles from 0 to 90degree on pipes of various diameters • Cold bending capable • Two-speed, heavy-duty hydraulic pumping system. • Longer piston stroke per pumping • Hand force minimized operator fatigue. • Heavy duty casters wheels • Output(T) 16 or better • Stroke(mm) 230 or better • Bending range (mm) 22-60 or better • Thickness of pipe (mm) 2.75-4.5 or better • Pipe Moulds 22,28,34,42,48,60 or more • Includes Pipe Modules and Dies **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	02		
29		**Argon Gas Welding Plant**	• Process DC TIG , MMA (STICK) • Rated Input Voltage 1PH ~ 230V ±15% • Approx. Max. Load Power TIG: 7.81 KVA, MMA: 5.63KVA • Approx. Capacity TIG: 250A/20V • Rated Duty Cycle (40°C) MMA: 200A/28V • 60%: TIG: 200A/18V • MMA: 160A/26.4V • 100%: TIG: 3A/10.1V~250A/20VMMA: • Approx. Welding Current/Voltage Range 20A/20.8V~200A/28V • Open Circuit Voltage 70V~80V • Power Factor 0.8 • TIG Pulse Frequency 0.2Hz~200Hz • Pulse Width (Ratio) 1~100%	Nos	Any	02		

			• Arc-starting Current 5A~250A • Crater-filling Current 5A~250A • Current Up-slope Time 0.1S~15S • Current Down-slop Time0.1S~15S • Pre-Gas Time0.1S~15S • Flow-Gas Time 0.1S~15S • Spot Arc Time 0.1S~10S • MMA Arc Force 10A~200A • Hot Start Time 0.1~3S • Hot Start Current 10A~200As **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories**: • 4M cable with torch • Electrode holder/2M • Earth clamp/2M • Argon gas regulator • Water cooling unit 6.5L • Welding road 5 packs (1 Kg Each) • Foot pedal					
30		**Mig/Tig Welding Machine With Inverter**	• Rated Input Voltage approx.3PH ~ 400V ±15% • Approx. Max. Load Power Capacity 15.26KVA • Approx. Rated Duty Cycle(40℃) 60% MIG: 350A/31.5V • MMA: 350A/34V 100% MIG: 300A/29V • MMA:300A/32V Approx. Welding Current/Voltage Ranges • MIG: 10A/14.5V~350A/31.5V • MMA:10A/20.4V~350A/34V • Open Circuit Voltage 70V~80V • Estimated Power Factor 0.85 • Pre-Gas Time Preset • Flow-Gas Time Preset • Wire-feed Mechanism 4 Rollers • Approx. range for Wire-feed Speed 0~25m/ min • Wire Spool Capacity 300mm (15kg)	Nos	Any	02		

			• Filler Wires (mm) Fe, Ss: 0.6~1.6 mm • WATER COOLANT unit • Operating Voltage 230V 50/60Hz • Rated Power260W • Cooling Power1.5KW(1L/MIN) • Maximum Pressure 0.3MPA/60HZ • Recommended Cooling water • Tank Volume6.5L **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Mig torch • Electrode holder/2M • Earth clamp with 3Mcables • CO_2 gas regulator with heater • Water cooling unit • Nozzle and contact tips kit • Welding rods 5 PACK					
31		**Arbor Press**	• Equipment body should be made of high quality cast-iron for study design purposes. • For press-fitting and pulling bearings, 4-position plate, Chrome-plate steel pinion and ram should be recommended. • Load Capacity: 3 Ton or better • Height &diameter MPA 285x163 or better • Arbor length 44 mm or better • Ram square mm 38x38 or better • Base size mm 455x300 or better • Press Height: 615mm or better • Base plate **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	02		

32		**Saw Circular 9 inch**	• Circular saw blade should be made of High-Speed Steel which is highly efficient and durable. • Low-voltage controlled hand switch should be provided which is convenient for operation • The double clamp structure can quickly clamp materials and rotate 45°from side to side for cutting. • Blade size 315mm or better • Circular @90° 100mm(4'') or better • Rectangular @90° 140x90mm(5.5"x3.5") or better • Circular @45° 90mm(3.5") or better • Rectangular @45° 100x0mm(4"x3.5") or better • Blade speed @50HZ18,36rpm or better • Vice opening 145mm(5.7") or better • Drive Gear • Extra saw blades (03) **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	03		
33		**Angle Iron Cutter**	• Blade diameter: 355mm or better • Max cutting capacity: 100mm or better • No-load speed: 3800/min or better • Power 2350W or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Cut off wheel (Qty 4) • Hex Key • Carbon brushes 1 set	Nos	Any	02		
34		**Metal Engraving Machine**	• Working Area (X*Y*Z)400mm*400mm*200mm or better • Platform size(X*Y)400mm*400mm or bigger • Engraving Speed 7000-8000mm/min or better • Running speed 12000mm/min or better • Machine frame should be made of cast iron • Spindle Speed 24000rpm or better	Nos	Imported	01		

			• Resolution 0.005mm or better • Repeatability 0.03mm or better • Machine accuracy around 0.02mm or better • Diagonal error 0.1mm-0.3mm or better • Lead shine stepper motor drivers • Falling Working Dictate G code*".u00", ".mmg" ".plt" • Operating system controller Control configuration: DSP • Software environment Windows 10 • Software Compatibility :Typle3, artcam, castmate, proE, Coreldraw/CAD,CAM • Diameter of cutter ф3.175, ф4mm, ф6mm, ф8mm, ф12.7mm,ф2mm,ф1mm, etc. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Control cabinet • spindle cover • Lead shine hybrid servo motor driver • Auto-oiling system • Tool-sensor • Water chiller system • Mist spray cooling system, • Water tank system • Working lamp • Heavy-duty dust proof system • Dust collector system • Rotary attachment • Tool box • Automatic Tool Calibration System • Different size tools and collets					
35		**Steam Engine Model (On Base) – Manual**	• A study model of steam engine with pistons and valves. • The model should be put in motion by turning the flywheel, thus showing the manner of operation of the engine and of the built-on centrifugal governor • Color coding with appropriate colors to differentiate the parts of the engine	Nos	North America/ Japan/ Europe	01		

			• Model should be mounted on appropriate base					
36		**Vehicle Simulation Software**	• The simulator for the study of all the operating features of an automobile with a hybrid system (internal combustion engine and electric motor) or completely electric. • Composed of a panel operated by computer with a silk-screened diagram which explains the positioning of the car components and indicating the features of the system by showing different colours on the panel. • The fault diagnosis provision related to practical and theoretical topics. • High-voltage battery (12 V) module, (Li-ion cells) • Recharging system by external AV • Electric motor control system • 3-phase inverter for managing the electric motor • Inverter control signals and sensors for the voltage and current measurement • 3-phase AC motor with integrated transmission system • Integrated sensors in the AC three-phase motor **Or Equivalent**	Nos	North America/ Japan/ Europe	01		
37		**EFI Reprogrammable Module**	• 8 pre-programmed injector current curves • Peak current 4A-10A • Hold current 1A-2.5A • Peak hold 0.5-1.0ms • Built in Injector test fire program for quick troubleshooting while in the field • 8 RGB LEDs indicate proper operation as well as log faults • 2 outputs (Ground and 0-5V) can be run to an ECU to datalog any injector faults • Pre-Programmed in Position 7 for Billet Atomizer 325-800 • Precision of injectors 500 Lb/Hr or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	01		
38		**Cutaway**	• Educational Model for CVTI Engine, manual transmission	Nos	North	01		

		Model: CVTI Engine With Simulator	and Break System Structure. • Each incised section should be painted with different colors for education efficiency. • Should be operated as same as a real vehicle while changing the gear and able to check internal engine movement by precise cutting. • Each part of engine should be painted specifically. • 4 cylinders • Displacement: 1000-1300 cc or better • DOHC - double overhead camshaft • CVTI system with electronically controlled intake valves • 4 valves per cylinder • Roller chain • Multi-point electronic injection with throttle • Thermostatic valve • Electronic ignition • Disc brake • Silencer		America/ Japan/ Europe			
39		**Peter Engine**	• Single cylinder • 2 stroke • Power:5Hpor better • Speed Range: 1500 RPM • Automation Grade: Manual • Cylinder bore and stroke: 80x100mm • Nominal compression ratio: 16.5:1 • Cubic capacity: 553cc • Specific Fuel consumption in g/kw/hr: 250 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	01		
40		**Leaf Springs Model**	• Leaf spring model of a real vehicle to understand the concept of suspension system • Model mounted on a suitable base • For reference purpose pic is attached as Picture-A	Nos	Any	01		
41		**Engine Generator**	• Lube Oil Capacity: Approx. 0.6 Ltr • Overload Protection Type: Non-fuse overcurrent protector inverter over current protection program control. • Output: 3-4 KW	Nos	Any	02		

			• Voltage: 220 Volt • Power Factor: 1 • Type: Single Cylinder-25°C inclined 4-Stroke-OHV air-cooled engine • Bore X Stroke: 70 x 55 mm • Starting System: Recoil Starter / Electric start • It should have built in Oil Alert • Fuel Tank Capacity: 10 Ltr • DC Output: 12V x 8.3A • Self – Excitation system					
42	**(a)**	**Electric Welding Plant**	• 200 - 400 Apm Three Phase Electric Welding Machine • Grade: Semi-Automatic • Welding type: MIG Welder • Material: Mild Steel • Approx. Voltage: 400V • Range of Current: 200-400Apm **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	01		
	(b)	**Soapstone, Squaring Tools, Welding magnets, Scribe, Welding clamps, Permanent markers, Welding pliers, Steel wire brush**	• Soapstone • Squaring Tools • Welding magnets • Scribe • Welding clamps • Permanent markers • Welding pliers • Steel wire brush	Set	Any	01		
43	**(a)**	**Gas furnace (casting)**	• Capacity: 10 kg or better • Inner container: crucible • Mobile or immobile type to fit different application • Furnace center max temperature: 1000℃ • Aluminum melt liquid max temperature: 850℃ • Approx. Heating speed: 130KGS/Hour • Replaceable internal heater	Nos	Any	01		

			• Insulator: fiber type • Automatic temperature modulation **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***					
	(b)	**Graphite Crucible**	• Composition: Carbon • Carbon Content: Medium-Carbon • Grade: Industrial Grade • Forming Way: Molded Graphite Standard parameter • Approx. refractoriness≥ 1630ºC • Recommended Carbon content≥ 38% • Apparent porosity≤ 35% • Approx. Bulk density≥ 1.6g/cm3 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	01		
	(c)	**Sand mixing machine**	• Mixing Drum Type Double Wheel • Continuous Operating type machine • Approx. Diameter of disk(mm) 1000 • Feeding amount one time is approx. 110 kg • Productivity(t/h) 1.5~2.5 • Rotational speed of driving shaftapprox:40r/min or more • Approx. Power:4kw **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	Any	01		
	(d)	**Closed Rectangular Molding Box**	• Closed rectangular molding box for foundry operations • Pic attached as Picture-B	Nos	Any	05		
	(e)	**Hand Riddle, Shovel, Rammers, Sprue, Trovels, Mallet, Gate**	• Hand Riddle • shovel • Reamers • Sprue • Trovels	Set	Any	01		

		Cutter, Swabs, Bellows, Slicks, Smoothers	• Mallet • Gate Cutter • Swabs • Bellows • Slicks • Smoothers					
44	**(a)**	**Universal wood machine**	**Planar** • Working tables : 400x1800 mm or better • Cutter block diameter : 40 mm or more • Cutter block rotation speed : 5700 r.p.m or better • No. of knives : 3 • Knifes dimensions : 400x20x30 mm or better • Table adjustment : 4 mm or better **Thicknesses** • Feed speed : 7 m/1' or better • Max. working height : 220 mm or better • Min. working height :4 mm or better • Max. cutting depth : 4,0 or better **Circular saw** • Working table size : 326x1112 mm or better • Shaft rotation speeds :4500 r.p.m or better • Blade diameter :200- 300 mm or better • Blade bore diameter : 30 mm or better • Cutting height at 90° : 100 mm or better • Distance between blade and fence : 730 mm or better • Blade inclination : 45° • Max cutting height at 45° : 75mm or better • Shaft rotation speed engraver : 7000 r.p.m or better. • Engraver blade diameter : 90 mm or better. • Engraver blade bore diameter: 22 mm or better. **Mortiser** • Working table : 250x500 mm or better • Longitudinal stroke : 200 mm or more • Transversal stroke :95 mm or better • Vertical stroke :90 mm or better • Chuck size : 16 mm or better • Chuck rotation speed ; 5700 r.p.m or better	Nos	Any	01		

			Shaper • Working table : 326x1112 mm or better • Shaft rotation speeds : 7000/4400/3100/2000 • Standard shaft diameter : 105 mm or better • Spindle Length : 30 mm or better • Shaft vertical stroke : 115 mm or better • Tool diameter : 180 mm or better • Tenoning depth : 65 mm or better • Tenoning carriage dimensions : 1800x315 mm or better • Carriage stroke 1800x220 mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • N°2 clamp lever • Sharper fence • Service wrenches • Mortised chuck • Table extensions with swinging arms: 860x600 mm • Guards on mortiser chuck • 3 pcs. Planer knives • Planer guide • Saw Guide • Bridge safety hood on planer • Set of wheels with feeding steering bar • Contouring fence • Carriage stroke : 2200/2000 • Wescott (Diameter) : 16 mm • Spiral cutter • Mortise knives • Mouler knives • Big saw blade • Small saw blade					
	(b)	**Chisel and chain mortising**	• Chisel capacity 6-12mm or better • Motorizing depth 76mm or better • Drilling chuck depth 1-13mm or better	Nos	Any	01		

		machine	• Chisel to table: 190mm • Motor input :370W • Spindle speed 1400 rpm approx.. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***					
	(c)	**Sanding machine**	• Voltage230V-240V, 50Hz/120V,60Hz • No-Load Speed 6000-12000/Min • Input Power 240W/2.0A • Size of Base: 125mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Dust Bag, • Sander Paper 10 Nos	Nos	Any	01		
	(d)	**Electric hand plane**	• Volts:220-240V~50/60Hz • Approx.power:1050W • No-load speed:16000rpm • Planing width & depth: 82x3mm or better • Base and side covers should be of aluminum • Self-cooling belt system **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • With 2pcs planning blades • With 1pcs belt • With 1set parallel guide • With 1pcs depth guide	Nos	Any	01		
	(e)	**Wood Pattern Router**	• Chuck Diameter: 12mm or better • No-load Speed: 0-2300RPM • Approx. Power: 1600W	Nos	Any	01		

			Or Equivalent ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Templet Plate • Straight Guide • Trimmer Guide • Collet • Wrench					

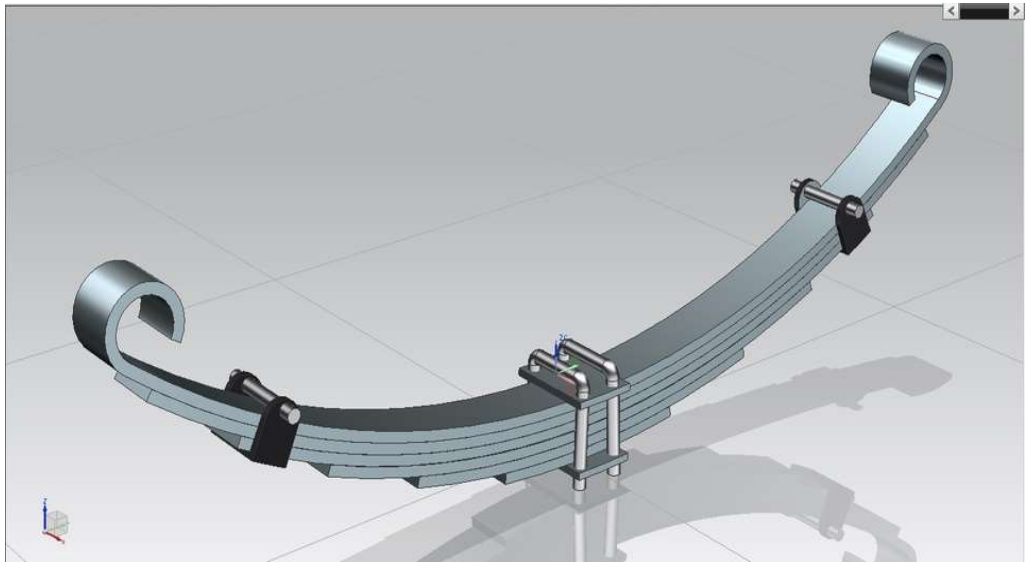
Firm Name: _____

Signature: _____

Name: _____

Designation: _____

Picture-A



Leaf Spring Model (for reference only)

Picture-B

Rectangular Molding Box

Special Instructions

Description	Bidder		Tech Scrutiny to be done by User		
	Yes	No	Accepted	Rejected	Reasons of Rejection
Environment Conditions (a) Temperature range: 05°C to +40°C (b) Relative humidity: 0-70% non-condensing					
Warranty period Two years from the date of commissioning.					
Training Notes Supplier will provide a set of handouts for training on operation and maintenance of the equipment					
Publications Supplier is to provide hard and soft copies (CD) of following manuals. (a) **Operational / Maintenance manual**: - Qty 01 with Equipment and additional Qty 02 for record purposes and should consist of following sections:- (1)**Equipment Description /Operation**:- (a) Specifications (b) Description (c) Operation (2)**Servicing**:- (a) Maintenance Schedule (b) Adjustment / test (c) Removal / Installation procedure (d) Tools Required (b) Full parts description along with detailed diagrams (exploded view). (c) **Experimental manuals** which must contain the list and procedure of the experiments that equipment can perform.					
Spares / Technical Support (a) Supplier to have in-country spares / technical support and ensure spares and technical support / assistance for next 10 years (b) Comprehensive list of spares required for scheduled maintenance of Equipment is to be provided					

(c) Any software provided must have its license (d) Software upgrade support must be provided free of cost for 10 x years with renewed license at every upgrade (e) Supplier must also provide calibration service for at least 5 years after commissioning					
Additional Spare / Replaceable parts. (a) Replaceable spare / parts during scheduled inspections are to be identified and provided as per requirement along with equipment sufficient to cater five years consumption. (b) All specialized / standard tools required for inspection / repair / servicing must be supplied along with equipment.					
Physical Inspection Criteria: 100% physical inspection of store will be carried out before commissioning of the equipment for following details:- (a) For physical damage, scratches and deformity. (b) Accessories /components as per contractual specifications. (c) Technical Manuals (Operation manual, user guide). (d) Quality certificate and calibration certificate by the OEM (e) OEM certificate and verifiable documents by the supplier that store has been procured from certified source and is factory new and from latest production. (f) Brand name and country of origin.					
Commissioning (a) Commissioning by OEM rep at his own cost and risk at designated place at NUTECH. (b) Any special requirement for installation, operation and commissioning must be specified in the offer by the supplier.					
Training 01 week operational/ maintenance training at NUTECH by rep of OEM (local suppliers)					
Improvement and Safety Measures Any improvement and safety measures suggested by NUTECH during commissioning are to be resolved by the supplier / manufacturer at no extra cost.					
Liability of Supplier (a) OEM certificate of authorized dealership Supplier is to provide original OEM certificate of subject equipment bought					

directly from the manufacturer and being an authorized dealer. (b) In case the equipment supplied is not compatible with specifications, the supplier will be obliged to call his representatives at his own cost for consultation and corrective action					
Special Notes (a) Additional requirements for the maintenance of equipment (if any) must be intimated by the supplier in technical offer. (b) Supplier must provide the list of organizations using same equipment in Pakistan (if any). (c) Equipment must be a standard product of OEM available at web address of OEM. (d) In case of premature failure of the equipment, OEM has to replace / rectify the item free of cost. Required transportation charges would be borne by the supplier.					

Firm Name: _____

Signature: _____

Name: _____

Designation: _____

Annex-B

TECHNICAL OFFER
NUTECH / SCM / Mechanical Lab Eqpt - PSDP 2021 / TD-186

Fill in following essential Parameters:-

1. Validity of Offer: _____Days (Should not be less than **90 days**)
2. Delivery period: _____Days (After placement of order)
3. Country of Origin: _____
4. Warranty Period: _____

General

1. GST Number: _____(Enclose Copy)
2. NTN / CNIC: _____(if exempted, provide valid exemption certificate)

Payment Terms (In continuation of IT Document clause 12)

In FOR Cases
20% advance payment against BG/CDR/Pay Order/DD
80% payment after delivery, installation / commissioning /user satisfaction certificate

Details of Foreign Principal Information with account details)

1. Name / Title: _____
2. Address: _____

OEM Name:	Firm Name:	Signature:
OEM Focal Person:	Firm Focal Person:	Official Seal:
OEM Phone Number:	Firm Phone Number:	Name & CNIC:
OEM Email Id:	Firm Email Id:	Designation:

Annex C

FINANCIAL OFFER
NUTECH / SCM / Mechanical Lab Eqpt - PSDP 2021 / TD-186

Ser	Part No	Items	Description	A/U	Qty	Unit Price PKR (Including Tax)	Total Price PKR (Including Tax)
1		**Combo Lathe**	• Frequency inverter • V-way bed is hardened and precision ground • Independent lead screw and feed shaft. • Power cross feed function. • Automatic feed and threading to be fully interlocked • Spindle bore35mm or better • MT5 or equivalent spindle hole with approximate Φ 150 mm three-jaw chuck • T-slotted cross slide • Tail stock may be offset for turning tapers • Geared mill head with more torque • Mill head should be tilted ± 90° . • Tolerance test certificate, test flow chart should be included. • Distance between centers: 650 mm or better • Swing over bed 290 mm or better • Swing over cross slide: 160 mm or better • Width of bed: 180 mm or more • Taper of spindle bore MT5 • Number of spindle speeds: Variable • Range of spindle speeds: 50-2000 rpm or better • Range of longitudinal feeds: 0.07-0.20 mm/r or better • Range of inch threads: 10-50T.P.I or better • Range of metric threads: 0.35-3.5 mm or better • Top slide travel: 75 mm or better • Cross slide travel 135 mm or higher • Tailstock quill travel: 65 mm or better • Taper of tailstock quill MT3 • Mill & drill • Spindle stroke: 55 mm or better	Nos	03		

			• Distance of spindle to table: 350 mm or better • Distance of spindle to column: 185 mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • change gears, • oil tray, • splash guard, • jaw chuck, • dead centers, • oil gun, • Steady rest • Follow rest • Face plate • 4 jaw chuck • Live center • Stand base • Lathe tools • Thread chasing dial • Spindle cover • Lead screw cover • Tool post cover • Side brake • 2 axis DRO • Quick change tool post • Machine vice • Collet chuck kits				
2		**Lathe Manual Bench Top**	• Distance between centers: 350 mm or better • Swing over bed: 240 mm or better • Swing over cross slide: 125 mm or better • Width of bed 120 mm or better • Taper of spindle bore: MT4 or MT5 • Spindle bore 25 mm or better • No. of spindle steps: 08 • Head:D1-4 Metric thread- 21kinds(0.4-7mm)	Nos	05		

			• Inch thread- 34kinds(4-56 T.P.I) • Mouldar thread-16 kinds(0.35-5M.P) • Diametral thread-36 kinds(6-104 D.P) • Variable spindle speeds: • Range of spindle speeds: 125-2000/50-2000 rpm or better • Range of longitudinal feeds: 0.05 -0.20mm /r or better • Top slide travel: 60mm or better • Cross slide travel 140mm or better • Tailstock quill travel: 50mm or better • Taper of tailstock quill MT2 or MT3 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories** • Change gear • 3-jaw chuck • Splash guard • Oil gun • dead centers • Steady rest • Follow rest • Lathe tool • Face plate • 4 Jaw chuck • Live center • Stand base • Side brake • Tool post cover • Thread chasing dial				
3		**Lathe Manual 6 feet**	• Swing over bed: 400mm or better • Swing over carriage: 220mm or better • Swing over gap 600mm or better • Length of work piece: 2000 mm or better • Width of bed 380 mm or better • Section of turning tool 25x25mm or better • Spindle speed: 20-1400rpm (24steps) or better	Nos	03		

			• Hole through spindle 50 mmor better • No. of feed 64 kinds for each • Range of metric threads 1-192mm 44 kinds or better • Range of inch threads: 2-24tpi 21kinds or better • Range of module threads: 0.25-48 module 39 kinds • Range of diametral pitch threads: 1-96 DP 37 kinds or better • Tailstock spindle travel: 145mm or better • Tailstock spindle diameter: 75mm or better • Taper of tailstock spindle center hole: MT5 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • 3-jaw chuck • 4-jaw chuck • Face plate • Steady rest • Follow rest • Dead centers • Splash guard • Oil tray • Work lamp • Coolant system • Foot Brake • Tools box • Quick change tool post • Live center • Chuck guard • Tool post guard				
4		**Universal Milling Machine**	• Table size: 250*1000mm or better • Table load100 KG or higher • Center distance120mm or higher • Drilling Dia: 50mm or better • T slot qty-size15mm or better • Spindle speed 40-8000rpm or better	Nos	03		

			• Spindle nose to table surface: 50-390mm or better
			• Spindle center to Columns
			  ○ X-axis travel: 800-900mm or better
			  ○ Y-axis travel: 400-370mm or better
			  ○ Z-axis travel: 340mm or better
			• Ram travel: 450mmor better
			• Spindle travel: 127mmor better
			• Head swivel: 90degree and tilting: 45degree
			
			Or Equivalent
			
			Ranges and values are approximate and close values will be acceptable
			
			Accessories:
			
			• step speed milling head
			• Lead screw
			• Mill arbors
			• Drill chuck
			• Guide way
			• Spindle bearing
			• Work light
			• Draw bar
			• Tool & tool box
			• Electric Power feed
			• DRO
			• ISO40 spindle
			• Machine vice
			• Variable/Frequency speed milling head
			• Milling chuck collets
			• 50pcs set clamping kits
			• Coolant system
			• Plastic splash guard
			• Oil collecting plate
			• Air drawbar
			• Ball screw
			• Automatic lubricating pump
			• Spindle protection cover
			• Hanging control panel				

5		**Surface Grinder**	• Machine stand and body made of cast iron. • The machine should be able to grind all kinds of surfaces • Grinder machine should be installed with permanent magnetic chuck or electro-magnetic chuck • Vertical dial graduations: 0.01mm or better • Cross travel graduations: 0.02mm or better • Working table size: 500x200mm or better • Movement of working table550x250mm or better • T -Slot number x width: 1x14mm or better • Grinding head distance from spindle center to table: 450mm or better • Wheel Size: 170x11x30 mm or better • Wheel speed: 2800 r/min or more • Vertical feed Per revolution: 1.75mm or better • Vertical feed Per graduation: 0.01mm or better • Cross feed Per revolution: 3 mm or better • Cross feed Per graduation: 0.02mmor better • Surface roughness: Ra0.32 or less • Coolant pump • Hydraulic motor **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Wheel exactor • Leveling wedge and bolt • Coolant tank • Wheel dresser stand • Working lamp • Electro-magnetic chuck 150*400 • Extra Wheel flange • Parallel wheel dresser • Dust collector	Nos	02		

6		**Shaper Machine**	• Shaping length: 630 mm or higher • Horizontal movement of the table630 mm or better • Distance between the ram bottom and table670 mm or better • Vertical movement of table360 mm or better • Displacement of arm 150mm or better. • Travel of tool head: 120mm or better • Number of ram strokes per minute T/ min14-80 or better • Table feed: Horizontal 12 steps 0.4-5mm or better • Table feed: vertical 12 or better steps0.08-1.0 mm or better • Width of the T-slot for center positioning mm 18 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Shaper head • Work lamp • Operate tools • Machine vice 200mm • 2 wheel grinder	Nos	02		
7		**Band Saw Machine**	• Frame of machine made of Solid steel within a dual-column frame guide. • Should have Manual linear stop for quick and easy setting of the correct work piece length • Powerful drive motor • At the end of the sawing cycle, the saw blade belt should stop and the saw blade should automatically return to the home position • V-belt drive with 4 different speed • Quick clamps for rotation from 0 to 45° or better • Capacity Circular @90° 178 mm or better • Rectangular @90 178x305 mm or better • Circular @45°127 mm or better • Rectangular @45° 120x125 mm or better • Blade speed @ 50Hz 22, 34, 49, 64 MPM or better • Blade speed @ 60Hz 27, 41, 59, 78 MPM or better	Nos	02		

			• Blade size 19x0.9x2362 mm or better • Motor main • Motor hydraulic • Coolant pump • Spare cutting blade • Tool Box **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***				
8		**Hack Saw Machine**	• Hacksaw machine for cutting bars, tubes and profiles in a wide variety of materials, • Cutting capacity (round/square) φ250/250x250mm or better • Hacksaw blade 450x35x2mmand 500x40x2mm or better • Number of reciprocating motion 91/min or better • Blade stock 152mm or better • Spare Blade • Tool Box **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	02		
9		**Radial Drilling Machine**	• Drilling capacity 40 mm or better • Distance from spindle to column 300 - 1300 mm or more • Distance from spindle to table 250 - 1300 mm or better • Spindle travel 200 mm or better • Spindle taper MT4 • Speed 75-1200 rpm or better • Spindle speed steps 6 steps • Spindle feed 0.1-, 0.16, 0.25 mm/r or better • Rocker rotary angle 360 degree **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	03		

			Accessories: • Box type worktable • Drill chuck • Taper sleeve • Wrench • Spindle guard • Machine vice				
10		**Bench Drilling Press**	• 16-speed settings to accommodate various materials and thicknesses • Cast iron worktable, height adjustable and bevels up to 45 Degree left & right • Scaled steel fence for aligning, guide and brace workpieces, stopping block for repetitive drilling jobs • Chuck 16mmor better • Spindle Travel 85mmor better • Spindle Taper MT2or equivalent • Speed Change 16 or better • Speed 50/60Hz 220-2840/260-3410 r/min 220-2840/260-3410 r/min or equivalent • Swing340mm or better • Working Table size 290x290mmor better • Column diameter 72mm • Distance of spindle nose to stand table 1000 mm or better • Distance of spindle axis to column 250 mm or better • Distance of spindle nose to work table: 700 mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Drill chuck • Tapper sleeve • Wrench • Safety guard • Vice	Nos	02		

11		**Sheet Bending Machine**	• A compact high-quality engineering and fully welded structure • Air Spring control with foot function • Simple and safe operation. • Hydraulic compensation • Air spring function • Foot control • Press blade and folding blade of segment structure • Working length 1000 mm or better • Working width 80 mm or better • Sheet thickness: 2 mm or better • Clamping bar lift 45 mm or better • Folding angle up to 135° • Press blade • Folding blade • Foot Pedal/Control **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	02		
12		**Tracked Tractor Transmission (on stand with wheels)- Manual**	• Clutch unit • Gearbox • Pinion gear – ring gear • Steering clutch • Final reducer • The transmission to be operated manually through a crank handle • The tractor transmission cutaway model to be mounted on the stand with wheels. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
13		**Auto Parts (Valve, Clutch, Gaskit, Engine Shaft, Piston, Connecting**	• Set of Auto parts of a 1300cc Toyota GLI (preferably 2019 model or better) vehicle • 2 valves • 1 cutaway complete clutch assembly • 1 gasket set for engine and other parts	Nos	01		

		Road, Crankshaft, Engine Head, Oil Pump, Camshaft, Timing Belt, Spark Plug, Piston Ring)	• 1 crankshaft/engine shaft • 1 cutaway piston • 1 connecting rod • 1 engine head • 1 cutaway oil pump • 1 camshaft • 1 timing belt • 3 piston rings				
14		**Manual Gear Transmission Apparatus with Software**	• Trainer to provide complete manual gearbox for group demonstration • Mounted on a steel plate • Hand operated Gearbox • Sectioned to show all moving components • Cloud-based software, with o Online interactive theory presentations o Investigations and assessments • For demonstrations of the position and mounting of manual gearbox components. • Front and Reverse Gear selection • Differential. • Clutch housing. • Speedo drive. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
15		**Automatic Gear Transmission**	• Trainer to provide complete automatic gearbox for group demonstration • Mounted on a steel plate • Hand operated Gearbox • Sectioned to show all moving components • Cloud-based software, with o Online interactive theory presentations o Investigations and assessments • For demonstrations of the position and mounting of automatic gearbox components. • Front and Reverse Gear selection • Differential. • Clutch housing.	Nos	01		

			• Speedo drive. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***				
16		**Self-Starter and Manual Starter Cutaway Models Of Engines**	• Trainer for demonstration, investigation and fault-finding and simulation of a typical automotive ignition and charging system. • Access to a variety of ignition systems and a charging system. • A range of fault-insertion options to simulate typical real-world system malfunctions. • Cloud-based software, with o Online interactive theory presentations o Online practical electronics tasks o Interactive theory investigations and assessments o • Wall mounting brackets, • Bench stands, • Digital Multimeter • Accessory kit. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Experimental Capabilities** • Identification of ignition system components and types. • Identification and investigation of the operation of spark plugs. • Identification and investigation of contact breaker ignition systems. • Diagnosis of faults in contact breaker ignition systems. • Identification and investigation of electronic ignition systems. • Diagnosis of faults in electronic ignition systems. • Identification of starting and charging system components and types.	Nos	01		

17		**Cutaway Model: Engine Oil Pathways**	• Oil pump apparatus with internal gears complete with oil filter. • Pressure bulb • Pressure relief valve • Suction device • Model should be mounted on a suitable base • Sectioned model should be color coded	Nos	01		
18		**Chassis Layout Complete**	• Car Chassis Front Engine Carburetor with Rear Drive (On Stand with Wheels) -Electrical • 4-stroke 4 in-line cylinders • Displacement: 2000 cu. Cm or better • Gearbox: 4/5 forward speeds + reverse • Hypoid differential • Camshaft in the crankcase • Vertical twin carburetor • Water cooling • Spring single plate clutch • McPherson front suspension • Front disc brakes and rear drum brakes • Rack steering box • Drive shaft with mechanical and flexible joint • Rear leaf spring suspension	Nos	01		
19		**Steering Mechanisms Apparatus**	• Electrical power steering (EPS) trainer in working conditions • Fully operating McPherson suspension • Instrumentation to show all information concerning the operation. • Operating McPherson struts, rack and pinion • Adjustment of the steering effort directly on the rack • Vehicle speed simulation from 0 to 120 km/h or better • Alternator simulation • Indicator lamp and voltage/current display • Body computer with diagnostic socket (with low speed CAN) OBD 16 pin **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		

20		**Shock Absorber Mechanism Apparatus**	• Steering Unit with McPherson Suspensions (On Stand with Wheels) – Manual • McPherson suspension • Shock absorber • Spring • Rack and pinion steering box • Disc brake • Steering wheel	Nos	01		
21		**Turbodiesel Engine – Functioning 4 Cylinders Indirect Injection Overhead Camshaft (OHC) Rotating Injection Pump Displacement: 1900 Cu. Cm**	• Vibration-proof frame • Fuel supply (tank, pump, line) and cooling water circuit • Sensors for cooling water flow rate & temperatures (exhaust gas, cooling water, fuel) • Control cabinet with warning lamps (oil pressure, alternator failure) • Operating time counter and ignition key • Water-cooled • 4 stroke, 4 in-line-cylinder diesel engine • Power transmission to engine test stand via elastic coupling and a jointed shaft • Turbocharged Intercooled Displacement: 2.8 L / 1900 cu. Cm or better • Power output: Approx. 72kW/3400rpm • Indirect injection • Rotary injection pump • Overhead camshaft (OHC) • Distribution through a toothed belt • Thermostatic valve • Gearbox: 5 forward speeds + reverse • Alternator **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
22		**Indirect Injection 4 Stroke Diesel Engine Model (On Base) – Manual**	• Indirect injection complete with: o injection pump o injector o pre- chamber o preheating glow plug o cooling system	Nos	01		

			○ distribution circuit, etc • Should be mounted on a moveable, heavy-duty steel frame • Hand operated and sectioned for visualization of all moving parts				
23		**4 Stroke Petrol Engine Model (On Base) – Manual**	• Training model of a 4-stroke petrol engine. • Hand operated through a crank handle • Complete with sectioned ○ carburetor ○ coil ignition, ○ cooling system, ○ distribution system, ○ spark coil, etc. • Indicator for simulation of the mixture ignition.	Nos	01		
24		**Cutaway Model: VVTI Engine With Transmission**	• Educational Model for VVTI Engine, manual transmission and Break System Structure. • Each incised section should be painted with different colors for education efficiency. • Should be operated as same as a real engine while changing the gear and able to check internal engine movement by precise cutting. • Each part of engine should be painted specifically. • 4 cylinders • Displacement: 1000-1300 cc or better • DOHC - double overhead camshaft • VVTI system with electronically controlled intake valves • 4 valves per cylinder • Roller chain • Multi-point electronic injection with throttle • 12V alternator • Thermostatic valve **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
25		**Cutaway Model: IVTEC Engine With Transmission**	• Educational Model for IVTEC Engine, manual transmission and Break System Structure. • Each incised section should be painted with different colors for education efficiency.	Nos	01		

			• Should be operated as same as a real engine while changing the gear and able to check internal engine movement by precise cutting. • Each part of engine should be painted specifically. • Composition: IVTEC Engine ASSY/4 cylinders • Manual Clutch Break System, • Emergency Switch, Safety • Fuse Light • Steel frame with Heat treatment painting • 4 wheels brake				
26		**Automobile Engine and Transmission Power System Cutaway Model**	• Displacement: 1600/2000 cu.cm or better • 2 overhead camshaft driven by a toothed belt –DOHC • Overhead valves with V-arrangement • Coil ignition • Alternator • Twin-carburetor • Gearbox: 5 forward speeds + reverse • Dry single-plate clutch	Nos	01		
27		**Tool and Cutter Grinder**	• Worktable Diameter 340mm or better • Worktable traveling 160mm or better • Worktable area130×675mm or better • Rotating Angle of Wheel head 360° • Face and side cutter • Lathe tool • Hobbing cutter • Reamer bit • Grind spiral milling cutter • Ball end mill “R” type • Graver and other taper milling cutter. **Accessories:** • Complete Grinding attachment for grind spiral milling cutter ball end mill, R type lathe tool, graver and other taper milling cutter • Complete Grinding Attachment for drill bit ,screw tap, side mill, round bar • Complete Grinding Attachment for end mill ,side mill • Complete Grinding Attachment for lot miller, face and side cutter, lathe tool ,hobbing cutter, reamer bit • Tool box	Nos	02		

			• Stand • Center **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***				
28		**Portable Hyd Pipe Bending Machine With Bending Die Set**	• Equipment capable of bending angles from 0 to 90degree on pipes of various diameters • Cold bending capable • Two-speed, heavy-duty hydraulic pumping system. • Longer piston stroke per pumping • Hand force minimized operator fatigue. • Heavy duty casters wheels • Output(T) 16 or better • Stroke(mm) 230 or better • Bending range (mm) 22-60 or better • Thickness of pipe (mm) 2.75-4.5 or better • Pipe Moulds 22,28,34,42,48,60 or more • Includes Pipe Modules and Dies **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	02		
29		**Argon Gas Welding Plant**	• Process DC TIG , MMA (STICK) • Rated Input Voltage 1PH ~ 230V ±15% • Approx. Max. Load Power TIG: 7.81 KVA, MMA: 5.63KVA • Approx. Capacity TIG: 250A/20V • Rated Duty Cycle (40^{o}C) MMA: 200A/28V • 60%: TIG: 200A/18V • MMA: 160A/26.4V • 100%: TIG: 3A/10.1V~250A/20VMMA: • Approx. Welding Current/Voltage Range 20A/20.8V~200A/28V • Open Circuit Voltage 70V~80V • Power Factor 0.8 • TIG Pulse Frequency 0.2Hz~200Hz • Pulse Width (Ratio) 1~100%	Nos	02		

			• Arc-starting Current 5A~250A • Crater-filling Current 5A~250A • Current Up-slope Time 0.1S~15S • Current Down-slop Time0.1S~15S • Pre-Gas Time0.1S~15S • Flow-Gas Time 0.1S~15S • Spot Arc Time 0.1S~10S • MMA Arc Force 10A~200A • Hot Start Time 0.1~3S • Hot Start Current 10A~200As **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories**: • 4M cable with torch • Electrode holder/2M • Earth clamp/2M • Argon gas regulator • Water cooling unit 6.5L • Welding road 5 packs (1 Kg Each) • Foot pedal				
30		**Mig/Tig Welding Machine With Inverter**	• Rated Input Voltage approx.3PH ~ 400V ±15% • Approx. Max. Load Power Capacity 15.26KVA • Approx. Rated Duty Cycle(40℃) 60% MIG: 350A/31.5V • MMA: 350A/34V 100% MIG: 300A/29V • MMA:300A/32V Approx. Welding Current/Voltage Ranges • MIG: 10A/14.5V~350A/31.5V • MMA:10A/20.4V~350A/34V • Open Circuit Voltage 70V~80V • Estimated Power Factor 0.85 • Pre-Gas Time Preset • Flow-Gas Time Preset • Wire-feed Mechanism 4 Rollers • Approx. range for Wire-feed Speed 0~25m/ min • Wire Spool Capacity 300mm (15kg)	Nos	02		

			• Filler Wires (mm) Fe, Ss: 0.6~1.6 mm • WATER COOLANT unit • Operating Voltage 230V 50/60Hz • Rated Power260W • Cooling Power1.5KW(1L/MIN) • Maximum Pressure 0.3MPA/60HZ • Recommended Cooling water • Tank Volume6.5L **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Mig torch • Electrode holder/2M • Earth clamp with 3Mcables • CO_2 gas regulator with heater • Water cooling unit • Nozzle and contact tips kit • Welding rods 5 PACK				
31		**Arbor Press**	• Equipment body should be made of high quality cast-iron for study design purposes. • For press-fitting and pulling bearings, 4-position plate, Chrome-plate steel pinion and ram should be recommended. • Load Capacity: 3 Ton or better • Height &diameter MPA 285x163 or better • Arbor length 44 mm or better • Ram square mm 38x38 or better • Base size mm 455x300 or better • Press Height: 615mm or better • Base plate **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	02		

32		**Saw Circular 9 inch**	• Circular saw blade should be made of High-Speed Steel which is highly efficient and durable. • Low-voltage controlled hand switch should be provided which is convenient for operation • The double clamp structure can quickly clamp materials and rotate 45°from side to side for cutting. • Blade size 315mm or better • Circular @90° 100mm(4'') or better • Rectangular @90° 140x90mm(5.5"x3.5") or better • Circular @45° 90mm(3.5") or better • Rectangular @45° 100x0mm(4"x3.5") or better • Blade speed @50HZ18,36rpm or better • Vice opening 145mm(5.7") or better • Drive Gear • Extra saw blades (03) **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	03		
33		**Angle Iron Cutter**	• Blade diameter: 355mm or better • Max cutting capacity: 100mm or better • No-load speed: 3800/min or better • Power 2350W or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Cut off wheel (Qty 4) • Hex Key • Carbon brushes 1 set	Nos	02		
34		**Metal Engraving Machine**	• Working Area (X*Y*Z)400mm*400mm*200mm or better • Platform size(X*Y)400mm*400mm or bigger • Engraving Speed 7000-8000mm/min or better • Running speed 12000mm/min or better • Machine frame should be made of cast iron • Spindle Speed 24000rpm or better	Nos	01		

			• Resolution 0.005mm or better • Repeatability 0.03mm or better • Machine accuracy around 0.02mm or better • Diagonal error 0.1mm-0.3mm or better • Lead shine stepper motor drivers • Falling Working Dictate G code*".u00", ".mmg" ".plt" • Operating system controller Control configuration: DSP • Software environment Windows 10 • Software Compatibility :Typle3, artcam, castmate, proE, Coreldraw/CAD,CAM • Diameter of cutter ф3.175, ф4mm, ф6mm, ф8mm, ф12.7mm,ф2mm,ф1mm, etc. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Control cabinet • spindle cover • Lead shine hybrid servo motor driver • Auto-oiling system • Tool-sensor • Water chiller system • Mist spray cooling system, • Water tank system • Working lamp • Heavy-duty dust proof system • Dust collector system • Rotary attachment • Tool box • Automatic Tool Calibration System • Different size tools and collets				
35		**Steam Engine Model (On Base) – Manual**	• A study model of steam engine with pistons and valves. • The model should be put in motion by turning the flywheel, thus showing the manner of operation of the engine and of the built-on centrifugal governor • Color coding with appropriate colors to differentiate the parts of the engine	Nos	01		

			• Model should be mounted on appropriate base				
36		**Vehicle Simulation Software**	• The simulator for the study of all the operating features of an automobile with a hybrid system (internal combustion engine and electric motor) or completely electric. • Composed of a panel operated by computer with a silk-screened diagram which explains the positioning of the car components and indicating the features of the system by showing different colours on the panel. • The fault diagnosis provision related to practical and theoretical topics. • High-voltage battery (12 V) module, (Li-ion cells) • Recharging system by external AV • Electric motor control system • 3-phase inverter for managing the electric motor • Inverter control signals and sensors for the voltage and current measurement • 3-phase AC motor with integrated transmission system • Integrated sensors in the AC three-phase motor **Or Equivalent**	Nos	01		
37		**EFI Reprogrammable Module**	• 8 pre-programmed injector current curves • Peak current 4A-10A • Hold current 1A-2.5A • Peak hold 0.5-1.0ms • Built in Injector test fire program for quick troubleshooting while in the field • 8 RGB LEDs indicate proper operation as well as log faults • 2 outputs (Ground and 0-5V) can be run to an ECU to datalog any injector faults • Pre-Programmed in Position 7 for Billet Atomizer 325-800 • Precision of injectors 500 Lb/Hr or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
38		**Cutaway**	• Educational Model for CVTI Engine, manual transmission	Nos	01		

		Model: CVTI Engine With Simulator	and Break System Structure. • Each incised section should be painted with different colors for education efficiency. • Should be operated as same as a real vehicle while changing the gear and able to check internal engine movement by precise cutting. • Each part of engine should be painted specifically. • 4 cylinders • Displacement: 1000-1300 cc or better • DOHC - double overhead camshaft • CVTI system with electronically controlled intake valves • 4 valves per cylinder • Roller chain • Multi-point electronic injection with throttle • Thermostatic valve • Electronic ignition • Disc brake • Silencer				
39		**Peter Engine**	• Single cylinder • 2 stroke • Power:5Hpor better • Speed Range: 1500 RPM • Automation Grade: Manual • Cylinder bore and stroke: 80x100mm • Nominal compression ratio: 16.5:1 • Cubic capacity: 553cc • Specific Fuel consumption in g/kw/hr: 250 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
40		**Leaf Springs Model**	• Leaf spring model of a real vehicle to understand the concept of suspension system • Model mounted on a suitable base • For reference purpose pic is attached as Picture-A	Nos	01		
41		**Engine Generator**	• Lube Oil Capacity: Approx. 0.6 Ltr • Overload Protection Type: Non-fuse overcurrent protector inverter over current protection program control. • Output: 3-4 KW	Nos	02		

			• Voltage: 220 Volt • Power Factor: 1 • Type: Single Cylinder-25°C inclined 4-Stroke-OHV air-cooled engine • Bore X Stroke: 70 x 55 mm • Starting System: Recoil Starter / Electric start • It should have built in Oil Alert • Fuel Tank Capacity: 10 Ltr • DC Output: 12V x 8.3A • Self – Excitation system				
42	**(a)**	**Electric Welding Plant**	• 200 - 400 Apm Three Phase Electric Welding Machine • Grade: Semi-Automatic • Welding type: MIG Welder • Material: Mild Steel • Approx. Voltage: 400V • Range of Current: 200-400Apm **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
	(b)	**Soapstone, Squaring Tools, Welding magnets, Scribe, Welding clamps, Permanent markers, Welding pliers, Steel wire brush**	• Soapstone • Squaring Tools • Welding magnets • Scribe • Welding clamps • Permanent markers • Welding pliers • Steel wire brush	Set	01		
43	**(a)**	**Gas furnace (casting)**	• Capacity: 10 kg or better • Inner container: crucible • Mobile or immobile type to fit different application • Furnace center max temperature: 1000℃ • Aluminum melt liquid max temperature: 850℃ • Approx. Heating speed: 130KGS/Hour • Replaceable internal heater	Nos	01		

			• Insulator: fiber type • Automatic temperature modulation **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***				
	(b)	**Graphite Crucible**	• Composition: Carbon • Carbon Content: Medium-Carbon • Grade: Industrial Grade • Forming Way: Molded Graphite Standard parameter • Approx. refractoriness≥ 1630ºC • Recommended Carbon content≥ 38% • Apparent porosity≤ 35% • Approx. Bulk density≥ 1.6g/cm3 **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
	(c)	**Sand mixing machine**	• Mixing Drum Type Double Wheel • Continuous Operating type machine • Approx. Diameter of disk(mm) 1000 • Feeding amount one time is approx. 110 kg • Productivity(t/h) 1.5~2.5 • Rotational speed of driving shaftapprox:40r/min or more • Approx. Power:4kw **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***	Nos	01		
	(d)	**Closed Rectangular Molding Box**	• Closed rectangular molding box for foundry operations • Pic attached as Picture-B	Nos	05		
	(e)	**Hand Riddle, Shovel, Rammers, Sprue, Trovels, Mallet, Gate**	• Hand Riddle • shovel • Reamers • Sprue • Trovels	Set	01		

		Cutter, Swabs, Bellows, Slicks, Smoothers	• Mallet • Gate Cutter • Swabs • Bellows • Slicks • Smoothers				
44	**(a)**	**Universal wood machine**	**Planar** • Working tables : 400x1800 mm or better • Cutter block diameter : 40 mm or more • Cutter block rotation speed : 5700 r.p.m or better • No. of knives : 3 • Knifes dimensions : 400x20x30 mm or better • Table adjustment : 4 mm or better **Thicknesses** • Feed speed : 7 m/1' or better • Max. working height : 220 mm or better • Min. working height :4 mm or better • Max. cutting depth : 4,0 or better **Circular saw** • Working table size : 326x1112 mm or better • Shaft rotation speeds :4500 r.p.m or better • Blade diameter :200- 300 mm or better • Blade bore diameter : 30 mm or better • Cutting height at 90° : 100 mm or better • Distance between blade and fence : 730 mm or better • Blade inclination : 45° • Max cutting height at 45° : 75mm or better • Shaft rotation speed engraver : 7000 r.p.m or better. • Engraver blade diameter : 90 mm or better. • Engraver blade bore diameter: 22 mm or better. **Mortiser** • Working table : 250x500 mm or better • Longitudinal stroke : 200 mm or more • Transversal stroke :95 mm or better • Vertical stroke :90 mm or better • Chuck size : 16 mm or better • Chuck rotation speed ; 5700 r.p.m or better	Nos	01		

			Shaper • Working table : 326x1112 mm or better • Shaft rotation speeds : 7000/4400/3100/2000 • Standard shaft diameter : 105 mm or better • Spindle Length : 30 mm or better • Shaft vertical stroke : 115 mm or better • Tool diameter : 180 mm or better • Tenoning depth : 65 mm or better • Tenoning carriage dimensions : 1800x315 mm or better • Carriage stroke 1800x220 mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • N°2 clamp lever • Sharper fence • Service wrenches • Mortised chuck • Table extensions with swinging arms: 860x600 mm • Guards on mortiser chuck • 3 pcs. Planer knives • Planer guide • Saw Guide • Bridge safety hood on planer • Set of wheels with feeding steering bar • Contouring fence • Carriage stroke : 2200/2000 • Wescott (Diameter) : 16 mm • Spiral cutter • Mortise knives • Mouler knives • Big saw blade • Small saw blade				
	(b)	**Chisel and chain mortising**	• Chisel capacity 6-12mm or better • Motorizing depth 76mm or better • Drilling chuck depth 1-13mm or better	Nos	01		

		machine	• Chisel to table: 190mm • Motor input :370W • Spindle speed 1400 rpm approx.. **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable***				
	(c)	**Sanding machine**	• Voltage230V-240V, 50Hz/120V,60Hz • No-Load Speed 6000-12000/Min • Input Power 240W/2.0A • Size of Base: 125mm or better **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Dust Bag, • Sander Paper 10 Nos	Nos	01		
	(d)	**Electric hand plane**	• Volts:220-240V~50/60Hz • Approx.power:1050W • No-load speed:16000rpm • Planing width & depth: 82x3mm or better • Base and side covers should be of aluminum • Self-cooling belt system **Or Equivalent** ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • With 2pcs planning blades • With 1pcs belt • With 1set parallel guide • With 1pcs depth guide	Nos	01		
	(e)	**Wood Pattern Router**	• Chuck Diameter: 12mm or better • No-load Speed: 0-2300RPM • Approx. Power: 1600W	Nos	01		

			Or Equivalent ***Ranges and values are approximate and close values will be acceptable*** **Accessories:** • Templet Plate • Straight Guide • Trimmer Guide • Collet • Wrench				

Firm Name: _____

Signature: _____

Name: _____

Designation: _____

Tender No_____
Name of the Firm _____
Firm Address_____
Date_____
Telephone No_____
E-Mail_____

To,

DD SCM Office
NUTECH University
I-12, Main IJP Road,
Islamabad.

Dear Sir

1. I / We hereby offer to supply to the NUTECH University the stores detailed in schedule to the tender inquiry or such portion thereof as you may specify in the acceptance of tender at the price offered against the said schedule and further agree that this offer will remain valid up to 90 days after opening of Financial offer and will not be withdrawn or altered in terms of rates quoted and the conditions already stated therein or on before this date. I / we shall be bound by a communication of acceptance to be dispatched within he prescribed time.
2. I / we have understood the instructions to Tenders and General Conditions Governing Contract available at NUTECH website and have thoroughly examined the specifications / drawing and / or patterns quoted in the schedule here to and am/are fully aware of the nature of the stores required and my/ our offer is to supply stores strictly in accordance with the requirements.

Yours Faithfully.

(Signature of Tenderer)
Designation
Date:

Individual signing tender and / or other documents connected with a contract must be signed by principal authorized rep/ OEM rep/ Authorized partner firm rep.

SPECIMEN FOR "ADVANCE PAYMENT BANK GUARANTEE"

Guarantee No: _____Date_____ Amount:_____ Valid upto:_____

In Favour of:

National University of Technology (NUTECH), IJP Road, I-12, Islamabad

Subject: **Advance Payment Bank Guarantee**

Contract No: _____DATED._____

Dear Sir,

1. We [Name of Guarantor] understand that you have entered into contract with M/S [Name of Firm] (hereinafter called Our Client), for provision of [Name of Stores]. And as per the above mentioned Contract, you are liable to pay to Our Client an amount of [Amount of Guarantee] in advance, which shall be released against a Bank Guarantee. 2. Bank & seller firm shall inform your office regarding termination of the validity of this bank Guarantee one clear month before the actual expiry date of this Bank Guarantee.

3. Now, we hereby irrevocably undertake to immediately make payment on to your orders, merely upon receipt of your first written notice, an amount not exceeding [Amount of Guarantee] that may be claimed by you at your own discretion without it being necessary for you to prove or even assert to the Bank any default whatsoever of Our Client under the Contract.

4. Claims against this Guarantee shall be lodged on us through written request/s on your proper Letter Head. Unless claims are not presented on or before the Validity Date, all rights and benefits under this guarantee shall be forfeited and we shall be released from all claims, demands or liabilities of any kind whatsoever.

5. This Guarantee shall remain in force up to the above mentioned Validity Date which can however, be extended upon request of Our Client.

Yours faithfully,

Signature:_____

Name:_____

Designation:_____

Bank Stamp:

"SPECIMEN FOR BANK GUARANTEE AGAINST PERFORMANCE/WARRANTY GUARANTEE"

Guarantee No: _____Date_____ Amount:_____ Valid upto:_____

In Favour of: National University of Technology (NUTECH), IJP Road, I-12, Islamabad

Subject: **In compliance with terms of Performance/Warranty Guarantee Bank Guarantee**

Contract No: _____ dated_____

Dear Sir,

1. Whereas your good-self have entered into Contract No__ dated_with M/s [Firm Name] Located at [Firm Address], Herein after referred to as our customer and that one of the conditions of the Contract is submission of Bank Guarantee by our customer to your good-self for a sum of [Amount].

2. Incompliance with this stipulation of subj contract, we hereby agree and undertake as under:-

   a. To pay to you unconditionally on demand and / or without any reference to our Customer an amount not exceeding the sum of [Amount] as would be mentioned in your written Demand Notice.

   b. To keep this Guarantee in force till [Validity Date].

   c. That the validity of this Bank guarantee shall be kept two clear year ahead of the original / extended delivery period or the warrantee of the stores which so ever is later in duration on receipt of information from your office. Our liability under this Bank Guarantee shall cease on the closing of banking hours on the last date of validity of this Bank Guarantee. Claim received there after shall not been entertained by us whether you suffer a loss or not. On receipt of payment under this Guarantee, this documents i.e., Bank Guarantee must be clearly cancelled, discharged and returned to us.

   d. That we shall inform your office regarding termination of the validity of this bank Guarantee on clear month before the actual expiry date of this Bank Guarantee.

   e. That with the consent of our customer you may amend / alter any term / cause of the contractor add / delete any term / clause to / from this contract without making any reference to us. We do not reserve any right to receive any such amendment / alternation or addition / deletion

provided such like actions do not increase our monetary liability under this Bank Guarantee which shall be limited only [Amount].

f. That the bank guarantee herein before given shall not be affected by any change in the constitution of the Bank or Customer / Supplier or Vendor.

g. That this is an unconditional Bank guarantee, which shall been cashed on sight on presentation without any reference to our Customer / Supplier or Vendor.

Signature_____

Name_____

Desig_____

Bank Stamp_____

Note: No changes in the above given BG format shall be accepted.

"SELLER'S WARRANTY CERTIFICATE"

(To be provided on stamp paper)

Contract No: _____ Dated:

Validity ____ years from the date of final acceptance of the Stores.

We hereby guarantee that we are the genuine and original Source of provisioning the Stores to our Buyer. We also undertake that nothing in the manufacturing of these Stores has been obtained through unauthorized means.

1. We hereby warrant and undertake that the Stores and all the associated spares/ accessories supplied under the terms and conditions of the above Contract, are:

   a. brand new, complete in all respects, possessing good quality and standard workmanship; and

   b. liable for replacement/rectification free of charge, if during the Warranty period the same are found defective before or under normal use or these do not remain within the limits and tolerances stated under the specifications or in any way not in accordance with the terms of this Contract. All expenses incurred in removal, re-provisioning and reinstallation of such defective Stores or their parts shall also be borne by us.

2. The Warranty shall remain valid for a period of ____ years from the date of final acceptance of the Stores.

Signature & Stamp _____

_____

Name & CNIC _____

Designation: _____

Date: _____

**Sellers warranty must be provided by the Seller (firm) on Rs 100 stamp paper along with bank guarantee/CDR/Pay Order without changing a word. BG with additional clauses will be rejected.

CHECK LIST

(This checked list must be attached with your technical offer, duly filled and Signed by authorized signatory)

Tender No_____ **Date**_____

1	Tender Processing Fee	a. Tender processing fee ref no_____ b. Bank_____ c. Amount_____	
2	EM/ Bid Bond	a. EM/ Bid Bond ref no_____ b. Bank _____	
3	Form Annex A, A-1, B and C signed by Authorized Signatory	**Yes**	**No**
4	Offering specification of items as per IT	**Yes**	**No**
5	Quoted Currency as per IT	**Yes**	**No**
6	Accounting unit/Qty as per IT	**Yes**	**No**
7	Delivery Schedule as per IT	**Yes**	**No**
8	Country of origin of store_____		
9	Name of OEM:-_____		
10	Original Performa invoice (Mandatory)	**Yes**	**No**
11	Certified that there is no Deviation from IT conditions/ there is deviation from IT condition as per fol details	**Yes**	**No**
12	Blacklisting certificate.	**Yes**	**No**
13	Verifiable OEM Certificate	**Yes**	**No**
14	Warranty Period as per IT	**Yes**	**No**
15	ATPs provided	**Yes**	**No**

Note: Fill and/or mark Yes/No where required

_____

Signature of Firm Auth Signatory