

**Technical Specification for Tool Room Machinery Ten. No. 02/2019-20**

**1**

**Bandsaw Machine (Hydraulic)**

<b>Sl. No</b>	<b>Item</b>	<b>Unit</b>	<b>Specication</b>
1	Max. Size of material to be cut		
1.1	Cap. Of round bar	mm	150-200
1.2	Cap. Of square bar	mm	200-250
2	Stroke Length	mm	140
3	Blade speed	mtr/ min	20-35
4	Blade Size	mm	<b>(2800-3800) x ( 20-30) x ( 0.5-0.9)</b>
5	Electric Motor:		
5.1	Power	H.P	0.5 -1.0
6	Collant Pump	H.P	0.15 -0.25
7	Accuracy		Cutting taper: $\pm 0.2$ mm/ 100 mm diameter, Cutting length $\pm 0.2$ mm Axial play of saw carriage: 0.3 mm
8	<b>Accessories:</b>		
8.1	Set of Blades		Set of accessories suitable to the machine
8.2	Work holding device / V-jaws for Bundle clamping		
8.3	Coolant system / equipment		
8.4	Adjustable Bar Rest / Work rest		
8.5	Adjustable material stop		
8.6	Machine Lamp		
8.7	One set of manual		
8.8	One set of service tools		
9	<b>Others</b>		Bidder to specify and quote if any other accessories available /required for smooth running of the machine
10	<b>General features :</b>		
10.1	The specification of feed drive motors with make, model no., max. & nominal torque		
10.2	Preferably the guideways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more		

10.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	Bidder to specify the features of the machine	
10.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper		
10.5	Arm movement (Hydraulic)		
10.6	Feed Control ( Speed , Feed control by lever)		
10.7	Auto Lift movement		
11	<b>Any Others Aecessories</b>		Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
12	Terms & Conditions		<p>Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details</p> <p>Equipment should be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
13	Scope of supply	Bidder should submit complete scope of supply (Machine, standard aecessories, Optional Aecessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.	
14	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
14.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.	
14.2	Training and documentation	<p>Training shall be provided at the times of installation. Minimum of 5 days training for five persons which includes basic &amp; advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> <li>· Software instruction</li> <li>· Maintenance and trouble manual</li> </ul>	

		<ul style="list-style-type: none"> <li>· Training</li> <li>· Installation and Commissioning</li> <li>· Handling of accessories</li> </ul>
14.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
14.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
14.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

## 2

### CNC EDM Machine

The CNC EDM with C-Axis should capable of wear free ED machining with graphite electrode and copper electrode as per the following detailed specification.			
1	Work Tank Size	mm	(800-1000) X (500- 700) X (250-450)
2	Axis Travel ( X x Y x Z)	mm	(400-500) x (300- 400) x (300-400)
3	Measurement resolution	µm	5 or better
4	Maximum Job weight	kg	>800
5	Max. electrode weight on automatic chuck	kg	>50
6	Dielectric Unit		Filtration system - 10µ or better ; Flushing Injections ;
7	Generator		ISPG Integrated or better
8	Max. machining current (Option)	A	80
9	Minimum surface roughness (Ra)	µm	1 or better
10	Control System	Latest with complete module CNC controller (or OEM system) and Capable storage to store large part programs for continuous running	
11	Essential Accessories		
11.1	Automatic Tool Changer Linear or Rotary		
11.2	Rigid Linear Motor (X, Y, Z)		
11.3	Glass Scale Feedback (X, Y, Z)		
11.4	Rotary Head		
11.5	C Axis		

11.6	Super finish Module	Bidder should quote and supply OEM/well known branded with make, model and major specification	
11.7	Zero Wear Module		
11.8	Flushing system		
11.9	Filter set		
11.10	Servo voltage stabilizer		
11.11	Ultra Isolation transformer		
11.12	Silent operation Air Compressor with drier		
11.13	Chiller Unit		
11.14	Collet holder with collet set		
11.15	3D probe measuring system for Erowa or System 3R		
11.16	Erowa or System 3R electrode holding system kit		
11.17	Remote controller		
11.18	Clamping kit		
11.19	Precision machine vice 4"		
11.20	Ethernet, USB ports, RS-232C Communication Ports		
11.21	Fire Extinguisher		
11.22	Air gun with pipe		
11.23	Machine lamp		
11.24	Dielectric fluid (400 Litre)		
12	Others		Need to specify and quote if any other accessories available /required for smooth running of the machine
15	Terms & Conditions		The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.
			Manufacturer of the supplied equipment must be ISO Certified
			Authorization Letter from OEM
			List of clients in last five years to be provided.
		Manufacture/Supplier should have sizable installations of same model worldwide and at least Fives in India.	
16	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.	
17	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
	Installation and requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.	

17.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
· Software CDs		
17.3	Warranty	The whole system and its accessories should be given three years warranty for replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
17.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
17.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

### 3

### CNC Lathe (CNC Turning Centre)

	Make	Bidder to specify	
	Model	Bidder to specify	
1	<b>Capacity</b>		
1.1	Swing over bed	mm	450-550
1.2	Swing over carriage	mm	200-300
1.3	Max. turning diameter	mm	250-300
1.4	Max. turning length	mm	400-450
1.5	Distance between centres	mm	400-500
2	<b>Travel</b>		
2.1	X-Axis Travel (Cross)	mm	150-200
2.2	Z-Axis Travel (Longitudinal)	mm	400-450
3	<b>Main Spindle</b>		
3.1	Spindle motor Power	KW	7.5 or better
3.2	Max. Speed	rpm	4000 or better
3.3	Spindle Bore	mm	50-60
3.4	Spindle Nose		A2-5
4	<b>Feed Rate</b>		
4.1	Rapid Traverse X axis	mts./min	20 or better

4.2	Rapid Traverse Z axis	mts./min	20 or better
4.3	Feed Rate	mm/min	5000 or better
5	<b>Turret</b>		
5.1	No. of station	Nos.	8 or better
5.2	Tool shank size	mm	20x20 or better
5.3	Boring bar dia.	mm	32 or better
5.4	Turret indexing		Bi Directional
6	<b>Tailstock</b>		
6.1	Quill dia	mm	60-80
6.2	Quill stroke	mm	100-120
6.3	Quill taper	-	MT4 or better
7	<b>CNC System</b>		
7.1	Controller		Siemens/Fanuc (Latest with complete module)
7.2	Part Program Storage	GB	"Bidder to specify"
7.3	Programming Functions with editor		Complete module
8	<b>Accuracy</b>		
8.1	Positioning uncertainty	µm	5
8.2	Overall Axis Repeatability (X, Z)	µm	5
8.3	Part Surface Finish	µm	5
8.4	Roundness	µm	5
8.5	Turret Indexing Repeatability	µm	5
9	<b>Essential Accessories</b>		
9.1	Programmable Tailstock with sleeves	one No.	
9.2	Automatic Tool setter	one No.	
9.3	Hydraulic 3 Jaw Chuck	Max. turning diameter of the quoted machine	
9.4	Hydraulic 4 Jaw Chuck	Max. turning diameter of the quoted machine	
9.5	Soft Jaws	two sets	
9.6	Drill Chuck	25 mm	
9.7	Hydraulic Collet chuck with set of collets	Size: 26 mm; set of collets upto 25 mm	
9.8	Set of standard Cutting Tools with holder for replaceable inserts (for Facing, Turning, boring, threading, grooving, parting, drilling etc)	Various operation suitable various size of jobs each one No. Drills- Centre Drill and 1 to 20 mm drills	
9.9	Coolant System	Bidder to specify and quote suitable for the machine	
9.10	Start up Tool kit	Bidder to specify and quote suitable for the machine	
9.11	Foot switch	Bidder to specify and quote suitable for the machine	
9.12	Work light	Bidder to specify and quote suitable for the machine	
9.13	Centralized lub. System	Bidder to specify and quote suitable for the machine	
9.14	Set of Rubber mounts	Bidder to specify and quote suitable for the machine	
9.15	Voltage Stabilizer	Bidder to specify and quote suitable for the machine	
9.16	Ultra Isolation transformer	Bidder to specify and quote suitable for the machine	
9.17	Others	Ethernet, USB ports, RS-232C Communication Ports, Set of manual (or) CD	
10	<b>Any Others Accessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.	

13	Terms & Conditions	<p>Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details</p> <p>Equipment should be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
14	Scope of supply	<p>Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.</p>
15	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
15.1	Installation and commissioning requirements	<p>Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.</p>
15.2	Training and documentation	<p>Minimum of 5 days training for five persons which includes basic &amp; advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> <li>· Software instruction</li> <li>· Maintenance and trouble manual</li> <li>· Training</li> <li>· Installation and Commissioning</li> <li>· Handling of accessories</li> <li>· Software key (if any)</li> <li>· Software CDs</li> </ul>
15.3	Warranty	<p>The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.</p>
15.4	Technical support and service	<p>Manufacturer should have established after sales &amp; service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.</p>

15.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown
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**4 CNC Lathe / Milling Programming Module (Simulator)**

1	CNC Programming Simulator for Turning and milling operations for FANUC / SIEMENS (or) Equivalent controllers with the following features	Bidder to specify the features of the simulator.
	a. Basic education	
	b. Integrative training in programming, toolpath generation	
	c. Machining verification through graphics simulation	
	d. Built -In USB port , RS-232 Port	
2	<b>GENERAL TERMS &amp; CONDITIONS</b>	
a	Software should be supplied with latest	
b	The quote shall be supplied with reference to the module	
c	<b>The license must be perpetual</b>	
d	<b>Warranty : Five years from the date of acceptance of installation</b>	
e	The Installation and training will be the responsibility of the supplier	
f	During the above period of maintenance, any upgrades released will be supplied free of cost	



3	<b>Any Others Accessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
4	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
5	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
6	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Training should be provided during installation. Total training duration shall be of 07 days. Training shall be planned in two phases basic for 4 days and advanced for 3 days. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
· Software CDs		
6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

**5**

**CNC Machining Centre / CNC Milling Machine (I)**

1	Make	Bidder to specify
2	Model	Bidder to specify
3	<b>Axis Travel</b>	
3.1	X-Axis (mm)	1000-1200
3.2	Y-Axis (mm)	600-800

3.3	Z-Axis (mm)	600-700
4	<b>Table</b>	
4.1	Length (mm)	1200-1400
4.2	Width (mm)	600-800
4.3	T-Slot Width (mm)	14-16
4.4	Number of Std T-Slots	5 or more
5	<b>Feed</b>	
5.1	Rapid Feed (X, Y,Z Axes) (m/min)	20 or better
5.2	Max. Cutting Feed (X, Y,Z Axes) (m/min)	15 or better
6	<b>Spindle</b>	
6.1	Rating (KW)	Bidder to specify
6.2	Max. Speed (rpm)	8000 or better
6.3	Taper	BT40
7	<b>Accuracy</b>	
7.1	Positioning (µm)	10 or better
7.2	Repeatability (µm)	5 or better
8	<b>Automatic Tool Changer</b>	
8.1	Magazine capacity (Nos)	10 or better
8.2	Tool select by shortest & Random select	Bi-Directional
8.3	Max. tool diameter (mm)	80 or better
9	<b>Control System</b>	
9.1	Controller	Fanuc / Siemens /or equivalent (Latest with complete module) with the screen size of 19" or more with touch screen technology, app based which leads to a smart paperless shop floor management and monitoring.
9.2	Part Program Storage (GB)	Capable to store large CAM programs for continuous running (Minimum 4 GB)
9.3	Programming Functions with editor	Complete Module with technical calculator for power and torque requirements , with dxf file import facility, 3D simulation
10	<b>Essential Accessories</b>	
10.1	Servo stabilizer	Bidder to specify and quote suitable for the machine
10.2	Ultra Isolation transformer	Bidder to specify and quote suitable for the machine
10.3	Air Compressor with drier and multi dry filter	Bidder to specify and quote suitable for the machine
10.4	Automatic centralized	Bidder to specify and quote suitable for the machine
10.5	Touch Probe	Bidder to specify and quote Branded quality(Renishaw / Blum) Touch Probe

10.6	Machine protection	Monitoring vibration during machining to protect machine and spindle failure. User autorisation to the control system and the machine. Safety during power failure and Panel cooler for electrical cabinet. Door interlock for safety
10.7	Industry 4.0 features leads to smart machine	Live status of important component of the machine in operation, internet based remote diagnosis of the machine like fault on the machine
10.8	Operation hardware	Electronic handwheel, Flushing gun for internal cleaning, Coolant tank with chip conveyor
10.9	Tool holding devices	<p>Bidder to specify and quote Set of suitable Cutting Tool holders</p> <p>ER 25 collet chuck -1 No.</p> <p>ER 25 collets Dia 3 to Dia 14 in steps of 1mm - 1 each</p> <p>ER 32 collet chuck - 1 No.</p> <p>ER 32 collets Dia 10 to Dia 20 in steps of 1mm - 1 each</p> <p>ER 40 collet chuck -1 No.</p> <p>ER 40 collets Dia 20 to Dia 25 in steps of 1mm - 1 each</p> <p>ER 25 Tap collets with square drive for M8 and M10 taps- 1 each</p> <p>ER 32 Tap collet with square drive for M12 tap-1 each</p> <p>Side lock adaptors Dia 16, 20, 25 &amp; 32 -1 each</p> <p>Keyless drill chuck 0-13mm</p> <p>Holder (adapter) for 40 mm Face mill - 1 No</p> <p>Holder (adapter) for 80 mm Face mill - 1 No</p> <p>Holder (adapter) for 125 mm Face mill - 1 No</p> <p>Holder (adapter) for 50 mm Bull - 1 No</p> <p>Tool locking device-1 No.</p> <p>Pull stud- 30 no's</p>
10.10	Cutting Tools	<p>Bidder to specify and quote Set of Cutting</p> <p>Face mill cutter (with replaceable inserts 20 nos.) - Dia 80 mm</p> <p>Bull nose cutter (with replaceable inserts 20 nos)- Dia 50 mm</p> <p>End Mill cutter (with replaceable inserts 20 nos)- Dia 32 mm</p> <p>Bull nose cutter (with replaceable inserts 20 nos)- Dia 25 mm</p> <p>Endmill cutter (with replaceable inserts 20 nos)- Dia 20 mm</p> <p>Endmill cutter (with replaceable inserts 20 nos)- Dia 16 mm</p> <p>carbide End Mill cutter (each two)- Dia. 3, 4, 5, 6, 8, 10, 12, 16 mm</p> <p>carbide Ball End Mill cutter (each two)- Dia. 3, 4, 5, 6, 8, 10, 12, 16 mm</p> <p>M8, M10, M12 HSS Tap with suitable Carbide Drills - 2 Sets</p> <p>HSS Drills ( one set) - Dia. 1 to 20 mm</p> <p>Centre Drill (Carbide &amp; HSS) - each 3 Diff. Sizes</p> <p>Finish boring kit dia 10 to 40- 1 set</p>

10.11	Clamping Kit	Clamp set Precision Hydraulic Vise with jaw opening of 275 mm and clamping force 60 KN - 1 No 3 Jaw chuck - 300 mm dia - 1 no..
10.12	Others	Ethernet, USB ports
10.13	Software	CAM software with post processor suitable for the machine to be quoted seperately
11	Any other accessories if available for better utilization	Bidder to specify and quote if any other accessories available /required for smooth running and better utilization of the machine.
12	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
13	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
14	<b>INSTALLATION, COMMISSIONING</b>	
14.4	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
14.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
· Software CDs		
14.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.

14.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
14.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

**6**

**CNC Machining Centre / CNC Milling Machine (II)**

1	Make		Bidder to specify
2	Model		Bidder to specify
3	<b>Axis Travel</b>		
3.1	X-Axis (mm)		700-800
3.2	Y-Axis (mm)		600-700
3.3	Z-Axis (mm)		500-600
4	<b>Table</b>		
4.1	Length (mm)		800-1000
4.2	Width (mm)		600-700
4.3	T-Slot Width (mm)		14-16
4.4	Number of Std T-Slots		5 or more
5	<b>Feed</b>		
5.1	Rapid Feed (X, Y,Z Axes) (m/min)		20 or better
5.2	Max. Cutting Feed (X, Y,Z Axes) (m/min)		15 or better
6	<b>Spindle</b>		
6.1	Rating (KW)		Bidder to specify
6.2	Max. Speed (rpm)		8000 or better
6.3	Taper		BT40
7	<b>Accuracy</b>		
7.1	Positioning (µm)		10 or better
7.2	Repeatability (µm)		5 or better
8	<b>Automatic Tool Changer</b>		
8.1	Magazine capacity (Nos)		10 or better
8.2	Tool select by shortest & Random select		Bi-Directional
8.3	Max. tool diameter (mm)		80 or better
9	<b>Control System</b>		

9.1	Controller		Fanuc / Siemens /or equivalent (Latest with complete module) with the screen size of 19" or more with touch screen technology, app based which leads to a smart paperless shop floor management and monitoring.
9.2	Part Program Storage (GB)		Capable to store large CAM programs for continuous running (Minimum 4 GB)
9.3	Programming Functions with editor		Complete Module with technical calculator for power and torque requirements , with dxf file import facility, 3D simulation
10	<b>Essential Accessories</b>		
10.1	Servo stabilizer		Bidder to specify and quote suitable for the machine
10.2	Ultra Isolation transformer		Bidder to specify and quote suitable for the machine
10.3	Air Compressor with drier and multi dry filter		Bidder to specify and quote suitable for the machine
10.4	Automatic centralized lubrication system		Bidder to specify and quote suitable for the machine
10.5	Touch Probe		Bidder to specify and quote Branded quality(Renishaw / Blum) Touch Probe
10.6	Machine protection		Monitoring vibration during machining to protect machine and spindle failure. User autorisation to the control system and the machine. Safety during power failure and Panel cooler for electrical cabinet. Door interlock for safety
10.7	Industry 4.0 features leads to smart machine		Live status of important component of the machine in operation, internet based remote diagnosis of the machine like fault on the machine
10.8	Operation hardware		Electronic handwheel, Flushing gun for internal cleaning, Coolant tank with chip conveyor

10.9	Tool holding devices		<p>Bidder to specify and quote Set of suitable Cutting Tool holders  ER 25 collet chuck -1 No.  ER 25 collets Dia 3 to Dia 14 in steps of 1mm - 1 each  ER 32 collet chuck - 1 No.  ER 32 collets Dia 10 to Dia 20 in steps of 1mm - 1 each  ER 40 collet chuck -1 No.  ER 40 collets Dia 20 to Dia 25 in steps of 1mm - 1 each  ER 25 Tap collets with square drive for M8 and M10 taps- 1 each  ER 32 Tap collet with square drive for M12 tap- 1 each  Side lock adaptors Dia 16, 20, 25 &amp; 32 -1 each  Keyless drill chuck 0-13mm  Holder (adapter) for 40 mm Face mill - 1 No  Holder (adapter) for 80 mm Face mill - 1 No  Holder (adapter) for 125 mm Face mill - 1 No  Holder (adapter) for 50 mm Bull - 1 No  Tool locking device-1 No.  Pull stud- 30 no's</p>
10.10	Cutting Tools		<p>Bidder to specify and quote Set of Cutting  Face mill cutter (with replaceable inserts 20 nos.) - Dia 80 mm  Bull nose cutter (with replaceable inserts 20 nos)- Dia 50 mm  End Mill cutter (with replaceable inserts 20 nos)- Dia 32 mm  Bull nose cutter (with replaceable inserts 20 nos)- Dia 25 mm  Endmill cutter (with replaceable inserts 20 nos)- Dia 20 mm  Endmill cutter (with replaceable inserts 20 nos)- Dia 16 mm  carbide End Mill cutter (each two)- Dia. 3, 4, 5, 6, 8, 10, 12, 16 mm  carbide Ball End Mill cutter (each two)- Dia. 3, 4, 5, 6, 8, 10, 12, 16 mm  M8, M10, M12 HSS Tap with suitable Carbide Drills - 2 Sets  HSS Drills ( one set) - Dia. 1 to 20 mm  Centre Drill (Carbide &amp; HSS) - each 3 Diff. Sizes  Finish boring kit dia 10 to 40 - 1 set</p>
10.11	Clamping Kit		<p>Clamp set  Precision Hydraulic Vise with jaw opening of 275 mm and clamping force 60 KN - 1 No  3 Jaw chuck - 300 mm dia - 1 no..</p>
10.12	Others		Ethernet, USB ports

10.13	Software		CAM software with post processor suitable for the machine to be quoted seperately
11	Any other accessories if available for better utilization		Bidder to specify and quote if any other accessories available /required for smooth running and better utilization of the machine.
12	Terms & Conditions		Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
			Equipment should be CE certified
			Authorization Letter from OEM
			List of clients in last five years to be provided.
13	Scope of supply		Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
14	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
14.4	Installation and commissioning requirements		Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
14.2	Training and documentation		Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
			The vendor should supply the necessary manuals such as
			• Software instruction
			• Maintenance and trouble manual
			• Training
			• Installation and Commissioning
			• Handling of accessories
			• Software key (if any)
	• Software CDs		



14.3	Warranty		The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
14.4	Technical support and service		Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
14.5	Annual Comprehensive Maintenance Contract (ACMC) as optional		Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

**7**

**CNC Wirecut EDM**

	Make	Bidder to specify	
	Model	Bidder to specify	
1	Type	Submerged	
2	Dimensions of table	mm	(800 - 1000) x (500-700)
3	Axis Travel (X x Y x Z) , U&V Travel	mm	(500- 600) x (400-500 ) x ( 300 -450), 75 or better
4	Taper angle and Height	°/ mm	±15 / 100 or better
5	Wire Charateristics		Dia. 0.25 mm ; Type of wire guide - Closed diamond type without clearance ; Protection against electrolytic effects- From roughing through to finishing;
6	Max. cutting speed	mm <sup>2</sup> /min	120 or Better
7	Max. weight of the workpiece	Kg	>400
8	Max. Machining current	A	25 or better
9	Min. finishing (Ra)	µm	1 or better
10	Position measurement system / Measurement resolution	µm	5 or better
11	Architecture	Std Input & output accessories- LCD 15" TFT TouchScreen , Key board , Remote control ; PC multiprocessors; Ethernet, USB ports, RS-232C Communication Ports;	

12	Control System with software	Latest with complete module CNC controller (or OEM system) and Capable storage to store large part programs for continuous running. Suitable software for programming and controlling.
13	<b>Essential Accessories</b>	
13.1	Chiller Unit	Bidder should quote and supply OEM/well known branded with make, model and major specification
13.2	Wire chopper	
13.3	Servo stabilizer	
13.4	Ultra Isolation transformer	
13.5	Silent operation Air Compressor with drier	
13.6	Air gun with pipe	
13.7	Holding & Clamping Kit (Such as vice, angle plate, v block, c clamp etc.)	
13.8	Consumables	Minimum 10 Spools of coated wire and other necessary consumables
13.9	Filters	2 sets of 10 micron filters or better
13.10	Workstation	Suitable latest workstation for part programming
14	Others	Bidder to specify and quote if any other accessories available /required for smooth running of the equipment
15	Terms & Conditions	<p>The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.</p> <p>Manufacturer of the supplied equipment must be ISO Certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p> <p>Manufacture/Supplier should have sizable installations of same model worldwide and at least Fives in India.</p>
16	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
17	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
	Installation and requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
17.2	Training and documentation	<p>Minimum of 5 days training for five persons which includes basic &amp; advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> <li>• Software instruction</li> <li>• Maintenance and trouble manual</li> <li>• Training</li> <li>• Installation and Commissioning</li> <li>• Handling of accessories</li> </ul>

		<ul style="list-style-type: none"> <li>· Software key (if any)</li> <li>· Software CDs</li> </ul>
17.3	Warranty	The whole system and its accessories should be given three years warranty for replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
17.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
17.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

## 8

### CNC Coordinate Measuring Machine (CNC-CMM)

1	Make		Bidder to specify
2	Model		Bidder to specify
3	Axis Travel		
3.1	X-Axis (mm)		600 - 700
3.2	Y-Axis (mm)		600-800
3.3	Z-Axis (mm)		500-600
4	Accuracy		2.2+ L/350) µm or Better
5	Scale Resolution		0.1 µm or Better
6	Table		Granite
7	Screw air compressor with dryer		Bidder to specify and quote suitable system
8	Table Load Capacity		500 kg or Better
9	Max Velocity Vector		600 mm/sec or Better
10	Max. Acceleration Vector		600 mm/sec <sup>2</sup> or Better
11	Control System		5-Axis CNC System + Servo Amplifiers + Joystick unit with accessories
12	Probe Kit		Probe head should be motorised capable of indexing in two directions. Renishaw (PH 20) Latest 5 axis infinite positioning probe head + TP20 module + Set of Styli of different sizes
13	Measuring and control Software		Should quote complete modules of software in latest version

14	Computer System with measuring & Analysis software		Bidder should specify and Quote Suitable system and latest complete module of software for control, measure and analysis. Measurement of known/ unknown contour, comparison of contour, Development of 2D profile, Multi tolerance facility on the single contour, Export/Import of 2D contour in DXF, IGES & STEP format. Report in different format like txt, PDF, Excel, HTML, Element graphic view, multiple graphic view.
15	Essential accessories		
15a	Voltage Stabilizer		Bidder should specify and Quote Suitable system for the CNC CMM
15b	Silent operation air compressor with Drier and necessary accessories		
15c	UPS		
15d	Printer		
15e	Clamping kit		
15f	Any other accessories if available for better utilization		Bidder to specify and quote if any other accessories available /required for smooth running and better utilization of the machine.
16	Terms & Conditions		The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.
			Manufacturer of the supplied equipment must be ISO Certified
			Authorization Letter from OEM
			List of clients in last five years to be provided.
			Manufacture/Supplier should have sizable installations of same model worldwide and at least Fives in India.
17	Scope of supply		Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
17	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
18.1	Installation and commissioning requirements		Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
18.2	Training and documentation		Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
			The vendor should supply the necessary manuals such as
			· Software instruction

			<ul style="list-style-type: none"> <li>· Maintenance and trouble manual</li> <li>· Training</li> <li>· Installation and Commissioning</li> <li>· Handling of accessories</li> <li>· Software key (if any)</li> <li>· Software CDs</li> </ul>
18.3	Warranty		The whole system and its accessories should be given three years warranty for replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
18.4	Technical support and service		Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
18.5	Annual Comprehensive Maintenance Contract (ACMC) as optional		Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

## 9

### Cylindrical Grinding Machine

1	Type	mm	Hydraulic
2	Centre Height	mm	250 -300
3.1	Max. Grinding Diameter	mm	400 -500
3.2	Max. Grinding Length	mm	Minimum 1000
3.3	Max. Grinding Diameter (Internal Grinding)	mm	15-150
4	Admit between Centre	mm	Minimum 1500
5	Table Speed Min./Max	mm/min	100 / 4000 or better
6	Table Swivel	degree	± (5 - 15)
7	<b>Work Head and Tail Stock</b>		
7.1	Speed of work head spindle	rpm	50-500
7.2	Morse taper in work head		MT-3
7.3	Swivel of work head	degree	± (30- 45)
7.4	Morse taper in tail stock		MT-3
8	<b>Wheel Head and Wheel speed</b>		
8.1	Grinding Wheel diameter	mm	250-400
8.2	Grinding Wheel width	mm	30 - 50
8.3	Grinding Wheel Bore	mm	76.2-127

8.4	Speed of the Grinding Wheel	rpm	2000 – 3000or better
9	<b>Internal Grinding Attachment</b>		
9.1	Grinding Spindle Diameter	mm	60
9.2	Max. Quill length	mm	81
9.3	Quill Diameter	mm	15
9.4	Min. & Max. dia. of hole grinding	mm	16-150
9.5	Spindle Speed	rpm	8000 or better
10	<b>Electrical Motors</b>		
10.1	Wheel head motor	HP	
10.2	Work Head Motor	HP	Bidder to specify and quote required for smooth running of the machine
10.3	Hydraulic pump motor	HP	
10.4	Coolant pump motor	HP	
10.5	Internal grinding Attachment motor	HP	
11	<b>Accessories:</b>		
11.1	Motors electrical panel, pump are fitted on the machine, Poly V-belt, coolant tank with piping, Grinding wheel with one flange, 2 dead centres, True Chuck Flange, Two Point Steady Rest., Three Point Steady Rest., set of Oil seals		Set of accessories suitable to the machine
11.2	Three Jaw chuck (∅ 150mm)		
11.3	Four Jaw Chuck (∅ 150mm)		
11.4	Dogs & Carriers (5 – 30 mm)		
11.5	Internal grinding Attachment		
11.6	Machine Lamp		
11.7	Diamond Tool with holder		
11.8	Coolant splash guard		
11.9	Wheel balancing stand		
11.10	wheel Puller with extracting nut		
11.11	Wheel guard		
11.12	One set of manuals		
11.13	One set of Service Tools, Keys, allen keys, Spanner		
11.14	Grinding wheel (Al <sub>2</sub> O <sub>3</sub> ) / SiC – 02 Nos.		
11.15	Anti vibration Pads		
12	<b>Others</b>		Bidder to specify and quote if any other accessories available
13	<b>General features :</b>		

13.1	The specification of feed drive motors with make, model no., max. & nominal torque	Bidder to specify the features of the machine
13.2	Preferably the guide ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	
13.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	
13.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
14	<b>Any Others Acessories</b>	
15	Terms & Conditions	<p>Bidder to specify and quote if any other accessories available /required for smooth running of the machine.</p> <p>Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details</p> <p>Equipment should be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
16	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Acessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
17	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	

17.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
17.2	Training and documentation	<p>training should be provided during installation. Minimum of 5 days training for five persons which includes basic &amp; advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> <li>· Software instruction</li> <li>· Maintenance and trouble manual</li> <li>· Training</li> <li>· Installation and Commissioning</li> <li>· Handling of accessories</li> </ul>
17.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
17.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
17.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

**10**

**Surface Grinding Machine (Hydraulic)**

	<b>Make:</b>		
	<b>Model:</b>		
1	Working Area	mm	(1000-1200) x (600 – 800)
2	Longitudinal Travel	mm	1000-1200
3	Cross travel	mm	600-800
4	Height of the Table to Grinding Wheel	mm	600-700
5	Spindle Speed	rpm	2500 - 4000
6	Cross feed, Vertical feed graduation	mm	0.001 or better
7	Table traverse Feed Range	m/min	1.5-15 or better



8	Max. Vertical traverse of Wheel Head spindle from the table	mm	600-800
9	Cross feed of the table / Auto feed with micrometer	mm / Stroke	0.5 - 10
10	Size of grinding wheel (dia x width x bore)	mm	250 -400 x 25 -50 x 76 -127 or equivalent
11	Wheel Head motor & Hydraulic Pump Motor	KW	3.50 – 4.0 & 2.25 – 3.0
12	<b>Essential Accessories</b>		
12.1	Complete electrical with motor & Starter	Bidder should quote and supply well known branded with make, model and major specification	
12.2	Permanent Magnetic Chuck		
12.3	Diamond Tool with holder		
12.4	Coolant equipment with splash guard		
12.5	Wheel Balancing stand with mandrel		
12.6	Wheel guard		
12.7	Wheel adaptor puller		
12.8	Grinding wheel (Al <sub>2</sub> O <sub>3</sub> ) – 04 Nos.		
..	One set of Service Tools, Keys, Oil can, spanners		
12.10	Anti Vibration Pads		
12.11	Machine Lamp		
12.13	One set of manuals		
13	Others		
15	Terms & Conditions	The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.	
		Manufacturer of the supplied equipment must be ISO Certified	
		Authorization Letter from OEM	
		List of clients in last five years to be provided.	
		Manufacture/Supplier should have sizable installations of same model worldwide and at least Fives in India.	
16	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.	
17	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
	Installation and requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.	

17.2	Training and documentation	Training should be provided at the time of installation. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
17.3	Warranty	The whole system and its accessories should be given three years warranty for replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
17.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
17.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

## 11

### Tool & Cutter Grinding Machine

1	Centre height	mm	120-150
2	Swing Diameter	mm	250 - 300
3	Swing with raising block	mm	350 - 400
4	Distance between tailstock centres	mm	700- 800
5	Distance between work head & tailstock centre	mm	600 - 650
<b>6. Table</b>			
6.1	Longitudinal travel	mm	500 - 600
6.2	Clamping area	mm	(950 - 1050) x (100 - 200)
6.3	Cross traverse	mm	250 - 300
6.4	Swivel of the table with centre locking	deg.	Plus / Minus 45
6.5	Fine Swivel with end locking	deg.	Plus / Minus 9
<b>7. Tilting Wheel Head</b>			
7.1	Eccentricity with central line of column	mm	40
7.2	Vertical adjustment	mm	250-300
7.3	Spindle Axis		
7.4	Above the axis of centres	mm	200-230
7.5	Below the axis of centres	mm	60-80

8	<b>Swivel</b>		
8.1	Vertical plane	deg.	Plus / Minus 20 - 25
8.2	Horizontal plane	deg.	360
8.3	Wheel speed in either sense of rotation	rpm	2800 / 5600 or better
8.4	Motor Power	kW	0.75 or better
9	<b>Work Head</b>		
9.1	Spindle bore taper		MT5
10	<b>Tail stock taper</b>		MT2
11	<b>Internal Grinding</b>		
11.1	Dia. Range Min. / Max	mm	14 / 56
11.2	Max. Spindle speed	rpm	18000 - 25000 or better
12	Total power	kW	3
13	<b>Accessories:</b>		
13.1	Cylindrical grinding attachment		Set of accessories suitable to the machine
13.2	Internal grinding attachment		
13.3	Universal vice for surface grinding		
13.4	Radius grinding attachment		
13.5	Radius truing attachment		
13.6	Hydraulic equipment for table movement		
13.7	Fine cross feed attachment		
13.8	PTFE coated guide way for cross movement		
13.9	Tape relief grinding attachment		
13.1	Rough reamer / core drills relief grinding attachment		
13.11	Attachment for grinding and relief of disc cutter		
13.12	Spiral milling and hob grinding attachment		
13.13	Twist drill sharpening attachment		
13.14	Permanent magnetic chuck		
13.15	Dust Exhausting device		
13.16	Water cooling device		
13.17	3-Jaw chuck		
13.18	Indexing unit		
13.19	Collet chucking attachment		
13.2	Attachment for grinding carbide tip tools		
13.21	Precision radius grinding attachment.		

13.22	DRO for all slides with display unit	
13.23	Grinding wheel guards	
13.24	Grinding wheel flanges (different sizes)	
13.25	Machine Lamp	
13.26	Diamond Tool with holder	
13.27	One set of manuals	
13.28	One set of Service Tools	
13.29	Different Grinding wheel (Cup, saucer, taper, straight etc.)	
13.3	Anti vibration pads	
14	<b>Others</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine
15	<b>General features :</b>	
15.1	The specification of feed drive motors with make, model no., max. & nominal torque	
15.2	Preferably the guide-ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	
15.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	Bidder to specify the features of the machine
15.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
16	<b>Any Others Aecessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.

17	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
18	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
19	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
19.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
19.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
19.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
19.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
19.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

12

**(Universal) Radial Drilling Machine**

1	Max. Drilling Capacity	mm	50-60
2	Drilling Radius Max./ Min.	mm	(1200-1500) / (450- 600)
3	Vertical Traverse of Arm	mm	1000-1200
4	Horizontal Movement of Drill Head	mm	800-1000
5	Column Diameter	mm	400-500
6	Cross travel	mm	1000-1200
7	Morse Taper in Spindle	MT-5	MT-5
8	Number of Speeds		12
9	Range of Speed	RPM	40-1800
10	Angle of Arm Rotation	Degree	360
11	Angle of Drill Head Rotation	Degree	360
12	Base working surface	mm	(1200- 1500 ) x (800-1000)
13	Spindle Travel	mm	300-500
14	Motor	HP	2.25 HP or better
15	Feed		Manual & Auto feed Both type
16	<b>Accessories</b>		
16.1	Box Shape Worktable		Set of accessories suitable to the machine
16.2	Machine Vise 8"		
16.3	Taper / Reduction sleeves		
16.4	Quick Change Drill Chuck		
16.5	Coolant Equipment		
16.6	Machine Lamp		
16.7	Drifts		
16.8	One set of manuals		
16.9	One set of Service Tools, Keys		
17	<b>Others</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine	
18	<b>General features :</b>		
18.1	The specification of feed drive motors with make, model no., max. & nominal torque		
18.2	Preferably the guide ways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	Bidder to specify the features of the machine	

18.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors.	
18.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
19	<b>Any Others Aecessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
20	Terms & Conditions	<p>Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details</p> <p>Equipment should be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
21	Scope of supply	Bidder should submit complete scope of supply (Machine, standard aecessories, Optional Aecessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
22	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
22.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
22.2	Training and documentation	<p>Training should be provided at the times of installation. Minimum of 5 days training for five persons which includes basic &amp; advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> <li>· Software instruction</li> <li>· Maintenance and trouble manual</li> <li>· Training</li> <li>· Installation and Commissioning</li> <li>· Handling of accessories</li> </ul>

22.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
22.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
22.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

### 13

### Conventional Lathe Machine (I)

1	Height of the Center	mm	200-250
2	Centre distance	mm	1500-2000
3	Maximum Swing over bed	mm	350-450
4	Swing over cross slide	mm	250-300
5	<b>Carriage</b>		
5.1	Cross slide travel	mm	250-300
5.2	Dial Graduation of Cross slide	mm	0.05
5.3	Top slide travel	mm	100-150
5.4	Dial Graduation of Top slide	mm	0.05
5.5	Angular Swivel graduation	degree	45 (Plus & Minus)
5.6	Maximum Tool Section	mm	16x16
6	<b>Tailstock</b>		
6.1	Spindle travel	mm	100-150
6.2	Spindle dia.	mm	55
6.3	Taper in spindle		MT3
6.4	Scale of Spindle graduation	mm	1
6.5	Hand wheel dia graduation	mm	0.05
6.6	Set-over adjustments	degree	45
7	<b>Spindle</b>		
7.1	Spindle bore dia.	mm	45-50
7.2	Collect capacity	mm	26
7.3	Spindle Power	Kw	Minimum 7.5
7.4	Spindle speed	rpm	50-3000 or better
8	<b>Feeds &amp; Threads</b>		
8.1	Longitudinal feeds	Mm/min // mm/Rev	240/0.03-0.7



8.2	Cross feeds	Mm/min //mm/rev	24/0.015-0.35
8.3	Metric threads	mm	48/0.15-20
8.4	US & Whitworth threads	TPI	60/56-1
8.5	Module threads	mm	40/0.25 to 14
9	<b>Accessories</b>		
9.1	Ø160 mm x 3jaw self center chuck		
9.2	Four Jaw chuck (ø 160 mm) with Adapter		
9.3	MT5 – MT3 center sleeve		
9.4	MT3 – male center		
9.5	Quick change tool post		
9.6	Electric coolant system with splash guard		
9.7	4 way Tool post		
9.8	5c Quick acting collet attachment		
9.9	Hand wheel type collet attachment		
9.1	Set of collets -size 5 mm to 20 mm -step of 1 mm		
9.11	Collet Holders		
9.12	Dog carriers dia. 20 mm , dia. 30 mm		
9.13	Splash Guards		
9.14	Revolving Center		
9.15	Drill Chuck		
9.16	Reduction sleeve- MT3-MT2, MT2-MT1		
9.17	Fixed & Traveling steady rest		
9.18	Extra change gears –for inches,module&DP threads		
9.19	Face plate(200mm)		
9.2	Driver plate		
9.21	Service tools		
9.22	Machine Lamp		
9.23	Live & Dead Center		
9.24	Foot Brake		
9.25	Chuck guard		
9.27	Tools kit		
9.26	One set of manuals		
9.27	Coolant Pump (0.25 - 0.5 HP)		
9.28	Anti vibration pads		
10	<b>Others</b>		
11	<b>General features :</b>		
11.1	The specification of feed drive motors with make, model no., max. & nominal torque		Set of accessories suitable to the machine

11.2	Preferably the guideways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	Bidder to specify the features of the machine
11.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	
11.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
12	<b>Any Others Aecessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
13	Terms & Conditions	<p>Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details</p> <p>Equipment should be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
14	Scope of supply	Bidder should submit complete scope of supply (Machine, standard aecessories, Optional Aecessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
15	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
15.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
15.2	Training and documentation	<p>Training should be provided during installation. Training content and plan to be submitted. Training faculty must have adequate experience in this field.</p> <p>The vendor should supply the necessary manuals such as</p> <ul style="list-style-type: none"> <li>· Software instruction</li> <li>· Maintenance and trouble manual</li> </ul>

		<ul style="list-style-type: none"> <li>· Training</li> <li>· Installation and Commissioning</li> <li>· Handling of accessories</li> </ul>
15.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
15.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
15.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

#### 14

#### Conventional Lathe Machine (II)

1	Height of the Center	mm	300-350
2	Centre distance	mm	2000-3000
3	Maximum Swing over bed	mm	550-650
4	Swing over cross slide	mm	350-420
5	<b>Carriage</b>		
5.1	Cross slide travel	mm	300-400
5.2	Dial Graduation of Cross slide	mm	0.05
5.3	Top slide travel	mm	150-200
5.4	Dial Graduation of Top slide	mm	0.05
5.5	Angular Swivel graduation	degree	45 (Plus & Minus)
5.6	Maximum Tool Section	mm	16x16
6	<b>Tailstock</b>		
6.1	Spindle travel	mm	150-250
6.2	Spindle dia.	mm	60-70
6.3	Taper in spindle		MT3
6.4	Scale of Spindle graduation	mm	1
6.5	Hand wheel dia graduation	mm	0.05
6.6	Set-over adjustments	degree	45
7	<b>Spindle</b>		
7.1	Spindle bore dia.	mm	60-80
7.2	Collect capacity	mm	32
7.3	Spindle speed	rpm	50-3000 or better
7	<b>Spindle</b>		

7.1	Spindle bore dia.	mm	60-80
7.2	Collect capacity	mm	32
7.3	Spindle Power	Kw	Minimum 7.5
7.4	Spindle speed	rpm	50-3000 or better
8	<b>Feeds &amp; Threads</b>		
8.1	Longitudinal feeds	Mm/min // mm/Rev	60 /0.04-2.24
8.2	Cross feeds	Mm/min //mm/rev	60/0.2-1.12
8.3	Metric threads	mm	48/0.15-20
8.4	US & Whitworth threads	TPI	60/56-1
8.5	Module threads	mm	40/0.25 to 14
9	<b>Accessories</b>		
9.1	Ø160 mm x 3jaw self center chuck		Set of accessories suitable to the machine
9.2	Four Jaw chuck (ø 160 mm) with Adapter		
9.3	MT5 – MT3 center sleeve		
9.4	MT3 – male center		
9.5	Quick change tool post		
9.6	Electric coolant system with splash guard		
9.7	4 way Tool post		
9.8	5c Quick acting collet attachment		
9.9	Hand wheel type collet attachment		
9.10	Set of collets -size 5 mm to 20 mm -step of 1 mm		
9.11	Collet Holders		
9.12	Dog carriers dia. 20 mm , dia. 30 mm		
9.13	Splash Guards		
9.14	Revolving Center		
9.15	Drill Chuck		
9.16	Reduction sleeve- MT3-MT2, MT2-MT1		
9.17	Fixed & Traveling steady rest		
9.18	Extra change gears –for inches,module&DP threads		
9.19	Face plate(200mm)		
9.20	Driver plate		
9.21	Service tools		
9.22	Machine Lamp		
9.23	Live & Dead Center		
9.24	Foot Brake		
9.25	Chuck guard		
9.27	Tools kit		
9.26	One set of manuals		
9.27	Coolant Pump (0.25 - 0.5 HP)		
9.28	Anti vibration pads		

10	<b>Others</b>	
11	<b>General features :</b>	
11.1	The specification of feed drive motors with make, model no., max. & nominal torque	Bidder to specify the features of the machine
11.2	Preferably the guideways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside. Guide ways should be of hardened steel with hardness HRC60 or more	
11.3	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors. Anti-vibration pad is to be provided for reach leg of the machine.	
11.4	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper	
12	<b>Any Others Acessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the machine.
13	Terms & Conditions	<p>Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details</p> <p>Equipment should be CE certified</p> <p>Authorization Letter from OEM</p> <p>List of clients in last five years to be provided.</p>
14	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Acessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
15	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	

15.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
15.2	Training and documentation	Trainig should be provided during installation. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
· Installation and Commissioning		
· Handling of accessories		
15.3	Warranty	The whole system and its accessories should be given two years warranty for the machine and three years for the spindle replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.
15.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
15.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown

## 15

### Computer / Workstation

1	Processor		Intel Xeon E5-1600 V3 or Better
			Core: Six Core or above
			Clock Speed: 3.5 GHz or above
			Cache: 15MB or above
2	Chipset		Intel® C612 series Chipset or better on OEM /Intel motherboard
3	Memory		8GB or better
			2400 MHz or better
			DDR4 or better
4	Graphics card		4GB NVIDIA Quadro K420 or Better
5	Hard Disk Drive (Internal Storage)		Hard Disk Drive Storage 1 TB
6	Optical Drive		DVD RW drive / SATA / Internal

7	RAID		As workstation is with single Hard disk, RAID is not required and shall be deleted
8	Networking		1x 1GB network controller & Compatible for 10 Gig Network Adapter
9	Operating System		Microsoft Windows 10 Pro 64 or above Professional Edition 64bit OS to be supplied with recovery media
10	Security & Manageability		User and supervisor BIOS password, Dynamic USB security for full hardware USB protection; Chasis Intrusion Switch; Performance Optimizer tool should be provided; should have intel Cache Accelerator Software or similar for faster read I/O with larger datasets; Trusted Platform Module 1.2 (TPM 1.2); I/O Interface Security; Kensington® lock slot, Padlock ring.
11	Monitor		OEM Make Monitor 24" widescreen TFT / LED Backlight Color monitors with:1920 x 1080 or higher resolution / Compatible with required graphics card / Viewing Angle: Min 178 degrees horizontal & vertical / (Autopivot (90*)), ECO Button for Energy saving, Automatic Brightness Control, Display port/DVI/VGA ) Height & Tilt / ROHS & TCO' 03 compliant.
12	Keyboard		OEM make standard Keyboard
13	Mouse		OEM make USB Optical Mouse
14	Form Factor		Minitower / Microtower (With Optimized thermal management, low-noise chassis and silent fans)
15	<b>Any Others Acessories</b>		Bidder to specify and quote if any other accessories
16	Terms & Conditions		Manufacture/Supplier should have sizable
			Equipment should be CE certified
			Authorization Letter from OEM
			List of clients in last five years to be provided.
17	Scope of supply		Bidder should submit complete scope of supply (Machine, standard acessories, Optional Acessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
18	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
18.1	Installation and commissioning requirements		Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
18.2	Training and documentation		training should be provided at the time of installation. Training faculty must have adequate experience in this field.
			The vendor should supply the necessary manuals such as

			· Software instruction
			· Maintenance and trouble manual
			· Training
			· Installation and Commissioning
			· Handling of accessories
			· Software key (if any)
			· Software CDs
18.3	Warranty		5 Years Onsite Warranty
18.4	Technical support and service		Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

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**SERVER**

1	Processor		Dual Intel Xeon Processor E5-2620 V2 or higher 2.10GHz, 15M Cache, 7.2GT/s QPI, Turbo, 6C, 95W
2	Chipset		Intel C600 or higher
3	Slot		PCI/PCI Express Slots (Not less than 5)
4	Memory		2x 8GB RDIMM, DDR3 1333MHz
5	Graphics card		2GB NVIDIA Quadro K420 or Better
6	HDD Storage		2x2TB HDD 10K/15K RPM,6Gbps nearline SAS 2.5 " Hot Plug Hard Drive, upto 6 total SATA HDDs slots.
	OS		Operating System Microsoft Windows server 2016
7	RAID		Integrated RAID Controller with the cache size of atleast 512 MB
8	Network Interface Cards		Quad Port (10/100/1000) Network Card Dedicated NIC Port for Remote Management
9	Ports		3 nos. USB, 1 Serial Port
10	Form Factor		2U Rack Mountable with mounting kit
11	Power Supplies		Hot plug 495 Watts or above redundant Power Supply
12	LED Monitor		OEM Make Monitor 24" widescreen TFT / LED Backlight Color monitors with:1920 x 1080 or higher resolution / Compatible with required graphics card / Viewing Angle: Min 178 degrees horizontal & vertical / (Autopivot (90*), ECO Button for Energy saving, Automatic Brightness Control, Display port/DVI/VGA ) Height & Tilt / ROHS & TCO' 03 compliant
13	Keyboard		OEM make standard Keyboard
14	Mouse		OEM make USB Optical Mouse
15	<b>Any Others Aecessories</b>		Bidder to specify and quote if any other accessories available /required for smooth running of the machine.



16	Terms & Conditions		Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
			Equipment should be CE certified
			Authorization Letter from OEM
			List of clients in last five years to be provided.
17	Scope of supply		Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
18	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>		
18.1	Installation and commissioning requirements		Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
18.2	Training and documentation		Training should be provided during installation. Training faculty must have adequate experience in this field.
			The vendor should supply the necessary manuals such as
			· Software instruction
			· Maintenance and trouble manual
			· Training
			· Installation and Commissioning
			· Handling of accessories
			· Software key (if any)
	· Software CDs		
18.3	Warranty		5 Years Onsite Warranty
18.4	Technical support and service		Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

1	Latest version of Delcam software with complete module of CAD & CAM programming for CNC controller. The software capable for 2-axis, 3-axis, simultaneous 4-axis & 5-axis milling, multi axis lathe, Mill-Turn, Wire EDM etc.	
<b>2 GENERAL TERMS &amp; CONDITIONS</b>		
	The Software should be a supplied with latest version.	
	The quote shall be supplied b with reference to the module.	
	<b>Please mention the quote c for Educational Bundle.</b>	
	The Software should be d supplied in DVD / CD media for windows 8 or higher	
	<b>The license must be e Network Perpetual License</b>	
	<b>Warranty</b> : Five years from f the date of acceptance of installation.	
	The Installation and training g will be the responsibility of the supplier.	
	During the above period of h maintenance, any upgrades released will be supplied free of cost.	
	j Annual Maintenance Contract charges interms of percentage on the basic price for a period of FIVE years after the completion of Warranty period need to be quoted separately.	
3	<b>Any Others Acessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the Software.
4	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
Equipment should be CE certified		

		Authorization Letter from OEM
		List of clients in last five years to be provided.
5	Scope of supply	Bidder should submit complete scope of supply (Software, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
6	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the Software. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Total training duration shall be of 07 days. Training shall be planned in two phases basic for 4 days and advanced for 3 days. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
		· Software CDs
6.3	Warranty	5 Years Onsite Warranty
6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

18

**NX CAD /CAM /CAE Software**

1	Latest version of NX CAD/CAM/CAE software with complete module of 2D, 3D Modeling, programming and FE analysis capabilities for product design, Engineering and manufacturing process.
<b>2 GENERAL TERMS &amp; CONDITIONS</b>	
	The Software should be supplied with latest version.

	b	The quote shall be supplied with reference to the module.
	c	<b>Please mention the quote for Educational Bundle.</b>
	d	The Software should be supplied in DVD / CD media for windows 8 or higher
	e	<b>The license must be Network Perpetual License</b>
	f	<b>Warranty</b> : Five years from the date of acceptance of installation.
	g	The Installation and training will be the responsibility of the supplier.
	h	During the above period of maintenance, any upgrades released will be supplied free of cost.
	j	Annual Maintenance Contract charges in terms of percentage on the basic price for a period of FIVE years after the completion of Warranty period need to be quoted separately.
3		<b>Any Others Aecessories</b> Bidder to specify and quote if any other accessories available /required for smooth running of the Software.
4		Terms & Conditions Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details Equipment should be CE certified Authorization Letter from OEM List of clients in last five years to be provided.
5		Scope of supply Bidder should submit complete scope of supply (Software, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
6		<b>INSTALLATION, COMMISSIONING AND TRAINING</b>

6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the Software. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Total training duration shall be of 07 days. Training shall be planned in two phases basic for 4 days and advanced for 3 days. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
6.3	Warranty	5 Years Onsite Warranty
6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

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**PRO-E (CREO) Software**

1	Latest version of ProE (PTC Creo) software with complete module of 2D, 3D Modeling, programming and FE analysis capabilities for product design, Engineering and manufacturing process.
<b>2 GENERAL TERMS &amp; CONDITIONS</b>	
a	The Software should be supplied with latest version.
b	The quote shall be supplied with reference to the module.
c	<b>Please mention the quote for Educational Bundle.</b>
d	The Software should be supplied in DVD / CD media for windows 8 or higher

	<b>The license must be e Network Perpetual License</b>	
	<b>Warranty</b> : Five years from the date of acceptance of f installation.	
	The Installation and training will be the responsibility of g the supplier.	
	During the above period of h maintenance, any upgrades released will be supplied free of cost.	
	j Annual Maintenance Contract charges in terms of percentage on the basic price for a period of FIVE years after the completion of Warranty period need to be quoted separately.	
3	<b>Any Others Acessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the Software.
4	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
5	Scope of supply	Bidder should submit complete scope of supply (Software, standard acessories, Optional Acessories etc with make model) in the technical bid without price.Bidder should supply complete start up package necessary to prove the machine and provide training.
6	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the Software. State clearly the specifications of electical requirement.Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Total training duration shall be of 07 days.Training shall be planned in two phases basic for 4 days and advanced for 3 days.Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		• Software instruction
		• Maintenance and trouble manual
		• Training
		• Installation and Commissioning

		<ul style="list-style-type: none"> <li>· Handling of accessories</li> <li>· Software key (if any)</li> <li>· Software CDs</li> </ul>
6.3	Warranty	5 Years Onsite Warranty
6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

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**Solid Edge Software**

1	Latest version of Solid Edge software with complete module of 2D, 3D Modeling, programming and FE analysis capabilities for product design, Engineering and manufacturing process.	
<b>2 GENERAL TERMS &amp; CONDITIONS</b>		
a	The Software should be supplied	
b	The quote shall be supplied with	
c	<b>Please mention the quote for</b>	
d	The Software should be supplied	
e	<b>The license must be Network</b>	
f	<b>Warranty</b> : Five years from the	
g	The Installation and training v	
h	During the above period of maintenance, any upgrades released will be supplied free of cost.	
j	Annual Maintenance Contract charges interms of percentage on the basic price for a period of FIVE years after the completion of Warranty period need to be quoted separately.	
3	<b>Any Others Accessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the Software.
4	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM

		List of clients in last five years to be provided.
5	Scope of supply	Bidder should submit complete scope of supply (Software, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
6	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the Software. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Total training duration shall be of 07 days. Training shall be planned in two phases basic for 4 days and advanced for 3 days. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
		· Software CDs
6.3	Warranty	5 Years Onsite Warranty
6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

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**Solid works Software**

1	Latest version of Solid works software with complete module of 2D, 3D Modeling, programming and FE analysis capabilities for product design, Engineering and manufacturing process.	
<b>2 GENERAL TERMS &amp; CONDITIONS</b>		
	The Software should be supplied with latest version.	



	b	The quote shall be supplied with reference to the module.
	c	<b>Please mention the quote for Educational Bundle.</b>
	d	The Software should be supplied in DVD / CD media for windows 8 or higher
	e	<b>The license must be Network Perpetual License</b>
	f	<b>Warranty</b> : Five years from the date of acceptance of installation.
	g	The Installation and training will be the responsibility of the supplier.
	h	During the above period of maintenance, any upgrades released will be supplied free of cost.
	j	Annual Maintenance Contract charges interms of percentage on the basic price for a period of FIVE years after the completion of Warranty period need to be quoted separately.
3		<b>Any Others Acessories</b>
		Bidder to specify and quote if any other accessories available /required for smooth running of the Software.
4		Terms & Conditions
		Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
5		Scope of supply
		Bidder should submit complete scope of supply (Software, standard acessories, Optional Acessories etc with make model) in the technical bid without price.Bidder should supply complete start up package necessary to prove the machine and provide training.
6		<b>INSTALLATION, COMMISSIONING AND TRAINING</b>

6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the Software. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Total training duration shall be of 07 days. Training shall be planned in two phases basic for 4 days and advanced for 3 days. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
		· Software CDs
6.3	Warranty	5 Years Onsite Warranty
6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.

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**Auto CAD Software**

1	Latest version of AutoCAD software	
<b>2 GENERAL TERMS &amp; CONDITIONS</b>		
a	The Software should be supplied with latest version.	
b	The quote shall be supplied with reference to the module.	
c	<b>Please mention the quote for Educational Bundle.</b>	
d	The Software should be supplied in DVD / CD media for windows 8 or higher	
e	<b>The license must be Network Perpetual License</b>	
f	<b>Warranty</b> : Three years from the date of acceptance of installation.	

		The Installation and training will be the responsibility of the supplier.
		During the above period of maintenance, any upgrades released will be supplied free of cost.
		Annual Maintenance Contract charges interms of percentage on the basic price for a period of FIVE years after the completion of Warranty period need to be quoted separately.
3	<b>Any Others Acessories</b>	Bidder to specify and quote if any other accessories available /required for smooth running of the Software.
4	Terms & Conditions	Manufacture/Supplier should have sizable installations of same or better model worldwide and at least Five in India which is education institutions centrally funded institution. A Satisfactory Performance certificate from two institutions to be provided for eligibility. Bidder should submit complete contact details
		Equipment should be CE certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
5	Scope of supply	Bidder should submit complete scope of supply (Software, standard acessories, Optional Acessories etc with make model) in the technical bid without price.Bidder should supply complete start up package necessary to prove the machine and provide training.
6	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
6.1	Installation and commissioning requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the Software. State clearly the specifications of electical requirement.Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
6.2	Training and documentation	Total training duration shall be of 07 days.Training shall be planned in two phases basic for 4 days and advanced for 3 days.Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
		· Software CDs
6.3	Warranty	3 Years Onsite Warranty

6.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
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**CNC Die Sinking EDM Machine**

The CNC EDM with C-Axis should capable of wear free ED machining with graphite electrode and copper electrode as per the following detailed specification.			
1	Work Tank Size	mm	(800-1000) X (500- 700) X (250-450)
2	Axis Travel ( X x Y x Z)	mm	(400-500) x (300- 400) x (300-400)
3	Measurement resolution	µm	5 or better
4	Maximum Job weight	kg	>800
5	Max. electrode weight on automatic chuck	kg	>50
6	Dielectric Unit		Filtration system - 10µ or better ; Flushing Injections ;
7	Generator		ISPG Integrated or better
8	Max. machining current (Option)	A	80
9	Minimum surface roughness (Ra)	µm	1 or better
10	Control System	Latest with complete module CNC controller (or OEM system) and Capable storage to store large part programs for continuous running	
11	Essential Accessories		
11.1	Automatic Tool Changer Linear or Rotary	Bidder should quote and supply OEM/well known branded with make, model and major specification	
11.2	Rigid Linear Motor (X, Y, Z)		
11.3	Glass Scale Feedback (X, Y, Z)		
11.4	Rotary Head		
11.5	C Axis		
11.6	Super finish Module		
11.7	Zero Wear Module		
11.8	Flushing system		
11.9	Filter set		
11.10	Servo voltage stabilizer		
11.11	Ultra Isolation transformer		
11.12	Silent operation Air Compressor with drier		
11.13	Chiller Unit		
11.14	Collet holder with collet set		
11.15	3D probe measuring system for Erowa or System 3R		

11.16	Erowa or System 3R electrode holding system kit	
11.17	Remote controller	
11.18	Clamping kit	
11.19	Precision machine vice 4"	
11.20	Ethernet, USB ports, RS-232C Communication Ports	
11.21	Fire Extinguisher	
11.22	Air gun with pipe	
11.23	Machine lamp	
11.24	Dielectric fluid (400 Litre)	
12	Others	Need to specify and quote if any other accessories available /required for smooth running of the machine
15	Terms & Conditions	The bidder must have supplied machines at other Institutes in the past (a satisfactory performance certificate from those users may be solicited if needed). Bidder should submit complete contact details.
		Manufacturer of the supplied equipment must be ISO Certified
		Authorization Letter from OEM
		List of clients in last five years to be provided.
		Manufacture/Supplier should have sizable installations of same model worldwide and at least Fives in India.
16	Scope of supply	Bidder should submit complete scope of supply (Machine, standard accessories, Optional Accessories etc with make model) in the technical bid without price. Bidder should supply complete start up package necessary to prove the machine and provide training.
17	<b>INSTALLATION, COMMISSIONING AND TRAINING</b>	
	Installation and requirements	Bidder should state the space required and condition of floor and any other requirements for installation of the machine and equipments. State clearly the specifications of electrical requirement. Vendor should carry out installation and commissioning of the machine and its accessories on a turnkey basis.
17.2	Training and documentation	Minimum of 5 days training for five persons which includes basic & advanced level training. Training content and plan to be submitted. Training faculty must have adequate experience in this field.
		The vendor should supply the necessary manuals such as
		· Software instruction
		· Maintenance and trouble manual
		· Training
		· Installation and Commissioning
		· Handling of accessories
		· Software key (if any)
		· Software CDs
17.3	Warranty	The whole system and its accessories should be given three years warranty for replacement and service against any design, manufacturing and workmanship defects from the date of installation and commissioning.

17.4	Technical support and service	Manufacturer should have established after sales & service network in India. The vendor shall have local service and application office and infrastructure to attend by visit within 48 hours of need. Technical support personnel must have adequate experience in this field. Technical support personnel details should be submitted. Name and address of the authorized service centre/ partner in India along with the certificate of authorization should be attached.
17.5	Annual Comprehensive Maintenance Contract (ACMC) as optional	Vendor should quote for Annual Comprehensive Maintenance Contract for the whole system and accessories supplied after the completion of performance warranty period. Supplier has to provide service support within 48 hours. Calibration of the machine shall be a part of warranty and ACMC. It shall also be mandatory to perform calibration after every major repair or breakdown