



# KAZI NAZRUL UNIVERSITY

Nazrul Road, Kalla More, P.O. – Kalla C. H.  
Asansol – 713340, Dist.-PaschimBardhaman, West Bengal  
www.knu.ac.in

Ref. No.:KNU/FO/NIT-22/681/2019

Date: 05/07/2019

## Request for Proposal (RFP) through E-TENDER platform

KAZI NAZRUL University (KNU) intends to procure Instruments/equipment for Metallurgy Department atAsansol through Online eTender. The tentative quantity of the required items along with technical configuration of each items are mentioned at Annexures separately. KNU is looking for interested bidders who have experience in supplying of above type of instruments and may follow the instructions as given below for submission of their tenders under online mode

### 1. General Instructions:

Intending bidder may download the tender documents from the website <https://wbtenders.gov.in> directly with the help of Digital Signature Certificate. Last date of submission **26.07.2019 at 12hrs.** Bid opening time **29.07.2019at 12 hrs.**

### 2. Submission of bids:

Both Technical bid and Financial Bid are to be submitted concurrently duly digitally signed by the Company personnel who is in the pay roll of the Company (having Authorization from the Company management) in the website <http://wbtenders.gov.in>. All papers must be submitted in English language.

### 3. Time Schedules for the e-tender:

The Time Schedule for obtaining the Bid Documents, Pre Bid meetings, the submission of bids and other documents etc. will be as per the list provided in Clause No. 10 given below.

### 4. Eligibility for Quoting:

Manufacturers or Dealers/Distributors/Agents duly authorised by the manufacturers who are able to supply the assured quantities as per requirement & have requisite Annual Average Turnover, as per clause no. 5, are only eligible for quoting. Manufacturers not having the capability to supply the required quantity solely need not apply. Failure of submission of declaration of full supply will lead to cancellation of tender. Further, vendors who were declared black listed and/or insolvent by any Govt. Concern/any Institutions in the Country for particular item or items are not eligible to participate in the current tender for that item or items.

### 5. Annual Turnover Requirements:

Vender having average annual Turn Over for last three financial years is more than Rs10 lakh in India or equivalent foreign currency in the respective foreign country for the year 2015-16 , 2016-17 & 2017-18 are eligible to participate in the Tender.

### 6. Submission of Tenders

#### 6.1 General process of submission

Tenders are to be submitted online through the website stated in Clause 1. All the documents uploaded by the Tender Inviting Authority form an integral part of the contract. Tenderers are required to upload all the tender documents along with the other documents, as asked for in the tender, through the above website within the stipulated date and time as given in the Tender. Tenders are to be submitted in two folders at a time, one is Technical Bid and the other is Financial Bid .The tenderer shall carefully go through the documents and prepare the required documents and upload the scanned documents of originals in Portable Document Format (PDF) to the portal in the designated locations/folders of Technical Bid. He needs to fill up the BOQ in the designated cell and



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upload the same in designated location of Financial Bid. The documents uploaded are virus scanned and digitally signed using the Digital Signature Certificate (DSC). Tenderers should specially take note of all the addendum/corrigendum related to the tender till the bid submission ends. Tenderers should in general upload the latest documents as part of the tender, however, in case of failure in uploading such documents, it will be deemed that they (tenderers) have taken note of such latest documents including addendum/corrigendum, if published till the bid submission ends.

## 6.2 Technical Bid

The Technical Bid should contain scanned copies and/or declarations in the following standardised formats in two covers (folders):

- I. Technical File (Statutory Cover) containing:
  1. Annexure –
    - a) Basic Information (Vide Annexure I) (to be submitted in “Annexure” folder)
      - b) Application for Tender - (Vide Annexure II) (to be submitted in “Annexure” folder)
      - c) Authorization letter - (Vide Annexure III) (to be submitted in “Annexure” folder)
      - d) Affidavit Proforma- (Vide Annexure IV) (to be submitted in “Annexure” folder)
    - e) DECLARATION ON KNU - (Vide Annexure V) (to be submitted in “Annexure” folder)
  2. Technical details of the Items Quoted (Bidders must submit Technical specification along with Catalogue of the item quoted in “Technical Details” Folders.
    3. Bidder must submit Audited Balance Sheet and Profit and loss Account for last 3 (three) financial year namely 2014-15, 2015-16 & 2016-17 in “Accounts” folder.

Note: Tenders will be summarily rejected if any item in the statutory cover is missing.

## II. My Document (Non-Statutory Cover) containing as follows:

| I.No. | Category        | Sub-Category      | Sub-Category Description   |
|-------|-----------------|-------------------|--|
| 1     | Certificates    | Certificates      | PAN Card of the Bidder   |
|       |                 |                   | GST Registration Certificate   |
|       |                 |                   |  |
| 2     | Company Details | Company Details 1 | Trade Licence/Enlistment Certificate/ License for Electrical works (Mandatory for Electrical installation work)                  |
|       |                 |                   | Registration with Registrar of Companies, if any   |
|       |                 |                   | Memorandum of Articles for Limited Companies, if any   |
| 3     | Credential      | Credential 1      | a) Copy of the purchase order for supplying Similar nature of items at least for last 2 years in an Institute of Higher Learning |



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|   |                       |                       |   |
|---|-----------------------|-----------------------|---|
|   |                       |                       | b) Brief User List preferably for users in West Bengal in an Institute of Higher Learning |
| 4 | Financial Information | Payment Certificate 1 | Income Tax Returns submitted for the Financial year 2015-16                               |
|   |                       |                       | Income Tax Returns submitted for the Financial year 2016-17                               |
|   |                       |                       | Income Tax Returns submitted for the Financial year 2017-18                               |
|   |                       | Payment Certificate 2 | GST Returns (of the last quarter) for the year 2017-18                                    |

### 6.3 Financial Bid

The Financial Bid should contain Bill of Quantities (BOQ) in one cover (folder):

Proforma (Don't quote here)

| Sl. No | Items                 | Specification   | Rate (INR) - A | Quantity - B | Total (INR) = A*B | GST amount @ ....% - C | Amount (INR) – D={A*B+(A*B*C)} |
|--------|-----------------------|---|----------------|--------------|-------------------|------------------------|--------------------------------|
| 1.01   | Metal cut-off grinder | Cutting capacity at rectangle 0° 100 x 196 mm<br>Cutting capacity at square 0° 119 x 119 mm<br>Cutting capacity at L-profile 0° 130 x 130 mm<br>Cutting capacity at rectangle 45° mitre 107 x 115 mm<br>Cutting capacity at square 45° mitre 110 x 110 mm<br>Cutting capacity at L-profile 45° mitre 115 x 115 mm<br>Tool dimensions (width x length x height) 256 x 520 x 400 mm<br>No-load speed 3,800 rpm<br>Cutting disc diameter 355 mm<br>Cutting disc bore 25.4 mm |                | 2            |                   |                        |                                |



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|------|--|---|--|---|--|--|
|      |  | Weight 15 kg<br>Rated input power 2,200 W   |  |   |  |  |
| 2.01 | Abrasive cutter                                  | Sturdy floor model cutter for sectioning Metallography Samples Rust proof construction, Swivel Base for rotation, Steel vise, Cutting Capacity upto 120 mm, Cut-off wheel dia 14", Splash proof, corrosion resistant with see-through hood, Cooling by four high flow water jets from the top and sides of the wheel head to provide optimum cooling, |  | 2 |  |  |
| 3.01 | Metal Cut of Saw                                 | Cutting capacity at rectangle 0° 100 x 196 mm<br>Cutting capacity at square 0° 119 x 119 mm<br>Cutting capacity at L-profile 0° 130 x 130 mm<br>Tool dimensions (width x length x height) 90 x 290 x 480 mm<br>No-load speed 3,800 rpm<br>Weight 18.1 kg<br>Rated input power 2,400 W   |  | 1 |  |  |
| 4.01 | One Angle Grinder                                | Clamping flange 1 605 703 115<br>Round nut 1 619 P09 976<br>Spanner wrench 1 619 P08 928<br>Auxiliary handle 2 602 025 067  |  | 1 |  |  |
| 5.01 | Double disc polishing machine                    | <ul style="list-style-type: none"> <li>• Disc Size 200 mm</li> <li>• Variable Speed 0 to 1000 RPM</li> </ul>  |  | 3 |  |  |
| 6.01 | Digital double Disc Polishing Machine            | 0.5HP high torque AC Motor, 8" disc dia. Standard, LCD display, RPM 50 to 1400 RPM, 71X45X42 cm. For ferrous and non-ferrous samples  |  | 2 |  |  |
| 7.01 | Polishing accessories                            | Polishing papers, polishing cloths, abrasives and etchants (nitric acid, sulphuric acid, hydrochloric acid, ethanol and cotton), hair dryer for drying the samples  |  |   |  |  |
| 8.01 | Manual Specimen Hot Mounting Press with Bakelite | Mold Diameter $\phi$ 30mm or 35mm or 40mm or 45mm<br>Input Voltage 220V/50Hz,<br>Power 1800W<br>Pressure 0-2Mpa   |  | 2 |  |  |



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|       |  |   |  |   |  |  |
|-------|--|---|--|---|--|--|
|       | powder   | Temperature 0-300°C<br>Mounting time 0~99 minutes and 0~59 seconds can be setup   |  |   |  |  |
| 9.01  | Upright Metallurgical Microscope with binocular phototube with camera and software (PC must) | Magnification up to 2000 X (100X dry)<br>* Computer interface attachment to get instant photographs<br>* Powerful image analyzer software<br>* Objective lenses of 5X, 10X, 20X, 40X, 50X, 60X, 80X, 100X<br>* Eye Piece of 10X, 12.5X, 15X, 20X  |  | 5 |  |  |
| 10.01 | Brinell hardness tester  | Load 500 kgf to 1000 kgf with 10 mm ball dia. Should conform to IS: 2281 - 2005, ASTM - E-10. Supply should be complete with standard test blocks   |  | 2 |  |  |
| 11.01 | Rockwell hardness tester   | Preliminary Test Force - 98.07N (10kgf).<br>Additional Test Force - 490.3, 882.6, 1373N (50, 90, 140 kgf).<br>Total Test Force - 588.4, 980.7, 1471N (60, 100, 150 kgf).<br>Test Force Selection by external dialing.<br>Auto zero setting dial gauge. Should conform to IS : 3804, BS 10109-2 & ASTM E-18 for Rockwell Test. Steel Ball Indenter 2.5 mm with 5 spare balls to be supplied. Supply should be complete with standard test blocks |  | 2 |  |  |
| 12.01 | Vickers hardness tester  | 5, 10, 20, 30, 50 kgf (Digital Display) with diamond indenter.<br>Optical Magnification 70 X. Optical Measuring Range 0.1 to 1.0 mm<br>Maximum Test Height 200 mm   |  | 2 |  |  |
| 13.01 | Digital rockwell hardness tester   | Load 60Kgf, 100Kgf, 150Kgf Testing load, preliminary load 10Kgf. Hardness scales: Rockwell A,B,C,D,E,F,G,H,K,L,M,P,R,S,V. Main Unit, Diamond Rockwell C Indenter, Rockwell Indenter 1/16", Flat anvil 70 mm and V-anvil 6 mm dia., NIST traceable HRC, HRB Test blocks  |  | 2 |  |  |
| 14.0  | Digital Brinellhardness  | Fully Computerised (PC Based). Total Load 500 to 3000 kgf in stages of 250 kgf  |  | 2 |  |  |



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|-----------|---------------------------|---|--|---|--|--|
| 1         | tester                    | .Magnification of objectives :2x. Max.Test Height 380 mm.Supply should be complete with standard test blocks  |  |   |  |  |
| 15.0<br>1 | Digital Vickers Tester    | Fully Computerised (PC Based) Vickers Hardness Machine.<br>Total Loads; 5, 10, 20, 30, 50, kgf. Max. Test Height 200 mm. Supply should be complete with 3 Nos. standard test block  |  | 2 |  |  |
| 16.0<br>1 | Knoopmicrohardness tester | As per specifications of BIS, ASTM Grade  |  | 2 |  |  |
| 17.0<br>1 | Microhardness Tester      | Test force: 10g (0.098N), 25g (0.245N), 50g (0.49N), 100g (0.98N), 200g (1.96N), 300g (2.94N), 500g (4.9N), 1000g (9.8N)<br>Rulers; HV0.01, HV0.025, HV0.05, HV0.1, HV0.2, HV0.3, HV0.5, HV1, HV2<br>Minimum measurement unit: 0.25µm<br>Measuring the hardness range: 1HV-4000HV<br>Hardness value read: Digital LCD<br>Total magnification: 100X (observed), 400X (measurement)(Expandable up to 200X or 600X)<br>Loading mode: FULLY AUTOMATIC (loading, dwell, unloading)<br>Holding Time: 1-99 seconds<br>The objective lens and the press head switch: Manual Turret                      Data<br>Output: Built-in printer (hardness values, maximum and minimum test time, the number of tests, the average)<br>Built-in RS-232 interface<br>Standard fittings, accessories: 10X eyepiece micrometer a Vickers indenter a 10X and 40X objective lens of each one, and two standard hardness block, XY table, flat fixture, sheet fixtures, small parts jig a leveling screw four a bubble level, the power cord in a dust cover, a manual, hardness conversion tables, certificate |  | 2 |  |  |
| 18.0<br>1 | Impact Testing Machine    | Charpy Test and Izod Test (one Mechanical & one Digital Display) Max Energy 300J.   |  | 2 |  |  |



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|-----------|---|---|--|---|--|--|
|           |   | Minimum scale graduation 2 J  |  |   |  |  |
| 19.0<br>1 | Universal tensile testing machine (UTM) (With PC and Printer) | Capacity - 5 k N and 200 KN, 300 KN with auto controller and standard grip. Supply should be complete with Electronic Extensometer, Shear Test Attachment, Mechanical Extensometer.   |  | 3 |  |  |
| 20.0<br>1 | Compression testing (With PC and Printer) Machine             | -Max Capacity 500KN<br>- Measuring range (KN) 0-500<br>- Load resolution in N(20,000 counts)<br>- Straining piston speed 60mm/min<br>- Motor for oil pump (3ph, HP)<br>- Motor for cross head(3ph, HP)  |  | 1 |  |  |
| 21.0<br>1 | Cold Crushing Strength  | B. HYDRAULIC SYSTEM<br><br>1. Capacity of the cylinder : 100Tons (Max)<br>2. Usage : Ceramic Powder pressing<br>3. Piston stroke : 150mm (Max)<br>4. Piston dia : 150mm and suitably<br>4. Loading type : Vertical up<br>5. Compaction type :Uni axial<br>6. Day light (distance between Punch and die) : 200 mm<br>7. Size of the platen : 300 mm<br><br>C. PRESS OPERATION<br>1. Operation : Automatic<br>2. Powder feeding : Manual<br>3. Details of operation : Digitally load will be set in the programmer (HMI) switch on the operation. Automatically the top punch will come down and press the components as per the load setting and then back to home position.<br>4. Indication : HMI (human machine Interface unit)<br>5. Pressure : Pressure programmable.<br>6. Resolution : 0.1 Tone.<br>7. Operation : Through power pack<br>8. Control : Loading and ejection are automatically controlled through PLC and Automation drive controlled<br>9. Load : Programmable at HMI (1 to 60 |  | 1 |  |  |



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|-----------|--|--|--|---|--|--|
|           |  | <p>ton)</p> <p>10. Human machine Interface : 5.7” LCD touch screen (Delta HMI)</p> <p>11. Programmable logic controller (PLC): 8 in digital IN put /OUT put PLC (delta PLC)</p> <p>12. Sensor : Pressure sensor</p> <p>13. Pressure sensor capacity : 300 Bar</p> <p>14. Load Controlling mechanism : VFD automation Drive</p> <p>15. Motor : 1HP Siemens motor</p> <p>16. Pump : Hydraulic Pumps Gear Axial Piston type</p> <p>17. Safety : 1.Emergency Switch<br/>2. Limit switch for Up/Down</p> <p>18. Mode of Operations : 1. Auto Mode<br/>2. Manual Mode</p> <p>D. POWER REQUIREMENT AND INDICATION:</p> <p>1. Power supply : 3 Phase, 50Hz, AC, 230V</p> <p>2. Press operation :<br/>Press operation will be by electrically operated power pack and other operations including ejection are automatic (except powder feeding)</p> <p>3. Indication : Power in, hydraulic on / off and emergency</p> <p>4. Pressure/Load : Pressure/load indicator cum programmer.</p> <p>5. Resolution : 0.1 Tone.</p> <p>6. Digital display : in metric tones with 00.1 digits</p> <p>7. Control : Loading and ejection are automatically controlled through micro processor</p> |  |   |  |  |
| 22.0<br>1 | X-Ray Diffraction Unit, table top with Chiller With PC and Printer | With copper target and all the necessary softwares including JCPDS-PCPDF, Rietveld analysis, MAUD, JESUS and TOPAZ, Power 600W, Voltage 40KV, Current 15mA, Cu Tube, Shutter: Rotary shutter linked to interlock , Scattering slit fixed, Divergence slit Fixed or Variable, Receiving slit fixed, Filter K $\beta$ foil, Goniometer: Vertical type,   |  | 1 |  |  |





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|-----------|---------------------------------------|--|--|---|--|--|
|           |                                       | Scanning range -3 to 145°(2θ), Scanning speed 0.01 to 100°/min (2θ), Accuracy 0.02°, Minimum step width 0.005°(2θ), Power Main Body: 100 to 240 VAC 1φ ±10% 50/60 Hz ±1% 1.0 kVA, PC power 100 to 240 VAC 1φ ±10%, 50/60 Hz ±1% 0.7 kVA, Heat Exchanger: 100 to 240 VAC 1φ ±10%, 50/60Hz ±1% 1.1kVA, with Chiller unit   |  |   |  |  |
| 23.0<br>1 | Planetary Ball Mill                   | Maximum speed 400 rpm with 50 ml grinding jar made of tungsten carbide coated jar and grinding ball and stainless steel jar and stainless steel ball   |  | 2 |  |  |
| 24.0<br>1 | Hydraulic press for powder compaction | Automatic with maximum capacity 10 ton   |  | 2 |  |  |
| 25.0<br>1 | Sand testing equipments               | Including sand mixer, Sand Sampler, Sample tray, Sand splitter, core box , sand rammer, permeability tester, moisture teller, Foundry grade Muffle Furnace (1400°C) Universal Strength Machine(Digital) to read compression/torsion/tensile strength up to 60 kg/cm <sup>2</sup> , sand muller,  |  | 1 |  |  |
| 26.0<br>1 | Corrosion testing equipment           | - Potentiostat standard unit with electrodes<br>- Conductivity measurement bridge<br>- Stress corrosion measurement setup  |  | 2 |  |  |
| 27.0<br>1 | Arc welding equipment                 | - A.C./D.C. Welding Machine(Manual metal Arc, TIG, MIG, SAW) (2 sets)<br>- Welding electrodes (tungsten or any other suitable coated electrodes for Welding of steel) (15 pairs)<br>- Electrode holder<br>- Cables<br>- Cable connectors and lugs<br>- Chipping hammer<br>- Protective clothing including leather apron, cap, leather hand gloves, Wire brush<br>- Screen or face shield |  | 2 |  |  |



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|-----------|--|---|--|---|--|--|
|           |  | - Gas Welding (acetylene, propane, butane)  |  |   |  |  |
| 28.0<br>1 | Stainless Steel<br>Round Hot plate   | Voltage rating 220-440V, Electric power operated frequency 50-60Hz, 1800 Watt Temperature upto 200-350C   |  | 4 |  |  |
| 29.0<br>1 | Magnetic<br>Stirrers with<br>Hotplate (with<br>Digital Speed<br>Indicator) | 2 MLH, 300Watt, With Stirrer 1200 RPM, 220x225 mm   |  | 4 |  |  |
| 30.0<br>1 | Laboratory Hot<br>Ovens  | Laboratory type, digital display, Voltage 220V, frequency 50Hz, Stainless Steel Material, Chamber Volume 100litre, Motorized Air Circulations, Proper temperature control with high accuracy, PID Controller, RT to 400°C   |  | 2 |  |  |
| 31.0<br>1 | Vertical Stirrers<br>(Direct Drive<br>Stirrers) AC/DC<br>mode              | 250-300 rpm drive   |  | 3 |  |  |
| 32.0<br>1 | High<br>temperature<br>Muffle furnaces                                     | Two 1200°C [width-150mm, height-150mm, depth-200mm, Volume 4.5ltrs<br>Metallic heaters, thermocouple-K type<br>Max temperature 1200C<br>Working temperature 1150C<br>Hot Zone Size (As per Std)] + two more<br>1400°C [width-150mm, height-150mm, depth-200mm, Volume 4.5 ltrs<br>SiC heaters, thermocouple-R type<br>Max temperature 1400C<br>Working temperature 1350C<br>Hot Zone Size (As per Std)] with kanthal and Super Kanthal/ Silicon Carbide heating elements. Accessories required at least three tubes for each. |  | 6 |  |  |
| 33.0<br>1 | Low<br>temperature<br>furnaces (tube<br>type)                              | Max Temp 1100°C, Nicrome/Kanthal heating element On/Off Controller<br>Metallic heaters Thermocouple K<br>Max Temperature- 1150<br><br>Working Temperature-1100  |  | 3 |  |  |



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|-----------|---------------------------------------|--|--|---|--|--|
|           |                                       | <p>Tube OD- 90mm/60mm<br/>Hot Zone length- 300mm/250mm</p> <p>Ordinary(1)+ Gas Purging Ar/N2(1)<br/>+Vacuum(1),</p>  |  |   |  |  |
| 34.0<br>1 | High Temperature Furnaces (tube type) | <p>Max Temp 1400°C (2)<br/>Silicon Carbide/MoSi2/Super kanthal,PID controller, +/- .05 degree C SiC heaters<br/>Thermocouple R</p> <p>Max Temperature- 1400</p> <p>Working Temperature-1350</p> <p>Tube OD-90mm/60mm<br/>Hot Zone length-300mm/250mm</p> <p>Gas Purging(1) +Vacuum (1), Max temp 1600°C (2) MoSi2 heaters Thermocouple B</p> <p>Max Temperature-1600C</p> <p>Working Temperature-1550C</p> <p>Tube OD-90mm/60mm<br/>Hot Zone length-300mm/250<br/>Gas Purging(1) +Vacuum (1)</p> |  | 4 |  |  |
| 35.0<br>1 | CRUCIBLE TYPE MELTING FURNACE         | <p>Electrically Heated Kanthal/ SiC Crucible<br/>Type Aluminum Melting cum holding furnace</p> <p>Heating Zone 6cmX20cm<br/>Temperature range: 1200°C<br/>Charging : Manual<br/>Tapping: Manual<br/>On/Off controller</p>  |  | 2 |  |  |
| 36.0<br>1 | Stir Casting Furnace                  | <p>FEATURES...</p> <p>Fully automated.<br/>Furnace up to 1000 degree Celsius.<br/>Suitable for metal matrix composite preparation.<br/>Die dimension : dia: 35mm, length: 230mm</p>  |  | 1 |  |  |



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|-----------|-----------------------------|---|--|---|--|--|
| 37.0<br>1 | Jominy End Quench Apparatus | <ul style="list-style-type: none"> <li>• As Per BIS Std Test piece - Total length is 100 + 0.5 mm diameter is 25 ( +0.5; - 0.0)mm.</li> <li>• Inside diameter of vertical water supply pipe 12.5 + 0.5 mm.</li> <li>• Height of the free water jet (without test piece in position) 65 + 10 mm.</li> <li>• Distance from Tip of nozzle to the bottom of test piece 12.5 + 0.5 mm.</li> <li>• This apparatus conform to IS:3848-1981 ASTM : A 255.</li> </ul>  |  | 1 |  |  |
| 38.0<br>1 | Jaw Crusher                 | Output size upto 3 mm, motor power 1.5 Kw   |  | 1 |  |  |
| 39.0<br>1 | Ball Mill                   | Consists of a drum made of welded steel having an inside diameter of 300 mm x 300mm long, supported on heavy duty ball bearings. All air and water tight cover is provided to close the 100 mm wide opening along the entire length of the drum. A reduction gear driven by a motor rotates the Ball mill at 28-30 RPM. Supplied complete with twelve 19 mm diameter hardened steel balls and an automatic revolution counter. One tray also provided for collecting the sample. Operation on : 220 V, single ph., 50 Hz., A.C. supply. |  | 1 |  |  |
| 40.0<br>1 | Rod Mill                    | Cylinder size upto 200 mm , capacity approx. 800 g, feed size upto 3 mm, product size 0.08 mm, grinding medium steel bar  |  | 1 |  |  |
| 41.0<br>1 | Flotation Cell              | Approx 1 litre volume   |  | 1 |  |  |
| 42.0<br>1 | Tabling equipment           | Wilfley table. Power 1-2 kw<br>Vibrating Range (Amplitude) 1-2 mm,<br>Driven Type: Electric<br>Material : Steel<br>Max Weight 200-400 kg  |  | 1 |  |  |
| 43.0<br>1 | Jigging equipment           | Standard for laboratory purpose for iron ore, coal and coke Jaws of Hadfield Steel lab. Model   |  | 1 |  |  |



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|-----------|--|---|--|---|--|--|--|
| 44.0<br>1 | Sieve Shaker machine with standard BIS Sieve set                           | Standard for mineral beneficiation laboratory   |  | 2 |  |  |  |
| 45.0<br>1 | Magnetic separator with control system for mineral and material separation | For mineral beneficiation and materials laboratory  |  | 2 |  |  |  |
| 46.0<br>1 | Weighing balance (Lab model)   | Max capacity 5 kg   |  | 3 |  |  |  |
| 47.0<br>1 | Top pan Digital Analytical Balance   | Max 200 g, sensitivity +/- 0.05, Readability .01g   |  | 3 |  |  |  |
| 48.0<br>1 | Power Hack Saw Machine with attached Saw                                   | For cutting steel samples   |  | 1 |  |  |  |
| 49.0<br>1 | Radial Drilling Machine  | Drill Mandrel with attached Drill tool  |  | 1 |  |  |  |
| 50.0<br>1 | Orifice Meter and Venturi Meter  | Standard type with Stainless Steel make   |  | 1 |  |  |  |
| 51.0<br>1 | Bernoulli's theorem verification test rig                                  | Standard type   |  | 1 |  |  |  |
| 52.0<br>1 | Moisture Testing Equipment   | Standard type   |  | 1 |  |  |  |
| 53.0<br>1 | Ultrasonic Flaw Detector   | Test range – 10 mm to 5 meter ( in steel), velocity – 1000 m/sec to 9999 m/sec, 100 dB calibrated gain adjustable in 0.5, 1, 2, 6, 12 or 20 dB step, Pulse echo and transmit/receive. Should be capable of measuring thickness/depth and defect size. Should be complete with necessary |  | 2 |  |  |  |



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|           |  | software and regular sized transducers (single crystal) with frequencies 0.5, 1, 2, 2.5, 4, 6 MHz   |  |   |  |  |  |
| 54.0<br>1 | Eddy current tester  | TEST FREQUENCY 1KHz to 5 MHz. FILTERS should be High Pass, Low Pass, Band Pass and Out. Fixed filter positions adjustable from 0.1 Hz to 5000 Hz flaw frequency. PHASE 0 - 359°, calibrated in 1° steps. SENSITIVITY 0 - 99 dB, calibrated in 1dB steps   |  | 1 |  |  |  |
| 55.0<br>1 | Ultrasonic Thickness Gauge Detector                              | Applicable materials: Homogenous: metals, ceramics, polymers etc<br>Measuring Range 1-300mm(Specified Range depends on test material, transducer, surface and temperature)<br>Dual Crystal (Transmitter-Receiver) type Probe, Velocity 1000-9999m/s Resolution 0.1mm (Conventional), Accuracy 0.1mm(Conventional), 2Penlite Dry cells (AA) or NiCd<br>For advanced Model Resolution 0.01mm, Accuracy 0.04mm |  | 2 |  |  |  |
| 56.0<br>1 | Carpentry Vice   | Standard dimension  |  | 2 |  |  |  |
| 57.0<br>1 | Wood Turning Lathe Machine                                       | Standard model for laboratory   |  | 1 |  |  |  |
| 58.0<br>1 | Wood planner machine   | Standard model for laboratory   |  | 1 |  |  |  |
| 59.0<br>1 | Ultrasonic laboratory processor                                  | 20/30/36KHz<br>220V AC 50Hz 600W, (upto 500ml, probe dia 12.5mm)1000W (upto 1000ml, probe dia 25mm)   |  | 2 |  |  |  |
| 60.0<br>1 | Microwave sintering furnace (1400/1600C) with atmosphere control | For material processing laboratory:<br>Effective Hotzone of 100 mm to 300 mm on all sides<br>Maximum Process Temperature of 1750 deg.C<br>Non-Contact Temperature Monitoring<br>Installed Microwave Power of 2.9 kW to  |  | 2 |  |  |  |



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|           | (N <sub>2</sub> /Ar/O <sub>2</sub> purging)              | 11.6 kW<br>Step-less Power Control using Microcontroller Module<br>Digital Display of Power and Temperature<br>Highly Integrated Interlocks<br>State of the Art Process Control using High End PID Controller<br>Industrial PLC with Touch Screen Controls<br>Sintering in Inert/Reducing/Oxidising Atmospher  |  |   |  |  |
| 61.0<br>1 | Microwave oven (350C)                                    | For material processing laboratory<br>Microwave Frequency of 2450 MHZ<br>Throughput ranging from 500gm to 1kg/hour<br>Typical Length Of the System ranges to 2 meters<br>Conveying System with speed controls from 2 to 50 mm/sec<br>Maximum Process Temperature from RT to 350 deg. C<br>Product Temperature Monitoring through suitable sensors<br>Installed Microwave Power of 5 kW to 100 kW<br>Step-less Power Control using Microcontroller Module<br>Digital Display of Power and Temperature<br>Exhaust Air Circulation of 100 to 1000 cfm<br>Highly Integrated Interlocks<br>Industrial PLC with user friendly controls |  | 2 |  |  |
| 62.0<br>1 | UV-VIS Spectrophotometer (With PC, Software and Printer) | <b>1) SPECTRAL</b><br>Range 190 to 1100 nm<br>Bandwidth 1.8 nm<br>Readability 0.1 nm<br>Accuracy ± 0.5 nm<br>Repeatability ± 0.2 nm<br><b>PHOTOMETRIC</b><br>System Double beam optics<br>Range ± 3 Abs<br>Accuracy<br>± 0.005 Abs at 1.0 Abs<br>± 0.010 Abs at 1.5 Abs<br>Repeatability ± 0.002 Abs at 1.0 Abs<br>Stability (Baseline) 0.003 Abs/hr. after 2  |  | 2 |  |  |



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|           |   | <p>hour warm-up<br/>Stray Light &lt;0.05% T at 220 nm with NaI 10g/L<br/>Readability<br/>%T 0.01<br/>Abs 0.0001<br/>LIGHT SOURCE<br/>Pre aligned Deuterium Lamp (D2) &amp; Tungsten (W) Halogen Lamp<br/>DETECTOR Silicon Photo Diode<br/>MONOCHROMATOR Concave holographic grating with 1200 lines/mm<br/>SAMPLE ATTACHMENT Standard Fixed 10mm path length Holders for Reference and Sample.<br/>Optional<br/>Fixed multi path cuvette holders for Reference and Sample accommodating 10mm to 100 mm cuvettes. Fixed cuvette holder for Reference and 6 Position motorized 10 mm path cell holder for Sample. Fixed cuvette holder to accommodate micro cuvettes.<br/>Complete supply with Printer; Cuvettes; CuvetteChanger; necessary softwares<br/>2) Specification: Wavelength range: 175-900 nm (Low UV kit is necessary for the region below 184 nm)<br/>Bandwidth selectable: 0.049 nm or higher (UV/Vis)<br/>Stray light: 0.00007% or less at 220 nm (10 g/L NaI ASTM Method)<br/>0.00007% or less at 370 nm (50 g/L NaNO<sub>2</sub>)</p> |  |   |  |  |
| 63.0<br>1 | FTIR spectrometer (With PC, software and Printer) | <p>For material characterization<br/>Specifications<br/>Interferometer Michelson interferometer (30° incident angle)<br/>Equipped with Advanced Dynamic Alignment system<br/>Sealed interferometer with auto dryer<br/>Beam splitter Germanium-coated KBr for Middle IR (Standard)<br/>Germanium-coated Csl for Middle/Far IR (Optional)</p>   |  | 2 |  |  |





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|           |  | <p>Silicon-coated CaF<sub>2</sub> for Near IR (Optional)<br/>Light source High-energy ceramic for Middle/Far IR (Standard)<br/>Tungsten lamp for Near IR (Optional)<br/>Detector DLATGS detector with temperature control for Middle/Far IR (Standard)<br/>MCT (Hg–Cd–Te) with liquid nitrogen cooling for Middle/Near IR (Optional)<br/>InGaAs for Near IR (Optional)<br/>Wavenumber range 7,800 to 350 cm<sup>-1</sup> (Standard)<br/>12,500 to 240 cm<sup>-1</sup> (Optional)<br/>Resolution 0.25, 0.5, 1, 2, 4, 8, 16 cm<sup>-1</sup> (Middle/Far IR)<br/>2, 4, 8, 16 cm<sup>-1</sup> (Near IR)<br/>Dimensions 600 (W) x 665 (D) x 295 (H) mm<br/>Weight 47 kg</p>   |  |   |  |  |
| 64.0<br>1 | UV-VIS-NIR (With PC, Software and Printer) | <p>UV-VIS-NIR spectrophotometer with three detectors, consisting of a PMT (photomultiplier tube) for the ultraviolet and visible regions and InGaAs and cooled PbS detectors for the near-infrared region. With conventional instruments that use only PMT and PbS detectors, there is a drop in sensitivity in the crossover region between those detectors. Using an InGaAs detector to cover this crossover region, however, ensures high sensitivity across the entire measured wavelength range, and gives a noise level of 0.00003 Abs at 1500 nm.</p> <p>In addition to the main unit, the Multi-purpose large-sample compartment and the Integrating sphere attachment also feature three detector, enabling the high-sensitivity measurement of solid samples. A high-performance double monochromator makes it possible to attain an ultra-low stray-light level (0.00005 % max. at 340 nm) with a high resolution (maximum resolution: 0.1 nm). The wide wavelength range of 185 to 3,300 nm enables measurement across the</p> |  | 1 |  |  |



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|           |  | ultraviolet, visible, and near-infrared regions.  |  |   |  |  |
| 65.0<br>1 | Refractometer  | <p>For material characterization</p> <p>Principle of operation : Optical-Refraction Critical-Angle detection system</p> <p>Refractive index : 1.3200 - 1.6500</p> <p>Resolution : 0.0001</p> <p>Accuracy : +- 0.001</p> <p>Brix : 0 - 95 %</p> <p>Resolution : 0.01 %</p> <p>Accuracy : +- 0.5 %</p> <p>Optical Wavelength : 589 nm (Na D-line)</p> <p>Light Source : High performance LED</p> <p>Filter : 589 nm Interference Filter</p> <p>Detector : Linear Array CCD</p> <p>Display : Graphic LCD</p> <p>Temperature Sensor : Pt 100</p> <p>Power Supply : AC 230V / 50Hz</p>   |  | 2 |  |  |
| 66.0<br>1 | Spectrofluorometer/fluorescence meter (With PC, Software, Printer) | <p>For material characterization</p> <p>Lamp Vertically mounted, CW, 150 W Ozone-free xenon arc lamp</p> <p>Gratings 1200 groove/mm blazed at 330 nm (excitation) and 500 nm (emission), plane ruled</p> <p>Automatic self-calibration of all wavelength drives and slits</p> <p>Monochromators All reflective optics, Czerny-Turner spectrometers</p> <p>Detectors Emission: R928P photon counting PMT (185-850 nm) and reference photodiode for monitoring lamp output</p> <p>Water Raman S/N 6,000:1 (FSD method) 16,000:1 (RMS method) See Signal-to-noise ratio</p> <p>Slits Continuously variable from 0 to 30 nm</p> <p>Accuracy 0.5 nm</p> <p>Repeatability 0.1 nm</p> <p>Minimum step</p> <p>0.0525 nm</p> <p>Integration time</p> <p>0.001 to 160 sec</p> |  | 1 |  |  |



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|           |                                     | Software<br><br>FluorEssence<br>Spectral Correction Factors<br><br>Included  |  |   |  |  |
| 67.0<br>1 | HRSEM-EDX<br>(With PC,<br>Software) | High Resolution Scanning Electron<br>Microscopy with EDX analysis, sputtering<br>for metallization.Textural and<br>compositional analysis (Microstructure)<br>Specifications<br>Resolution High vacuum mode: 3.0 nm (30<br>kV) 15.0 nm (1.0 kV)<br>Low vacuum mode※1: 4.0 nm (30 kV BED)<br>Direct magnification x 5 to x 300,000<br>(Defined with a display size of 128 mm x<br>96 mm)<br>Displayed magnification x 14 to x 839,724<br>(on the monitor)<br>(Defied with a display size of 358 mm x 269<br>mm)<br>Electron gun W filament, Fully automatic<br>gun alignment<br>Accelerating voltage 0.3 kV to 30kV<br>Probe current 1 pA to 1 μA<br>Low-vacuum pressure adjustment※1 10<br>to 650Pa<br>Objective lens aperture 3-stage, with XY<br>fine adjustment function<br>Automatic functions Filament adjustment,<br>Gun alignment,<br>Focus / Stigmator / Brightness / Contrast<br>Maximum specimen size 200 mm dia. x 75<br>mm height<br>200 mm dia. x 80 mm height ※Option<br>32 mm dia. x 90 mm height ※Option<br>Specimen stage Large eucentric type<br>X: 125 mm, Y: 100 mm, Z: 80 mm<br>Tilt: -10° to 90° Rotation: 360°<br>Montage function Built-in<br>Measurement-position coordinate display<br>203 mm dia.<br>Standard recipes Built-in (includes EDS<br>functions ※2) |  | 1 |  |  |



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|  |  | <p>Image mode Secondary electron image, REF image, Composition image, ※1 Topographic image, ※1 Stereo-microscopic image, ※1 etc.<br/>         Pixels for image acquisition 640 x 480<br/>         1,280 x 960<br/>         2,560 x 1920 5,120 x 3,840<br/>         OS Microsoft® Windows®10 64 bit<br/>         Observation monitor 23-inch touch panel<br/>         EDS functions ※2 Spectral analysis, Qualitative &amp; Quantitative analysis, Line analysis (horizontal line, specific direction line), Elemental mapping, Probe tracking, etc.<br/>         Measurement functions Built-in (distance between 2 points, distance between parallel lines, angle, diameter, etc.)<br/>         Data management function SMILE VIEW™ Lab<br/>         Report generation function SMILE VIEW™ Lab<br/>         Language switch Operable on UI (English / Japanese)<br/>         Vacuum system Fully automatic, TMP: 1 RP: 1 or 2 ※1<br/>         Notices:Windows is a registered trademark of Microsoft Corporation in the United States and other countries.</p> <p>Main Options<br/>         Backscattered Electron Detector (BED) ※1<br/>         Low Vacuum Secondary Electron Detector (LSED)<br/>         Energy Dispersive X-ray Spectrometer (EDS) ※2<br/>         Wavelength Dispersive X-ray Spectrometer (WDS)<br/>         Electron Backscatter Diffraction Detector (EBSD)<br/>         Load Lock Chamber (pre-exchange chamber)<br/>         Stage Navigation System (SNS)<br/>         Chamber Scope (CS)<br/>         Operation Panel</p> |  |  |  |  |
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|           |   | 3D Measurement Software   |  |   |  |  |
| 68.0<br>1 | Raising Hearth<br>Furnace   | For material processing and casting; Temperature upto 1700°C, molybdenum disilicide heating elements or molybdenum bunched wires / formed strips used as heaters.   |  | 2 |  |  |
| 69.0<br>1 | Molten Salt<br>Bath Furnace   | For metallurgical processing in Laboratory  |  | 2 |  |  |
| 70.0<br>1 | DSC-TGA<br>Analyzer (With<br>Computer<br>,software,<br>Printer)                         | <p>Detail Information</p> <p>Simultaneous analysis of TG with DTA mode (?T) and DSC (mW) mode for fast enhanced result interpretation</p> <p>Wide temperature range allow measurements from below room temperature to 1600 °C. Superior accuracy and sensitivity in a small package with an attractive price</p> <p>Superior weight, heat flow and temperature accuracy in a small package with an attractive price</p> <p>Top loading balance for ease of sample loading</p> <p>Balance below furnace for optimum isolation from contamination</p> <p>Vertical displacement balance sensor (not rotational) provides weight insensitivity to sample position, e.g., no spurious weight change from melting</p> <p>Specifications</p> <p>21 CFR Part 11 Compatible No</p> <p>Maximum Temperature 1600 °C</p> <p>Minimum Temperature 15 °C</p> <p>Model Name STA 8000</p> <p>Portable No</p> <p>Technology Type Thermal Analysis</p> |  | 1 |  |  |
| 71.0<br>1 | LCR Meter<br>analyzer<br>(General +<br>Temperature<br>variation) (With<br>PC, Software, | Measurement Range: 100 mΩ to 100 MΩ, 10 ranges (All parameters are determined according to Z) Display Range: Z: 0.00 m to 9.99999 GΩ, Y: 0.000 n to 9.99999 GS, θ: ± (0.000° to 180.000°), Q: ± (0.00 to 9999.99), Rdc: ± (0.00 m to 9.99999 GΩ),   |  | 2 |  |  |



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|           | printer)  | <p>D: <math>\pm</math> (0.00000 to 9.99999), <math>\Delta\%</math>: <math>\pm</math> (0.000 % to 999.999 %), or other, Measurement Signal level: [Normal mode: V mode/CV mode]</p> <p>4 Hz to 1.0000 MHz: 10 mV to 5 Vrms (maximum 50 mArms)</p> <p>1.0001 MHz to 8 MHz: 10 mV to 1 Vrms (maximum 10mArms)</p> <p>[Low impedance high accuracy mode: V mode/CV mode]</p> <p>4 Hz to 1.0000 MHz: 10 mV to 1 Vrms (maximum 100 mArms)</p> <p>[Normal mode: CC mode]</p> <p>4 Hz to 1.0000 MHz: 10 <math>\mu</math>A to 50 mArms (maximum 5 Vrms)</p> <p>1.0001 MHz to 8 MHz: 10 <math>\mu</math>A to 10 mArms (maximum 1 Vrms)</p> <p>[Low impedance high accuracy mode: CC mode]</p> <p>4 Hz to 1.0000 MHz: 10 <math>\mu</math>A to 100 mArms (maximum 1 Vrms)</p> <p>[DC resistance measurement]</p> <p>Measurement signal level: Fixed at 1 V, Generating range: DC voltage 0 V to 2.50 V (10 mV resolution)</p> <p>In low Z high accuracy mode: 0 V to 1 V (10 mV resolution) power Supply: 100 to 240 V AC, 50/60 Hz, 50 VA max Temperature upto 1200C,</p> |  |   |  |  |
| 72.0<br>1 | Scratch Tester (With PC, Software)                      | <p>For mechanical property studies</p> <p>Parameter Specifications</p> <p>Low Load Head Up to 2 N</p> <p>High Load Head Up to 20 N</p> <p>X Axis Travel 50 mm</p> <p>Y Axis Travel 5 mm</p> <p>Scratch Speed 10 mm/sec</p>   |  | 1 |  |  |
| 73.0<br>1 | Pin on Disc tribometer (Dry + wet) (With PC , Software) | <p>Conforms to ASTM G 99 standard.</p> <p>Measurement of wear, friction, co-efficient of friction &amp; temperature.</p> <p>Performs test under sliding wear conditions.</p> <p>Real time data acquisition of wear, friction, co-efficient of friction &amp; temperature etc.</p> <p>Parameter Specifications (Micro POD)</p>  |  | 2 |  |  |



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|           |   | <p>Specifications (Macro POD)</p> <p>Load Range Up to 60 N Up to 200 N</p> <p>Rotational Speed Up to 500 rpm (optional: up to 2000 rpm) 200 to 2000 rpm</p> <p>Frictional Force Measurement 0 to 20 N (optional: 0 to 60 N) 0 to 200 N</p> <p>Compound Wear Measurement 0 to 1200 <math>\mu\text{m}</math> 0 to 1200 <math>\mu\text{m}</math></p>   |  |   |  |  |
| 74.0<br>1 | Ball on Disc tribometer (With PC , Software)        | <p>Conforms to ASTM G 99 standard.</p> <p>Measurement of wear, friction, co-efficient of friction &amp; temperature.</p> <p>Performs test under sliding wear conditions.</p> <p>Real time data acquisition of wear, friction, co-efficient of friction &amp; temperature etc.</p> <p>Parameter Specifications (Micro POD)</p> <p>Specifications (Macro POD)</p> <p>Load Range Up to 60 N Up to 200 N</p> <p>Rotational Speed Up to 500 rpm (optional: up to 2000 rpm) 200 to 2000 rpm</p> <p>Frictional Force Measurement 0 to 20 N (optional: 0 to 60 N) 0 to 200 N</p> <p>Compound Wear Measurement 0 to 1200 <math>\mu\text{m}</math> 0 to 1200 <math>\mu\text{m}</math></p> |  | 1 |  |  |
| 75.0<br>1 | Rotary bending machine (With PC, Software, Printer) | <p>For mechanical studies in metallurgy</p> <p>Parameter Specifications</p> <p>Specimen Dimensions 20 mm dia; held by collet</p> <p>Bending Moment up to 20 Nm; in steps of 2 Nm</p> <p>Speed 300 to 4200 rpm</p> <p>Timer 99:59:59 (Hr:Min:Sec); pre-settable</p> <p>Counter 999,999 (Max) Features</p> <p>Auto shutoff on test completion.</p> <p>Rugged floor standing design.</p>   |  | 1 |  |  |
| 76.0<br>1 | Dry abasion tester machine (With PC & software)     | <p>For mechanical studies in metallurgy</p> <p>Parameter Specifications</p> <p>Load 100 N to 300 N (dead weights)</p> <p>Speed 245 +/- 5 rpm</p> <p>Duration 999,999 rev (Max) Features</p> <p>Illuminated test area for ease of use.</p> <p>Auto shut off on test completion.</p> <p>Easy test setup and clean operation.</p>  |  | 1 |  |  |



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|           |   | Containment chamber for dust collection.<br>Integrated wheel dressing tool.<br>Options<br>Automated Loading Module<br>High Temperature Module   |  |   |  |  |
| 77.0<br>1 | Slurry Abrasion Tester machine (With PC & software)     | For mechanical studies in metallurgy<br>Features<br>Auto shut off on test completion.<br>Easy test setup and clean operation.<br>Corrosion resistant materials for long lasting performance.<br>Parameter Specifications<br>Load 100 N to 300 N (dead weights)<br>Speed 245 +/- 5 rpm<br>Duration 999,999 rev (Max)   |  | 1 |  |  |
| 78.0<br>1 | Laser Raman Spectrometer (With PC and Software)         | For characterization studies in metallurgy:<br>Laser source : 532 nm 40 mW DPSS Laser<br>Wavelength Range : 200 ~ 800nm (Monochromator)<br>Wavelength Accuracy : $\leq 0.4$ nm<br>Wavelength Repeatability : $\leq 0.2$ nm<br>Reciprocal of Linear Dispersion : 2.7 mm<br>Half-Width of Spectral line : $\leq 0.2$ nm @ 586 nm<br>Monochromator<br>Relative Aperture Ratio : $D / F$ 1 / 5.5<br>Optical Grating : 1200 l / mm<br>Slit Width : 0 ~ 2mm Continuously Adjustable |  | 1 |  |  |
| 79.0<br>1 | XRF analyzer (With PC & software)                       | For analysis of solid, liquid, thin film and powder samples pertaining to Materials Science and Engineering:<br>Elemental range : Be-U<br>Composition range : 0.1 ppm to 100%<br>Resolution 35eV  |  | 1 |  |  |
| 80.0<br>1 | High Pressure autoclave for Hydrothermal & solvothermal | For material preparation, hydrometallurgy & Others<br>50 ml to 2ltr volume<br>Pressures upto 350 bar<br>Maximum temperatures of 500°C   |  | 2 |  |  |





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|           | reaction  | Different materials such as SS316, Hastelloy C, Monel, Inconel, Nickel, Titanium, Zirconium, Tantalum etc.<br>Volumes from 25 ml to 750 ml<br>Pressures up to 200 bar<br>Maximum temperatures of 250°C<br>Acid digestion vessels made from SS 316 with PTFE liner & PTFE cap   |  |   |  |  |  |
| 81.0<br>1 | Solution Combustion facility                      | For material preparation and studies   |  | 1 |  |  |  |
| 82.0<br>1 | Dip coating & Spin Coating (With PC and Software) | Dipping & Lifting Speeds: 0.5-450mm/min (Dip coating)<br>Deposition Arm Movement: 150mm<br>Deposition Cycles: 35,000 (Max.)<br>Dry & Wet Times: 59,999.9min (Max.)<br>Preset Editable Recipes: 10<br>Input & Control Option: Keypad<br>Features:<br>Micro-controller Controlled<br>Programmable Dipping & Lifting Sequences<br>Recipe Saving Option in Memory<br>Integrated Power On-off Switch in Keypad<br>Arrow Display for Dipper Arm Movement Direction<br>Multi-slide Holder (Customizable)<br>Blank Distance Adjustment for Better Performance<br>Self Performance Test Option<br>Real-time Display of Control Processes (Deposition/Lifting Speed, Dry/Wet Time, Deposition Cycles etc.) in LCD Console<br>Slide Mount/Unmount Option<br>Easy Installation & User-friendly Operation<br>Spin Coating Micro-controller Controlled<br>Brushless DC Motor Speed Range: 500-7,000 R.P.M.<br>[based on a Glass Substrate of Dimension 1.5" (L) X 1" (W) & Thickness 0.05"]<br>Acceleration Period: 2-3 sec<br>[based on a Glass Substrate of Dimension 1.5" (L) X 1" (W) & Thickness 0.05"]<br>Duration: 1-1,200 sec<br>Real-time Display of R.P.M., Timing & other |  | 2 |  |  |  |



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|           |   | <p>Parameter Status on 4 Line LCD Console.<br/>Parameters saving in Non-volatile Program Memory<br/>Input &amp; Controlling through Push-dial Encoder<br/>Teflon coated Working Chamber of 8" Diameter. User-friendly Firmware Interface: Integrated Motor Start/Stop Button with Indicator<br/>Calibration Option. Warm Up Option.<br/>Transparent Photo-resist Safety Lid over the Working Chamber, Spill-drainage Facility. Power: Universal Input<br/>Wattage: 100 W (Maximum)<br/>With Delrin Substrate Holders [10 mm Diameter, 0.5" Diameter &amp; 1" Diameter] &amp; N2 &amp; other Inert Gas Purging Module</p> |  |   |  |  |
| 83.0<br>1 | Modulus of Rupture                          | <p>For material characterization IS:1528(Part 20)-1993 &amp; ISO:5013-1985 for a batch of 5 or 6 Samples of size between 25 x 25 x 150 and 40 x 40 x 150 (mm).<br/>Loading Range : up to 400 Kgs. Load measured with in-line Load Cell.</p>  |  | 1 |  |  |
| 84.0<br>1 | Hot Modulus of Rupture (With PC & software) | <p>Test Sample Size &amp; No. : 25 x 25 x 150 (mm) ---- 6 nos.<br/>35 x 35 x 160 (mm) ---- 5 nos.<br/>Bearing Edge Span / Radii : 125 ± 1 mm / 5 ± 1 mm<br/>Load / Measuring Accuracy : 380 Kgs. Max / ± 1%<br/>Loading Rate (stepless) : 0.20 to 4.00 Kg / Sec ± 2%<br/>Furnace Cavity Size (gross) : 300 W x 250 H x 400 D<br/>Heating Elements : Silicon Carbide<br/>Temperature / Control Accuracy : 1450o C max / ± 1o C<br/>Heat-up Rate Capacity (max.) : 10o C to 6o C per minute<br/>Temp. Programmer / Data Logger : PID, 0-5V dc, 16 segments<br/>PC Interfacing Facility through RS 232</p>                  |  | 1 |  |  |



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|           |   |  |  |         |  |  |
|-----------|---|--|--|---------|--|--|
|           |   | <p>Power Control : Thyristor Systems<br/>Power Supply / Rating : 400 Volt 3-Ph A.C. / 10 KW<br/>Dimensions : Furnace Part : 132 W x 142 D x 198 H (cm)<br/>(overall) : Control Panel : 56 W x 51 D x 168 H (cm)<br/>Atmosphere Inlet : Optional<br/>Custom-made Dedicated SOFTWARE, operating on the Platform compatible</p>   |  |         |  |  |
| 85.0<br>1 | Microwave reactor & Solution Digestion Facility             | <p>Effective Batch size of 100 ml to 1ltr<br/>Maximum Process Temperature upto 350 deg.C<br/>Contact Type Temperature Monitoring<br/>Controlled Magnetic Stirrer for agitation<br/>Specially designed condensation system<br/>Installed Microwave Power of 0.5 kW to 29 kW<br/>Step-less Power Control using Microcontroller Module<br/>Digital Display of Power and Temperature<br/>Highly integrated Interlocks<br/>State of the Art Process Control using High End PID controller<br/>Industrial PLC with touch screen controls<br/>Inert/Reducing/Oxidising Atmospheric Processing</p> |  | 1       |  |  |
| 86.0<br>1 | Electrophoretic Deposition set up and Electroplating set up | For surface studies in metallurgy and material engg (as per ASTM and BIS Stds)   |  | 2       |  |  |
| 87.0<br>1 | Glass beakers   | (50 ml, 100 ml, 500 ml)  |  | 50 each |  |  |
| 88.0<br>1 | Measuring Cylinders   | (25 ml, 50 ml,)  |  | 20 each |  |  |
| 89.0<br>1 | Ethanol   |  |  | 1 litre |  |  |
| 90.0<br>1 | Nitric acid   |  |  | 1 litre |  |  |



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7.The tenderers are not required to submit hard copies of Technical File (Statutory) or My documents (Non-Statutory). Submission of hard copy of Financial Bid is strictly prohibited and only be submitted through on line through NIC portal.

## 8.Evaluation of the tenders

During the tender evaluation process, the “Technical Bid” will be opened first. Those Bidders who have qualified in respect of the essential & other requirements in “Technical Bid” will be identified and their financial bid will be opened. The financial bid of those Tenderer failing to meet the technical & other requirements laid down in the tender will not be opened and be rejected. The Tenderer offering the item found suitable and as per the tender specifications will only be selected. Final selection of the lowest bidder in respect of Financial Bid is subject to further verification. The Financial Bids of only those tenderers who have been considered as Technically Qualified will be opened. If found suitable in the context of above pre qualification etc, the Tenderer quoting the lowest rate will be considered as successful.

## 9. TERMS & CONDITIONS REGARDING PURCHASE POLICY OF TENDERING AUTHORITY:

### 9.1 Bid Information:

- a) Partial Quotation within the same item will not be accepted and tender will be liable for cancellation.
- b) All duties, taxes and other levies payable by the contractor under the contract shall be included in the total price but should be indicated separately in the price bid.
- c) The rate quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- d) Bidder must follow the instruction for filling up BOQ as per Clause 6.3.

9.2 Evaluation of Quotation: The Purchaser will evaluate and compare the quotations determined to be substantially responsive stage wise. Firstly, Technical Bid will be evaluated based on and thereafter Price Bid for technically qualified bidders will be evaluated for selection of vender.

9.3 Award of Contract: The purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive both technically and commercially. Purchaser reserves the right to reject any or all the tender, wholly or partly, without assigning any reason thereof and shall not be bound to accept the lowest bid.

9.4 Warranty: The vendor shall be fully responsible for onsite warranty for all equipment, accessories etc. including spares and services as mentioned in Item Specifications (Clause 6.3). In all respect, warranty period will start from the date of installation Report. Bidder must upload Warranty confirmation certificate showing the warranty period as per the above clause in “TECHNICAL DETAILS” folder.

9.5 Adequate infrastructural facility: The bidder/manufacturer should have registered establishment set up in Kolkata/Asansol or its adjacent locality. In addition, the bidder/manufacturer must have authorised service centre with adequate numbers of sound service personnel. Representatives from both establishment and service centre must be made available within 24 hours after making calls from the KaziNazrul University. Documents in support of establishment and service centre with pay roll sheet must be uploaded in “TECHNICAL DETAILS” folder.

9.6 Training Facility: User training regarding the operation of the equipment shall be arranged by the supplier/vendor at no extra cost if required.



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9.7 Technical Bid must be submitted along with the copies of OEM license or authorization from the manufacturer. Document in support of the same must be uploaded by the bidder in “TECHNICAL DETAILS” folder. If the bidder is not the manufacturer/brand owner, proper manufacturer’s/brand’s authorization must be uploaded in the said folder. Detail technical catalogue must be uploaded with the bid. If catalogue (with technical detail) , OEM license or authorization from the manufacturer is not submitted , the bid may be rejected.

9.8 Credentials: Documents of previous experience of the job, at least 2 years, must be submitted along with the tender.

9.9 DSIR Certification: KaziNazrul University does not possess the privilege for availing the facility of procuring items at Concessional Customs Duty and without incurring any excise duty as per DSIR certification at present but applied before authority.

9.10 Make & Model: Bidder must mention Make and Model in the Information Sheet as given vide Annexure-I and must send the product details/catalogue/brochure in the “Technical Details” folder.

9.11 Time Schedule: The supply and installation work must be completed within 15 days from the date of receipt of the purchase order.

9.12 Validity of offer: A bidder should spell out in the tender that it shall remain valid for a minimum period of 12 months from the date of opening of the tender and during this period, the bidder shall not be entitled to revoke or cancel its offer.

9.13 Place of delivery: Dean(Science), Laboratory Building, KaziNazrul University, Asansol. Nazrul Road, Kalla More, P.O. – Kalla C. H. Asansol – 713340

9.14 Payment Schedule : Payment be made after delivery and installation of the items.

9.15 Performance Security:

Successful bidder should deposit Performance Security money equivalent to the 10% of the order value in the form of DD/Bank Guarantee immediately before issuing purchase order from the University. Such security will be refunded after completion of the warranty period in normal case without any accrued interest. University may forfeit the Security Money in the event of the following circumstances:

i) Selected bidder withdraws the bid before expiry of its validity but after receipt of the Purchase Order.

ii) Selected bidder does not accept the order after issuing the same or fails to enter into a contract within validity period of offer.

iii) Selected bidder fails to supply the items within the scheduled time as specified in the Purchase Order

iv) If before expiry of the warranty period, the supplied items break down or do not function satisfactorily due to the cause related with the item itself or for its installation and not for any reason caused by the University Authority and the supplier denies to take the responsibility to make the supplied items in order.

v) In case of any false submission /statement by the bidder

vi) In case of any refusal to abide by terms and conditions or refusal to enter into a written agreement as per prefixed terms and conditions

9.16 Quantity Changeability: Quantity as stated in the tender document may subject to change at the time of issuing purchase order due to the fund crunch or for other valid reasons.



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9.17 Requisite Documents to be submitted: Bidder must have adequate documents relating to Trade License and updated returns for Income Tax, GST, Audited Statement of Accounts and other documents as sought for under Clause 6.2.II of this tender.

9.18 Turnover Criterion: Bidder must have average annual turnover of more than Rs.10 lakh in last three financial year ending 2017-18.

9.19 Disposal of Disputes: In case of any dispute, the University's decision will be treated as the final and conclusive. All legal actions are subject to Kolkata jurisdiction only.

9.20 The bidders are required to quote for each item separately in terms of basic price and all other charges. Prices can be quoted in Indian Currency only (₹).

Discretion of the University:

9.21 University may take decision about non-purchase of the said equipment even after selection of vendor due to its fund constraints.

9.22 University may seek documents from the bidder in addition to the scanned documents sent by them at the time of uploading technical bid for verification and evaluation of tender.

9.23 University reserves the right to relax any clause as stated hereinabove for selection of responsive vender.

## 10.Dates& Information:

| Sl.No | Activities  | Date & Time  |
|-------|---|--|
| 1     | Date of uploading in the e-tender portal of NIC : <a href="https://wbtenders.gov.in">https://wbtenders.gov.in</a> | 05.07.2019   |
| 2     | Documents download (online)   | 10.07.2019 at 16 hrs.  |
| 3     | Bid Submission Start Date(on line)  | 11.07.2019 at 11 hrs.  |
| 4     | Bid Submission Closing Date (Online)  | 26.07.2019 at 12 hrs.  |
| 5     | Bid Opening Date (Online) – Technical Bid   | 29.07.2019 at 12 hrs.  |
| 6     | Date of uploading list for technically qualified bidder (online)  | To be notified   |
| 7     | Date of opening of Financial Bid  | To be notified   |
| P8    | Date of uploading of list of bidders along with the approved Rate   | To be notified   |
| 9     | Pre bid meeting date at Asansol   | 10.07.2019 (in the Chamber of Director, School of Mines & Metallurgy) at 12 hrs. at Laboratory Building, Nazrul Road, Kalla More, P.O. – Kalla C. H., Asansol) |



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11. Opening the financial bid as per schedule will BE NOTIFIED LATER ON.

Financial bid can be seen & accessed by the bidder through the NIC Portal on line after opening of financial bid on line. No objections raised by any Bidder in this respect will be entertained by the University. No informal tender will be entertained in the Bid further.

12. During the scrutiny, if it comes to the notice to tender inviting authority that the credential or any other paper found incorrect/ manufactured/ fabricated, that bidder would not allowed to participate in the tender and that application will be rejected outright without any prejudice.

13. The Tender Selection Committee reserves to right to cancel the tender due to unavoidable Circumstances and no claim in this respect will be entertained.



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## Annexure I

FURNISHING BASIC INFORMATION- (To be furnished in the Company's official letter pad)

|    |  |  |
|----|--|--|
| 1  | Name of the Bidder   |  |
| 2  | Address for Communication  |  |
| 3  | Contact Number(s)  |  |
| 4  | E-mail ID  |  |
| 5  | Trade License No.<br>(Please enclose copy of Trade License)  |  |
| 6  | PAN(Please enclose copy of PAN Card)   |  |
| 7  | GST No.(Please enclose copy of GST)  |  |
| 8  | Do you have previous experience for supplying similar nature of Items at Educational Institute of Higher Learning<br>(Please enclose copy of Purchase order & user list, if yes) | Yes/No<br><br>(Please put tick mark)   |
| 9  | Annual Turnover as per Audited P/L ACCOUNTS & BALANCE SHEET  | 2015-16:<br>Rs.....<br>2016-17:<br>Rs.....<br>2017-18:<br>Rs.....<br>Average Annual Turnover:<br>Rs..... |
| 10 | Status of the bidder(Please enclose copy authenticating your status)   | Manufacturer/Dealer/Distributor/Selling Agent/Stockiest<br>(Please put tick mark)                        |





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## Annexure II

### APPLICATION FOR TENDER

(To be furnished in the Company's official letter pad with full address and contact no, E mail address etc)

To  
Registrar  
KaziNazrul University  
Asansol

Sub: .....for the Supply of .....

Ref: - \_\_\_\_\_ No .....dated .....

Sir,

Having examined the pre-qualification & other documents published in the ....., I /we hereby submit all the necessary information and relevant documents for evaluation:

1. That the application is made by me / us on behalf of .....  
.....in the capacity ..... duly authorized to submit the offer.

The authorization letter from the Company is attached in Annexure II.

2. We accept the terms and conditions as laid down in the tender document vide Clause 9 and declare that we shall abide by it throughout the tender period including its extensions, if any.

3. We have gone through the Tender Document thoroughly and quoted the tendered items keeping in mind all sorts of information as furnished in the tender document including Corrigendum/Addendum as published from time to time

4. We are offering rate for the following item /items and assured supply to the KaziNazrul University

5. In the event of being selected, I will make the supply within the stipulated period excepting the condition which is beyond our control.

Date :- Signature of applicant including title and capacity in which application is made.

Contact no:

E-mail address:

Postal Address:



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## Annexure III

(Authorization letter in favour of the applicant (other than Managing Director/ Proprietor/Partner) from the competent authority.)

### FORMAT

(To be furnished in the Company's official letter pad with full address and contact no, E mail Address etc.)

(TO WHOM IT MAY CONCERN)

This is to certify that Mr.....(Name),

Employee of this Organisation as..... (Official Designation) is hereby authorised to submit tender online, Vide ..... No....., Dated ..... on behalf of the Organisation.

Signature of the competent authority with Seal.....(Signature of the Authorised Person)

Signature of Mr.....is hereby attested.

Signature of the competent authority with Seal



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## ANNEXURE IV

(Affidavit Proforma)

(To be furnished in Non – Judicial Stamp paper of appropriate value duly notarized)

I, Sri/Smt.....The Managing Director/Proprietor (etc.) of the Firm. .... (Name of the firm)At (address).....Do hereby solemnly affirm and declare as follows:

1. That I have not ever been convicted of any offence making myself liable to be disqualified to supply of Chemicals / Equipments/other items to any Govt. or Govt. undertaking Organization /Institution in the State of West Bengal or other State or States.
2. That no case is pending against me or against my firm in any criminal court of law to supply of Laboratory Equipment and other items to the Govt. or Govt. undertaking Organization / Institution in the State of West Bengal or other State or States ( If any case is pending, state the details ).
3. That, I also declare that if any information subsequently found incorrect or false will it automatically render the tender submitted by me cancelled and make me liable for penal/legal action as per law of the country.
4. That my concern has not yet been declared bankrupt by any banking or money lending agency duly licensed by RBI nor has it been considered doubtful by any Government concern so far as the solvency of the organisation is concerned.
5. That I do further affirm that the statements made by me in this tender are true to the best of my knowledge and belief and all the documents attached are genuine & correct.

Deponent(s).



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## ANNEXURE V

(Affidavit Proforma)

(To be furnished in Non – Judicial Stamp paper of appropriate value duly notarized)

### DECLARATION ON KNU

I, the undersigned, do hereby declare that on behalf of my organization, I will comply all the formalities that are required to be complied as per KNU and I will observe all clauses of the KNU (including Terms & conditions). In case of any non-observance of any clause(s), we will be bound to follow the decisions taken by the Kazi Nazrul University for taking decision related with the tender.

Full signature of the Person  
(Designation with Seal)

Date:

Place: