BIDHAN CHANDRA KRISHI VISWAVIDYALAYA

PO- Krishi Viswavidyalaya, Mohanpur (741252), Nadia, W. B.

Ref. No. CAAST/18-19/02 **Date: 28.12.2018**

The Principal Investigator, CAAST on "Conservation Agriculture" funded by the World Bank under ICAR-National Agricultural Higher Education Project (NAHEP) is inviting quotations from most competent and bonafide vendors /parties/ distributers/ dealers/agents/manufacturers having registration of GST for supply of following items to the **Main Campus, F/ Agriculture, Mohanpur, Nadia- 741252** as per specifications appended bellow.

Terms & Conditions:

i. Submission of quotation: the quotation shall be submitted **within 18.01.2019 up to 5.00 pm.**

ii. Preparation of bids: the tender should be submitted under two bids system with validity for a period of 6 (six) months.

iii. Technical bids will be evaluated by the Indenter and other expert members of the office and the financial bids will be opened of those bidders who qualified in technical bids.

iv. Price: The price of items, including imported ones, should be quoted in INR & net per unit (including taxes and duties, etc). However, University will provide valid DSIR and authorization certificate to the clearing agent, if required.

v. Quoted rates must be FOR DESTINATION (including packing, insurance and delivery charges up to the laboratory at **Main Campus, F/ Agriculture, Mohanpur, Nadia- 741252** with satisfactory installation and demonstration. The bidders must stipulate the delivery period of the same.

vi. Payment will be made after satisfactorily performance of the items.

vii. The vendor should have experience for supplying of different items to any Government / Semi Government organization.

viii. Important safety standards

The instrument must confirm to International EMC and Safety standards.

ix. Warranty

Warranty period minimum 3 Year or more from the date of supply. Manufacturer must have their own dedicated Service Centre available in India and details of Service Centre must be provided while submitting their Quotations

x. <u>Supporting documents</u>

- Bid papers should accompany authorization certificate from original manufacturer, trade license, GST registration, proprietary certificate (if any) etc.
- Photocopy (self attested) of the original supporting document in favour of the specification –claim for each item must have to be submitted separately, if available.
- User list along with certificate from reputed users also need to be submitted..

xi. The Viswavidyalaya reserves the right to accept or reject any tender without showing reason.

Sl. No.	Name of the Item/ Brief Description of the Goods	Specification	Qty.
1.	Cone Penetrometer with Datalogger	Measurement Insertion Depth Range upto 100 cm, Measuring Interval: 0 to 100 cm (Each Centimeter), Measurement Range (kPa): 180 kPa to 4900kPa (1.8 Kg to 50 Kg), Accuracy: < ±1%, Data Storage Capacity: 1000 locations, Communication method: Bluetooth, Data Download: USB cable, Display Unit Power source and Cone Penetrometer Power Source (with Rechargeable battery), GPS Measurement System: WGS-84, Internal Protection: Dust proof, Drip proof structure, Main Unit Operating Temperate: 0 to 50 ˚C, Warranty: **Three years full comprehensive warranty from date of installation**	1 no.
2.	Sieve apparatus	Mechanical oscillation powered by a gear reduction motor having amplitude of oscillation 3.8 cm and frequency of oscillator 30-35 cycles per minute. Four nests of sieves working simultaneously each having 12.5 cm diameter and 2.0, 1.0, 0.50, 0.25, 0.10 and 0.05 mm diameter brass fitted the oscillator. (Mesh nos.- 10, 18, 35, 60, 150 & 300). A steeled drum 16 gage with an out let all complete	1 no
3.	CHNS analyzer	PC Controlled Elemental Analyzer with all essential accessories for the quantitative analysis of Carbon, Hydrogen, Nitrogen and Sulfur in Environmental samples in such as Soil & Geological samples etc. **Time Separated Gas Chromatography Based Separation technique and Thermal Conductivity Detection. Single or Dual High temperature Resistance Furnace with separate settable temperatures for Combustion up to 1000^{0}C or more, Reduction up to 800^{0}C** or more with the flash temperature up to 1800^0 C or more. Separation techniques- Gas Chromatography preferably Frontal Chromatography technique, **Detector:** Thermal Conductivity or Infra Red or Both. **Measuring range**- 0.0 to 100% (C- 0.1 to 15 mg, H-1 to 10 mg, N-0.1 to 50 mg, S-0.1 to 20 mg). **Carrier Gas:** Must have the facility to use both either Argon or Helium as carrier gas. **Analysis Time:** Least analysis time for all the elements simultaneously. **Maximum Sample Mass**: At least up to 100 mg of organic sample & 250 mg of soil samples. **CHNS Elemental Analyzer must be capable analyzing for liquid and solid samples.** CHNS Elemental Analyzer **should have at least 60 position Zero Blank Auto sampler,** Pneumatically actuated; Should be capable to accommodate the **large sample size or weight with commonly available 10x10mm and 5x9mm tin caps for solids, viscous and liquid samples** or through other Folding materials, disks,	1 No.

		cones etc, compatible with carousel cavities. The auto sampler package must be complete & includes pneumatic control unit and silent air compressor. Integrated Ash and Residues removal/extraction device, to remove the residues or ashes without extracting the reactor from furnace. **CHNS Elemental Analyzer should be supplied with a Semi-Microbalance** of sensitivity up to 5 place i.e. 0.01 mg or more with facility for automatic weight transfer to Elemental Analyzer to avoid post script error. **Elemental Analyzer must be quoted with** At least 3000 Consumables for CHNS analysis of Geological samples with appropriate standards for Soil, Plants and suitable organic reference Standards, Liquid sample preparation accessories / sealing device etc., Branded PC (i5), or better with HP Color inkjet injector or equivalent, UHP grade Helium gas filled cylinder, UHP grade Oxygen gas filled cylinder, UHP grade Nitrogen gas filled cylinder, Double stage SS regulators for Nitrogen gases, and other pressure regulators along with necessary Tubing and connections. Gas purification panel for Carrier & Combustion gases, suitable UPS with 60 minutes battery backup, Split AC 2.0 ton capacity. Warranty: **Three years full comprehensive warranty from date of installation.**	
4.	Automatic Nitrogen digestion and distillation Unit	Microprocessor based Automatic Twenty (20) Place Economic Version Auto sequencing, Macro Block Digestion System with digital display (Suitable for plants, soils, water, food & feed, Fertilizers & pesticides), Three Stage Semi Automatic Acid Neutralizer Scrubber, Microprocessor Based Basic Automatic PC Compatible Auto sequencing Value Added Distillation System with in-built software with added safety requirements to fulfil GLP & CE Norms, Digital Burette Titration System. Quoted with additional back up unit for digestion and distillation assembly. **Three years full comprehensive warranty from date of installation.**	2 No.
5.	Deep freezer	**-20°C:** Net volume (in Ltr.) 300 L, double door, direct cool, global standard condenser (PTC/SKIN) with fan, castor wheel mounted and with locking system, 4 shelves/two doors, analogous or digital temperature setting, refrigerant R-134a, inner cabinet with anodized stucco aluminum/GP steel. **-80°C:** Temperature Range -40° C to -80°C, Capacity 170 Litre, Inner Chamber Made of Stainless Steel SS-304, 22 SWG, Outer Chamber Made of Powder Coated CRCA sheet, 18 SWG, Powder Coating thickness 80 Microns after 7 tank process of phosphating, Insulation 150 mm thick Polyurethane Foam (PUF) insulation, Shelves / Trays: 3 Nos. of stainless steel shelves made of SS-304 (22 SWG) and 4 compartments, Sub-doors Made of Stainless Steel, Hot Line Anti-moisture entry using hot line at the mouth of the cabinet, Compressors Hermetically sealed compressors, Refrigerants High Stage: R-404A & Low Stage: Suva 95 from Dupont, USA, Heat Exchanger Brazed Plate Heat Exchanger, Condense: Air-cooled condensers with grooved Aluminium fins for effective heat transfer. Pure Copper coils (At least 99.9% pure),Condenser Fan Continuous rated from ebm, Germany or equivalent standard, Controller Microprocessor based temperature controller with digital display, Sensor Fast response Pt-100 RTD sensor, Alarm Audio-visual alarm for	2 No. (1+1)

		deviation from set conditions, Safety controller for interlock between high and low stage. 2. MCB's for over load protection. Required Essential Accessories : Cryo Racks (for 5 ml vials) 2 Nos, Cryo Racks(for 2 ml vials) 1 Nos, Cryo Trays (90 slot/5ml vials) 6 Nos., Cryo Trays(100 slot/ 2 ml vials) 9 Nos., Cryo Gloves Mid-arm Cryo Gloves for safety in accessing cold temperature. **Warranty Period THREE YEARS full comprehensive warranty from date of installation** Quality standards: Must be manufactured to international quality standards.	
6.	Laminar air flow	Laminar Cabinets Inner Chamber & Outer Chamber made of stainless steel high efficiency particular air filters, to achieve the air purification upto 0.3 Microns in Working area.Working area at least 4 ft x 2 ft x 2 ft, Blower fitted with ¼ HP Motor, with RPM 1200 to 1400, Pre-filters made of high grade nylon Net fixed in S.S. frame for first Stage air purification, through blower system. Closed Inner Chamber fitted with HEPA having very accurate performance rate of air filtration, rated 99.99%, resulting in ceasing all air bore molecule of particle upto 0.3 micron in working Area of Laminar Bench. Working area of Laminar Airflow Cabinets illuminated by fluorescent light; cabinets operated at 230V. Single Phase 50Hz. AC Supply. Fitted with UV Germicidal lamp for sterilization. Fitted with Acrylic Front Door sliding type, Fitted with Manometer for Measurement of HEPA Filters Choking system, Fitted with Cock for Gas Connection Warranty: **Three years full comprehensive warranty from date of installation**	1 No.
7.	Weighing Balance	High precision analytical electronic balance with weight range, Capacity: 220 g, Readability: ±0.0001 g, Tare range: 220 g, Response time: 2 second or less, Repeatability: = or ± 1 mg, Linearity: = or ± 2 mg, Calibration: Internal, Balance housing**:** Die-cast aluminum, Plastic ABS, Overload protection, Levelling feet, Level indicator, AC adopter, Port for computer and printer, Warranty : 3 Years	2 No.
8.	Real time PCR	It should support multiple analyses such as gene expression analysis, pathogen/virus detection, DNA methylation analysis, SNP genotyping, mutation analysis, gene scanning, microRNA detection and high resolution melt analysis, and in multiplex format. 2. It should have centrifugal rotary loading design for excellent thermal [Temperature range: 35 to 99°C; Temperature accuracy: ± 0.25°C; Temperature resolution: ± 0.02°C; Temperature uniformity: ± 0.01°C; Well-to-well temperature variation: ± 0.01°C] and optical performance. 3. It should have a fast ramp rate (>15°C/s heating and >20°C/s cooling) to support short run times (40 cycles in 45 min). 4. Excitation should be by high energy light-emitting diodes. 5. The photomultiplier detection system should be capable of uniform detection thereby avoiding need for ROX reference dye. Acquisition time should be ≤4 sec. Dynamic range should be 12 orders of magnitude. 6. It should support SYBR® Green, TaqMan probes, FRET hybridization, Scorpion probes, or other available multiplex chemistries. 7. It should have 5 channels (5plex) for optical detection. Green channel (Excitation: 470 ± 10 nm, Detection: 510 ± 5 nm), yellow channel (Excitation: 530 ± 5 nm, Detection: 557 ± 5 nm), orange channel (Excitation: 585 ± 5 nm, Detection: 610 ± 5 nm), red channel (Excitation: 625 ± 5 nm, Detection: 660 ± 10	1 No.

		nm), and crimson channel (Excitation: 680 ± 5 nm, Detection: 712 high pass nm). In addition, the software should allow creation of new excitation/detection wavelength combinations, as per requirement. 8. The optical detection channels should be able to detect a wide range of fluorescent dyes, eg. FAM, Alexa Fluor 488, Alexa Fluor 568, Alexa Fluor 633, Alexa Fluor 680, CAL Fluor Gold 540, CAL Fluor Red 610, Cy 3.5, Cy5, EvaGreen, Fluorescein, JOE, HEX, MAX, LightCycler Red640, LightCycler Red705, ROX, SYBR Green I, TET, Texas Red, Quasar 670, Quasar 705, VIC, Yakima Yellow. 9. It should have real time peltier controlled high resolution melt (HRM) analyzer for the detection of SNPs, genotyping, quantitative methylation analysis, gene scanning and sequence matching. 10. It should have high-intensity optical HRM channel (Excitation: 460 ± 20 nm, Detection: 510 ± 5 nm) which should be able to detect fluorescent dyes such as SYBR Green I, SYTO9, LC Green, LC Green Plus+, EvaGreen. 11. HRM analysis should be supported by thermal resolution of 0.02°C, high data-acquisition rates, and appropriate HRM software. 12. It should support multiple PCR tube formats such as 0.2 ml PCR tubes; 0.1 ml PCR Tube Strip (4 tubes); etc. 13. It should be able to run up to 100 samples at a time. Appropriate rotors for running 36 (0.2 ml PCR tubes, 20-50 µl reaction vol.) and 72 (0.1 ml PCR tubes, 10-25 µl reaction vol.) samples long with accessories such as rotor stand/holder and rotor locking discs should be provided along with the machine. 14. It should have a small footprint **Warranty Period THREE YEARS full comprehensive warranty from date of installation**	
9.	Gel documentation system	System specifications- Gel documentation system suitable for Chemi-luminescence , UV and Fluorescence, System Configuration-Camera – CCD,1.4 megapixels<=4 megapixels, 12 bit, Dynamic range - >3 orders of magnitude, Lens – f/1.2, 8-48mm8.5-51 mm, motorized zoom, Camera cooling system: Peltier based (cooling Temp. ~ -400°C), Filter position – 3 or more (chemiluminescence, fluorescence- 2), Illumination modes – Trans-UV, white and epi-white lights, Field of view: Min. 20x20cm, Fire wire / USB connectivity with fast data transfer, With USB port, Set of extra UV/Visible lamps, Gel Analysis software, Capable of imaging and analysing 1-D/2-D electrophoresis gels, dot blots, slot blots and colony count, Molecular weight determination, Band/lane matching analysis with comparative dendrogram creation, background subtraction, Latest branded PC with Laser printer, Accessories to be quoted, 254nm UV lamp / 302 nm UV lamp / 365 UV lamp, Filter, SYBR Green / Green fluorescent protein / SYBR Gold/ fluorescence, Other Requirements, **3 years comprehensive warranty + 2 more years free AMC**, Validation of the instrument is to be done every six months during the period of warranty, Availability of local Service Support and response time for a Service Call during and after warranty to be mentioned, Additional features/accessories if any that can potentially increase the productivity of this instrument should be quoted as optional items.	1 No.
10.	Temp. controlled ultra-centrifuge	Maximum speed: 100,000 rpm or above, Max G Force: 800,000 x g or above, Speed control accuracy: +/- 50 rpm of set speed or better, Temp control system: Preferably thermo module cooling system (HCF free), Set temperature range: 0-	1 No.

		40°C with 1°C increment or better, Temperature control: +/- 1°C of set temp, User settable programmed: >10 stored program or better options, Screen display: Touch screen LCD display, Drive system: Frequency controlled, vacuum encased, direct induction drive, Timer: 1 min to 99 hrs or more, with an option of Hold function, Low noise: <50 dB, Option for Safer Self Locking rotors, Suitable on line UPS of minimum 10KVA for proper functioning of machine, Machine should have features like eye-balancing of samples, delayed start/stop, dualdisplay of Run and Set parameters, data entry through key pad/ touch pad,RPM/RCF mode, Rotor Life Management etc., Machine should comply with CE and other safety and regulatory standards, Rotors: suitable number of rotors with tube stands of the following specifications withsuitable tubes should be provided: Fixed Angle rotor(s) to spin following volume ranges: - 24 X 1.5mL microtubesat speed ~100,000 rpm and rcf ~200,000 x g or better; 6-12 place rotor with adapters (as and if required) to accommodate multiple volumes of samples, if feasible, for example, ~30ml, ~6-8 ml and ~4ml and at speed ~50,000 rpm and rcf ~200,000 x g or better. Multiple rotors servingthe similar experimental requirement may also be quoted. Swing Bucket Rotor to spin the following volume ranges: 6-8 place rotor with adapters (as and if required) to accommodate multiple volumes of samples, if feasible, for example, ~30.0-40.0 ml, and ~13.0-17.0 ml at speed ~30,000 rpm and rcf ~120,000 x g or better. Multiple rotors serving thesimilar experimental requirement may also be quoted, 6-8 place rotor with adapters (as and if required) to accommodate ~5.0-7.0ml at speed ~45,000 rpm and rcf ~200,000 x g or better. Multiple rotors serving the similar experimental requirement may also be quoted **Warranty Period THREE YEARS full comprehensive warranty from date of installation**	
11.	pH Meter	Digital pH meter with accessories and temperature probe, Instantaneous reading with temperature correction, Additional glass electrode, Warranty: **Three years full comprehensive warranty from date of installation**.	2 No.
12.	Conductivity Meter	Digital conductivity meter with accessories and temperature probe, Instantaneous reading with temperature correction, Additional glass electrode, Warranty: **Three years full comprehensive warranty from date of installation**.	2 No.
13.	Flame Photometer	Four filters (Na, K, Ca and Li) , LED Display, Oil Free Air compressor, Air Filter with Pressure Regulator & Gauge, Atomizer Tube, Gas Lighter, Sample Beaker (05 Nos), LPG Tube, Air line PU Tube etc. Range : Na, K, & Li :1-100 ppm and Ca:15-100 ppm, Sensitivity : Na, K, & Li :0.5 ppm and Ca:15 ppm, Linearity : < 3%, Reproducibility : 2% CV for 20 samples, Detector : Photo multiplier Tube, Ignition System : Manual, Ignition Flame System : LPG & Dry Oil Free Air, Gas Control : Adjustable with Knob, Automiser : Axial Flow Type, Oil free Air Compressor : Supplied with Built-in Air Filter with Pressure Regulator & Gauge to deliver stable and moisture / oil free air supply, Power Supply : 230 VAC ±10%, 50 Hz, **Three Years full comprehensive warranty from date of installation**	2 No.
14.	Autoclave	Triple walled construction, working chamber, steam jacket, outer chamber and the lid should be made of stainless steel, Should have water inlet and outlet valves, Should have a	1 No.

		water level gauge, Should have gauges for measuring inner and outer steam pressure, Should have an inner temperature indicator, Should have automatic pressure control switch, safety valve and eject valve, Should have joint-less silicone gasket, automatic low water protection, supplied along with bins, Should have an ISI mark, working temperature 121ºC at 15 to 20 psi pressure, Chamber volume (85 L) approximately 300mm diameter and 500mm depth with minimum 2 bin type, operated in 220 – 240 V AC 50 Hz input power supply, Water inlet and outlet pipe should be provided and connections should be done on a turnkey basis	
15.	Microwave digestion system	Designed with well-engineered microwave technology, pressurized digestion cavity (PDC) temperatures up to 300 °C and pressures up to 199 bar can be achieved. Suitable for all kinds of samples such as soil, food, environmental, polymer, cosmetic, pharmaceutical, geological, chemical, and petrochemical samples. Different sizes of vials (5, 10, 25, 40, 50 mL) with plug-on caps and racks of up to 24 positions for different size vials should be provided with the system. Integrated water cooling system, remotely controlled mechanism via VNC from computer, notebook, or mobile phone etc. from any location, automated notifications of completed runs and events via email, and gives an audio notification and a visual notification via Smart Light etc. **Three Years full comprehensive warranty from date of installation**	1 No.
16.	Rhizotron/Root imaging scanner	High – resolution images (up to 23.5 million pixels), Linear scanning with no distortion, 100-2400 DPI scanning resolutions, 360-degree scans, Live updating root images, Included labtop computer powers scanner, operates control software, and saves images, Portable and convenient to transport and insert into root tubes, Allows observation of root growth and behavior over multiple growing seasons, 600 DPI or more image resolution. Should be able to measure Root length, Diameter, Area, Branching angle, Volume, appropriate software to analyze the scanned images, At least 20 number of access tubes (acrylic or compatible) for scanning, hammer, soil auger and borer for driving access tubes into the soil upto 1m, jack arrangement for extracting the tubes from the soil after recording of data. Imaging should be done atleast upto 1 m soil depth. Training to the persons at the Institute on operating procedure of the instrument. At least 3 years onsite warranty	1 No.
17.	Leaf Area meter	*Resolution:* 1 mm^2 (1 mm x 1 mm scanning area), *Accuracy:* Within ± 2% for samples >50 cm^2, *Display Capacity: Area:* 9,999,999.99 cm^2, Length: 99,999,999.9 cm, Width: 12.8 cm. *Display:* 2 line x 16 character LCD. *Keyboard:* Sealed, 24 key tactile response with audio feedback. *Real Time Clock:* Year, month, day, hour, minute, second. Accuracy: ± 3 minutes per month (0 to 55 °C). *Internal Memory:* More than 2.1MB of non-volatile FLASH. Measurement data is maintained even in absence of power. *Memory Capacity:* From 65,000 to 125,000 individual leaf area measurements. *Communications:* USB 1.1 Compliant, Full Speed, Bus rate @ 12 Mbps; RS-232 DTE, N,8,1, Baud rate set @ 38400 bps, Hardware Flow Control. *Sample Dimensions:* Width: 127 mm maximum, 1 mm minimum. Thickness: 8 mm maximum. Length: 1 meter maximum. *Scanning Speed:* Up to 1 m/s. Length encoding cord drawing	1 No.

		speed need not be constant. Error message indicates if encoding cord is drawn too fast. *Power Requirement:* Rechargeable 6V lead-acid battery; or 115/230VAC, 50/60 Hz, 20W maximum. *Battery Capacity:* Typically 12-15 hours of continuous operation. *Recharging Time:* minimum, instrument off. Charging circuitry is built in. *Battery Voltage Sensor:* Low battery warning occurs approximately 1 hour before automatically shutting off the instrument. Over-voltage warning occurs if battery becomes over-charged. *Scanning Head:* LED Light Source: 6.4 mm from outer edge. Size: 30.5 cm overall length (12.0"). Weight: 680 g (1.5 lb.) *Operating Temperature:* 0 to 55° C, 0 to 95% RH (noncondensing). *Storage Temperature:* -20 to 55° C, 0 to 95% RH (noncondensing). Long term storage at high temperatures will shorten life of internal battery. *Scanning Head:* LED Light Source: 6.4 mm from outer edge. Size: 30.5 cm overall length (12.0"). Weight: 680 g (1.5 lb.).	
18.	Atomic absorption Spectrophotometer	**Hardware:** Optics: Narrow beam optics. Optics should be fully sealed and mirrors quartz overcoated, Wavelength range: 185-900 nm, Monochromator: Focal length **300 mm or equivalent.** Preferably Czerny-Turner or equivalent monochromator with computer controlled wavelength selection, Slits: Automated slit selection. Settings**, 0.1, 0.2, 0.5 and 1.0 nm** plus one reduced height slit of 0.5 nm, Grating : Holographic blazed grating with line density at least 1800 lines/mm, **Dispersion: better than 1.0 nm/mm,** Detector : Photomultiplier Tube or Solid state covering full wavelength range., Background corrector High intensity deuterium background corrector. Range 185-425 nm to 2.3 Abs., 2 ms response. Electronic modulation with automatic gain attenuation. Easily aligned and replaced by the user, **Lamp System**: **Fully software controlled 8 lamp fixed positions**. **Turret is not preferred. Selection of lamps through software for Fast sequential mode of operation, Gas control**: **Fully programmable gas control system**. Rapid regulation for gases. PC controlled gas flows. Automatic oxidant changeover facility should be there, Safety system: There should be adequate safety measurement such as separate ignite/flame-off buttons, internal gas connections made automatically, flame shields and protection against heat and UV radiation. External adjustment of all burner and spray chamber controls. Violation of any safety interlock should prevent flame ignition or should extinguish existing flame, Flame atomization system. Spray chamber should be fluorinated high density polyethylene design for aqueous and organic solutions, Impact beads should be externally adjustable, Nebulizer: Adjustable nebulizer with inert platinum/iridium capillary and PEEK venturi for corrosion resistance. Burners should be of inert material. Air/acetylene and nitrous oxide/acetylene burner to be offered . Should provides external burner rotation. Should have facility for PC controlled burner adjuster with auto setting of burner height. **Performance: >0.9 absorbance** with precision of <0.5% RSD from ten 5 sec. integrations for 5 mg/L Cu solution. **Software:** Windows 7 based 'worksheet' layout running on external PC with mouse or keyboard control, Measurement modes: Absorption or flame emission using PROMT, Pre-read delay	1 No.

		variable from 0-999 secs. Up to 20 replicates with read time from 0.1-30 secs. Minimum Signal Facility skips to the next sample if the first measurement is less than the specified minimum reading. Different number of replicates can be selected for samples and standards, Sampling modes: Manual or autosampling with flame, furnace and vapor operation, On-line cookbook: Analytical methods 'cookbook' information should display for each method in the Method window. Should include typical calibration graph and list of alternative wavelengths with comparative sensitivities and any other analytical recommendations, Data handling: All raw data, signals (when selected), method and sequence parameters stored in the worksheet database. Furnace data should be stored in both height and area. Editing of results by masking replicate or solution results and post run modification of peak measurement mode with automatic recalculation of edited result. Calibration data can also be edited by masking standards. Post-run application of alternative algorithm, Data import/export: Facility to transfer current data can be transferred directly into third party software using Microsoft ActiveX technology. In addition, data can be exported during run or post-run in ASCII and PRN file formats., LIMS support: Facility to direct data to a serial port for real time transfer to LIMS in ASCII or PRN file formats, Sample labels and sample select marks (samples selected for analysis) can be transferred between a LIMS and the worksheet software, Help system: Context sensitive help with extensive index, graphics, videos and cross referencing should be available **Accessories:** **Graphite Furnace System:** should be fully automated 'Constant Temperature Zone' graphite furnace. Dynamic Feedback Temperature Control with cooling water temperature compensation for enhanced temperature accuracy should be there. Should have up to 20 temperature steps per program, temperature programmable from 40-3000 °C with maximum heating rate 2000 °C/sec. There should be choice of two inert gases with 0 to 3.1 L/min gas flow programmable in 0.1 L/min increments. The furnace work head must be of solid titanium for maximum corrosion resistance. Quartz end windows for high light transmission. Graphite tube must be enclosed in an inert gas atmosphere by a one piece graphite shroud for maximum tube life. There should be at least five safety interlocks monitor inert gas pressure, cooling water flow and temperature, graphite tube and transformer temperature. **Autosampler for graphite furnace:** Automatic Programmable Sample Dispenser for Graphite Furnace. There should be capacity for 50 samples in 2 mL vials with five central 25 mL vessels for bulk solutions. Should automatically prepare up to a 10 point concentration or standard additions calibration from one bulk standard. Premix mode should be provided for use with manually prepared standards. There should be automatic addition of up to two chemical modifiers with pre and/or co-injection of modifiers and automatic over range volume reduction. There should be 'Hot injection' for Fast Furnace Analysis, programmable from 40-200 °C injection and programmable injection rate. There should Automatic flow through rinse of the dispensing capillary after	

		each injection. **Vapor Generation Accessory:** It should be modular continuous flow or Flow injection type Vapor Generation Accessory for trace level determination of elements like Hg, As, Se etc. at µg/L concentrations. Typical precision should be 1-2% RSD. **Hollow cathode lamps:** coded Single and mullti-element hollow cathode lamps for analysis of various elements (**Hollow cathode lamps** for Fe, Mn, Zn, Cu, B, Hg, Cd, Se, Al, Pb, Cr, Ni, As & Mo must be supplied with the instruments). The lamps should have Guaranteed 5000 mA hour of usage time. **Utilities:** PC/Printer. Should be quoted with necessary gas cylinders, regulators, exhaust hood, compressor, chiller, gas purification system, Online UPS, split AC 2.0 Ton Capacity etc. Warranty: **Three years full comprehensive warranty from date of installation**	
19.	Core Sampler/ Power Augar	Soil core sampler (for bulk density study of soil) with knife and Hammer, 3 stainless still rings Stainless steel cylindrical core, (5 cm diameter, 15 cm height) 100 cc soil sample collected from 100 cm depth with other accessories/ Fully automated Power augar, petrol or Diesel operated motor, enable to draw soil upto 2.0 m depth	1 No.
20.	Permeameter	Closed system, Sample rings diameter ~ 50 mm and height ~60 mm, At least 25 samples can be run simultaneously, Pump Type: Eheim 1048, Power rating- 230 V/50 Hz, Power-10 W, Capacity- 10 liter per minute, suitable for continuous use under water to a max. depth of 1 meter, Maximum lift 1.5 m, Battery operated measuring bridge to measure the water levels, Suitable water tank with the system, Warranty: **Three years full comprehensive warranty from date of installation**	1 No.
21.	Chlorophyll Meter	Default Display Unit: µmol of chlorophyll per m^2 of leaf surface, Optional Display Units: CCI, SPAD, Measurement Area: At least 9 mm standard diameter with 5 mm diameter with reducer, Resolution: ± 10 µmol m^{-2} chlorophyll concentration using generic equation, Linearity: ± 1 %, Repeatability: ± 1 %Sample Acquisition Time: Less than 3 s, Storage capacity: 8 MB for up to 160,000 data measurements; 94,000 data measurements with GPS data entries, User Interface: 50 mm by 15 mm graphic display screen, 8 push buttons for control and data manipulation, Data Output: Mini-B USB port provided for main data transfer, External GPS Option: RS-232 port (GPS location data is saved with each measurement), Operating Temperature: 0 to 50 ºC, Temperature Drift: Temperature compensated source and detector circuitry over full range, Power Requirement: Standard 9 V DC alkaline battery, Warranty: **Three years full comprehensive warranty from date of installation**	1 No.
22.	Hydrometer	ASTM Soil Hydrometer, 152H, 68˚F, Bouyoucos Scale	2 No.
23.	Muffel Furnace	Inside Chamber Size: at least 6" x 6" x 12", 3.6 L approx with swing aside door at the front, Furnace construction: Double shell steel case with cooling fan to keep outside case cool, High purity alumina fiber insulation for max. energy saving Heating element The chamber section should be heated by six to eight Super Kanthal Molybdenum disilicide heating elements (Super 1800 grade $MoSi_2$) suspended in a chamber made of high temperature refractory fiber lined with a combination of ceramic fibre blankets. Standard Working	2 No.

		Temperature at least 1600° C (continuous), Temperature Control: PID temperature controller, automatic power control and programmable with necessary safety features, Heating Rate: The furnace should be of fast heating type with the maximum attainable temperature should reach as a ramp function in less than one hour, Temperature Accuracy: +/- 1.0 ºC, Thermocouple: Pt. Pt. Rh. Thyristor controller will be provided along with the furnace to measure the temperature with Recrystalized alumina sheath & connecting holder complete set. Cooling Fan/ Air Circulation Attached with Furnace, Provided inside the control unit to protect Costly component Max. Power Upto 8 KW Certificate CE certified, Three Years full comprehensive warranty from date of installation. Accessories: Al_2O_3 Sample Plate: 1 pcs, Al_2O_3 Furnace Door Block: 1 pcs, Protection Glove: 2 pairs, Crucible Clip: 1 pair, Crucibles: 6 pcs Warranty: **Three years full comprehensive warranty from date of installation**	
24.	Shaker	Platform type, Variable speed P.M.D.C. Geared motor continues duty, RPM 20 to 250 with S.S. tray lotus clamp type, Body made of Galivanted sheets powder coated. Supplied with S.S clamp, Digital RPM Indicator, Electronic Digital Timer (0 to 999 Minutes) for above, variable flask holding capacity of 250 ml, 500ml, 1000ml of at least 50 places as 250 ml flask equivalent. Three year full replacement warranty	1 No.
25.	BOD Incubator	Capacity- At least Six Shelves/Trays, Microprocessor based temperature Control System, Safety thermostat for over temperature protection (Temperature Range- 5ºC to 60ºC, Temperature accuracy- ±0.5ºC, Temperature uniformity- ±0.1ºC), CFC free cooling system, Fully Adjustable Shelves, Solid insulated door with glass door and lock, Double walled construction with insulation, Combined Electronic Digital Temperature & humidity controller, Automatic Voltage Stabilizer of 3 KVA, Three year full replacement warranty	1 No.
26.	Water bath	Outer body made SS304 for GMP Model and MS Powder Coated for STD Model, Inner body made SS 304 for STD and GMP Models, Specially made extra long heating elements for durability, Better uniformity of temperature, Concentric rings 3" dia i.e (75 mm), Temperature range Ambient + 5˚C to 110˚C, Provided with microprocessor based digital PID controller PT100 temperature sensor having resolution 0.1 ˚C, Accuracy 1.0 ˚C, Heater -2000W, Provided with indicating lamp & on/off switch Electrically operated 230 V AC single phase power	2 No.
27.	Single water distillation unit	Barosil grade or equivalent, horizontal type, output-4 L hr^{-1}, auto cut devise at low water level	2 No.
28.	Double water distillation unit	Barosil grade or equivalent, horizontal type, output-4 L hr^{-1} auto cut devise at low water level	2 No.
29.	Laboratory Microwave Oven	General Requirement: simple in operation and with turntable, Supply voltage: 220 volts, 50Hz. Power Consumption: 1300W approx. 4. Microwave Power: 600-900W, Microwave Frequency: 2400 MHz, Convection power-2000 W, Oven Capacity: 32 litre, Soft/one touch control with Timer, Safety: The equipment shall be bonded to earth effectively in accordance with the I.E.E. Wiring Regulations. Sufficient Safety Interlocks to prevent leakage of microwave. Accessories : supplied with a glass/ceramic tray, Microwave compatible gloves, **Three Years full comprehensive**	1 No.

		warranty from date of installation	
30.	Infrared thermometer	Temperature range:-30°C to 500°C (-22°F to 932°F), Emissivity- 0.10 to 1.00, Optical resolution-10:1 (calculated at 90% energy), Display resolution-0.1°C (0.2°F), Three year full replacement warranty	1 No.
31.	Automatic weather	1) Maximum thermometer, 2)Minimum thermometer, 3)Dry bulb and wet bulb thermometer/ Relative, humidity sensor, 4)Pyranometer, 5)Wind velocity and direction, 6)Rain gauge, 7/Net Radiation Sensor, radiometer **Data Loggers** 12 Analog ,4 Event and 2 relay channels,1 Wet Sensor (Digital Input Channel and inbuilt SDI-12 Interface Includes Delta LINK PC Software, USB Cable ,Quick Start Guide and Software and Manual Disk. Accepts the voltage, resistance, current, potentiometer, bridge, counter, frequency and digital state inputs. setup logging sequences and provides control over reading frequency, sensor type ,thresholds units **Simulator:** Software for logging programs which can be tested before real time activation. For applications involving measured environmental variables can be changed to test how the program responds. Years of logging time can be simulated in a few minutes for reporting. 2 Relay outputs expandable up to 6 Memory: 4 Mbytes of FLASH memory storing 2.5 million readings (typical), exported as text file with caching for large datasets. Power Source : **Internal power** 6x AA alkaline cells, typically sufficient for 300k readings. RH/Precision Air Temp Sensors (2 K Thermistor) Fitted with 5 Meter Cable. Both Mounted in same solar radiation shield. Solar Energy Flux Sensor (5m cable) (Solar Radiation) Rain gauge, compact (6m cable), including leveling base plate Combined Wind Speed and Direction Sensor (supplied without cable) Dome Net Radio meter Supplied with 5 pairs of domes and gaskets for 12 months typical use. Radiometer (7m cable) Supplied along with support arm type NR2/ARM. **Solar Panel ,Mast And Accessories** Enclosure and 12V Wiring Kit for GP2 Logger For mounting onto Delta-T masts. Back plate mounted 12V battery wiring system with protected input power terminals. Comprises lockable IP53 steel enclosure, cable glands (supplied with 12 glands as standard) and trunking. The cost of the enclosure includes the fitting and or direct partial pre-wiring of any logger power supplies Dimensions: 500(h) x 400(w) x 250(d) cms NB: Does not include battery, charger or solar panel. M2-FSG 2m mast, excluding logger canopy For GP2 Logger. Comprises 2m mast, 1m cross arm, fixed base plate assembly, 3x steel guy wires and stakes, light sensor mounting and user manual	1 No.
32.	TOC analyser	**Measurement modes**: Fully PC controlled TOC analyser for measurement of TOC, TIC, TC, NPOC and Direct determination of TOC or as difference from TC/TIC measurements should be possible. **Sample handling:** Should be able to measure solid and liquid samples without any additional attachment of furnace etc. for solid samples. **Oxidation method:** High temperature combustion at min.	1 No.

		900°C and up to 1200 °C to ensure complete combustion of all type of samples. **Sample range:** Solids module by means of tin capsule technique, applicable for sample amount of just a few µg up to 1g, switching from solids to liquids mode within lowest possible time, Liquid samples, Freely adjustable injection volume from 50µl up to 1,500µl, Liquid samples without any particle size restriction, Samples with high salt concentration upto 35 gm/L. **Measuring range**: Wide detection range of more than 60,000 ppm without need for sample dilution for liquid samples. **Detection range**: minimum 50 ppb, **Automatic calibration** from just one stock solution by means of different injection volumes, **Wide range NDIR detector** with extreme linearity over the whole working range, Fully automated liquids analyses with integrated sample feeder for up to 50 samples with stirring, Instrument control and data collection thru windows based software with LIMS possibility. Sufficient consumables to analyze 4000 samples in liquid mode and 5000 sample in solid mode. Matrix separation system for long, uninterrupted operation even with difficult samples like sea water or brine. Maintenance-free, 3-step condensing system for effective gas drying. Integrated maintenance software with free selectable cleaning cycles, automatic leak test, sleep/wakeup function, real-time control of all instrument parameters like pressure, temperature, gas flow, Advanced mathematical post processing functions like statistical evaluation, automatic or manual peak integration, direct data export to MS Excel, Nominal voltage: 230 / 110 VAC, 50/60 Hz. Vendor should quote for complete system including- UHP grade filled Oxygen gas Cylinder with regulator, Desk top PC with Intel Core i5 or better/ RAM 8 GB or more, Hard Disk- 512 GB or more, Monitor- 15 inch or above internal speakers, wireless/ USB ports 03 or more/optical mouse; keyboard, Online 5 KVa UPS with 30 min backup, licensed version of Microsoft Windows 10 with Latest upgrade; Laser Printer, **Three Years full comprehensive warranty from date of installation**	
33.	Oven	Hot air oven, inner dimension- 24" x 24" x 36", at least 6 selves, Max. Temperature at least 110˚C, Temperature controller and digital display, equipped with standard insulating material, outer surface should be electric resistant. Three year full replacement warranty	2 No.

The quotations completed in all respect with all supporting documents should preferably be dropped in the box which will be kept in the Office of **Registrar and Chairman, Central Purchase Committee, 2nd Floor, Administrative Building, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, PIN- 741252 or sent by post within 18.01.2019 up to 5.00 P.M.** For any further clarifications, contact can be made with Dr. Kaushik Batabyal (Mob: 8348609944) and Dr. Dibyendu Sarkar (Mob: 9432010595).

Chairman
Central Purchase Committee, BCKV