

TEA RESEARCH ASSOCIATION

Tocklai Tea Research Institute

CINNAMARA, JORHAT-785 008, ASSAM, INDIA

Ph.-91-376-2360973 / 2360974 / 2360475 Fax: 91-376-2360474, e-mail: administration.tocklai@tocklai.net, Web: [www.tocklai.net](http://www.tocklai.net/)

Ref:3622/TOK/G.22/2963 June 16, 2022

**Tender No. TRA-Tocklai/22-23/T-01Dated 16.06.2022**

Sealed tenders in two parts (Technical bid & Financial bid) are invited by the Director, Tea Research Association from reputed manufacturers / authorized dealers / importers for supply of Instrument / Equipments under **DBT funded Tea Network Projects** at Tocklai Tea Research Institute, Jorhat - 785008, Assam. Both the bid documents are to be put in sealed envelopes separately super scribing the words “Technical Bid “ & “Financial Bid” which are to be put together in the sealed envelope super scribing the Tender No. The details of instruments/equipments are shown as ‘Annexure – A’ enclosed herewith.

**Last date of issue/receipt of tenders: 08.07.2022 up to 5.00 p.m.**

**Terms and Conditions**:

1. The tenderer should submit the following documents along with the tender:
2. Dealership certificate/authorization certificate
3. List of users
4. Up-to-date sales tax/GST /income tax clearance certificate
5. **Earnest Money 2% (refundable)** of the quoted amount is to be deposited by the tenderer in the form of Bank draft/Bankers certificate in favour of “**Tea Research Association”** **payable at Jorhat.**
6. **Tender Document Cost (non refundable) of Rs.1,000/-** is to be deposited in the form of **separate Bank Draft** in favour of “**Tea Research Association ”** **payable at Jorhat.**
7. Tenders must accompany with the product catalogues/ specification.
8. Tenderers must quote the warranty period of the product.
9. **Tenderers must quote the year-wise rate for CMC or AMC separately for a further period of 5 years beyond the warranty period.**
10. **Instruments / Equipments are to be delivered/installed FOR/CIP at Tocklai Tea Research Institute, Jorhat – 785008, Assam.**

TRA reserves the right to accept or reject the bids without assigning any reason thereof. The tender document can be obtained from the office of the undersigned during working days from Monday to Friday (8-30 am to 5.00 pm) or **may be down loaded from the website –** [**www.tocklai.org**](http://www.tocklai.org)**.**

**Tender should be accompanied by Tender Document Cost of Rs.1,000/- and Earnest Money 2% of the quoted amount, failing which the tender will be rejected.** **The drafts for EMD and Tender Document Cost should be enclosed with “Financial Bid” only**. All tenders should be sent to the following address:

 The Director,

 Tea Research Association

 Tocklai Tea Research Institute,

 Cinnamara, Jorhat-785 008, Assam.

 **DIRECTOR**

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| Registered Office:Tea Research Association, 113  Park Street , 9th Floor, Kolkata - 700 016 , INDIA Ph : 91-033-22291815, 22297943, Fax : 91-033-22294271, Web :   [www.tocklai.net](http://www.tocklai.net/)  |

**Annexure – A**

**SPECIFICATIONS OF EQUIPMENT AND INSTRUMENT**

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| **Sl. No.** | **Items** | **Unit No.** | **Specifications** |
| 1. |  **High Performance Liquid Chromatography** | 01 | 1. The system should be controlled by Workstation/Network-based Chromatography software.
2. HPLC system should also work in UHPLC mode w/o changing any part.
3. System should be upgradable for hyphenation with LC-MS/MS or HRMS in the future.
4. Computer-controlled HPLC system comprises of suitable HPLC pump, inbuilt advanced degasser, column compartment, UV-Vis detector, and auto sampler, capable of working in both gradient and isocratic mode. Usable solvent types should include both organic and aqueous solutions and should work in the operable pH range of 1 to 12 with salt gradient compatibility.
5. The pump must have variable/adjustable Gradient delay volume to support different applications range 300-1000µl or better user selectable to obtain higher-resolution or required mixing.
6. Quaternary Gradient Solvent Delivery Unit with In-Built Degasser Facility:
7. Quaternary Gradient pump with serial/parallel dual piston mechanism of pumping without any air bubbles. Auto-purging is preferable.
8. Flow rate: 0.001 mL/min to 5 mL/min or better.
9. Flow rate accuracy: ±0.1% or better.
10. Flow rate precision: < 0.1% RSD or better.
11. Gradient composition precision: < 0.2% RSD at 0.2 – 1.0 ml/min.
12. Pulsation Typically < 1.0% or < 0.2 MPa, whichever is greater.
13. The pump should support the pressure of minimum of 10,000 psi and must support 3um, 5um and < 2um UHPLC and LC-MS Columns.
14. Degassing unit should have the latest technology with suitable flow lines and membranes to provide online degassing requirements, and should have 4 or more flow lines & membrane-type online degassing.
15. The pump must be able to deliver gradients with minimum 1-9 gradient curves (including step, exponential, convex, etc).
16. The column compartment should have both: Still air for highest efficiency and forced air for easiest method transfer facility. Or any better technology.
17. Column compartment must have a temperature range from 10°C to 80°C or better.
18. The column compartment must support columns of at least 300 mm length.
19. The column oven should have passive pre-heating facility.
20. Temperature stability ±0.05 ˚C.
21. Temperature accuracy ±0.5 ˚C.
22. Column compartment should have separate two individual slots with separate programming for each.
23. Should have the option of tracking usage and column records.
24. The Auto sampler should operate at pressures in the range 10,000 psi or better.
25. The linearity of the auto sampler must be r >0.99999 (caffeine in water) or better.
26. Auto sampler should detect well plates and empty sample segments.
27. The complete eluent flow path must be compatible with eluent conditions (pH 2-12, max. 1 mol/L chloride concentration).
28. The injection principle of the autosampler must be in-line split-loop (also called flow through the needle) for high reproducibility injections with no sample loss.
29. The auto sampler must support a sample capacity minimum 100 vials position.
30. The injection range of the auto sampler should be 0.01–100μL.
31. The injection volume precision of the auto sampler < 0.25% RSD or better (caffeine in water), typically < 0.5% area RSD for 0.5 μL (caffeine in water).
32. The carryover of the auto sampler must be <0.0004% or better.
33. UV/VIS detector photometer (tunable Czerny-Turner monochromator) with additional internal reference beam.
34. The detector must typically provide a linear range up to 2.5 AU or better.
35. The wavelength range of the detector must range from 190 to 900 nm or better.
36. Wavelength accuracy of the detector must be ± 1nm.
37. The wavelength repeatability must be ± 0.1nm.
38. Drift of the detector should be < 0.1 mAU/h at 254 nm.
39. The detector must provide a data collection rate of up to 200 Hz or higher.
40. The detector must have spectral bandwidth of 6 nm at 254 nm wavelength.
41. It must acquire data for 4 channels simultaneously.
42. The detector must provide a software-supported predictive performance function for scheduling maintenance procedures.\
43. The Detector must have built-in safety features like leak detection and safe leak handling, excess pressure monitoring, etc.
44. Should provide the following column with the equipment
* One UHPLC column with filter 150 x 2.1mm, 1.9μm particle size or equivalent.
* Suitable C18 phenyl hexyl ligand column.
* Suitable Amino acids column.
1. Original Licensed Data Management System/software.
2. Suitable Chromatography Software for monitoring and analysis of sample should be provided.
3. Software must register all events (log files) audit trails for Data, Acquisition Method, Report, and User Administration Controls.
4. Operation of the system should be simple and intuitive via a state-of-the-art 64 bit Windows 10-based software or better.
5. Chromatography software that complies with Good Laboratory Practice (GLP) and Regulatory Conformity.
6. It must record instrument events such as injection, complete instrument settings, changes & conditions in real-time.
7. Software with integrated database along with 21CFR part 11 Compliance, Software with integrated database and should be capable enough to program at least 1-9 different gradient curves.
8. Necessary branded computer (with suitable latest configuration, 21” IPS LED monitor, CD/DVD drive, and a branded multifunctional laser printer).
9. Suitable calibration standards should be supplied during the installation.
10. Additional Performance Maintenance (PM) Kit should be provided.
11. Additional Viper tubing should be provided.
12. One Year Manufacturer’s onsite warranty should be quoted.
13. AMC contract to be offered for additional two years.
14. Submitted model should have international CE and ISO certificates.
15. Vendor should have proven track record and should provide at least 15 installation details (Specifically from the eastern and north-eastern Region) in various IIT’s, IISER’s, NIT’s, any reputed government institute/university. Along with institute name, customer details contact details as per requirement.
16. All the supporting technical documents should also be available on the OEM website for verification.
17. All the specification needs to be supported with authenticated online data sheet and documents.
18. Submitted model should have international CE and ISO certificates, which should be attached.
19. Vendor/Bidder should have an Official Service support facility at Assam.
20. Vendor/Bidder should submit at least three performance certificates from existing users.
21. The specification of the submitted model must be available on the official website.
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| **2** | **Inverted Fluorescence Microscope**  | 1 | 1. Inverted microscope frame with minimum 5-watt LED to maintain constant colour at all stages of intensity with auto cut-off function to save energy.
2. Microscope body must be scratch resistant.
3. Universal Slide holders and object guides must be supplied with the microscope.
4. Long working distance condenser for the larger volume cell container must be quoted, longer working distance will be given preference
5. Objectives for microscope with Integrated phase slider must include
* 4X Plan Objective
* 10X Phase Objective NA 0.2
* 20X Phase Objective NA 0.3
* 40X Phase Objective NA 0.5
1. The system must have 4 Position Objective Holder
2. 10X Eyepiece with FN 20
3. Ultra-high-pressure 100W Hg-lamp for Fluorescence Applications with Lamp Housing, Power Supply and Fluor Protection Shield should be quoted
4. The system should be quoted with Filters for Fluorescence for UV excitation, excitation filter: BP 340-380, dichromatic mirror: 400, suppression filter: LP 425, For Blue excitation, excitation filter: BP 450-490, dichromatic mirror: 510, suppression filter: LP 515, For green excitation and **optional:** excitation filter BP 515-560, dichromatic mirror: 580, suppression filter: LP 590.
5. Camera Attachment: Color CCD/CMOS sensor for the scientific sample and slide imaging. Image resolution to be at least 12 megapixel or more, High definition live image, Live resolution up to 60fps,Camera must have an option for working on stand-alone mode without PC
6. Image capture and analysis software for basic analysis like linear and area measurement
7. The Microscope, camera, and software should be supplied from the same manufacturer for better compatibility.
8. Preference will be given to manufacturers with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no, and location to be submitted).
9. The system should be quoted with a Computer System with core i5 Processor, RAM -4 GB, HDD-1TB,USB2, OS, WIN10 64 bit, external graphics card 1GB, 22‘’ display IPS monitor, and 1KVA UPS
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| 3 | **CO2 Incubator** | 1 | 1. Should have at least 170 L or more of internal capacity.
2. Temperature management of at least 4ºC above ambient to 50ºC with control increment of 0.1ºC
3. Temperature accuracy should be ± 0.4 ºC at 370C, Temperature stability of ± 0.1ºC at 37 ˚C, and Temperature uniformity of ± 0.3ºC at 37 0C
4. CO2 gas range should be at least 0.1 – 20% with control increment of 0.1%, accuracy should be + 0.3% at the specified Relative Humidity (RH) at 37˚C, stability of + 0.1% at 37 ˚C and gas uniformity of + 0.1% at 37 ˚C across the chamber.
5. Minimum CO2 recovery rate after door opening and closing event to attain 5% CO2.
6. Should have High-Temperature Disinfection [HTD] of at least 140 ºC for 2 hours.
7. The system should have BMS relays built in and option to incorporate onto Data monitoring and documentations modules.
8. The door hinges, associated cable and other accessories should be robust and stringently tested.
9. Should have a large backlit display for control of temperature and alarms
10. Should have separate single inner glass door for monitoring of samples without disturbing conditions of the chamber.
11. Should have option to Retrofit/field upgrade on site with 4- or 8-segmented inner glass doors
12. Should come with an inline pressure regulator to ensure less gas consumption and prevent overshooting of pressure which shortens life span of incubator.
13. The Inner chamber should be formed from a single stainless-steel sheet with deep-drawn and seamless design with no corners, welds or joints for higher capacity and ease of cleaning.
14. Should have six-sided direct heating elements to ensure even distribution of heat throughout the entire incubator chamber.
15. Should come with a removable humidity tray for easy cleaning and refilling of distilled water.
16. Should be “fan less” design without HEPA filter inside to reduce the chance of contamination, reduce the noise level, minimum air turbulence and bigger usable capacity.
17. All gas inlets into the chamber should be HEPA filtered; the filter manufacturer should meet ISO-9001:2008 standards and all materials pass USP Class VI requirements.
18. Should have state-of-the-art Dual Channel Infra-Red (IR); NDIR type CO2 sensor with auto-calibration feature to ensure accuracy of sensor automatically.
19. The CO2 IR sensor should have a long-life.
20. The incubator should come with standard 3 perforated stainless-steel shelves
21. The system should have an option for Shelves and a humidity tray made of metallic Copper (Cu) for advanced contamination protection.
22. Should have 02 Nos. Access ports at the back of the chamber to allow for external probes,
23. Should conform to European CE certification standards.
24. System should be supplied with double stage Co2 Regulator and 31 kg Co2 Cylinder.
25. Warranty period of 1 year from the date of installation.
26. Should be supplied a suitable voltage stabilizer
27. Preference will be given to manufacturers with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
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| 4 | **Bio-Safety Cabinet, Class II A2 Type** | 1 | 1. The cabinet should be advanced microprocessor control, which supervises the operation of all cabinet functions. Temperature-compensated air velocity sensor monitors both exhaust and downflow, 24-hour clock, UV timer,
2. UV run hour meter and blower run hour meter must come as standard and ducting facility as an option.
3. There should be a programmable PIN, which restricts unauthorized cabinet access.
4. The cabinet should have energy-efficient electronically controlled DC blower motor with night set back mode facility.
5. Inflow velocity should be 0.53m/s or better.
6. The cabinet should have long life DUAL ULPA/HEPA Filter for supply and exhaust with 99.999% efficiency for particle sizes 0.1 to 0.3 microns.
7. The system must adhered to the norms of IEST contamination control group
8. Should have raised armrest to elevate the operator’s arms to prevent inflow grille blockage for safety work.
9. The sound emission should be less than 59.5 dBA.
10. The system must have programmable automatic UV light timer that shall simplify operation.
11. The Cabinet outer surface should have antimicrobial coating for minimizing contamination.
12. Work tray should be made of single piece stainless steel type 304, with 4B finish.
13. The cabinet should have built-in warm, white, electronically ballasted zero flicker with at least 5000K lightening
14. There should be UV protected sliding front sash which can be fully opened during specific requirements.
15. The construction of the cabinet should be electrogalvanized steel including stand also.
16. The controller should include soft-touch keypad controls with LCD display of airflow velocity
17. Instant start fluorescent lamp intensity should be around 1200 lux or better.
18. The Biological safety cabinet should comply International Standard Certificates like NSF, JIS, CE etc. The quoted model should be enlisted in NSF website and all the certificate should be submitted.
19. The model offered should be at least 4 meter wide in dimension.
20. The cabinet should be offered with following accessories: atleast 2 nos. UV lamps, minimum two nos. electrical outlet sockets, and antimicrobial coated SS movable stand with wheels & brakes for easy movement, universal service fixture for gas/vacuum/water, any one.
21. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).

**Optional** – A suitable UPS can be offered with minimum of 15 min back up  |
| 5 | **Real Time PCR** | 1 | 1. The system should be automated and integrated with 96 well peltier based for both realtime PCR and post-PCR (end-point) analysis with 6 independently controlled zones.2. It should have an interactive touch screen LCD for standalone operation with 8 - 10GB onboard memory for storage of at least 1600 - 2000 runs.3. System should support a minimum recommended reaction volume of 10–30 μL/10–100 μL for 0.1/0.2 mL tubes/plate in the system block, respectively.4. The system should support the temperature range from 4°C to 99°C with block ramp for 6°C - 9°C/sec.5. System should have at least six de-coupled excitation and emission filter sets to enable the collection of a maximum number of combinations of wavelengths during a single run for multiplexing five colors or above.6. The System should utilize a single bright white LED source, excitation by LED light source with a > 5 years lifespan and detection by CMOS/CCD with whole plate imaging and detection.7. The system should be factory calibrated for the following FAM/SYBR Green, VIC/JOE/HEX/TET, ABY/NED/TAMRA/Cy3, JUN, ROX/Texas Red, Mustang Purple, Cy5/LIZ, Cy5.5 dyes8. The system should be able to do applications such as Gene Expression, Genotyping, Copy Number Variation, Pathogen Detection, and Viral Load, Mutation Scanning, Methylation and other Epigenetic Applications, miRNA profiling.9. The system should be able to do applications such as Protein analysis with proximity ligation assays and Protein Thermal Shift technology.10. The system must be CE, ISO, and MIQE compliant.11. System should detect differences in target quantity as small as 1.5-fold in single plex reactions, and should have 10 logs of linear dynamic range.12. The system should be able to do single-plate analysis, absolute and relative gene expression, SNP genotyping, presence/absence, high resolution melt, multiplate analysis gene expression studies, SNP genotyping studies.13. The normalization of reaction due to non-PCR related fluctuations should be possible by using any calibrated dye.14. The system must be able to get connected to the online ecosystem and instrument data/status will be automatically uploaded, allow users to access and securely share result with colleague anywhere, anytime from any location with internet access15. The warranty of the instrument should be 1 years post installation.16. The system should be supplied with a suitable UPS17. System should be supplied with a 1.5 ton AC with stabilizer |
| 6 | **NANODROP** | 1 | 1. The system must be able to measure low volume of samples (preferably 1µl) for Nucleic acid and protein quantification.
2. The system measuring surface must have pedestal material of construction: 303 stainless steel and quartz fiber.
3. Absorbance accuracy should be at least ± 3%
4. The system should be UL/CSA and CE compliance
5. The system should have LCD display and light source must be LED
6. Detector Type: Silicon photodiode
7. System must have capability of data transfer via USB flash drive.
8. System must come with a suitable computer and an UPS.
9. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
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| 7 | **Freeze Dryer** | 1 | 1. Microprocessor controlled fridge dryer system with LED display to show operational parameters
2. Bench top model
3. Operating voltage 220V
4. Frequency 50 Hz
5. Fitted with Indian standard electrical connector
6. Electrical accessories, fittings, and wire should be provided for the power supply to the instrument
7. Condenser temperature -110 oC
8. Seamless surface condenser with external colling coil without any gasket
9. Cold trap -110 oC
10. Fitted with insulation
11. Materials of construction - Stainless steel
12. Cooling media R507/R1150 refrigerant
13. Double stage rotary direct driven high vacuum pump
14. Pump operating voltage 230V/50Hz
15. Fitted with Indian standard electrical connector
16. Vacuum up to 0.002m bar
17. Future upgradable to Speed Vac system
18. Minimum 6 port manifold
19. Adaptor for flask holder
20. Drying flask of capacity 25 ml, 50 ml, 100 ml, 250 ml, 500 ml, 1000 ml, and 2000 ml
21. Ampoule Tree with Ampoule sealer
22. Necessary accessories should be provided for the smooth operation of the instruments
23. One Year Manufacturer’s onsite warranty should be quoted.
24. Installation and onsite demonstration at TTRI, Jorhat
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| 8 | – **80 oC freezer** | 1 | 1. Fully programmable microprocessor controlled with membrane keypad and eye level control panel.
2. Freezer should be of 410 – 450 Liters capacity and should have LED display
3. Freezers should have an Automated vent port for quick access to samples as part of the eye level display / advanced interface
4. Compressor fan air filter should be located on the front panel for ease of access for cleaning and maintenance.
5. System should have Dedicated alarm and backup system for 24/7 sample safety
6. System should have Programmable operating temperature from –50 °C up to –86°C with minimum increment at operating temperature.
7. Insulation should be of advanced PolyUrethane Foam (PUF) to maintain highest heat insulation.  System should be highly energy efficient
8. System Exterior should be made up of powder coated Steel to resist scratch and rust and the interior should be of Polished Stainless-Steel grade for easy cleaning and to eliminate potential for oxidation.
9. At least 4-5 Inner doors with tight sealing to prevent temperature loss and Outer door should have reinforced tight sealing.
10. System should have an ergonomically designed door handle for smooth and easy operation; for enhanced safety of user.
11. Should have security keyed locks and also with option to lock the ergonomically designed door handle with a padlock.
12. System should have Heavy duty wheels to easily move the freezer to a new position
13. System should have minimumNoise level (at -80 °C) 51.5 dB or lesser
14. Freezer must have battery back-up and pass word protection security for unauthorized tampering of freezer settings.
15. System should have Door open recovery (DOR)
16. System should have battery powered back-up circuit; in event of a main/power outage the battery should supply power to the alarms and display for up to 72 hrs at least.
17. Audible and visible alarms for temperature, power failure, system failure, battery low etc., and it also have remote alarm port for connection to an auto dialer.
18. Freezer must have HFC-free, CFC-FREE, HCFC-FREE non-flammable refrigerants, and should have Green NaturalHC Gas based refrigeration system
19. Freezer must have ISO 9001 standard quality test requirements and IEC 61010 Electrical safety CE certified.
20. Freezer must have capacity to hold racks of 2” heights.
21. Warranty must be provided to at least one year from the date of successful installation
22. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
23. System should be supplied with a suitable voltage stabilizer.
24. System should be supplied with a 1.5 ton AC with stabilizer.
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| 9 | **– 80 oC freezer, compact** | 1 | 1. Freezer should be compact design with minimum footprint, so that it can be accommodated in the convenient spaces in the lab.
2. System should have Programmable operating temperature from –50°C up to –86°C with 1°C increment
3. System must be energy efficient and hermetically sealed Refrigeration system of 2-stage cascade cooling system; Compressors used should be Commercially available, heavy duty compressors with minimal failure rate.
4. Freezer must use Green Sustainable Natural Gas/ HydroCarbon (HC) refrigerants HFC-free, CFC-FREE, HCFC-FREE nonflammable refrigerants, and refrigeration.
5. Construction should be of Vacuum Insulation Panels (VIP) and Green Polyurethane foam Insulation
6. Freezer must have two compartments with two inner doors for easy handling of samples; both inner and outer doors should be Insulated and sealed.
7. System should have a Door open recovery (freezer set to -80 °C, recovery to -80 °C) after 15 sec door opening of 19 min or lesser indicative of the insulation & sealing efficiency
8. System should be ultra-Slender design for occupying lesser lab space
9. Freezer should have the sample (50 mm /2” in vials) capacity of 6000 or more.
10. Freezer should have Easy-access air filter located in front for convenient cleaning without requirement for tools
11. Freezer Construction should be Stainless steel grade 304 2B for Interior chamber and Powder-coated steel for Exterior
12. Should have Door handle Lock system (key), Power switch and Battery switch Secured by lockable plateto keep out unauthorized users
13. Freezer must have battery back-up and intuitive touchpad controls for safe and easy handling.
14. Freezer must have Password Protection for ULT freezer settings &Remote alarm port (BMS relay) as standard
15. Freezer should be equipped with Systems Monitoring and Reporting Technology (S.M.A.R.T PLUSTM) self-diagnostic software for the self-diagnosis of faults in electronic systems, probes and/or the cooling system.
16. Audible and visible alarms for Alarms Adjustable high/low temperature, power-fail, battery low, filter clean and fault alarm.
17. Freezer must have ISO 9001 standard quality test requirements and IEC 61010 Electrical safety CE & UL certified.
18. Freezer should have electric supply of Electrical rating (1 phase) 230 V/50 Hz, Current rating 5.0 A; WEEE, ROHS, REACH agency listing & Certification. All components tested to CE Specification & Certification
19. System should have warranty period of 1 year from the date of Installation.
20. Preference will be given to manufacture with good nos. of Installation in North East (details to be submitted) and service person based in North East (details with Name, mobile no and location to be submitted).
21. Must be supplied with a suitable voltage stabilizer
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| 10 | **Multipurpose Refrigerated Centrifuge** | 1 | 1. Refrigerated multipurpose bench-top centrifuge with LCD display
2. System should be capable of using fixed angle and swing out rotors with adapter to use different tube formats.
3. System should have a maximum Capacity of 4 x 250 ml bottles
4. System should have user-friendly operation; key panel with provision to set speed RPM / RCF, radius correction values that can be changed during centrifugation.
5. System should have fast temperature function for rapid cooling of centrifuge and stand-by cooling options
6. System should have an in-built condensate drain to prevent water accumulation
7. System should have excellent temperature control with compressor running continuously during the run time
8. System should have automatic shut off function to reduce energy consumption and to extend compressor life when not in use for long hours
9. System must be equipped with automatic rotor recognition and imbalance detection for maximum operational safety
10. System must have timer setting 1 min to 99 min, with continuous run function and separate short spin key with selectable rotational speed
11. System should have acceleration and deceleration steps
12. Noise level at max speed should be less than 58 dB(A) for quite operation in work place.
13. Rotors and rotor lids should be made of metallic and must be fully autoclavable at 121°C
14. Centrifuge lid with soft-touch lid closure, and low opening height for stress-free lid locking.
15. System must have a smallest possible foot print and the smallest lid opening height for easy sample accessing while loading and unloading samples
16. Features in the quotations should be substantiated with proper company catalogue
17. System must be CE Certified
18. Following rotors need to be supplied with the instrument:

a. Fixed Rotor for 30 x 1.5/2 ml with aluminum lid; Max. rpm : 14,000 or more and Max. rcf : 20,500 x g or moreb. Swing out rotor for 15/50 ml with adapter for 15 ml and 50 ml with speed of 3,000 rpm or morec. Swing out plate rotor for MTP/Cell culture plate/ DWP with speed of 3,000 rpm or more 1. Warranty of at least one year from the date of successful installation on site
2. Preference will be given to manufacturers with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no, and location to be submitted).
3. Should be supplied a suitable voltage stabilizer.
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| 11 | **High Speed refrigerated Centrifuge** | 1 | 1. Refrigerated Centrifuge should be supplied with temperature control range : -11°C to 40°C, should be able to maintain 4°C at maximum speed
2. Centrifuge should be supplied with a rotor with a capacity to hold 30 x 1.5/2.0 ml tubes and 6 x 15/50 ml conical tubes.
3. Centrifuge should have the facility for rapid cooling and should be able to maintain a continuous cooling environment during the centrifugation process.
4. Centrifuge should have the facility for auto shut-off of the compressor.
5. Centrifuge should have a feature for multiple programming facilities with capability to store in the memory.
6. All rotors and rotors lid should be autoclavable.
7. Centrifuge must have CE, UL, ISO 9001, ISO 13485, ISO 14001 Certified
8. Centrifuge should have the feature of pre-set temperature programming according to the given time
9. Centrifuge should have a feature for water drainage facility for accumulated water inside the chamber.
10. Instrument should have an automatic rotor recognition facility to automatically recognize and set maximum speed upon rotor change.
11. Centrifuge should have max RPM of 17,000 or better
12. Centrifuge should have Max RCF of 30,000 x g or better
13. System should have a warranty period of 1 year from the date of Installation.
14. Preference will be given to manufacturers with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
15. Should be supplied a suitable voltage stabilizer.
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| 12 | **Basket Centrifuge** | 1 | 1. Material of construction of the basket and shell: Corrosion resistant SS316
2. Material of construction of the rest of the body: MS with powder coated and painted
3. Dynamically balanced
4. Bottom driven and Top discharge
5. Minimum volume of the basket of 25 liter
6. Centrifuged speed of minimum 1400 RPM
7. G value of more than 450
8. 3 Phase 415V Operation voltage
9. Supply of connection cable to the instrument from the main supply at the site of installation
10. Filtration bag of 25 microns or less, minimum 2 number
11. Any additional accessories needed for the operation of the instrument
12. Installation and demonstration at TTRI, Jorhat
13. Warranty on the product for a minimum period of 1 year
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| 13 | **Photp Periodic Simulator and Temperature Controller** | 1 | 1. The photo periodic timer should be digital and should operate 110 tube lights of 36/40 watt each with minimum 15 min on/off periodic cycles.
2. It should have the following functions: TIMER, MANUAL, CLOCK, DAY, HOUSR, MIN, RESET, LED.
3. The system should be supplied with necessary voltage stabilizer, mounting kit, pipes etc.
4. The nominal cooling capacity should be 1.5 ton minimum.
5. The compressor should be inverter rotary type and should have hot and cold inverter technology.
6. It should prohibit the accumulation of moisture, mold or dust within the indoor unit.
7. It should have variable fan speed with precision control.
8. It should be stabilizer free and should ensure protection against unpredictable surge or fluctuations in voltage.
9. It should have 2 gear modes to ensure operation with 75% or 50% power input.
10. Preference will be given to manufacture with the record of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
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| 14 | **BOD Incubator** | 1 | 1. The incubator must have Microprocessor based auto tuned PID controller with CE mark & dual display of set value & process value
2. Should have 3” Thick PUF Insulation ensures for stable temperature & reduced energy consumption
3. Should have Motorized Blower at the back side of the chamber to develop unique air flow system which maximizes uniform temperature condition inside the chamber.
4. Should have Blower motor of capacity of 1/12 HP, TEFC, F-class insulation, 230 Volts
5. Should have High quality S.S. Tubular Heaters for better heating.
6. Should have Full view observation Acrylic Door / Glass Door with gasket to observe sample inside the chamber.
7. Should have CFC Free hermitically sealed Emerson Copland make compressor with R 134 A for better cooling with ECO friendly refrigerant with time delay to safe guard compressor system.
8. Should have 50 mm validation port hole with Silicon rubber seal to insert sensors for validation.
9. Should have Interior illumination for working area.
10. Should have Temperature variation, Temperature deviation audio visual alarm.
11. Should have Safety Thermostat Cut off facility with safety alarm.
12. Should have Compressor ON delay timer (2 min.) to safe guard the compressor.
13. Should have inbuilt over load protector provided for hermetically sealed compressor.
14. Should have Fibre/PU Wheel with lockable front for easy movement. MCB for electrical safety. Adjustable tray height arrangements.
15. Should have Specially designed stainless steel rod trays
16. Chamber should be Inside S.S. 304 mirror finish. Outer Galvanized Iron (GI) sheet with powder coated.
17. Temperature Range should be 50 C to 600 C, accuracy - ± 0.50 C, uniformity - ± 20 C
18. Capacity of the system should be 190> Litres
19. Should have at least 2 Trays
20. System should have optional accessories as mentioned below:

COMPLETE PLC SYSTEM (WITH TOUCH SCREEN HMI): PLC for auto changeover for standby refrigeration system with 7” Touch screen color HMI. 21 CFR Part 11 compliance Ethernet based communication software for data management with multi dropping monitor 8 chambers to one software.Ready to use stand by refrigeration system in case of regular system fails. Complete with Compressor, Condenser, Cooling coil etc1. Temperature scanner complete with sensors
2. Mobile alert system
3. Security System (Door Access)
4. Safety digital temperature controller with accessories
5. Digital Timer 0-999 ( Hr / Min / Sec ) with Alarm
6. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
7. A suitable stabilizer must be provided
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| 15 | **Electronic precision balance** | 1 | 1. Electronic balance with a minimum display of 0.1 mg
2. Maximum weight capacity >200 gm
3. Calibration: Internal calibration
4. Repeatability ≤ 0.1 mg
5. Weighing pan diameter: minimum 90 mm
6. Response time ≤ 5 sec
7. Materials of construction: Chemically resisted
8. Display: LED display with backlight
9. Balance leveller: Fitted with bubble level
10. Weighing pan covered with glass or transparent materials
11. Stable in the temperature range of 10-35 oC
12. The balance should provide a function key to show weight on different scales and unit
13. Operation voltage, 230V/50 Hz
14. Electrical connectors of Indian standard
15. Installation and demonstration at TTRI, Jorhat
16. Warranty on the product for a minimum period of 1 year
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| 16 | **TDR Soil Moisture Meter** | 1 | System should have following features:-1. Increased accuracy of soil moisture (volumetric water content)
2. Measures EC (electrical conductivity).
3. Measures Turf Surface Temperature.
4. Integrated Bluetooth and GPS.
5. Industry exclusive backlit display.
6. Improved shaft-mounted probe with telescoping tubular frame.
7. Data can be collected with USB flash drive.
8. No PC interface needed.
9. Powered by AA lithium batteries.
10. Measurement by time domain measurement method principle.
11. Measurement in percent volumetric water content Units.
12. Resolution: 0.1% volumetric water content.
13. Accuracy: $\pm $3.0% volumetric water content with electric conductivity $<$2 mS/cm.
14. Range is from 0% to saturation (saturation is typically around 50% volumetric water)
15. Battery life must be at least 12 months
16. Data logger around 50000 measurements.
17. EC: Range from 0to 5 mS/cm, Resolution: 0.01 mS/cm, Accuracy:$ \pm $1 mS/cm
18. Temperature: Range: -30˚C to 60˚C, Resolution: 0.1˚C Accuracy: $\pm $1˚C
19. System must be supplied with:
* Carrying case
* Requisite rods as required for the machine.

20. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).   |
| 17 | **BENCHTOP pH meter** | 1 | 1. The system should have pH/mV/CONDUCTIVITY/TDS/TEMP measurement parameters.
2. pH measuring range should be from -2.00 to 16.00 pH with 0.01 pH resolution and ±0.01 pH accuracy with 5 points calibration.
3. mV measuring range should be ± 2000 mV with 0.1 mV (±199.9 mV) / 1 mV resolution and ±0.2 mV (±199.9 mV) / ±2 mV accuracy.
4. Conductivity measuring range should be from 0.01 μS/cm to 200.0 mS/cm with 0.01 μS; 0.1 μS; 1 μS; 0.01 mS; 0.1 mS resolution and ±1 % accuracy with 5 points calibration.
5. TDS measuring range should be from 0.01 to 100 ppt @ 0.5 TDS factor with 0.01 ppm; 0.1 ppm; 1 ppm resolution and 0.01 ppt; 0.1 ppt accuracy with 5 points calibration.
6. Temperature range should be from 0°C – 100°C with 0.1°C resolution and 0.5°C accuracy.
7. It should come with ATC/MTC compensation and buffer option.
8. System should come with large comprehensive dual-display LCD that display readings, calibration points and electrode indicator with ready indicator alerts when readings are stable.
9. It should have non-volatile memory size of minimum 100 data sets.
10. Should be supplied with electrodes and built-in electrode arm.
11. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
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| 18 | **Analytical Weighing Balance** | 1 | 1. The max capacity of the Analytical Weighing Balance should be 220 g along with 0.1mg Readability [0.0001g] and ± 0.2 mg Linearity
2. Tare Range should be full Capacity [-220 g]; Repeatability: ± 0.1 mg; Pan Size: 100 mm Dia.
3. Draft shield should be manual
4. The weighing units should be available inG, kg, ct, lb, oz, ozt, tlh, tls, tlt, Gn, dwt, mg, /lb, tlc, mom, k tol, bat, and MS.
5. Following weighing modes such as Weighing, Parts Counting, Check weighing, Percent setup, Formulation, Dosing, , Peak hold, Statistics, Animal Weighing, Density, under hook weighing, Autotest, totalizing , alibi memory, Ambient Conditions Measurement should be available.
6. The Calibration should be fully automatic and there should not be need of any external weight.
7. The stabilization time should be2 Seconds or less.
8. The working temperature should be between+10˚C to +40°C.
9. The power supply range should be between110V to 230V AC / 50 to 60 Hz.
10. It should contain LCD display with back light.
11. It should have the Databases as follows: 10 users, 1,000 Products and 1,000,000 weighing records to be stored in memory.
12. Draft shields should be removable from 3 Side.
13. The balance should comply with GLP/GMP and ISO certified.
14. Data Management, ALIBI Memory Internal ALIBI memory to guarantee safety and automatic record of measurements copies, it also offers possibility to preview, copy and archive data.
15. Kensington Lock for securing the device against theft etc.
16. Easy Data Transfer: There should be easy two-direction data exchange to import or export databases using USB pen drives.
17. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
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| 19 | **Autoclave** | 1 | 1. The system operating Parameters must be 103.4 kPA(15psi)/121⁰C and heater: 3.00kW
2. The system should have features of automatic purging for efficient sterilization.
3. The system must have preset (at 121°C) digital temperature indicator cum Controller which should be link to a timer.
4. The system must have low water level cut off.
5. The system should be fitted with a Safely Valve for added safety.
6. Must be supplied with certificate for pressure gauge and temperature Indicator.
7. The system must have sensor for precise control and monitoring
8. The machine should have drain valve on side at bottom for easy cleaning
9. The system body must be of Stainless Steel-304 with double walled construction
10. The system must be able to saves over 20% in electricity costs and must have SS wire mesh Carrier(s) and spare gasket
11. The system must be CE certified and Calibration Reports must be provided.
12. Preference will be given to manufacture with good nos. (details to be submitted) of Installation in North East and service person based in North East (details with Name, mobile no and location to be submitted).
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