Gautam Buddha University

Greater Noida – 201 310

Website : www.gbu.ac.in

BID FORM

FOR THE SUPPLY OF EQUIPMENTS FOR

ADVANCE ENVIORNMENTAL ENGINEERING LABORATORY

OF

SCHOOL OF ENGINEERING

Gautam Buddha University
Greater Noida – 201 310

TENDER FOR SUPPLY OF EQUIPMENT FOR ADVANCE ENVIORNMENTAL ENGINEERING LABORATORY OF SCHOOL OF ENGINEERING

Tender	**Supply of Equipment for Advance Environmental Engineering Laboratory**
Opening Date	13th May 2011
Closing Date	13th June 2011 upto 3.00 p.m.
Last date of Bid Submission	13th June 2011 upto 5.00 p.m.
Technical Bid Opening Date, Time & Place	14th June 2011 at 3.00 p.m. Venue : Conference Room of the Registrar Office, 1st Floor, Administrative Building, G.B.U., Gr. Noida.
Earnest Money Deposit	2% of the offered cost
Completion Period	Within 10-12 weeks from the date of Purchase Order issued
Bid System	Two Tier : 1) Technical Bid 2) Financial Bid
Technical Bid Shall Contain	i. Technical specifications of each equipment quoted ii. All documents in support of commercial terms & conditions and eligibility criteria. iii. Bidders Proforma iv. EMD & Tender Fee demand drafts / pay orders.
Financial Bid	The Financial Bid shall contain rate schedule only. The price shall be in words as well as in numeric numbers.

"TECHNICAL BID (BIDDER'S PROFORMA)"
(To be submitted in separate envelope)

1. Name of the firm: ……
2. Date of incorporation……..
3. Name of the company – Government / Public Ltd. / Private Ltd. / Partnership / Proprietorship : ……
4. Specify the number of years in this line of activity by the company:……..
5. Sales Tax/VAT registration No. (please attach certificate) : ……
6. Experience (in year) of supplying & installation for similar software to IITs, NIT's or Central Universities or any Academic Institute of National Repute (please attached certificate/P.O.) : ……..
7. Turnover in the last three financial years (Figures should be in Indian Rupees in Lakhs; please attach the certified copies of balance sheet with trading, profit & loss account) : (if the figures for 10-11 are not available then they may furnish balance sheet of year 07-08)

2008-09	2009-10	2010-11

8. Provide the postal address, telephone & fax numbers, and email address of the nearest service center : ……
   ……..
9. Mention delivery period from the date of the placement of an official purchase order : ……..
10. Enclose the list of customers to whom you have supplied /serviced during the last 3 years ending 31/03/2011 with full postal address and name of the contact person with phone, FAX numbers, and E-mail-id, billing amount etc. Certificate regarding satisfactory performance from the minimum three end users should be furnished.
11. Are you the manufacturer / authorized dealer / distributor/ reseller for the product quoted (please attached relevant certificate): ……..
12. Was there any lapse or delay in supplying the goods ordered or any service related issue during the warranty period for the products supplied by your firm to different Institutes/Universities during last three years? If yes, provide details.
13. Deviations in specifications, if yes, please mention in separate sheet.
14. Whether technical specification are attached with Technical Bid or not. Yes/No

DECLARATION

1. The rates quoted in financial bid are inclusive of all taxes, packing, handling and installation charges.
2. The information given in the financial bid by the undersigned is correct.

(SIGNATURE OF THE BIDDER)
WITH SEAL

NAME : ……

ADDRESS : ……

: ……

: ……

Tel./Mobile No. : ……

Note: The financial bid is required to be submitted separately in a sealed cover super scribing as 'Supply of Equipments for Advance Environmental Engineering Lab. of School of Engineering.

Annexure : 'A'

Gautam Buddha University

School of Engineering

TECHNICAL SPECIFICATIONS: ADVANCE ENVIRONMENTAL ENGINEERING LABORATORY

S. No.	Experiments	Equipment	Specifications
1	Mixing	Vortex mixer V1 plus	Mixer, Vortex; Pulsing; Pulse feature reduces heat generation while delivering more effective mixing; Variable speed control from 500 to 3000rpm; 230V 50/60Hz, 75w 02-215-371 1 , Mixer, Vortex; Digital; 100 to 3200rpm +/- 25rpm Accuracy; 230V 50/60Hz; 75w; Suitable for flasks, 18926 beakers, tubes, and microwell plates; Durable; rugged
2	Pippeting	Pippets (Electronic)	Micro-Pipettes & Pipette holder Technical Specifications: Eppendorf 1 µL-1000 µL of all capacities
3	Indoor air quality monitoring Industry	Personal Sampler	Capable of sampling dusts and metal fumes in work area or shop-floor environment. Consisting of: Sampling pump with rechargeable batteries, Two Sampling Heads for Desirable Accessories, Spares & Consumables (Optional) Whatman GF/A Grade Glass Microfibre filters 25 mm dia in a sealed packet of 100 discs. Specifications : • Flow Rate : 0.5 – 2.0 LPM. • Filter : 25mm dia. Filter Discs • Batteries : Ni – Cd. rechargeable. • Operation Time : 8 hrs. on fully charged batteries • Recharge Time : 12 – 14 hrs. • Size & Weight : 155 x 82 x 60 mm 1.2 kg.

Annexure : 'B'

Gautam Buddha University

School of Engineering

TECHNICAL SPECIFICATIONS: ADVANCE ENVIRONMENTAL ENGINEERING LAB.

S. No.	Name of Experiment	Equipment	Specifications
1	Digestion	Digestion Fume hood &Hotplate with stirrer	SPECIFICATIONS: System for digestion of different types of sample for analysis, including water, wastewater, food products, plant tissue, feed stuffs, oil, coal, organic & mineral samples for analysis of Kjeldahl nitrogen, protein, phosphorus, calcium, potassium, lead, cadmium etc in solid and liquid samples. The sample after digestion would then be analysed by spectrophotometer, turbidimetric or titrimetric methods. This should be alternate to conventional digestion eliminating the need for a mercury or metal catalyst. -The apparatus set should have a heater assembly heat shield, fractionating column, capillary funnel, digestion flasks and a water aspirator. -Should have a thermostatically controlled 250-watt heating element and should provide even heating through out the digestion process. -Should have variable temperature control from 100 to 480 deg C with LED digital display for temperature. -Should be corrosion resistant, plastic and polyurethane painted metal. -Should digest samples for heavy metal analysis also -Power requirements : 230 VAC -Temperature Control : Variable from 100 to 480 deg C -Aspirator : 11.5 L/min at a water flow rate of 6.5 l/min -Water Pressure : 51.7 kPa (7.5 psi) minimum, drain required -Compliance : CE certification and EMC
2	Study of noise measuring equipments & pollution	Noise level meter	Capable of Monitoring Sound Pressure Level with Min Max and LEQ computation for each record. Unit has data logging facility and the recorded data can be can be downloaded to computer for further analysis Pressure Level (SPL), LEQ and SEL on a digital display. Frequency Weighting "A " type and Time Weighting for SLOW and FAST mode provided as per requirements of IS 15575 (Part1) 2005. Data recording facility with multiple file storage. Sufficient memory to record 24 hours data at 1 minute intervals. Data transfer to PC for detailed Analysis and report preparation.

			Technical Specifications: Measurement Range: 34 to 134 DBA in three 50DB overlapping ranges. Error Indication : Over Range, Under Range and Low Battery. Accuracy / Class : Type II designed for field use. Display : LCD 16 Character, 2 Line Display with 0.1 DB resolution. Frequency Weighting : "A" type as per IS 15575 (Part1) 2005.* Time Weighting : SLOW and FAST as per IS 15575 (Part1) 2005 Measurements : Sound Pressure Level (SPL), MIN SPL, MAX SPL, LEQ, Sound Exposure Level (SEL) and run time continuously available on the display by selecting appropriate display screen. Operation Modes: Continuous and Recording. In Continuous Mode the SLM100 displays the current SPL level and LEQ, SEL etc. for the duration of current session of operation. In Recording Mode, current values of above parameters are displayed on the screen and LEQ, MIN SPL, MAX SPL, and SEL values integrated over a minute are recorded in the built-in data logger. The SLM100 allows the user to record multiple files making it possible to make a detailed survey at several locations before downloading data to a PC for Analysis. Memory Capacity : The data logger provided in the SLM100 can store more than 24 hours data (at 1 minute intervals) in non-volatile Flash Memory. Data Download : The SLM100 Sound Level Meter has a built-in RS232 Serial Port for direct interface to a PC. Software : data download to a PC and makes the data available in an Excel Spreadsheet for analysis and report preparation. Battery : The SLM100 Sound Level Meter is provided with a re-chargeable NiMH battery pack. The instrument operate for 10 hours or more with fully charged battery. A built-in battery status facility allows the user to check useable battery hours and automatically prompts the user when the battery is running low. To prevent battery damage the instrument will automatically shut-down when the battery voltage drops to a pre-set level
3	Ambient air Quality Monitoring	Gaseous Pollutants Sampler	TECHNICAL SPECIFICATION (i)Absorbers Provided : 4 Nos. of 35ml borosilicate glass impingers as per BIS 5182 (Part 6) 2006 and 2 fritted disc impingers. (ii) Sampling Rate of each Impinger : 0.3 -3.0 lpm measured using acrylic body rotameter (iii) Sampling Train : A Manifold having Four inlets and one out let manifold with built in needle valves for flow control of each inlet (iv) Sampling Time : 28 hours (maximum) (v) Sampling Time Record : 0 to 9999.99 Hrs. (vi)Automatic Sampling Control : 24 hr programmable timer to automatically shut off the system after preset interval. (vii) Power Requirement : Nominal 220v, single phase 50 Hz AC

4	Ambient Air Monitoring for HC & Organic vapors	Organic Vapour Sampler	Capable of sampling HC and various Organic vapours in the ambient air Shop floor and from small fugitive emission sources at low flow rate 20-200ml/min. Extra SPARES & CONSUMABLES (OPTIONAL) Organic Vapour sampling glass tube containing activated charcoal. Flow Rate Range : 20 to 200 ml/min continuously adjustable with a precision needle valve provided for flow control. Display : LCD 20 characters, 2 line display. The instrument constantly displays flow rate and total volume of air sampled. Operation Mode : Continuous and compositing. In continuous mode air is passed continuously through the adsorbing media with a flow rate set by the user. In Compositing Mode, the user programs the ON & OFF cycle and the built in Microcontroller operates the system cycle of ON & OFF periods for a duration that is also programmable. So a long term averaged sample consisting of small spaced out samples is automatically collected. The instrument displays and records the total volume of air sampled. Charcoal Tube : supplied with two types of charcoal tubes. Stainless Steel tubes provided with the instrument can be directly inserted into Thermal Desorbers attached to Chromatographs. After desorption the tubes can be re-activated for immediate re-use. Alternatively the user can order glass tubes packed with activated charcoal. The contents of the tube are removed from the glass tube after sampling for desorption in Carbon Disulphide. The tubes can be re-packed with fresh activated charcoal for re-use. Battery : rechargeable NiMH battery pack. operate for 8 hours or more with a fully charged battery. A built-in battery status facility allows the user to check useable battery life and automatically prompts the user when the battery is running low. To prevent battery damage the instrument will automatically shut-down when the battery voltage drops to a pre-set level
5	Indoor air quality monitoring	Handy Sampler	Capable of sampling gaseous pollutants as well as dust in work areas and shop-floor environment and consisting of: Sampling pump with rechargeable batteries, detachable ice tray, two glass impingers, two sampling heads for 25mm dia. filters, a battery charger and a digital timer. Extra SPARES & CONSUMABLES (OPTIONAL) Whatman GF/A Grade Glass Microfibre filters 25 mm diameter in a sealed packet of 100 discs for Measurement of particulates. Millipore Filter Type AA pore size : 0.8 mm, 25mm Diameter in a sealed packet of 100 discs for measurement of asbestos fiber. A Chemical Kit of containing essential chemicals needed for absorption and analysis of gaseous pollutants. Specifications : Suction Pump : Built-in Rotary vane type. Sampling Rate : 0.5 – 1 LPM Timer (Battery Operated) : 3 digit display in

			minutes ; Adjustable from 0 to 12 hrs. Running Time : 1 – 999 Min. Delay Time : 1 – 99 Min. Power Supply : 230+/-10V AC, 50Hz with Battery charger and Rechargeable Batteries(2AH). Operation Time : 10 hours with full charge, with sampling rate of 1 LPM. Charge : 15 hours or less. Sampling Train : Consisting of 2 nos., 35 ml glass impingers kept in ice tray connected with inert Silicone tubing.
6	Ozone analysis	Ozone meter	The instrument should have the following specification. Pocket Colorimeter should have single wavelength 600nm to Programme OZONE with our own chemicals. The instrument should have capability for user-entered calibration. Absorbance Range : 0 to 2.5Abs Lamp : Light Emitting Diode (LED) Detector : Silicon detector Wavelength : 600 ± 2nm Range : Ozone (0.01 to 0.25 mg/L O3—LR and 0.01 to 0.75 mg/L O3-MR) Filter bandwidth : 15nm User-Entered Calibration : Capability to store 2 calibration curve up to 10 standards in the instrument . Sample cell Path length : 1inch and 1cm Compliance : European CE mark Display : LCD, Backlit Power supply : 4AAA batteries Data storage & Recall : 10 most recent data points Enclosure : IP67, waterproof at 1m for 30minutes The standard supply with the instrument should be Ozone reagents of 0.01-0.75 ppm reagents & 4 sample cells, Instruction manual and carrying case
7	Fluoride analysis	Fluoride kit	SPECIFICATION FOR FLUORIDE POCKET COLORIMETER The instrument should have the following specification. Pocket Colorimeter should have single wavelength 580 nm to Programme FLUORIDE with our own chemicals. The instrument should have capability for user-entered calibration. Lamp : Light emitting diode (LED) Detector : Silicon photodiode Photometric precision : ± 0.0015 Abs Filter bandwidth : 15 nm Wavelength : 580 nm Range : 0.1 to 2 mg/L Absorbance range : 0–2.5 Abs Sample cells : 25 mm (10 mL), Optionally

			AccuVac Ampuls 25 mm cells (10-ml mark) Operating condition : 0 to 50 °C (32 to 122 °F); 0 to 90% relative humidity (non condensing) Power supply : Four AAA alkaline batteries; approximate life is 2000 Tests The standard supply with the instrument should be fluoride reagents of 0.1-2.0 ppm & 4 sample cells, Instruction manual and carrying case
8	Nitrate analysis	Nitrate kit	Nitrate, 0.4 to 30.0 mg/L, with reagent set (100 tests), manual, and carrying case Specification The instrument should have the following specification. Pocket Colorimeter should have single wavelength 528 nm to Programme NITRATE with our own chemicals. The instrument should have capability for user-entered calibration. Lamp : Light emitting diode (LED) Detector : Silicon photodiode Photometric precision : ± 0.0015 Abs Filter bandwidth : 15 nm Wavelength : 528 nm Range : 0.4 to 30.0 mg/L NO3- -N Absorbance range : 0–2.5 Abs Dimensions : 3.2 x 6.1 x 15.2 cm (1.25 x 2.4 x 6 inches) Weight : 0.2 kg (0.43 lb) Sample cells : 25 mm (10 mL), AccuVac Ampuls Operating conditions (noncondensing) : 0 to 50 °C (32 to 122 °F); 0 to 90% relative humidity Power supply : Four AAA alkaline batteries; approximate life is 2000 tests The standard supply with the instrument should be reagents for 4 sample cells, Instruction manual and carrying case
9	Residual, Break point, Available chlorine	Titration Kit	Chlorine Amperometric Automatic calculation of analyte concentration Automatic "hands-free" operation Easy to use interface Real-time graphics and graphic print output Automatic archiving of results Titrant calibration Electrode cleaning Greater accuracy and precision than manual titrations.
10	Coagulation and Flocculation test(Jar Test)	Lab Stirrer : Six Paddle Lab Stirrer Flocculator	flocculator should be designed both for optimizing the dosing of coagulants for separating pollutants in wastewater treatment plants thanks to the laboratory results obtained using the so-called Jar Test, and for running toxic substance leaching tests on solid wastes to be sent to the dump. The multiple stirrers with reproducible stirring speeds allow standard conditions for the tests to be adopted, a basic requirement in order to obtain reliable results. The sample being examined can be backlit using a special switch found on the front panel making for easier readings. The instrument has an ergonomic design and the control panel is tilted for easier parameter settings and readings. The rotation speed can be programmed from 10 to

			300 rpm, with 1 rpm intervals and the time remaining can be set to hours or minutes GENERAL FEATURES Construction material: epoxy painted metal structure Number of stirring rods: 4 Stainless steel stirring rods: adjustable in height by a self blocking chuck Back panel: disconnectable lighted DC gear motor Monoselector: same speed for each rod Power: 19 W, Power supply: 115 V or 230 V / 50-60 Hz Weight: 13 kg (28.6 lb) PERFORMANCES Electronic speed control: from 10 to 300 rpm, Speed setting interval: 1 rpm, Microprocessor controlled timer: 0 ÷999 min or 0 ÷99 hours (or continuous)
11	Field sampling & analysis	Complete Water Quality Lab	Portable Spectrophotometer along with the reagents and apparatus necessary to run approximately 100 tests* on 20 different parameters. Two test kit cases are included. One case holds the instrument and accessories, and the other case holds reagents and testing apparatus. The instrument case has additional storage space for adding optional pH meter, Portable Turbidimeter, and 2 probes. Case size (both cases): 21" x 11.5" x 11" (W x D x H) Detailed Description Complete Water Quality Laboratory contains: (1) DR 2800 portable spectrophotometer (1) Lithium Ion Battery (1) Instrument Case and accessories, probe holder and stand. Has additional storage space for adding optional pH meter, portable turbidimeter, and 2 probes. Foam insert for protecting instrument Case size: 21" x 11.5" x 11" (W x D x H) (1) Reagent/ Apparatus Case Holds Reagent Set and Apparatus Set Case size: 21" x 11.5" x 11" (W x D x H) Apparatus Set Includes: Reagent Set Reagents for running approximately 100 tests* on 20 different parameters
12	Standard plate count test MPN, Sterilizing equipments and samples, Total coliform Test	Digital Colony Counter (Elect.)	Magnifying lens: 100 mm diameter with glare-free illumination with adjustable position Automatic digital display (minimum 3 digits) with facility to manually reset. Power supply: 220±10 volts / 50±5% HZ AC Should be complete with ON/OFF switch, probe for counting, power cable with plug suitable to work on
		Microbiological Test Kit For Total *Coliform* And *E. Coli* (MEL/MPN)	SPECIFICATION: Portable Bacteriological Kit to be used with most probable number technique for enumeration of Total Coliform and E.Coli. Should be supplied with prepared media (USEPA approved) LAURYL TRYPTOSE, BRILLIANT GREEN TUBES, EC MEDIUM MPN TUBES and EC/MUG W/O DURHAM TUBES (for 200 tests) for enumeration of microorganisms

			in field within 24 hours. Total Coliform and E. Coli Laboratory should Includes Portable Incubator, portable UV lamp, and consumables for 200 tests. The Lab should includes: - Step-by-step, illustrated procedures manual. - Portable Incubator (Battery not included. May be powered from automabile cigarette lighter receptacle.) - MPN Tube Rack for 39 tubes. - Portable long-wave UV lamp for E. coli detection. - 25 Whirl-Pak Bags with de-chlorinating agent for sampling. - 50 pre-sterilized 10-mL pipets and a pipet bulb. - 50 pre-sterilized inoculating loops. - Armored alcohol thermometer, -10 to 110°C. - Five germicidal cloths for disinfecting test surfaces. Portable bacterial incubator for field use in Microbiological Environmental Laboratories (MELs). The Portable Incubator maintains temperature within ± 0.5°C and the incubation temperature is adjustable between 30 and 50°C. Ideally suited for total coliform, fecal coliform and *E. coli* testing. The instrument power cord easily plugs into an automobile cigarette lighter. For remote field use, a 12Vdc portable battery is available. The portable battery should be rechargeable and includes recharger and nylon carrying case. Incubator Specifications – - Ambient Operating Temperature: 0 to 40°C - Storage Temp: –40 to 60°C (instrument only) - Temp Stability: ± 0.5°C - Temp Range: Five degrees above ambient to 50°C - Warm-up Time: 2 ± 1 hour - Capacity: 42—50-mm petri dishes *or* 40—MPN tubes (19 mm OD) *or* 6—P/A Disposable Bottles - Power Requirements: 12 Vdc or optional battery eliminator - External Dimensions: 30.5 x 30.5 x 25 cm (12 x 12 x 10") - Internal Dimensions: 20 x 20 x 15 cm (8 x 8 x 6") Instrument Weight: 1.8 kg (4 lb)
		Horizontal Laminar Flow Cabinet	Construction: cabinet should be made up of stainless steel 304grade • Work Area: 120cms x 60cms x 60cms Principle: Double filtration of Air 24Filters Pre-filter and HEPA filters with at least 99.97%

			efficiency for particulates of 0.3 micron or large size on all the sides. DOP tested for leaks and certified. • Air flow: 90 FPM (feet per minute) • Noise : less than 65 db on 'A' scale at work area • Light level: Normal working fluorescent light. The intensity should exceed 100 feet candles at work area • Vibration : 0.0001- inch average displacement of work table • Blower: Dynamically balanced and with at least 0.25 HP electric motor operating on 220 ±10 volts / 50 ±5% HZ AC power supply. • Housing : Wood-melamine or equivalent • Work Top: Stainless Steel (SS 304), Accessories : Ultra Violet light, static, pressure inclined manometer, - Air / Vacuum petcock and burner. The HEPA filter and manometer should be calibrated from NABL accredited calibration laboratory. The calibration certificate should also be provided.
13	Incubation	Incubator	Culture, Low-Profile, 230V Precise microprocessor control, triple wall construction, layered insulation contribute to temperature uniformity. Five heating elements ensure uniform heat-no hot spots. Set point, chamber temperature appear on digital display. Chamber volume 189 liters (6.7 CFT). Exterior 76 x 76 x 81 cm (30 x 30 x 32"), interior 65 x 65 x 51 cm (24 x 24 x 20"). Temperature range 5°C above ambient to 70°C, uniformity ± 0.25 at 37°C. CSA-approved. Accuracy is ± .1°C 220/240 Vac, 50/60 Hz, 650 watts
14	Oil and grease analysis	Oil& Grease Analyser	– (As per USEPA approved Method) KIT STARTER W/O SR, EPA 1664A. Necessary Accessories:- a) SPE SOLVENT RECOVERY KIT - b) Consumables Kit for EPA Method 1664A Testing Consumables kit includes: - SPE Filters, 47mm diameter - 24 Transfer Pipets, 15 mL capacity per pipet - 24 Inline Columns with Sodium Sulfate, 10g per column c) SUPPORT, BASE & ROD: Cast iron, white enamel base provides favorable background For observing end points. Also acts as a steady support for buret. Base is 178 x 330 mm (7 x 13") furnished with a 13 x 610 mm (0.5 x 24") aluminum rod with a threaded nut. Humboldt. d) Clamp, Two-Prong, Swivel Perfect for cylinder shaped glassware. Swivel feature allows for complete circular adjustments. Clamp complete with both Slip-on vinyl and fiberglass grip sleeves. Length 5 - 7/16" (138 mm). Open diameter is 3" (77 mm). e) Clamp Holder For rods or pipes between 1.1 and 2.2 cm (0.43 to 0.87") diameter in any type of right-angle clamp

			setup (horizontal or vertical). Comes with two 45° angle ribbed thumb screws.
15	Determine the Humidity, air & soil temperature, soil moisture, pressure, Rainfall, sunshine in the atmosphere as well inside a building	Automatic Weather Monitoring System	Data Acquisition/ Data logging System Should have following features: •Robust, Stand alone, low power data logger with USB memory stick support •18 bit resolution and built in display • Easy Configurable Windows Based Software • Stand Alone & Real Time Data Acquisition • Remote Monitoring & Control • Removable Terminal Base Assembly • User definable memory allocation & mode System • LCD display with 2 line 16 characters with back light • Operating Temperature range : -45 DegC to 70 DegC • Display functions – channel data, alarms and system status • Key pad for function execution • Real Time Clock : resolution 200 µs accuracy +/- 1 min /year • Power supply – 10 to 30 Vdc facility to connect additional power source to system. • 5W power consumption, 6V (1.2AHr) lead acid internal battery with 21 days of operating capacity with I hour sampling • Powder coated Zinc and anodized aluminum • Weight should not be more than 1.5 Kg •Inbuilt signal conditioning for various parameter i.e. voltage, current, temperature (TC,RTDs , Thermistors, etc.) and various IC sensor Analog Inputs • 5 -15 number of analog channels • Can be measures voltage, current, resistance and frequency • Resolution upto 0.25 µV and 2.5 nA, 1.5 mΩ. • Accuracy 0.1% • There should be isolation between the inputs • Input impedance > 100 MΩ programmable • Sampling Resolution 18 bit • Linearity 0.01 % • Facility to upgrade the number of channels Digital Channels • 12 Flexible Digital channels • 8 Bi-directional channels for state & count input and state output • Digital Input Type : 8 logic level measures state or low speed count • Digital Output type : 4 with open drain FET • 4 dedicated counters or 2 phase encoders • 4 SDI – 12 inputs, shared with digital channels

			• 2 channels available and programmable for data to be logged from smart sensors with Host and Dedicated port. •Alarms with high, low, within range and outside range conditions, delays can be provided. Communication Interfaces • Ethernet, RS 232, USB, Web Server, Modbus server (Slave) •Capability of wireless communication with GSM, PSTN modems an over the internet. Memory • Internal storage capacity should be 128 MB i.e. 100,00,000 data points •Should be compatible with USB 1.1 and USB 2.0 derives i.e. Flash drive (capacity 90,000 data points per mega bytes) •Scheduling of Data Acquisition – number of schedules is up to 11 with schedule rates of 10 ms to days. AUTOMATIC WEATHER STATION SHOULD HAVE FOLLOWING SENSOR SPECIFICATIONS: 1.WIND DIRECTION Sensor : Wind vane coupled to a linear endless Potentiometer Range : 0 to 359 degrees from North Accuracy : + 3 degrees. Linearity : With in the accuracy limit Output : 0 to 5 K ohms resistance corresponding to the range option of 0 to 1 Volt or 0 to 2.5 Volts for the range Power input : 5 to 12 Volts depending on the users requirement. Termination : On a 4/5pin MS connector (including Anemometer). 2. WIND SPEED Sensor : 3 cup rotor coupled to a chopper and IR emitter/detector circuit. Range : Wind speed 0 to 60 Meters /sec Accuracy : + 2% of full scale Starting Threshold : 0.3 Meters /sec Linearity : With in the accuracy limits. Output : TTL level pulses frequency proportional to W .Speed. Approx. 15 Hz/ Mtr/sec Option – Voltage output 0 - 1 V or 0 – 2.5V for 0 to 60 Meters /sec 3. RAINFALL SENSOR Sensor : Tipping bucket rain gauge. Sensing : Magnet and reed switch (on-off output). Resolution : 0.5mm. Accuracy : better than + 5% Operating Temperature : -40˚C to +50˚C. with built in heater (optional)

			Rim diameter : 203mm. Collecting area : 325 mm². Capacity : Unlimited. Sensitivity : 0.5 mm or, 0.2 mm (rainfall per pulse) 4. SUN SHINE SENSOR Sensing : Sensitive silicon cell. Sensing type : Chopper Range : 0 to 17 Hrs. Accuracy : ± 1 Minute Power requirement : + 12 volts DC. (40 ma) Size of body : 180(H) x 150 mm diameter 5. SOIL TEMPERATURE SENSOR Range : - 40˚C to +60 ˚C Accuracy : + 0.1 ˚C Resolution : 0.01 ˚C Sensor type : Resistance type (PT 1000) Response time : < 10 sec Out put : Resistance proportional to temp (non linear) Construction : SS 316 Body 6. AIR TEMPERATURE SENSOR Sensing : Standard Platinum RTD element (PT1000 or PT100 mounted inside a weather shield Range : - 40 degrees to + 60 degrees Celsius. Resolution : 0.1 ˚C. Accuracy : + 0.2 ˚C Output : Resistance Weather Shield : Weather shield coated with weather proof reflective white paint. Size of body : 320(H) x 90 mm diameter (with weather shield). Housing : Nylon body with weather shield and brass stem to mount the sensor. The sensor is fitted with a three pin MS connector for easy removal. 7. HUMIDITY SENSOR Sensing : Solid state capacity type sensor. Resolution : 0.1%. Range : 0 to 100 % operating at -40˚C to +50˚C Accuracy : ± 3% of full scale reading. Operating Temperature : -40˚C to +50˚C Power requirement : + 5 volts DC. Power consumption :~4mA. Output : 0- 1V for 0 to 100% humidity Weather Shield : Weather shield with weather proof reflective white paint coating. Size of body : 250 (H) x 90 mm diameter. (With weather shield). 8. SOIL MOISTURE SENSOR Range : 10 to 200 Centibars suction

			Sensor type : Solid state Resolution : 10 centibar suction Power supply : + 5V /120 Hz voltage. output : 120 Hz voltage proportional to soil moisture. 9. ATMOSPHERIC PRESSURE SENSOR Range : 600 to 1100 hpa Resolution : 0.1 hpa (milli bar) Accuracy : + 0.2 hpa. Sensor Type : Solid State Response Time : 10 sec or better
16	Analysis of SO2 & NOx	Gaseous Pollutants Sampler	TECHNICAL SPECIFICATION (i)Absorbers Provided : 4 Nos. of 35ml borosilicate glass impingers as per BIS 5182 (Part 6) 2006 and 2 fritted disc impingers. (ii) Sampling Rate of each Impinger : 0.3 -3.0 lpm measured using acrylic body rotameter (iii) Sampling Train : A Manifold having Four inlets and one out let manifold with built in needle valves for flow control of each inlet (iv) Sampling Time : 28 hours (maximum) (v) Sampling Time Record : 0 to 9999.99 Hrs. (vi)Automatic Sampling Control : 24 hr programmable timer to automatically shut off the system after preset interval. (vii) Power Requirement : Nominal 220v, single phase 50 Hz AC
17	Suspended Particulate Monitoring	Respirable Dust Sampler	With almost noiseless imported brushless blower. Optional Items Attachment for Gaseous Sampling OR Thermo Electrically Cooled Gaseous Sampling Attachment for controlling temperature 10-15ºC automatically Extra Spares & Consumables (Optional) GF/A Filter papers 8"x10" size Whatman make in Sealed packet of 100 sheets. Spare Glass Impinger 35 ml. Cap. A Kit of containing essential reagents needed for absorption and analysis of gaseous pollutants. Specifications Flow Rate 0.9 – 1.4 m3 /min free flow Particle Size Particles of 10 microns & below collected on Filter Paper holder. SPM bigger than 10 microns collected in a separate sampling bottle under the cyclone. Sampling Time 28 hours (maximum) Sampling Time Record 0 to 9999.99 hrs. recorded on a Time Totalizer. Automatic Sampling 24 hrs programmable timer to automatically shut off the system after pre set time interval. Power Requirement Nominal 220 V, Single Phase, 50Hz AC mains supply. Size & Weight 430 x 320 x 930mm., 45Kg
18	Stack Monitoring	Stack monitoring kit	EQUIPMENT TO MONITOR STACK EMISSIONS: Stack Sampler VSS1 Consisting of: (a)Instrument Panel with integrated Ice Tray Assembly having 4 glass impingers (b) Probe Set & Set of interconnection Hose Pipes

			(c) Vacuum Pump Assembly Stack Sampler VSS3 (Equipment specially to monitor Dioxins & Furan emissions) with Normal Stack Monitoring facilities like PM, Sox, NOx etc. Consisting of:(a) Instrument Panel with integrated Ice Tray Assembly (b)Glass Impingers (c) Probe Set & Set of interconnection Hose Pipes (d) Oil Free Vacuum Pump Assembly (e) Heating Probe & box assembly with auto temperature controller (f) Teflon/glass lining inside the nozzle, thimble holder & probe pipe (g) Cold Box Assembly with 4 Glass Impingers (h) Probe Pipe, Thimble Holder Assembly, Set of 3 Nozzles for normal stack etc. NOTE: Demonstration of equipment on Stack will be provided on demand as complimentary. Consumables:Vacuum Pump Assembly 100 LPM Free Flow CAP (MONOBLOC TYPE)-VSS1 / VSS3Heated Probe system suitable for use in high moisture conditions Fluorine Kit Differential Density Manometer Assembly Cyclone Assembly Glass NOX Collection Assembly Chemical Kit VCK2 for Sampling and Analysis Cnsisting of Chemicals for sampling SOx and NOx,Tools, essential accessories and standard methods) for SOURCE EMISSION MONITORING - approximately 80 Monitorings Dry Gas Meter upto 40 LPM Dry Gas Meter upto 100 LPM Extension Vacuum Hose Pipe metal braided 10mtr. long Carbon Monoxide Bottle Filtration thimbles Whatman make in a sealed packet of 25 thimbles: (i) Cellulose, size 28 x 100mm, (suitable up to 150oC) (ii) Glass microfibre, size 19 x 90mm (suitable up to 500oC) Glass Impinger 240 ml. capacity (SPM) PVC end Glass Impinger 120 ml. capacity PVC end Glass Impinger 120 ml. capacity (Silicagel) PVC end
19	Respirable dust sampling	Fine Particulate Sampler	Based on designs standardised by US-EPA. Gaseous Pollutants Sampler A thermo electrically cooled compact sampler fitted with suction pump, time totalizer and timer suitable for sampling of SO2, NO2, Cl2, H2S, NH3 & HCHO etc DESIRABLE ACCESSORIES, SPARES & CONSUMABLES (OPTIONAL) PTFE filter with identification number for each filter, Whatman Make, Pore Size 2µm, dia 46.2mm with PP ring supported. Suitable for monitoring of Pm 2.5 dust. sealed packet of 50 discs 37mm dia GF/A Filter paper, Nupore make, for WINS Impactor in a sealed packet of

			50 discs. Filter carrier with cover Silicone Oil for 'WINS' Impactor in 100ml bottle. Specifications : • Particle Size : Omni-directional air inlet with PM 10 separation through an impactor followed by PM 2.5 separation through a WINS Impactor. • Sampling rate : Constant sampling rate of 1m3/hr unaffected by voltage fluctuation and filter choking maintained by critical orifice system. • Filter Media : Filter holder designed to accept any standard 47 mm diameter filter media. • Sample Volume : Dry Gas meter records the total air volume sampled. • Power Requirement : Single phase AC 220 Volts, 50 Hertz supply. Sampler unaffected by +/- 10% fluctuation in supply voltage
20	Ph, Conductivity, Dissolved Oxygen	Multi-Parameter	SPECIFICATION- A single meter should have facility to measure multiparameter of pH, mV, Temperature, Conductivity , TDS, salinity, resistivity, LDO& ORP with the following features: •Dual Input – 2 parameter's measurement simultaneously using 2 different probes(any two pH, Conductivity, LDO,ORP at once) •Dual Display –View information of two parameters simultaneously on one screen at once with calibration status. •Calibration history stored in intelli CAL probes •Changing Probe facility without re-calibration •Meter should recognize probe's (pH, Conductivity, LDO,ORP) automatically •Data Storage: GLP/ISO compliant reading data stored & transfer facility to PC or printer with calibration details. •Data Memory: 500 points, Electrode Specifications: Auto calibrated Rugged Probe Specification's of pH, Conductivity, Dissolved Oxygen & ORP are must be as follows: Features: •Move probes between meters without the need to re-calibrate, Super tough, stainless steel body and polymer sensor shroud •Reinforced, steel sheathed cables-durable yet manageable •Waterproof to 30 meters for 24 hours (IP68) •Unbreakable, locking connectors-color-coded for easy identification of parameter •Choice of cable lengths-5, 10, 15, or 30 meters •Track performance with calibration history •Probe alerts when re-calibration is needed •Useful in harsh environmental conditions. •Ultimate traceability-easily obtain: Time and Date stamp, Operator and Sample ID - Calibration history, Parameter Reading PH: Range : 0 to 14 pH, Resolution : 0.1/0.01/0.001 selectable Temp: Range : -10.0 to 110.0 deg C Resolution : 0.1 deg Conductivity: Range : 0.01 uS/cm to 200 mS/cm Resolution : 0.01 uS/cm (5 digits, maximum) Resistivity: Range : 2.5 ohm.cm to 49 Mohm.cm

			Resolution : 0.1 ohm (5 digits, maximum) SalinityRange : 0 to 42 g/kg or % Resolution : 0.01 ppt TDS Range : 0.0 to 50.0 mg/L Resolution : 0.1 mg/L LDO Range : 0.00 to 20.00 mg/L (0 to 200%) Resolution : 0.01 mg/L ORP (mV) : Range : +/-1200 mV Resolution : 0.1 mV Cable length : 1 meter of each probe of pH, Conductivity ,LDO & ORP. Power Requirements: 4 AA batteries alongwith 220 V,AC line power . Buffer Recognition: Auto; 4.01, 6.86, 7.00, 10.01 Display: LCD with Backlight Data Storage GLP/ISO compliant reading data stored with calibration details. Calibration details and check standard readings documented as events in log. Automatically store in "press to read" mode and interval measurement mode. Manually store in "continuous read" mode. Data Export Download via USB connection to PC or flash stick. Automatically transfer entire datalog-or as readings are taken. Temperature Correction/Compensation Off, automatic, and manual (correction is parameter dependent) Display Lock Function Continuous measurement or "press to read" mode available with averaging function for LDO measurement. Automatic pH Buffer Recognition Choose from 3 sets: Color-coded: 4, 7, and 10 pH IUPAC: 1.679, 4.005, 7.000, 10.012 DIN: 1.09, 4.65, 9.23
21	Automation Control	Supervision Software: Pilot For Windows	Each supervision software concerning univocally a specific plant operates in Windows and enables: • to control ON–OFF signals, that is controlling pumps, compressors, resistors from a PC • to communicate with the microprocessor PID controller installed on the plant, that is gathering all data coming from the controller and carrying out all the operations being available on instrument display, from a PC • to display the trend of process parameters in real time • to display the historical trend of process variables No card must be inserted into the PC to use this software: just connect the plant with the serial port (COM1 or COM2) of the PC via the serial cable of the equipment.

Annexure : 'C'

Gautam Buddha University

School of Engineering

TECHNICAL SPECIFICATIONS: ADVANCE ENVIRONMENTAL ENGINEERING LABORATORY

S. No.	Name of Experiment	Equipment	Specifications
1	Determine Total Organic Carbon (TOC)	Total Organic Carbon (TOC) Analyser	SPECIFICATION Digital reactor block for COD, TOC, Total Nitrogen, Total Phosphorous, Total Chromium and Sample digestions for use with the metal prep set for determination of Cadmium, Chromium, Copper, Iron, Lead, Nickel, Silver, Zinc etc. • Dual Block: 25 wells. 21 Wells of 16 mm & 4 Wells of 20 mm - Pre-programmed for all standard digestion temperatures (100°C/105°C/150°C) And all TOC, UniCell, TNT tests which require digestion. - Temperature stability better than ± 1°C. - Fully insulated heater block (no skin contact) - Separate locking and transparent protective lids - Temperature safeguard to prevent overheating - High flexibility via customer programmable reactions - Two separately controlled heating blocks for simultaneous digestion at different/ identical temperatures and different/identical time Digital countdown timer with automatic shut off and alarm signal. - Adjustable temperature setting (35°C to 165°C in 1°C steps). - Adjustable Time setting 1 to 480 minutes (8 hours)) - Up to 3 customer specific digestion/reaction storable applications - Power supply: 230V Reagent for TOC analysis: TOC LR range- (0.3-20) ppm TOC MR range- (15-150 ppm) **TOC HR range- (100-700 ppm)**
		Reagent Set	Mid Range,50/test Total Organic Carbon (TOC) Reagent Set, Mid Range Test 'N Tube(TM) includes: Acid Digestion Solution Vials, High Range TOC, Buffer Solution (Sulfate), Micro Funnel, Indicator Ampules (High Range TOC), TOC Persulfate Powder Pillows Method: Direct Range: up to 150.0 mg/L C 50/test OR Total Organic Carbon (TOC) Reagent Set, High Range, 100-700 mg/L, 50/test Total Organic Carbon (TOC) Reagent Set, High Range, Test 'N Tube(TM) includes: Acid Digestion Solution Vials (High Range TOC), Buffer Solution (Sulfate), Micro Funnel, Indicator Ampules (High Range TOC), TOC Persulfate Powder Pillows Method: Direct Range: up to 700.0 mg/L C 50/test
2	Flow Rate &	Ultrasonic	Ultra sonic Flow Meter should be compact and to be supplied

	Velocity Measurement	Flow Meter	with complete controller ,display system along with sensor & cable must having following features & specifications : i) Display Specifications: Display : Graphic dot matrix LCD, 128 x 64 pixels with LED backlighting; 1/2 inch main Character height ; 1/8 inch (3 mm) auxiliary information character height; menu screens contain up to six text lines Measurement Modes : Weirs: V notch, Rectangular, Cipolletti Flumes: Rectangular, V-notch weir, Round bottom flume, Khafagi flume, Rectangular weir, Neyrpic flume, Leopold-Lagco flume, Cipolletti weir, Parshall flume, H Type flume, Rectangular flume, Pa lmer-Bowlus flume, Trapezoidal flume. Operation Temp.: -4 to +140°F (-20 to +60°C); 0 to 95% relative humidity, non- condensing Storage temp: -22 to +158°F (-30 to +70°C); 0 to 95% relative humidity, non-condensing Relays (four): Types/Outputs: Electromechanical relays; SPDT (Form C) contacts; U.L. rated 5A 115/230 VAC, 5A @ 30 VDC resist, Operational Mode: Each relay (A, B, C, D) can be set to be driven by the measured flow, depth or volume (resettable) ii) Sensor Specifications: Alarm: Settings for low alarm pt., low alarm pt. deadband, high alarm pt., high alarm pt. deadband, off delay, and on delay Control : Settings for high/low phasing, setpoint, deadband, off delay, and on delay Penstock: Settings for high/low phasing, off delay, and on delay Flow Pulse: Relay provides a fixed 0.5 second contact closure pulse output each time a user-set volume is reached Indicators: Relay annunciators (A, B, C, and D) indicate respective relay on/off status Temperature Compensation:Automatic from -40 to +176°F (-40 to +80°C)Sensor-to-Analyzer Distance: 328 ft. (100 m) maximum Calibration Methods: Cal Depth 1 Point: Enter known water depth Cal Depth 2 Point: Enter known sensor range (distance from sensor to water level) and known water depth Analog Outputs (two): Isolated 0/4-20 mA outputs; each with 0.004 mA (12-bit) resolution and capability to drive up to 600 ohm loads; each output can be assigned to represent the measured flow, depth, or volume (resettable) Communication Port: RS-232: Enables configuration and retrieval of measured data for one analyzer using IBM-compatible PC and GLI optional software tool kit, Memory Backup (non-volatile) All user settings are retained indefinitely in memory (EEPROM) Analyzer Performance (Electrical, Analog Outputs): Accuracy: 0.5% of span Sensitivity: 0.1% of span Repeatability: 0.1% of span Response Time: Less than 180 seconds to 90% of value upon step change
3	TKN determination	Kheldhal Nitrogen Unit	a) Distillation Unit 230 V / 50-60 Hz The model is able to house 6 test tubes of 250 ml with the diameter of 42 mm. The digester of a aluminum heating block, with a maximum working temperature of 450°C. The block's temperature is controlled by dedicated microprocessor electronics. The temperature probe does not require calibration since the electronic automatic calibrates the device every time is turned on. The data referring to the tests being run can be sent to a printer or PC for storage, should be combined with a proper aspiration pump and fumes neutralization system. Use of the digester in combination with the JP pump and the SMS scrubber unit.
		SMS Scrubber	Optional: The system in the configuration consisting of two stages:

			- condensation - neutralization The instrument with a third (optional) stage, generally used with samples that generate high amounts of fumes during digestion (e.g. soybean). The unit a broad range of applications, from the Kjeldahl method to neutralization with acids and bases. contact between gas and liquid, the SMS provide effective cleaning of the fumes, preventing their hazardous emission into the laboratory and environment
		Distillation Unit	132 230V / 50-60Hz, Determining ammonical nitrogen, protein nitrogen, (Kjeldahl or direct alkaline distillation), nitric nitrogen (after reduction), phenols, volatile fatty acids, cyanides, alcohol content, etc. according to official procedures. Distillation unit equipped with automation of the various operational phases, with high reliability and safety characteristics. The supply water should feed automatically stopped during pauses. The instrument equipped with a system that recognizes when the sliding protection is not closed, when there is not enough cooling water and when the test tube is present, without which the instrument does not start operation. Use of system should allow various sizes of test tubes to be used and 500 ml Kjeldahl flasks to be housed. 10 customizable methods for the most significant distillation parameters, and access to the programming menus in 5 different languages is simple and intuitive. In conformity with the G.L.P. (Good Laboratory Practices), the instrument can be connected to a printer or PC so the data concerning the tests in progress can be printed or stored.
		Recirculating Water Pump for fumes aspiration	i) 230 V / 50 Hz Recirculating water pump that lets two different timed modes for the DK6 or DK20 digesters to be selected. This ensures optimum aspiration depending on the digestion phases and the number of samples in the digester connected the pump. Lack of adequate water mains pressure or its high consumption frequently prevent common water pumps from being used. The unit developed by VELP consists of a ABS structure highly resistant to chemical corrosion and a tank where the water introduced is recirculated continuously, offering considerable savings on water. The type and quality of the materials make the instrument extremely quiet and long-lasting, and guarantee a high flow rate (up to 35 l/min). Special technical devices, such as the level tank for checking the water, the cock for emptying the tank and two convenient handles for handling, help the laboratory technician during use. Combined with the special Velp SMS Scrubber, it provides the ideal complement to achieve highly effective fumes neutralization developed during acid digestions.
4	Determination of Hardness (Total, Permanent, Temporary), Acidity , Alkalinity, Volatile Fatty Acid in water & wastewater	Titration Workstations	- End point titration: 1 to 2 preset end points. - Inflection point titration: Auto determination of 1 to 4 inflection points, programmable IP acceptation windows. - IP detection using 1st & 2nd derivative curve. - Titration stops at: pH, mV, ml, IP number. - Titrant addition techniques: incremental dynamic, incremental monotonic and continuous dynamic. - Titrant calibration. - pH electrode calibration: up to 5 points using IUPAC standards or 4-7-10 Series buffers with error recognition. - Direct pH/mV measurements: with recording on stable reading. - Back titration with manual or automatic reagent addition. - Sequencing of up to 3 consecutive methods within a sample changer series. - Coupling of 2 methods in one beaker. Measuring ranges

			Resolution -9 to 23 pH 0.001 pH ±2000mV 0.1mV -10°C to +100°C 0.1°C Printout Automatic. GLP compliant. Selectable: no, 80 columns. 3 levels of detail defined by method. Printed data can be sent as a single character string for LIMS connection. Results In each method, calculation of up to 4 results and 1 user-defined equation. Statistical calculations. Optional result recalculation in case of sample quantity modification before archiving. Units All standard units for samples/results. User-defined result units. Storage capacity Global password protection for programming access. Non-volatile memory. User programmable: 10 methods. Libraries for 15 electrodes and 15 reagents: more than 30 electrodes and 20 titrants preidentified (ID and type) to help programming. Storage of last 60 results, last electrode and last reagent calibration for each library. Stored parameters characterised by own ID, location and calibration data. Embedded operating procedures for reagent exchange and burette operations. Sample list Up to 20 data with alphanumeric ID. Electrode stand – stirring Magnetic stirrer, 22 reproducible speeds (0 to 1100 rpm) in 50 rpm steps. Propeller connection. Beaker volume: 5 to 400 ml. Burette 1 or 2 embedded burette stands. Burette volumes available: 1, 5, 10, 25, 50 ml. Delivered with 25 ml burette. Burette motor: 18000 steps. Complies with ISO 8655-3. UV-protected encapsulated glass syringe. Embedded operating procedures for burette exchange, air bubble removal (Flush). Fill, Empty functions. Inputs/outputs 1 indicator and 1 reference electrode input. Selectable polarised input from -1 mA to 1 mA in 1 µA steps, DC or AC. Differential input for a third platinum electrode. Temperature input. 0-5 V TTL output. Serial connections: printer, balance, additional titrator, PC with TitraMaster 85 Data Collector software and SAC80 Sample Changer fitted with 10 to 20-position tray. PS/2 port: PC keyboard, barcode reader. Languages English, German, Danish, French, Italian, Spanish and Swedish. General specifications Fully splashproof chemical resistant lathene. Graphic 128x128 dot LCD protected from spillages with TPX cover. Rubber soft touch alphanumeric keypad. Dimensions (H x W x D) and Weight: 380 x 230 x 450 mm (excl. tubing). 5 kg (excluding reagent bottles). CE marking: Complies with EMC directive 89/336/EEC and LV directive 73/23/EEC. Power requirements: 47.5 – 63 Hz, 115/230 Vac +15 -18%. Environmental conditions: 5 to 40°C ambient temperature. 20 to 80% relative humidity. Titrator, monoburette or pH/EP/IP Titrator, biburette with full set of connecting cables, cell accessories and one or two 25 ml burette(s). Also available without burette for use with one of the following volumes: 1, 5, 10, 25 & 50 ml. comply with ISO 9001 and ISO 17025 requirements, supply calibration and verification certificates. pH and conductivity standards with certificates of traceability and conformity.Technical Specifications Radiometer Analytical SAS • France • Technique-based Acid/base titration in aqueous or non-aqueous media Complexometric titrations Argentimetric titration (halides and silver) Redox titration (zero and imposed current) Dedicated

			Water hardness, calcium and magnesium determination TAN and TBN, bromine number and bromine index according to ISO and ASTM Hydrogen sulphide and mercaptans according to ASTM Peroxide number in edible fats and oils Chloride in milk, butter and other dairy products Ascorbic acid determination in food and beverages
5	Anions & Cations determination	Ion Chromatograph	Ion Chromatography System with accessories for the analysis of the following: •Anions like Chloride, Fluoride,Sulphite, Sulphate, Phosphate, etc. •Cations like Sodium, Potassium, Lithium, Calcium, Magnesium etc. •Transition & heavy metals like Copper, Iron, Zinc, Chromium, Nickel, Cobalt, Magnese, Arsenic etc. The system should comprise of the following: Solvent Delivery System (Pump) : Quartenary gradient Pump/ Ternary gradient pump capable of mixing and delivering upto four/three solvents in different propotions as per requirement. The pump should have the following minimum specifications: - Flow rate Range : 0.001 – 10.00 ml/min Flow rate accuracy : < ± 0.2 Pressure Range : 100-5000 psi Pressure Pulsation/Ripples : 1% or less Gradient Proportioning Accuracy : 1% or less Gradient proportioning precision : 1% or less Gradient Types : Linear, Convex, Concave Seal wash : On-line automatic Flow Precision : ±0.1% at 1ml/min. or better Number of solvents : 3/4 solvents Vacuum degasser : Built in Chromatography Enclosure: It should be able to accommodate different accessories such as Injector, Columns, Suppressors, Detector Electronics etc. COLUMNS (i)Columns for analysis of Cations such as Sodium, Potassium, Lithium, Calcium, Magnesium etc. in ppb range. (ii)Columns for analysis of Anions such as Chloride,Fluoride,Sulphite,Sulphate, Phosphate, etc. in ppb range. (iii)Column for analysis of Transition & heavy metals like Copper, Iron, Zinc, Chromium, Nickel, Cobalt, Magnese, Arsenic etc. in ppb range. The column should be able to separate and detect different species of the elements like CrIII / CrVI , AS3 / ASv , Fe+2 / Fe+3 & etc. (iv)Columns for analysis for Cyanide, sulphide, , Sugars, Amino acids etc. Advanced electrolytic Suppressor for Isocratic and Gradient applications- 1No. (For enhancing analyte conductivity and reducing background Conductivity) The suppressor should be electrolytic suppressor. It should be capable of generating the required ions for regeneration by electrolysis of water. Detectors: Conductivity Detector - 1 No. (for Cations & Anion analysis in ppb range) Range : 0.01 - 10000µs or more Resolution : 0.10 ns, Noise S/N Ratio : 200,000 : 1 or higher Cell Temp. stability : <0.005 ºC

			UV-Visible Detector - 1No (for analysis of transition metals in ppb range) Light source : Deuterium & Tungsten Lamp Wavelength Range : 190-900 nm or higher Bandwidth : 6 nm or less Wavelength accuracy : ±1 nm Advanced Electrochemical detector/ Avanced Bioscan detector- 1No. (For analysis of Cyanide, Sulphide, Iodide and Biomolecules such as sugars, Aminoacids etc. The Electrochemical Detector must have the following two modes of operation: i) Pulse amperometry mode ii) DC amperometry mode CHROMATOGRAPHY SOFTWARE- 1No. It should be capable of controlling compete system including Chromatography accessories Software should be capable to compatible with the windows XP/7.0 systems. It should be able to do automatic evaluation of Chromatograms, It should be able to do flexible reporting as for complete chromatography information Note: The system should be quoted with all the necessary solvents, reagents, standards, consummables etc., needed for the above analysis for a minimum of 1000 samples or 2years o
6	Analysis of heavy metals viz. Cu, Cr, Cr+6, K, Mn, Zn, As, Sr, Ca	Atomic Absorption Spectrophoto meter	OPTICS The system should be True Double Beam with quartz over coating on mirrors and sealed against dust and vapour. System should be controlled through inbuilt/ external computer. Monochromator: Ebert-Fastie or equivalent design grating monochromator with 1800 lines /mm focal length >300 mm. Wavelength Range: Wavelength range from 185-900nm with Automatic wavelength selection and peaking. Slit Width:Variable slits width from 0.1 to 2 nm with option 0.1, 0.2, 0.5, 0.7, 1 & 2nm. Automatic setting of slit width and height and reduced slit height for furnace operation. Preference will be given to continuously variable slit width. Application source / Turret : The system should have provision for mounting six (6) element in a single source / in a turret with automatic element selection. Background Correction: Background correction should take 100 to 200 sample reading per second for correcting fast background peaks. Flame Control: Automatic Gas control box with Automatic setting of flame and gas flows from stored conditions, automatic change of flame conditions during automatic multi element operation. Flame atomization systems System should be design with solid inert polymer mixing chamber. All titanium burner instruction, the nebulizer must have a platinum iridium capillary and tantalum venturi for resistance to acid attack.. Performance Guarantee : System must have performance guarantee > 0.8 abs of 5ppm Cu with RSD < 0.5% List of Elements : Plz. Specify Accessories: The system should be quoted along with accessories like air compressor, acetylene gas cylinder & regulator, nitrous oxide gas cylinder with regulator, Argon Gas Cylinder with regulator, fume hood, computer & printer etc. The system should be fully upgradeable and functional with Graphite Furnace & Auto Sampler in near future and supplier must have supplied at least 10 system along with Graphite Furnace & Auto Sampler with documentary proof. Hydride Generator: The system should be used for the trace elemental analyses of hydride foaming elements like As, Se, Bi, Ge, Sb & Hg, Mercury trapping accessory to enable ppt analysis

			of mercury. Graphite Furnace & Auto-sampler: The system should include graphite tubes mounted in enclosure with quartz windows. Temperature range from ambient to 3000 degree C, maximum heating rate 2000 degree C / Second, 20 number of steps. Auto-sampler should accommodate 40 samples & 10 pre-mixed standard and one stock solution for automatic mixing up to 10 standards. The system must be supplied along with suitable water circulator. Argon Gas Cylinder with regulator is also required
7	Phenols , catecols	Gas Chromatograph	SPECIFICATION :A microprocessor-controlled gas chromatograph system with a built-in EPC or PPC or EFC pneumatic control capability, GC for FAME /Pesticide analysis from food samples and it should be fully controlled from s/w and from instrument's screen/panel preferable touch screen graphical user interface. System should have facility for three injectors and three detectors simultaneous operation facility. Oven: •Minimum Twenty one level, Twenty-ramps and max temp 450°C with 120 °C/min ramp rate. •At least twenty methods storage facility. •Up to three simultaneous analog outputs for integrator or recorder, switchable to either detector. •Electronic Flow control read outs with capillary injectors. •External computer communications allows full instrument control plus three simultaneous channels of raw data. Three Injectors with Electronic Flow control pneumatic at least 150 psi suitable for 0.1, 0.5,020,0.05mm micro bore columns. GC Should have three PTV Injector facilities Programmable Temperature Vaporizing Injector, Pressure range: 0-150 psi, LVI for 250 ul sample capacity, Total flow: 500 mL/min at 10 psi Temperature range:Ambient + 10 °C to 450 °C, Suited for columns:Wide bore: (0.53 mm) Narrow bore: (0.05 to 0.32 mm) , GC should have three detector simultaneous operation facilities: 1) FID Flame Ionization Detector , Maximum temperature: 450 °C, Detectivity: 2 pg °C/sec, Linear dynamic range: 10 7, Operational quality: Flame-out detection Auto re-ignition 2) ECD Electron Capture Detector, Maximum temperature: 450 °C Detectivity: 7 fg/s Lindane Linear dynamic range: 10 4 Radioactive source: 63Ni - 15 mCi (555 Mbq) 3) NPD or TSD (Thermionic Specific Detector) Maximum temperature: 450 °C Detectivity: N: 100 fg N/sec (Azobenzene) P: 100 fg P/sec (Malathion) Linear dynamic range: N: 105, P: 104 Auto liquid injectors Sample capacity: 21 vials Dual and duplicate mode Internal standard addition Modes of operation: SPME facility with Sample heating and cooling Optional modules: additional sample trays, micro-well plate holders, wash station, Columns : Capillary columns with 30 meter length (0.25umX0.25mm ID and 0.32X 0.032 mm ID) suitable for pesticide /Fragrance and FAME analysis. Local Supplies:- a)PC & Printer b/w laser b)H2,N2 & Zero air Gas cylinders with regulators c)Gas Purification Panel d)UPS 3KVA with 30 min back up
8	Surfactants & Detergents	HPLC system	Flexar Binary LC Pump Platform The Flexar Binary LC Pump Platform consists of a Flexar Binary LC Pump and Flexar Solvent Manager with 3-channel degasser. The Flexar Binary LC Pump, operating at up to 6100 psi (420 bar), is a rugged sixth-generation LC pump incorporating a patented uni-directional pumping mechanism designed to maximize seal life and

			minimize maintenance. High speed piston retraction (65msec) assures minimum pressure pulsations for extremely precise mobile phase flow rates. A patented design provides positive pressure solvent transfer to eliminate vacuum bubbles and cavitation, while a double-check valve design prevents solvent backflow on each delivery stroke, assuring efficient operation even at lower flow rates. Proprietary proportioning valve for precise and accurate blending of two solvents, uses minor-component interlacing to assure compositional accuracy even at low mixing levels. High flow, turbulent mixing within pump's dual-piston chambers assures high efficiency solvent mixing with extremely low mixing volumes. Patented real-time blending compensation accounts for and meters different volumes according to solvent shrinkage occurring with mixing, and corrects for solvent compressibility changes under pressure. Tube management clips integrated into all four corners of the pump front fascia assure secure tubing positioning while allowing flexibility in tubing configuration. Integrated drain tray and inter-component drain management also built into front fascia provide protection against leaks drain management designed for plug-and-play with all other Flexar components. Color-coded LED display indication for power, system status and purge. Easily-removable magnetized front panel provides immediate access to pump purge valve and check valve. Convenient slide-out removable pump module provides ready access to internal components. Includes stand-alone calibration and maintenance software package. Pump can be controlled by Chromera or TotalChrom Chromatography (WS/CS) Data Systems version 6.2.1 or higher. All cables required for connection with either Chromera or TotalChrom workstations included. Flexar UV/VIS LC Detector The Flexar UV/VIS LC Detector is a high-sensitivity, low-noise dual beam spectrophotometric detector operating over a wide wavelength range. Acquires data with a maximum acquisition speed of 50 pts/sec. Dual channel electronic noise subtraction for exceptional stability and signal-to-noise performance. Comes standard with deuterium source lamp and is compatible with optional tungsten source lamp for VIS range operation. Includes 12 uL, 10 mm pathlength detector flow cell and is compatible with a wide choice of optional flow cells for a wide range of LC applications. Tube management clips integrated into all four corners of the detector front fascia assure secure tubing positioning while allowing flexibility in tubing configuration. Integrated drain tray and inter-component drain management also built into front fascia provide protection against leaks drain management designed for plug-and-play with all other Flexar components. Color-coded LED display indication for power, system status and detector lamps. Easily-removable magnetized front panel provides immediate access to detector. Includes stand-alone calibration and maintenance software package. Detector can be controlled by Chromera or TotalChrom Chromatography (WS/CS) Data Systems version 6.2.1 or higher. All cables required for connection with either Chromera or TotalChrom workstations included. (120/240 V, 50/60 Hz) INJECTOR KIT-FLEXAR MANUAL OPERATIONAL KIT CHROMERA SOFTWARE KIT V2.1.2 CONVERTER-USB/4 PORT RS232/NT Power Cord, India. For use in India, South Africa and Hong Kong. CABLE-CROSSOVER CAT-5E 6 FEET For transferring data from an AAnalyst 200 to a PC.COL-

			ANALYTICAL C18 3um 150 x 4.6mm
9	Calorific Value of solid waste	Bomb Calorimeter	TECHNICAL SPECIFICATION- Working principal isoperibol and Dynamic Power input 1,8 kw Devices fuses 2 x 6.25 AT ; 230 V, 2 x 15 AT ; 115 V Measurement Voltage 115/230 V Measurement frequency 60/50 Hz Protection class 1 (protective grounding) Over-voltage catgory 2 Contamination level II Protection class acc. To DIN EN 60529 IP21 Permissible ambient temperature 20 °C – 25 °C (constant) Permissible humidity 80% System structure Automated Energy Measurment range Max, 40,000 joule Reproducibility based on isoperibol 0.05% RSD Analysis of 1 g benzoic acid NBS 39i dynamic 0.1% RSD Fundamental standard DIN 519000,ISO 1928 , ASTM 240D Temperature measurement In the inner vessel Working temperature 25 °C and 30 °C adjustable Temperature measuring resolution 0.0001 °C Average temperature increase 2 - 4 k Internal temp. meas. Range 4,5 - 39,0 °C Analysis time : Isoperibol up to 22 mins Dyanamic up to 7 mins Measuring accuracy +/- 0,1 % Corrections Halogen , Sulphur , Nitrogen , Moisture and ash Type of bomb Removeable Standard bomb C 5010 , C 5012 for helogen Test Oxygen filling of decomposition vessel Automated Venting of decomposition vessel Manual Water handling Fully automatic Interface 2 x serial (RS232) for PC and balance 1 x parallel (centronics) for Printer 1 x keyboard (DIN socket), 1 x sample rack System expansion Calwin software Network connection Multical system Control of max. 8 calorimeters with PC and Calwin plus Power supply

			115/230 V ; 50/60 Hz Auxillary energy Oxygen (purity 99,95%) Operating oxygen pressure 30 bar Cooling water supply tap water Flow rate 60 liter/hour Operated with KV 600 : Temp 18 °C -25 °C Pressure 0,3 bar Operated with firmly installed Water connection : Min/Max : Temp 12 °C – 18 °C Max pressure at the tap 1 -1,5 bar Test memory 1000 test Weight 30 kg
10	To determine Kinetics of aerobic degradation of wastewater	Aerobic wastewater treatment Pilot Plant	Automated ACTIVATED SLUDGE SEWAGE TREATMENT PILOT PLANT Automated version Technical specifications • Dimensions: 2100x870x2400 mm, 1550x670x1870 mm, Weight: 280 kg, 250 kg • Stainless steel AISI 304 trailed structure • 300-1000-l feed tank made in plastic reinforced with fiber glass • 300-l Plexiglas oxidation reactor, with cylindrical section • Stainless steel AISI 304 reactor with gearmotor • Sintered stainless steel air injector to the reactor • 150-l Plexiglas static decanter • 20-l Plexiglas feed tank for hypochlorite solution • 6-l Plexiglas chlorination tank • Stainless steel AISI 316 gear feed pump with magnetic drive, flow-rate 0-60 l/h • Stainless steel sludges recycle gear pump with magnetic drive, flow-rate 0-60 l/h • Sodium hypolchlorite metering pump made in plastic, flowrate 0-1.5 l/h • Alternative compressor for air feed to the reactor, flow rate 1.2 Nm3/h • pH electronic microprocessor transmitter-indicator, range 2-12, accuracy ±0.25% • Electronic microprocessor transmitter indicator for the quantity of O2 dissolved in water, range 0-10 ppm, accuracy ±0.5% • Feed flow rate measurement flowmeter for the air to the reactor, range 0-1800 Nl/h • Electronic feed flow-rate transmitter with magnetic induction, range 0-60 l/h, stainless steel AISI 316 execution, output signal 4-20 mA, accuracy ±0.2% • Electronic feed flow-rate indicator, range 0-60 l/h, accuracy ±0.5% • Electronic flow transmitter for sludges recycle with magnetic induction, range 0-60 l/h, stainless steel AISI 316 execution, output signal 4-20 mA, accuracy ±0.2% • Electronic feed flow-meter for sludges recycle, range 0-60 l/h, accuracy ±0.5% • Double Pt 100 RTD, stainless steel AISI 316 sheath • Electronic temperature indicator, range 0-200 °C, accuracy ±0.5%

			• Electrical control panel IP55, fitting CE standards • Emergency pushbutton • Synoptic of the plant • Connection lines and valves, stainless steel AISI 304 – 316 execution • Max feed of 1 kg/die of COD (1.7 g/l for an hourly rate of 25 l) Electronic air flow meter, range 0-1500 Nl/h, stainless steel AISI 316 execution, output signal 4-20 mA, accuracy ±0.2% Pneumatic control valve for the air flow rate, CV = 0.32, stainless steel AISI 304 execution Electropneumatic converter, 4-20 mA/0.2-1 bar, accuracy ±1% ■ Digital microprocessor PID controller, accuracy ±0.1%. Theoretical-experimental texts • Theoretical - practical- experimental manual.Utilities • Electrical power supply: single-phase + T, Pmax = 1 kW • Compressed air: max. consumption 5 Nm3/h, 1.5-bar pressure (only automated and computerized version) • Water: rarely used • Floor drain. Optional • Supervision software mod. SW-FAA/EV: it operates in Windows and enables control of ON-OFF signals, analog signals coming from the PID controller, real time and historical trend. Plant's variations upon request • The equipment can be changed upon Customer's specific request. Automated version managed by a PC with the addition of: Managing and supervision software (mod. SW-FAa/EV) Personal Computer (DELL / HP / ACER OR EQUIVALENT)
11	To determine Kinetics of anaerobic degradation of wastewater	Anaerobic wastewater treatment System	ANAEROBIC DIGESTION PILOT PLANT (Biogas) (mod. BIO/EV) Technical specifications • Dimensions: 2300x1000x2020 mm • Weight: 290 kg • Stainless steel AISI 304 trailed structure • 350-l anaerobic digester, stainless steel AISI 316 execution • Automatic liquid heating system with exchanger, stainless steel AISI 304 execution with oil recycle • Electronic thermostat for heating temperature control, range 0-200 °C, accuracy ±0.5% • 1 double Pt 100 RTD, stainless steel AISI 316 sheath • Stainless steel AISI 316 gear feed pump with magnetic drive, flow-rate 0-60 l/h • Stainless steel AISI 316 sludges recycle gear pump with magnetic drive, flow-rate 0-60 l/h • Centrifugal compressor for gas recycling and drawing, flowrate 1200 Nl/h, stainless steel AISI 316 execution • Electronic feed flow-rate transmitter with magnetic induction, range 0-60 l/h, stainless steel AISI 316 execution, output signal 4-20 mA, accuracy ±0.2% • Electronic feed flow-rate indicator, range 0-60 l/h, accuracy ±0.5% • Electronic flow-rate transmitter for sludges recycling with magnetic induction, range 0-60 l/h, stainless steel AISI 316 execution, output signal 4-20 mA, accuracy ±0.2% • Electronic flow-rate indicator for sludges recycle, range 0-60 l/h, accuracy ±0.5% • pH electronic transmitter-indicator, measurement range programmable between 2-12 pH, output signal 4-20 mA, accuracy ±0.25% • rH electronic transmitter-indicator, measurement range programmable between -1500 and +1500 mV, output signal 4-20 mA, accuracy ±0.25% • Pressure-gauge, range 0-50 mm H2O •

			Electrical control panel IP55, fitting CE standards, with the synoptic of the plant • Emergency pushbutton • Connection lines and valves, stainless steel AISI 304 – 316 execution ■ Digital microprocessor PID controller, accuracy ±0.1%. Theoretical-experimental texts • Theoretical - practical- experimental manual. Utilities • Electrical power supply: single-phase + T, Pmax = 1.5 kW • Water: rarely used • Floor drain., Optional • Supervision software mod. SW-BIOA/EV: it operates in Windows and enables control of ON-OFF signals, analog signals coming from the PID controller, real time and historical trend. The automated version mod. BIOA/EV can be controlled manually from electrical control board.
12	Effects of oxygen transfer under non-steady state conditions & measurement of the absorption coefficient Ks and the oxygenation capacity R	Aeration Unit	TECHNICAL DETAILS: Pump: Diaphragm type Tank capacity: 24.5 litres, Flow meter range: 1-12 litres/min Oxygen/temperature -5 to 199%DO2 meter ranges: -5 to 25.0%DO2 -5 to 19.99mg/l -10 to 1050C, Oxygen probe length: 300mm Paddle: Variable sped controlled by D.C. shunt wound motor Chemicals required: Sodium sulphite, (not supplied) Cobaltous chloride ORDERING SPECIFICATION ● An aeration unit to permit the study of oxygen transfer characteristics of diffuse air systems. ● Comprises a 24.5 litre open tank with variable speed motor driven stirrer paddle and pumped air supply, via a valve and flow meter, to a diffuser. ● Sparger, single and treble airstone diffusers are included in the supply. ● A battery powered dissolved oxygen meter provides instrumentation including direct reading of water temperature. RECOMMENDED INSTRUMENTS: Stop clock Triple beam top loading balance 100ml measuring cylinder SERVICES REQUIRED Electrical supply: W10-A: 220-240V/1ph/50Hz, W10-B: 120V/1ph/60Hz W10-G: 220V/1ph/60Hz , Water supply: Initial fill and laboratory drain OVERALL DIMENSIONS Height: 0.75m Width: 0.6m Depth: 0.5m SHIPPING SPECIFICATION: Volume 0.70m3, Gross weight: 100kg
13	Sludge, soil analysis	Scanning Electronic Microscope	A fully PC controlled with conventional tungsten heated cathode and capability for LaB6 electron source, intended for both - for high vacuum as well as for low vacuum operations for versatile applications, with Environmental SEM capability. Best achievable and guaranteed resolution. Flicker-free digital image with clarity, sophisticated and user-friendly software for microscope control and image capturing uses Windows™ platform, standard formats of stored images, easy image management, processing and measurements, automatic set up of the microscope and many other automated operations are characteristic features of the equipment. Various modes in electron optics must be available to facilitate the following functions: • Automatic Column configuration and setting for producing the highest resolution for the chosen working conditions, and also enhancing the depth of focus. • Optimization of the column to provide a large non-distorted field of view. Also, to provide an large non-distorted field of view at low / extra low magnification. • IMPORTANT: Environmental SEM capability Bidder must categorically explain the availability and usage of all

			these modes in the offered system. Resolution in :- High Vacuum Mode (SE) – W Filament: 3 nm at 30 kV or better Low Vacuum Mode (BSE) – W Filament: 3.75 nm at 30 kV or better Equipment must have the capability of using with LaB6 filament, and the cost to be given as option. Magnification: 3X to 1,000,000X (Continuous) Accelerating Voltage: 200 V to 30 kV Electron Gun: Tungsten heated cathode. Probe Current: 1 pico-Amp to 2 micro-Amp or wider Achievable Chamber Vacuum: High vacuum mode: < 5x10-4 Pa Low vacuum mode: Up to 500 Pa. (option 2000 Pa or more) In case of LaB6 attachment, the achievable chamber vacuum has to b chosen according to the microscope configuration Door Width : 80 mm or more Number of Ports for future expansion: 9 or more Specimen Stage: Compucentric or Eucentric, fully motorized Specimen height. More than 80 mm Stage Movements: X = 80 mm or more, Y = 60 mm or more, Z = 45 mm or more, Rotation: 360° continuous Tilt: –20° to +90° (If necessary, pre-tilt holder to be included) SEM must have the facility to stop stage / sample movements the moments sample touches any part of the chamber, with alarm. Detectors: Standard: SE – Secondary electron detector (YAG Crystal) BSE - Retractable annular scintillator type. IR CCTV-Camera for the Chamber View (Essential). Other Standard attachments: • Detector for Probe Current • TE Detector (Bright and Dark Field imaging modes) • Peltier Cooling stage up to -50 Deg. c • Water Vapor Inlet (In case of biological samples) • Multisample Holder with Stage Navigation • Silencer box for Rotary Pump • TCP/IP for Remote Control and Online Fault Diagnosis • EDS: 129eV Dry Cool Microscope Control: All microscope functions are controlled by keyboard, mouse and trackball / joy stick via the program VegaTC using Windows TM platform. Computer Latest configuration branded (Separate computer for SEM and EDS; However, common Mouse operation for the two computers for SEM and EDS preferred) Image Display: 22" LCD monitor Image Size: As better pixels size as possible, adjustable separately for live image (in 3 steps) and for stored images (10 steps), selectable square or 4:3 or 2:1 rectangle Image Formats: BMP, TIFF, JPEG, JPEG2000, GIF, PNG or PGM Remote Control: Via TCP/IP Dynamic Focus, Point & Line Scan, 3D Beam – live stereo imaging Automated Operations (Standard): • Vacuum Control • Filament Heating • Gun Alignment • Centering of Scanning Modes • Compensation for kV • Probe Current Optimized for Spot Size • Spot Size Optimized for Magnification

			• Scanning Speed (according to S/N Ratio) • Contrast & Brightness • Focus & Stigmator • Look Up Table • Measurement, • Image Operation • Image Processing • 3D Scanning • Hardness, • Multi Image Calibrator, • Object Area, • Print Magnification, • Switch-Off Timer, • Tolerance, Options: • Gold Sputter Coating Unit & Carbon Coating Unit. Possible combinations of all other relevant detectors and other accessories & Softwares must be offered as options. Local items: (1) Color Laser Jet Printer, (2) On-line UPS of minimum 5 kVA. NOTE: Separate PC for SEM and EDS with a common Mouse operation Terms and Conditions: • The equipments should be supplied and installed at GBU Campus, Gr NOIDA. • The prices quoted should be inclusive of all Packing, Forwarding, Freight and Insurance charges (Excluding Customs Duties). Bidder may have to clear the consignment through Customs. Necessary duty exemption documents shall be provided. • The quotation received after due date will not be considered • University reserves the right to reject any quotation without assigning any reasons • The suppliers MUST support the quoted specifications with the help of original printed manuals of the equipments • The payment terms should be specified in the quotation clearly • The suppliers may mention any number of optional accessories in their quotes; However the same should be clearly distinguished from the main requirements along with their individual prices • The suppliers should supply service and operational manuals of the systems. • The quotations MUST include a detailed compliance report vis-à-vis required specifications. • Validity of the quotations should be at least three months. • Indian Agency Commission if any should be specified separately. • Manufacturer's agent should provide an authorization certificate from the Principles. • Warranty for all the items shall be for minimum two years. Comprehensive Maintenance Contract at least for two consecutive years after expiry of warranty schedule must be quoted. • Training options, both in India and abroad, should be clearly specified. Other items to be quoted as OPTIONAL: (1) WDS, (2) Cathodoluminiscence Detector, (3) E-beam Lithography – Complete Hardware and Software.

GENERAL TERMS AND CONDITIONS

1. Detailed information about the Equipments/Instruments and their specifications are available in tender document, which can be downloaded from the University website www.gbu.ac.in.
2. Two bids system of tender will be adopted.
   (i) The bid containing technical specifications and EMD
   (ii) Bid containing financial offer

   Technical and financial bids should be submitted in separate covers. The envelopes should be marked as technical bid and financial bid with reference numbers. These two envelops shall be sealed in a common cover and addressed to **The Registrar, Gautam Buddha University, Greater Noida, Gautam Budh Nagar -201310 (U.P.**) superscribing "**Tender against Notification Advt. GBU/S&P/02/2011, Name of supply: Laboratory Equipments/Instruments for the Advance Environmental Engineering Lab. in School of Engineering"** so as to reach us on or before last date of bid submission.

3. The Technical Bid and Financial Bid should be duly filled-up.
4. These bids will be opened in two stages. The bid containing technical specifications and EMD will be opened at first stage and if same is found according to required specifications, the bid containing financial offer shall be opened in second stage.
5. The "**Technical Bid"** shall contain all documents in support of quoted Equipments/Instruments, their specifications, commercial terms & conditions and eligibility criteria along with the page number for cited specifications in the company brochure for the particular item.
6. The **"Financial Bid"** shall contain price schedule only. The rates and units shall not be overwritten in the price schedule. The price shall be both in words and figures.

7. **Eligibility Criteria**: All the participating suppliers/firms or principal manufacturer- should meet the following qualifying criteria. The firm should be a registered supplier for such supplies. Following documents are required to be submitted with Technical Bid, to qualify eligibility criteria:
   (a) Sales Tax/VAT registration certificate.
   (b) PAN and TIN number should be mentioned.
   (c) The firm should have experience of supplying & installation for similar Equipments/Instruments to institute of National repute such as IIT, AIIMS, CSIR labs etc. The company should also furnish a list of clients of last 3 years.
   (d) Certified copy of balance sheet with trading, profit & loss account for the last three financial years should be submitted.
   (e) Name of branch offices & service centres after sales arrangements.
   (f) Earnest Money Deposit (EMD) **as 2% of the offered cost** is required to be submitted in the form of DD/Banker's Cheque only drawn in favour of "Finance Officer, Gautam Buddha University" payable at "Greater Noida" along with the Technical Bid. If supply is not made within the prescribed period EMD would be forfeited.
   (g) Authorized signatory should sign on all pages. Bids without authorized signature will be rejected.
   (h) ***Minimum turnover required to procure the equipments/instruments :*** *No turnover for Annexure – 'A', Rupees One Crore for Annexure – B' and Rupees Two Crore for Annexure – 'C'.*
   (i) The bidder must be either sole Manufacturer of the Equipments/Instruments or the authorized agent/representative of the OEM. In the case of agent/representative, certified copy of the agency/authorization issued by the OEM should be enclosed with the tender.

8. Offer should be sent in a sealed envelope, submitted either in person or by post on which name and address of the supplier/firm shall be written. Tenders received through E-mails or FAX will not be considered.
9. The technical bids will be opened on scheduled date and time in the presence of the vendors present possessing authorization letter from the respective companies/firms. Suppliers intending to attend the tender opening should intimate in advance.
10. The rate quoted should be F.O.R. Gautam Buddha University (Gautam Budh Nagar, Greater Noida, UP) in rupees inclusive of all charges e.g. packing, forwarding local taxes, railway freight, transit insurance, for outside firms and free delivery at University stores in the case of local firms. The total price should include all accessories required for final installation of the Equipments/Instruments.
11. The Equipments/Instruments should have USEPA/International/National validation certificates, wherever applicable.
12. The cost of the tender is Rs.1000/- (Rupees One Thousand) inclusive of taxes (Non-refundable) and it shall be paid separately in the form of DD/Banker's Cheque only drawn in favour of "Finance Officer, Gautam Buddha University" payable at "Greater Noida" and should be attached with technical bid envelope.
13. The EMD of the successful bidder will be refunded after two months of the completion of the supply and installation of the Equipments/Instruments to the satisfaction of the Gautam Buddha University. The EMD of the unsuccessful bidders will be returned to the concerned immediately after finalization of the tenders. No interest will be paid on EMD in any case.
14. The required delivery period must be mentioned against each item. Tenders should preferably be given only for those equipments/items/articles, which are available ex-stock. Rates of imported goods should be quoted excluding custom duty, as this University is exempted from payment of custom duty (by letter of Department of Scientific and Industrial Research, Ministry of Science & Technology, GOI).
15. Detailed specifications with the mention of make and model/Version of each item should be clearly given supported by the illustrated pamphlets wherever possible. Quotations without specified make and Model/Version and other particulars may be rejected. The payment will be made after the goods have been received, opened, checked, installed and found to be working satisfactorily as per the specifications and requirements. The accessories included in the Equipments/Instruments should also be clearly mentioned.
16. Losses or damage in transit will be borne by the Supplier. The supplier may, if he so desires, get the goods insured and include such charges in the tendered rate.
17. Offered prices should be valid at least for two months from the last date of receipt of tenders.
18. All legal proceedings, if necessity arises to the University may be any of the parties (University or Contractor/Supplier) shall have to be lodged in the courts situated at Gautam Buddha Nagar and not elsewhere.
19. (a) The Equipments/Instruments delivery time should be preferably within 10-12 weeks after the date of issuance of the purchase order. If the delivery time is quoted more than 10-12 weeks, GBU reserves all rights to permit the bidder to compete.

    (b) The Penalty Clause is as under:-

    Should the bidder fail to deliver the goods within stipulated period**,** the Competent Authority may, at his discretion, allow an extension in time subject to recovery from the bidder as agreed liquidated damages, and not by way of penalty, a sum equal to the percentage of the value of tender amount which the bidder has failed to supply for period of delay as stated below:-

i.Delay up to one week	1%
ii.Delay exceeding one week but not	2%

exceeding two weeks	
iii. Delay exceeding two weeks but not exceeding one month	5%
iv. Delay exceeding one month	5% for each month and part there of subject to maximum 10%

(c) In case of failure to supply the goods within stipulated delivery period and in accordance with the specifications given in the quotations, the University shall be free to cancel the order.

20. Supply of the placed order in part will not be accepted.
21. The University's term for payment: 90% against delivery of items in good condition, installation and putting those in satisfactory working conditions; balanced 10% payment shall be released after 60 days of satisfactory working of the items. For balance 10% payment, the firm has to raise bill/letter for balance payment. No advance payment shall be released.
22. The AMC cost, wherever applicable, after warranty period shall be made in equal installments at the end of each quarter subject to satisfactory service rendered.
23. The price quoted should be in Indian Rupees.
24. No revision of price bid will be allowed once the price bids are opened.
25. No increase in price will be allowed after our purchase order(s) are placed.
26. Warranty certificate against all the Equipments/Instruments developed defects covering warranty period, which commences from the date of installation shall be given at the time of supply of the Equipments/Instruments.
27. Inspection certificates of the equipments/instruments inspected by the qualified engineer of the manufacturer and packed in accordance with the terms and conditions of this order must be enclosed.
28. During the warranty period whenever the firm is called upon to attend to the rectification of the defects/faults in the consignments, the firm shall attend to the repair work within a period of a week. They should render timely back up service whenever called upon. A certificate to the effect should be attached to the tender.
29. A certificate to the effect that Equipments/Instruments supplied is fully operational and no additional accessory or space is required to fully functioning the Equipments/Instruments should be issued along with the delivery challans/invoice. GBU reserves the right to refuse payment in the event of not furnishing this certificate at the time of supply.
30. Complete user, technical and service manuals/installation drawings/documentation and spare parts catalogue are to be provided along with the supply of the item.
31. Failure to comply with all the terms and conditions mentioned herein would result in the tender being summarily rejected.
32. Vendors are informed that once the firms are shortlisted based on the eligibility criteria and technical specifications, only then the financial bids of the firms meeting eligibility criteria, technical specifications / requirements would be opened.
33. Conditional tenders will not be accepted.
34. Any cutting and overwriting in the financial bid will not be accepted.
35. GBU reserves the right to change the order quantity or split the orders among multiple vendors without assigning any reason (s) whatsoever.
36. GBU reserves the right to reject any or all the tenders without assigning any reasons whatsoever.

SPECIAL TERMS AND CONDITIONS

1. Warranty period of equipments should be of two years.
2. Quote for three year extensive Annual Maintenance Contract (AMC) should be submitted separately in financial bid.
3. Price quoted shall include all necessary component parts, accessories and software required to run the equipments for successful intended experiments.
4. To verify the technical specifications and capabilities while evaluating technical bids, the firm may be asked to demonstrate the equipment in the University. If demonstration of the equipments in the University is not possible the firm shall arrange a visit of university officials to the nearby location for the same
5. Successful bidders shall arrange training programmes for the faculty and staff for the period decided by the University.
6. All equipments shall be compatible for Indian environmental conditions.

Registrar
Gautam Buddha University

ACCEPTANCE

We accept the above terms and conditions and shall comply with them strictly.

SIGNATURE OF THE AUTHORISED SIGNATORY : ……

NAME OF THE SUPPLIER : ……

ADDRESS : ……

: ……

: ……

Annexure : 'A'

FINANCIAL BID
Name of Laboratory : ADVANCE ENVIRONMENTAL ENGG. LAB.

Name of the School : School of Engineering

S. No.	Equipment	Qty.	Unit Price (Rs. In figure)	Unit Price (Rs. in words)	Total Cost (Rs.)
1	Vortex mixer V1 plus	02			
2	Pippets (Electronic)	10			
3	Personal Sampler	01			

Extensive Annual Maintenance Contract cost (three years) should be mentioned on a sheet for each item separately.

Total cost of the offer is Rs._____ in words (Rupees _____

_____. I abide by all the terms & conditions of the tender.

DECLARATION

1. The information given in the financial bid by the undersigned is correct.

SIGNATURE OF THE AUTHORISED SIGNATORY: _____

NAME OF THE SUPPLIER : _____

ADDRESS : _____

_____

Annexure : 'B'

FINANCIAL BID

Name of Laboratory : ADVANCE ENVIRONMENTAL ENGG. LAB.

Name of the School : School of Engineering

S. No.	Name of Experiment	Equipment	Qty.	Unit Price (Rs. In figure)	Unit Price (Rs. in words)	Total Cost (Rs.)
1	Digestion	Digestion Fume hood &Hotplate with stirrer	**01**			
2	Study of noise measuring equipments & pollution	Noise level meter	**02**			
3	Ambient air Quality Monitoring	Gaseous Pollutants Sampler	**01**			
4	Ambient Air Monitoring for HC & Organic vapors	Organic Vapour Sampler	**01**			
5	Indoor air quality monitoring	Handy Sampler	**01**			
6	Ozone analysis	Ozone meter	**01**			
7	Fluoride analysis	Fluoride kit	**01**			
8	Nitrate analysis	Nitrate kit	**01**			
9	Residual, Break point, Available chlorine	Titration Kit	**01**			
10	Coagulation and Flocculation test(Jar Test)	Lab Stirrer : Six Paddle Lab Stirrer Flocculator	**01**			
11	Field sampling & analysis	Complete Water Quality Lab	**01**			
12	Standard plate count test MPN, Sterilizing equipments and samples, Total coliform Test	Digital Colony Counter (Elect.)	**02**			
		Microbiological Test Kit For Total *Coliform* And *E. Coli* (MEL/MPN)	**01**			
		Horizontal Laminar Flow Cabinet	**01**			
13	Incubation	Incubator	**01**			
14	Oil and grease analysis	Oil& Grease Analyser	**01**			
15	Determine the	Automatic Weather	**01**			

	Humidity, air & soil temperature, soil moisture, pressure, Rainfall, sunshine in the atmosphere as well inside a building	Monitoring System				
16	Analysis of SO2 & NOx	Gaseous Pollutants Sampler	**01**			
17	Suspended Particulate Monitoring	Respirable Dust Sampler	**01**			
18	Stack Monitoring	Stack monitoring kit	**01**			
19	Respirable dust sampling	Fine Particulate Sampler	**01**			
20	Ph, Conductivity, Dissolved Oxygen	Multi-Parameter	**01**			
21	Automation Control	Supervision Software: Pilot For Windows	**01**			

Extensive Annual Maintenance Contract cost (three years) should be mentioned on a sheet for each item separately.

Total cost of the offer is Rs._____ in words (Rupees _____

_____. I abide by all the terms & conditions of the tender.

DECLARATION

1. The information given in the financial bid by the undersigned is correct.

SIGNATURE OF THE AUTHORISED SIGNATORY: _____

NAME OF THE SUPPLIER : _____

ADDRESS : _____

_____

Annexure : 'C'

FINANCIAL BID

Name of Laboratory : ADVANCE ENVIRONMENTAL ENGG. LAB.

Name of the School : School of Engineering

S. No.	Name of Experiment	Equipment	Qty.	Unit Price (Rs. In figure)	Unit Price (Rs. in words)	Total Cost (Rs.)
1	Determine Total Organic Carbon (TOC)	Total Organic Carbon (TOC) Analyser	**01**			
		Reagent Set	**01**			
2	Flow Rate & Velocity Measurement	Ultrasonic Flow Meter	**01**			
3	TKN determination	Kheldhal Nitrogen Unit	**01**			
		SMS Scrubber	**01**			
		Distillation Unit	**01**			
		Recirculating Water Pump for fumes aspiration	**01**			
4	Determination of Hardness (Total, Permanent, Temporary), Acidity , Alkalinity, Volatile Fatty Acid in water & wastewater	Titration Workstations	**01**			
5	Anions & Cations determination	Ion Chromatograph	**01**			
6	Analysis of heavy metals viz. Cu, Cr, Cr+6, K, Mn, Zn, As, Sr, Ca	Atomic Absorption Spectrophotometer	**01**			
7	Phenols , catecols	Gas Chromatograph	**01**			
8	Surfactants & Detergents	HPLC system	**01**			
9	Calorific Value of solid waste	Bomb Calorimeter	**01**			
10	To determine Kinetics of aerobic degradation of wastewater	Aerobic wastewater treatment Pilot Plant	**01**			
11	To determine Kinetics of anaerobic degradation of wastewater	Anaerobic wastewater treatment System	**01**			
12	Effects of oxygen transfer under non-steady state	Aeration Unit	**01**			

	conditions & measurement of the absorption coefficient Ks and the oxygenation capacity R					
13	Sludge, soil analysis	Scanning Electronic Microscope	**01**			

Extensive Annual Maintenance Contract cost (three years) should be mentioned on a sheet for each item separately.

Total cost of the offer is Rs._____ in words (Rupees _____

_____. I abide by all the terms & conditions of the tender.

DECLARATION

1. The information given in the financial bid by the undersigned is correct.

SIGNATURE OF THE AUTHORISED SIGNATORY: _____

NAME OF THE SUPPLIER : _____

ADDRESS : _____

_____