

BID DOCUMENT

NATIONAL COMPETITIVE BIDDING

FOR

SUPPLY, INSTALLATION, COMMISSIONING & MAINTENANCE OF EQUIPMENTS
FOR
ENGINEERING CHEMISTRY LABORATORY AT I.K.G.PTU KAPURTHALA AND ITS OTHER
CONSTITUENT CAMPUSES (PUNJAB)

Bid No. : EdCIL/PROC/PTU-2017/LAB-BTECH-CHEM/CHEM-1/1 (Retender)

PART-II- FINANCIAL BID



EdCIL (India) Limited

(A Govt. of India Mini Ratna Enterprises)

'EdCIL House', Plot No. 18A, Sector- 16A

NOIDA – 201301 (UP), INDIA

Tel: 0120 – 2512001-006, FAX: 0120-2515372

Dated: 09.06.2017

This document serially numbered from page number 01 to 32.

FINANCIAL BID
Instructions to Bidders

1. Financial Bid shall be submitted with full price details.

Financial Bid shall contain only the prices duly filled in as per the format given in Schedule of Rates provided in the tender document. Price bid should not have any Commercial and/or Technical stipulation in addition to, what is already given in Part I – Technical bid.

Financial Bid Standard Forms (Form-1 , Form-2A and /or Form-2B) shall be used for the preparation of the price quote according to the instructions provided.

2. **The Bidder should quote for all the Laboratory items / equipments listed in this document. In case, the Bidder/s does not quote for all the Laboratory items/Equipments, the Bid shall be treated as incomplete and shall be rejected summarily.**
3. The Items / equipments to be supplied / delivered / installed / commissioned at various locations of IKGPTU Campuses is as shown in the enclosed Annexure VI. The rate shall be inclusive of all taxes, octroi, transportation (as per the location), packing, loading and unloading (as designated location) ,Insurance etc. and nothing shall be paid extra.
4. The bid shall be evaluated on total value of all Laboratory items/Equipments as shown in summary and supply order shall be placed to a bidder as a composite bid.
5. The prices quoted by the bidder shall be fixed for the quantity mentioned for the duration of the contract and shall not be subject to adjustment on any account. Price should be firm for any positive or negative variation in quantities up to 100%.
6. The changes displayed in the corrigendum/addendum to the bid documents, particularly with the financial bid should be attached with the financial bid submission, in the same packet, duly signed and stamped by the authorized signatory of the Bidder firm.

FINANCIAL BID SUBMISSION FORM

To:

Chief General Manager (EIS & EPS)
EdCIL (India) Limited
EdCIL House, 18 A, Sector-16 A
NOIDA – 201301 (U.P.), India

Dated: ____/____/2017

Dear Sir,

We, the undersigned, offer to provide “SUPPLY, INSTALLATION , COMMISSIONING & MAINTENANCE OF LABORATORY EQUIPMENTS” in accordance with your Request for Proposal dated ____/____/2017.

Our attached Financial Bid is for the amount of _____ *[Indicate the corresponding to the amount(s), currency(ies) {Insert amount(s) in words and figures}]*.

Please note that all amounts shall be the same as in Form-1. Our Financial Bid shall be binding upon by us subject to the modifications resulting from Contract negotiations, if any, up to expiration of the validity period of the Proposal.

We remain,

Yours sincerely,

Authorized Signature {In full and initials}:

Name and Title of Signatory:

In the capacity of:

Address:

E-mail:

FORM-1**SUMMARY OF FINANCIAL BID**

S. No.	Description	Amount (exclusive of Tax) (Rs.)	Tax (Rs.)	Amount (Inclusive of Tax) (Rs.)
A.	Engineering Chemistry Laboratory Equipments (Form-2A and/or Form-2B)			
B.	Comprehensive Annual Maintenance (Annexure-IV)			
	Total (Rs.)			
Total Price Bid (exclusive of taxes) (in Words) (Rupees.....)				
Total Price of Bid (Inclusive of taxes) (In Words) (Rupees.....)				
Signature of bidder				
Name & Address		..... ..... .....	
Note :	Date	.....	
i)	<i>Discount or any other offers affecting the package price must be mentioned here only. Discount or any other offers affecting the package price mentioned at any other place of the bid will not be considered.</i>			
ii)	<i>In case of discrepancy between unit price and total price, the unit price shall prevail.</i>			
iii)	<i>Bids shall be evaluated based on total price without taxes.</i>			

**FORM-2A
(FINANCIAL BID)**

PRICE SCHEDULE FOR GOODS TO BE IMPORTED

ANNEXURE – I

Date:

Name of the Department:

Name of the Laboratory:

(A) Price Schedule: (Format used for imported items)

S.No.	Currency	Description and Specification of the Item	Qty. in Units	Unit Price	Agency Commission (If applicable)	Discount	Ex-works price	Packing + Handling + DOC + Inland Freight + Insurance	CIF price	Insurance + Freight	CIP Price	Total Price
			(a)	(b)	(c)	(d)	(e)=(b+c-d)	(f)	(g)=(e+f)	(h)	(i) = (g+h)	(j) = (i*a)
				(i) In Figures: (ii) In words:								

Total Price of Bid (In Words)	
Signature of bidder	.....
Name & Address	.....
Date	.....
Note: 1. <i>The above financial template should be strictly followed. Any deviation from the above template (in terms of description and specification of the item) may debar the bidder at sole discretion of EdCIL.</i> 2. <i>Discount or any other offers affecting the package price must be mentioned here only. Discount or any other offers affecting the package price mentioned at any other place of the bid will not be considered.</i> 3. <i>In case of discrepancy between unit price and total price, the unit price shall prevail.</i> 4. <i>Bids shall be evaluated based on total price including all charges as CIP Price.</i> 5. <i>CIP - Carriage and Insurance Paid to (named place of destination): The seller pays for the carriage of the goods up to the named place of destination and the seller is required to obtain insurance for the goods while in transit.</i>	

FORM-2B

ANNEXURE-II

PRICE SCHEDULED FOR GOODS (INDIGENOUS / IMPORTED GOODS TO BE QUOTED IN INR)**Price Schedule: (Format used for indigenous items/ Imported Items).**

S.No.	Description and Specification of the Item	Qty. in Units	Unit Price in Rs.	Excise Duty % /Custom Duty	CST/ VAT %	Insurance other duties and taxes if any,	Packing and Inland Transportat ion	F.O.R Destination Price	Total Price in Rs. (Excluding Taxes)	Total Price in Rs. (Including Taxes)
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)=(b*a)	(i) = (g *a)
			(i)In Figures: (ii)In words:							
Total Price of Bid (In Words)										
Signature of bidder						.....			
Name & Address						.....			
Date						.....			
Note: <ol style="list-style-type: none"> <i>The above financial template should be strictly followed. Any deviation from the above template (in terms of description and specification of the item) may debar the bidder at sole discretion of EdCIL.</i> <i>Discount or any other offers affecting the package price must be mentioned here only. Discount or any other offers affecting the package price mentioned at any other place of the bid will not be considered.</i> <i>In case of discrepancy between unit price and total price, the unit price shall prevail.</i> <i>Bids shall be evaluated based on total price including all charges as F.O.R Destination Price.</i> 										

ANNEXURE – III**COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT PRICES SCHEDULE**

S. No.	Item Description	2 nd Yr.	3 rd Yr.	Total Comprehensive Annual Maintenance Contract for 2 years(2 nd year & 3 rd year) after warranty period of 1 year from the date of successful installation. (E= C+D)
A	B	C	D	E
1.	Equipment: Make: Model: Qty.: (Mention Total quantity from Annexure-VI)			
SUB-TOTAL(Rs.) (Carry forwarded to Summary)				
Sub-Total Price Bid (exclusive of taxes) (in Words) (Rupees.....)				
Sub-Total Price of Bid (Inclusive of taxes) (In Words) (Rupees.....)				
Signature of bidder			.....
Name & Address			..... .....
Note:	Date		.....
i)	<i>Discount or any other offers affecting the package price must be mentioned here only. Discount or any other offers affecting the package price mentioned at any other place of the bid will not be considered.</i>			
ii)	<i>In case of discrepancy between unit price and total price, the unit price shall prevail.</i>			
iii)	<i>Bids shall be evaluated based on total price without taxes.</i>			

Note:

- 1. The above rates shall be included in computing the total cost of the equipments.**
- 2. Agency to use separate sheet for each equipment/Item/package.**

DETAILED TECHNICAL SPECIFICATIONS:**ANNEXURE-IV****ENGINEERING CHEMISTRY LABORATORY EQUIPMENTS**

Sl.No	Experiment/Equipment	Specifications
1	HOT PLATE and Magnetic Stirrer	Stirring Volume : 0 to 2 L Stirring Speed : 0 to 1200 RPM or better Top Plate Size : 130 mm x 130 mm or better Plate Material : Steel Temperature : 0- 300°C Accuracy : $\pm 1^{\circ}\text{C}$ (<100 °C) $\pm 3^{\circ}\text{C}$ (<300°C) Timer : 999 minutes
2	Rotary evaporator with heating bath built-in vacuum controller	6 different types of flasks are attachable (from 50ml to 3 L) Standard supply : 1 L Evaporating and receiving flask each Digital speed control Digital R.P.M Display Speed control range : 20~250 R.P.M Should have Slant type condenser Should Include Water bath (PTFE coating) Double Jacketed Bath safe to touch Heater : 1000W or better Bath Material : SUS304 Capacity : 4 L or better Digital interior temperature measure and display Should include Motorized up & down Control switch Easy to utilize standard distillation solution

		<p>DIAPHGRAM VACUUM PUMP Delivery : 20 L/min</p> <p>Ultimate vacuum : 700 mm Hg or better</p> <p>Ultimate Pressure : 9.5 mbar or better</p> <p>Power : 180 W</p> <p>Operating current : 0.5A</p> <p>VACUUM CONTROLLER Solid state module for precise control.</p> <p>Adjustable for any pressure level between 1mmHg and kpa abs 101~0</p> <p>Power source : AC 220V 50/60Hz</p> <p>COOLING WATER CIRCULATOR (CHILLER)</p> <p>Capacity : 4L</p> <p>Circulator Pump: Magnet 20W</p> <p>Max. flow :15 L/min</p> <p>Temp. Range : Down to~ -15 °C or better</p> <p>Controller : FND Controller</p> <p>Refrigerator : 1/4HP or better</p> <p>Refrigerant : 134A</p> <p>Power consumption : 330W or better</p> <p>Power Supply : AC 230V 50/60Hz</p>
3	Digital Melting Point Apparatus	<p>Temperature range : Ambient Room temp upto 300°C</p> <p>Repeatability : 0.2°C at heating rate of 0.2°C/min Temperature</p> <p>Accuracy : $\pm 0.4^{\circ}\text{C}$ (<200°C) $\pm 0.7^{\circ}\text{C}$ (<300°C)</p>

		<p>or better</p> <p>Temperature Gradients : 0.1°C—20°C</p> <p>Standard Capillary Size : I.D. 1.0mm, O.D. 1.4mm</p> <p>Display : TFT Screen</p> <p>Interface : USB, RS 232, SD Card, Internet</p> <p>Should have an Camera</p> <p>Video Output : SD card 2 G</p> <p>Magnification : 6 X to 8X</p> <p>Capacity per batch: 4 pcs/ batch</p> <p>Curve storage : 50 groups or more</p> <p>Power : 120W</p>
4	Scientific Balance up to 1 mg	<p>Fully Automatic Electronic weighing Balance.</p> <p>Capacity : 220 g</p> <p>Readability : 0.1 mg</p> <p>Repeatability : ± 0.1 mg</p> <p>Linearity : ± 0.2 mg</p> <p>Internal Calibration</p> <p>Display : LCD</p> <p>Response Time : 6 sec or better</p> <p>Pan Size : 90mm to 120 mm diameter</p> <p>Operation Temp : +10°C to 40°C</p> <p>Interface : RS232</p> <p>Power : AC 220V/ 50-60 Hz</p>

5	UV Chamber	<p>Ultra Violet Fluorescence Inspection Cabinet: Dual Wave</p> <p>Having imported filters with separate low pressure mercury vapour tubes for short U.V. (254 nm.) and long U.V.(365 nm) plus separate lamp for visible light.</p> <p>The low pressure mercury vapor tubes to facilitate immediate use for inspection.</p> <p>Chamber should be Well closed</p> <p>It should hold TLC plates of size :20 cm x 20cm & 20cm x 10 cm</p> <p>All parts are powder coated.</p>
6	Muffle Furnace	<p>Digital temperature indicator cum controller.</p> <p>Casing : mild steel reinforced with iron angles riveting screw joints</p> <p>Heating chamber Shape: Rectangular horizontal</p> <p>Temperature : 1500°C.</p> <p>Heating elements made of high temperature kantal wire surrounded into the heating chamber</p> <p>Distribution of Heat : Uniform</p> <p>Should protect heating elements against damage and chemical deterioration.</p> <p>It should be equipped with a dependable indication pyrometer having a 3.5" scale calibrated in 20°C increments to 1200°C with mounting bracket attached to the furnace pyrometer equipped with chromel alumel thermocouple.</p> <p>Temperature of the furnace can be operated continuously up to 900°C -1000°C</p> <p>Temperature controlled by energy regulator fitted in front of the furnace with two indicating lights</p> <p>The furnace is complete with</p> <p>a) one pyrometer, thermocouple, thermal fuse,</p>

		<p>b) 2 meter main lead with lead power plug to work on 220/230 volts AC</p> <p>c) Muffle Size 150 x 150 x 300 mm.,</p> <p>d) Rating : 3.5 KW</p>
7	Heating Mantle	<p>Voltage :220/230 V AC</p> <p>Capacity :10 L</p> <p>Temperature :Up To 300°C</p> <p>Features :With Energy Regulator and with all safety accessories</p>
8	UPRIGHT FREEZER (- 10 C to - 20 Deg C)	<p>150 L capacity Temp: -10 to -25°C</p> <p>Refrigerant : R 134A</p> <p>5 pull-out drawers With Locks</p> <p>Power : 180 W</p> <p>Super-freeze function Reversible door</p> <p>High-temperature alarm CE Certified</p>
9	b) Upright freezer (0 C to -5 C)	<p>150 L capacity Temp: 0 to -5°C</p> <p>5 pull-out drawers With Locks</p> <p>Power :180 W</p> <p>Super-freeze function Reversible door</p> <p>High-temperature alarm CE Certified</p>
10	Digital pH meter	<p>pH Range : 0.00 to 14.00 pH</p> <p>pH Resolution : + 0.01pH</p> <p>pH Accuracy : + 0.01pH</p> <p>mV Range : 0 to + 1999mV</p>

		<p>mV Accuracy : +1mV</p> <p>Temperature Range : 0 to 100 C</p> <p>Temperature Accuracy : +1C</p> <p>Calibration : 3 points</p> <p>Temperature Compensation: 0 to 100deg C</p> <p>Auto calibration</p> <p>Auto-Buffer recognition</p> <p>View electrode slope</p> <p>Automatic temperature compensation</p> <p>Fluid resistant housing and swivel electrode holder</p> <p>Power supply : DC 9V, using AC Adaptor 220 V, 50 Hz</p> <p>SHOULD INCLUDE: 1) pH Electrode, 2) pH Buffers, 3) Temperature Probe, 4) Electrode Stand, 5) 9V Power Adaptor & Instruction Manual</p>
11	Digital Conductivity meter	<p>The equipment should Auto calibrate</p> <p>Should Conductivity Auto-ranging</p> <p>Should have Automatic temperature compensation feature</p> <p>Should have Adjustable temperature coefficient and cell constant</p> <p>Conductivity Range : 0.00 to 1.999,19.99,199.9,1999 μs, 19.99, 200.0 ms</p> <p>Conductivity Accuracy : $\pm 1\%$ F.S</p> <p>Temperature Range : 0 to 100 °C</p>

		<p>Temperature Accuracy : +1 C</p> <p>Temperature Coefficient : 0 to 3.9% per °C</p> <p>Calibration Points :1 point per range</p> <p>Calibration Solution : 10 to 17μS, 100 to 170μS, 1000 to 1700μS, 10 to 17 mS</p> <p>Cell Constant : 0.1, 1.0, 10 adjustable</p> <p>Temperature Compensation: 0 to 50°C</p> <p>Power Supply : DC 9V, using AC Adapter 220V, 50Hz</p>
12	UV Spectrophotometer	<p>Wave length Range : 190 -900 nm or better</p> <p>Source : Tungsten-halogen and Deuterium Lamp</p> <p>Spectral Band width : 0.5/ 1/ 2/4 nm</p> <p>Grating Lines : 1200 lines / mm and 600 lines/mm gratings Crazy Turner</p> <p>Resolution : +/- 0.1 nm or better</p> <p>Stray Light : < 0.05%T or better</p> <p>Wavelength accuracy : ± 0.3nm,</p> <p>Wave Length Reproducibility : 0.1 nm</p> <p>Photometric range : ± 3.5Abs</p> <p>Photometric accuracy : + 0.3 % T</p> <p>Photometric accuracy : ± 0.002A (0~0.5A),</p> <p>Noise : + 0.00004A or better</p> <p>S/N ratio : 300:1 or better</p> <p>Base Line Flatness : + 0.0008ABS or better</p>

		<p>Base Line Stability : 0.0005ABS /H or better</p> <p>Automatic Light source switchover</p> <p>Scanning Speed : 10 to 3000 nm/min</p> <p>Drift : 0.0005 Abs/h</p> <p>Detector : Silicon photodiode/PMT which ever is better</p> <p>Software : Window based complete multitasking software capable to handle data</p> <p>Min 7" TFT color screen and water proofing keyboard</p>
13	Water Bath	<p>Set Temperature : Ambient temperatures of + 5°C - 99.9°C</p> <p>Water Bath Heating : electrically heated,</p> <p>Temperature control : Thermo statically controlled with regulator to facilitate temperature control within ± 20 C.</p> <p>It should be double walled, outside mild steel painted in textured Siemens grey finish</p> <p>Insulation : Glass wool insulation</p> <p>Cover : Nickel plated cover</p> <p>No of Holes : Should have 6 holes of 3" diameter with concentric rings and is fitted with immersion heater (ISI Marked)</p> <p>The equipment should have Digital control system</p> <p>Power rating : Up to 1000 watts.</p> <p>Size : 14" x 10" x 4",</p> <p>Inside Chamber : S. Steel,</p> <p>No of Holes : 6</p> <p>Safety : Alarm indicators</p>

14	Colorimeter	<p>Advanced Optical System :Single Bean, Grating 1200 Lines/mm</p> <p>Wavelength Range :350 - 1000nm</p> <p>Spectral Bandwidth :4nm</p> <p>Wavelength Accuracy :±2nm</p> <p>Wavelength Repeatability :±1nm</p> <p>Photometric Accuracy :±1%T or better</p> <p>Photometric Repeatability :±1%T or better</p> <p>Photometric Mode :T.A.C.F</p> <p>Stray Light :≤0.3%T</p> <p>Stability :±0.002A/h</p> <p>Display :LCD</p> <p>Output :USB Port & Parallel Port (Printer)</p> <p>Light Source :Tungsten Halogen Lamp</p> <p>Power Supply :AC 220V / 50Hz</p> <p>Supplied with :10mm Glass cuvettes</p> <p>Filters required :420,490,510,550,610 up to 9 filters</p>
15	Dissolved Oxygen Analyser	<p>Dissolved Oxygen :</p> <p>Concentration- Polarographic</p> <p>Range : 0 to 90 mf/L</p> <p>Resolution : 0.01, 0.1</p> <p>Relative Accuracy : ± 0.2</p> <p><u>% Saturation – Polarographic</u></p> <p>Range : 0 to 600</p> <p>Resolution : 0.1, 1</p> <p>Relative Accuracy : ±2%</p> <p><u>Concentration-RDO</u></p> <p>Range : 0 to 50 mg/L</p> <p>Resolution : 0.01, 0.1</p> <p>Relative Accuracy : ±0.1 mg/l up to 8 mg/L; ± 0.2 mg/L from 8 to 20mg/L 10% of reading from 20 to 50 mg/L</p> <p><u>% Saturation-RDO</u></p>

		<p>Range : 0 to 500</p> <p>Resolution : 0.1,1</p> <p>Relative Accuracy : $\pm 2\%$</p> <p>Automatic Barometric : 450.0 to 850.0 mm Hg Pressure</p> <p>Correction</p> <p>Salinity Factor Correction : 0 to 45 ppt</p> <p>Calibration features : Water-Saturated air, air saturated water</p> <p>Manual (Winkler) and zero point Probe Characteristics : polarographic or RDO Temperature :</p> <p>Range : 0 to 50°C, 32 to 122 °F</p> <p>Resolution : 0.1</p> <p>Relative accuracy : ± 0.1</p> <p>Datalogging :</p> <p>Number of Points : 2000 with time and date stamp</p> <p>Log Function : Manual, ready (includes AUTO-</p> <p><u>Inputs :</u></p> <p>DO with temperature Probe : 9-pin mini-DIN</p> <p>Output : RS232, USB</p> <p><u>Power :</u></p> <p>AC Adapter : included – universal, 100- 240VAC</p> <p>Battery Power : Optional – 1 AAs</p> <p>Battery Life : 800 hrs</p>
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ANNEXURE-V

TECHNICAL COMPLIANCE REPORT:

A. Laboratory Equipments

S. No.	Description	Technical Specifications	Numerical Values and Other information	Whether Comply (Yes/No)
1	HOT PLATE and Magnetic Stirrer	Stirring Volume : 0 to 2 L		
		Stirring Speed : 0 to 1200 RPM or better		
		Top Plate Size : 130 mm x 130 mm or better		
		Plate Material : Steel		
		Temperature : 0- 300°C		
		Accuracy : $\pm 1^{\circ}\text{C}$ ($<100^{\circ}\text{C}$) $\pm 3^{\circ}\text{C}$ ($<300^{\circ}\text{C}$)		
		Timer : 999 minutes		
2	Rotary evaporator with heating bath built-in vacuum controller	Standard supply : 1 L Evaporating and receiving flask each		
		Digital speed control		
		Digital R.P.M Display		
		Speed control range : 20~250 R.P.M		
		Should have Slant type condenser		
		Should Include Water bath (PTFE coating)		

		Double Jacketed Bath safe to touch		
		Bath Material : SUS304		
		Capacity : 4 L or better		
		Digital interior temperature measure and display		
		Motorized up & down Control switch		
		Standard Distillation solution		
		DIAPHRAGM VACUUM PUMP Delivery : 20 L/min		
		Ultimate vacuum : 700 mm Hg or better		
		Ultimate Pressure : 9.5 mbar or better		
		Power : 180 W		
		Operating current : 0.5A		
		VACUUM CONTROLLER Solid state module for precise control.		
		Adjustable for any pressure level between 1mmHg and kpa abs 101~0		
		Power source : AC 220V 50/60Hz		
		COOLING WATER CIRCULATOR (CHILLER)		
		Capacity : 4L		
		Circulator Pump: Magnet 20W		
		Max. flow :15 L/min		
		Temp. Range : Down to~ -15 °C or better		

		Controller : FND Controller		
		Refrigerator : 1/4HP or better		
		Refrigerant : 134A		
		Power consumption : 330W or better		
		Power Supply : AC 230V 50/60Hz		
3	Digital Melting Point Apparatus	Temperature range : Ambient Room temp upto 300°C		
		Repeatability : 0.2°C at heating rate of 0.2°C/min		
		Temperature Accuracy : $\pm 0.4^{\circ}\text{C}$ (<200°C) $\pm 0.7^{\circ}\text{C}$ (<300°C) or better		
		Temperature Gradients : 0.1°C—20°C		
		Standard Capillary Size : I.D. 1.0mm, O.D. 1.4mm		
		Display : TFT Screen		
		Interface : USB, RS 232, SD Card, Internet		
		Should have an Camera		
		Video Output : SD card 2 G		
		Magnification : 6 X to 8X		
		Capacity per batch: 4 pcs/ batch		
		Curve storage : 50 groups or more		
		Power : 120W		
4	Scientific Balance up	Fully Automatic Electronic weighing Balance.		

	to 1 mg	Capacity : 220 g		
		Readability : 0.1 mg		
		Repeatability : ± 0.1 mg		
		Linearity : ± 0.2 mg		
		Internal Calibration		
		Display : LCD		
		Response Time : 6 sec or better		
		Pan Size : 90mm to 120 mm diameter		
		Operation Temp : +10°C to 40°C		
		Interface : RS232		
		Power : AC 220V/ 50-60 Hz		
5	UV Chamber	Ultra Violet Fluorescence Inspection Cabinet: Dual Wave		
		Low pressure mercury vapour tubes for short U.V. (254 nm.) and long U.V.(365 nm)		
		Separate lamp for visible light.		
		Inspection allowance.		
		Chamber should be Well closed		
		It should hold TLC plates of size :20 cm x 20cm & 20cm x 10 cm		
		All parts are powder coated.		

6	Muffle Furnace	Digital temperature indicator cum controller.		
		Casing : mild steel reinforced with iron angles riveting screw joints		
		Heating chamber Shape: Rectangular horizontal		
		Temperature : 1500°C.		
		Heating elements : High temperature kantal wire		
		Distribution of Heat : Uniform		
		Safety : Should protect heating elements against damage and chemical deterioration.		
		It should be equipped with a dependable indication pyrometer having a 3.5" scale calibrated in 20°C increments to 1200°C Pyrometer equipped with chromel alumel thermocouple.		
		Temperature : operated continuously up to 900°C -1000°C		
		Temperature controlled by energy regulator fitted in front of the furnace with two indicating lights		
		The furnace is complete with		
		a) one pyrometer, thermocouple, thermal fuse,		
		b) 2 meter main lead with lead power plug to work on 220/230 volts AC		

		c) Muffle Size : 150 x 150 x 300 mm.,		
		d) Rating : 3.5 KW		
7	Heating Mantle	Voltage :220/230 V AC		
		Capacity :10 L		
		Temperature :Up To 300°C		
		Features :With Energy Regulator and with all safety accessories		
8	UPRIGHT FREEZER (- 10 C to - 20 Deg C)	150 L capacity Temp: -10 to -25°C		
		Refrigerant : R 134A		
		5 pull-out drawers With Locks		
		Power : 180 W		
		Super-freeze function Reversible door		
		High-temperature alarm CE Certified		
9	b) Upright freezer (0 C to -5 C)	150 L capacity Temp: 0 to -5°C		
		Refrigerant : R 134A		
		5 pull-out drawers With Locks		
		Power : 180 W		
		Super-freeze function Reversible door		
		High-temperature alarm CE Certified		
10	Digital pH meter	pH Range : 0.00 to 14.00 pH		
		pH Resolution : + 0.01pH		

		pH Accuracy : + 0.01pH		
		mV Range : 0 to + 1999mV		
		mV Accuracy : +1mV		
		Temperature Range : 0 to 100 C		
		Temperature Accuracy : +1C		
		Calibration : 3 points		
		Temperature Compensation: 0 to 100deg C		
		Auto calibration		
		Auto-Buffer recognition		
		View electrode slope		
		Automatic temperature compensation		
		Fluid resistant housing and swivel electrode holder		
		Power supply : DC 9V, using AC Adaptor 220 V, 50 Hz		
		SHOULD INCLUDE: 1) pH Electrode, 2) pH Buffers, 3) Temperature Probe, 4) Electrode Stand, 5) 9V Power And Adaptor & Instruction Manual		
11`	Digital Conductivity meter	The equipment should Auto calibrate		
		Should Conductivity Auto-ranging		
		Should have Automatic temperature compensation feature		

		Should have Adjustable temperature coefficient and cell constant		
		Conductivity Range : 0.00 to 1.999,19.99,199.9,1999 μ S, 19.99, 200.0 ms		
		Conductivity Accuracy : $\pm 1\%$ F.S		
		Temperature Range : 0 to 100 $^{\circ}$ C		
		Temperature Accuracy : ± 1 $^{\circ}$ C		
		Temperature Coefficient : 0 to 3.9% per $^{\circ}$ C		
		Calibration Points : 1 point per range		
		Calibration Solution : 10 to 17 μ S, 100 to 170 μ S, 1000 to 1700 μ S, 10 to 17 mS		
		Cell Constant : 0.1, 1.0, 10 adjustable		
		Temperature Compensation: 0 to 50 $^{\circ}$ C		
12	UV-VIS Spectrophotometer	Power Supply : DC 9V, using AC Adapter 220V, 50Hz		
		Wave length Range : 190 -900 nm or better		
		Source : Tungsten-halogen and Deuterium Lamp		
		Spectral Band width : 0.5/ 1/ 2/4 nm		

	Grating Lines : 1200 lines / mm and 600 lines/mm gratings Crazy Turner		
	Resolution : +/- 0.1 nm or better		
	Stray Light : < 0.05%T or better		
	Wavelength accuracy : ± 0.3 nm or better		
	Wave Length Reproducibility : 0.1 nm		
	Photometric range : ± 3.5 Abs		
	Photometric accuracy : + 0.3 % T		
	Photometric accuracy : ± 0.002 A (0~0.5A),		
	Noise : + 0.00004A or better		
	S/N ratio : 300:1 or better		
	Base Line Flatness : + 0.0008ABS or better		
	Base Line Stability : 0.0005ABS /H or better		
	Automatic Light source switchover		
	Scanning Speed : 10 to 3000 nm/min or better		
	Drift : 0.0005 Abs/h		
	Detector : Silicon photodiode/PMT which ever is better		

		Software : Window based complete multitasking software capable to handle data		
		Min 7" TFT color screen and water proofing keyboard		
13	Water Bath	Set Temperature : Ambient temperatures of + 5°C - 99.9°C		
		Water Bath Heating : electrically heated,		
		Temperature control : Thermo statically controlled with regulator to facilitate temperature control within ± 20 C.		
		It should be double walled, outside mild steel painted in textured Siemens grey finish		
		Insulation : Glass wool insulation		
		Cover : Nickel plated cover		
		No of Holes : Should have 6 holes of 3" diameter with concentric rings and is		
		Immersion heater (ISI Marked)		
		The equipment should have Digital control system		
		Power rating : Up to 1000 watts.		
		Inside Chamber : S. Steel,		
		No of Holes : 6		

		Safety : Alarm indicators		
14	Colorimeter	Advanced Optical System: Single Bean, Grating 1200 Lines/mm		
		Wavelength Range: 350 - 1000nm		
		Spectral Bandwidth: 4nm		
		Wavelength Accuracy: ± 2 nm		
		Wavelength Repeatability: ± 1 nm		
		Photometric Accuracy : $\pm 1\%$ T or better		
		Photometric Repeatability : $\pm 1\%$ T or better		
		Photometric Mode: T.A.C.F		
		Stray Light : $\leq 0.3\%$ T		
		Stability : ± 0.002 A/h		
		Display : LCD		
		Output : USB Port & Parallel Port (Printer)		
		Light Source: Tungsten Halogen Lamp		
		Power Supply : AC 220V / 50Hz		
		Supplied with : 10mm Glass cuvettes		
		Filters required: 420 nm,490 nm,510 nm,550 nm,610 nm up to 9 filters		
15	Dissolved Oxygen Analyser	% Saturation – Polarographic Range : 0 to 600 Resolution : 0.1, 1 Relative Accuracy : $\pm 2\%$		

		<u>Concentration-RDO</u> Range : 0 to 50 mg/L Resolution : 0.01, 0.1 Relative Accuracy : ± 0.1 mg/l up to 8 mg/L; ± 0.2 mg/L from 8 to 20mg/L 10% of reading from 20 to 50 mg/L		
		<u>% Saturation-RDO</u> Range : 0 to 500 Resolution : 0.1, 1 Relative Accuracy : $\pm 2\%$ Automatic Barometric : 450.0 to 850.0 mm Hg Pressure		
		<u>Correction</u> Salinity Factor Correction : 0 to 45 ppt Calibration features : Water-Saturated air, air saturated water		
		Manual (Winkler) and zero point Probe Characteristics Range : 0 to 50°C, 32 to 122 °F Resolution : 0.1 Relative accuracy : ± 0.1		
		<u>Datalogging :</u> Number of Points : 2000 with time and date stamp Log Function : Manual, ready (includes AUTO-		
		<u>Inputs :</u> DO with temperature Probe : 9-pin mini-DIN		
		Output : RS232, USB		

		Optional – 1 AAs Battery Life : 800 hrs		
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ANEXURE-VI

DETAILS OF EQUIPMENTS TO BE SUPPLIED AT VARIOUS IKGPTU CAMPUSES:

S. No	Name of the Equipment	Kapurthala	Amritsar	Batala	Bhikhiwind	Dinanagar	Hoshiarpur	Total Quantity
1	Magnetic Stirrer and Magnetic Stirrer	5	5	5	5	5	0	25
2	Rotavapor with vaccum pump and chiller	1	0	0	0	0	0	1
3	Melting Point Apparatus	2	1	1	1	1	0	6
4	Scientific Balance up to 1mg	2	2	2	2	2	0	10
5	UV Chamber	2	2	2	2	2	0	10
6	Muffle Furnace	1	0	0	0	0	0	1
7	Heating Mantle	5	5	5	5	5	0	25
8	(A) Freezer up to -10 to -20°C	1	0	0	0	0	0	1
9	(B) Freezer from 0 C to -5C	0	1	1	1	1	0	4
10	Digital pH Meter	5	5	5	5	5	0	25
11	Digital Conductivity meter	5	5	5	5	5	0	25
12	UV Spectrophotometer	1	0	0	0	0	0	1
13	Water Bath	2	2	2	2	2	0	10
14	Colorimeter	2	2	2	2	2	0	10
15	Dissolved oxygen analyser	1	1	1	1	1	0	5