SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY,LONGOWAL

		NAME OF FIRM/AGENCY	
Technical Bid		**E-TENDERNO. PUR/30/2020-21**	
Category: "A"		**DEPARTMENT: CHEMICAL ENGINEERING-HEFA**	
S.No.	**Name of Item/ Equipment**	**Detailed Specifications (Generic)**	**Quantity**
1	**Overhead Stirrer**	Overhead stirrer having dual speed range of 0/150 - 6000 rpm. Microprocessor controlled technology with a removable wireless controller and a digital TFT display. The stirrer should have equipped with a RS 232 and a USB interface. Should have overload protection and able to display viscosity changes measurements. Accessories including strap clamp for stand diameter: of 25-36mm for holding vessel of diameter 40-300mm, stirrer rotor diameter within 40-50mm and stable stand along with head clamp should be provided	1
2	**Reciprocating pump test rig**	Reciprocating pump – Double cylinder, 3/4"x 3/4" size to be provided with 1 HP (of standard make). DC motor & speed controller; Sump tank: 900 x 600 x 600 mm. height; Measuring tank: 400 x 400 x 450 mm height; Energy meter for motor input measurement; Pressure & Vacuum gauge for measurement of head; Pressure relief valve; Stop watch; Technical manual: 01. The unit should be provided with an attractive & rust proof powder coating.	1
3	**Pilot tube**	Measuring tank size 400x400x300 mm, MS Material,18 gauge with power coating.; Sump tank size 900x400x400 mm, MS Material,18 gauge with power coating; Motor ISI Make, Cable Finoax; Plug: anchor; Handle Valve 1' and ½' brass; Structure: 490x210x410 mm MS Material,18 gauge with power coating. GI pipe: standard ISI make; Connection: GI/PVC; U Tube manometer: 0-400 mm acrylic body	1
4	**Gear pump test rig**	Gear pump with 1/2 HP three phase motor of standard make (ISI mark, Kirloskar/Crompton/equivalent make) with three speed cone pulleys mounted over the sump tank. Discharge measurement tank; Pressure gauge for discharge head and vacuum gauge for suction vacuum; Energy meter for power input; Pressure relief valve in discharge pipe; Needle valve to control discharge pressure. The equipment should be capable for determining following characteristics: Speed V/S Discharge; Head V/S Discharge; Discharge V/S input power; Discharge V/S efficiency. The unit to be provided with and attractive & rust proof powder coating. The technical manual: 01.	1
5	**Multistage centrifugal pump test rig**	Centrifugal pump: Monoblock (ISI mark, Kirloskar/Crompton/equivalent make), 2" x 2" size, 2 stage pump with 5HP 3 phase induction motor; Sump tank (Stainless steel 316): 900 x 900 x 750 mm height; Measuring tank (Stainless steel 316): 300 x 400 x 400 mm. height; Energy meter for motor input measurement; Pressure gauge at 1st and 2nd stage delivery & vacuum gauge at suction for measurement of head; Stop watch; The unit to be provided with an attractive & rust proof powder coated mounting; Technical manual: 01	1

6	**Rotary air compressor rig**	Vane compressor-Rotary compressor (ISI mark, Kirloskar/Crompton/equivalent make), , driven by 3 HP motor; Calibrated orifice meter with water manometer to measure air intake; Energy meter to measure input of the meter; Pressure gauge to measure discharge pressure; Control valve at delivery side; Stop clock. A technical manual: 01	1
7	**Dropwise/ film wise condensation**	To determine overall heat transfer co-efficient for Film wise & Drop wise condensation of steam on a vertical surface. Visualization of condensation process in drop wise as well as film wise condition. Copper tubes (2 Nos.): one with natural finish and other nickel polished, ID 16 mm, OD: 19 mm (Approx.), Length: 175 mm (Approx.); Water Flow measurement: Rotameter. Condensate Measurement: Measuring Cylinder & Stopwatch; Steam Generator: 8 Litres. (Approx.) made of Stainless steel with 1.5 kW heater; Insulated with ceramic wool and cladded by aluminium foil; Control valves: One each for Steam; Cooling water & Drain; Pressure Gauge: Bourdon type; Control panel comprising of: Digital Temp, Controller : PID Controller, 0- 199.9° C (For Steam Generator); Digital Temp. Indicator : 0-199.9°C, with multi-channel switch, Temperature Sensors : RTD PT-100 type-6Nos. Standard make On/Off switch, Mains Indicator etc.	1
8	**Computerised CSTR**	Constant stirred tank reactor for the study of reaction kinetics and stability of process, tuning of controller (PID) (close loop method) and tuning of controller (PID) (open loop method) Material of construction: borosilicate Glass / Acrylic / PVC, Volume variable, 0.4-1.5 Litre, Baffles SS /Acrylic removable Variable speed 0-230rpm Agitator. SS 304 for heating and cooling Heat Transfer Coil, material of construction: PP/PTFE/Ceramic variable speed for different flow Reagent feed pump (2nos.). material of construction: acrylic, capacity 5 litres Reagent feed tank (2nos). Material of construction: SS 304 with digital temp. Controller Hot water tank. Hot water circulation pump of MOC PP/PTFE/Ceramic Operation range: minimum up to 60°C. Reaction rate monitoring using Temperature (RTD PT 100 type or better) and Conductivity sensor. With SCADA type of control having control unit; Interfacing unit with ADC/DAC conversion and RS232 communication. Compatible HP/Acer/Lenovo/Del Computer i5 or higher with UPS and Printer (HP): minimum 4 GB RAM, Minimum 500 GB SSD, 17" TFT, DVD-RW drive, optical mouse, Keyboard, Speakers, with 10/100/1000 LAN card. Minimum 01 RS232, 1 Parallel, 6 USB port (two at front) OS: Windows 10 Certified Version. and the compatible software to run the unit, data logging and acquisition. All the wetted part should be of SS304.	1
9	**Probe-sonication system**	System should be Microprocessor based, programmable along with software to connect with tablet or Pad for controlling and monitoring the process, Sample operating Range: 0.2 to 1500 mL, Operating frequency: 20kHz or better, Control mode: auto-tuned frequency mode, Number of programmes: 10 No. or more, Power Output: Upto 500 Watts or more, Amplitude setting: 10% – 100%, Pulse/cycle repetition from 1 to 10000 or better, Probes for processing volumes in the range of 0.2 to 500 mL to be supplied, System should be with sound box stand and Jack, System must be CE, RoHS and EMC certified and copy of certificate must be attached with offer. The system should be provided with all other accessories to make the system operational. Warranty period of the equipment should be minimum one year.	1

10	**Programmable Muffle Furnace**	Maximum temp. : 1500ºC; Working temperature: 1400ºC; Temp. Accuracy : +/- 5 ºC Heating Elements : Silicon Carbide Spiral / Rod type, with end connection, easily replaceable. Inner Chamber : Ceramic Board with base plate of Silicon Carbide, with heating elements placed on the top. Insulation : Ceramic Fibre of Zirconia grade Construction : Triple walled with air insulation on the outer side for minimal skin temp. Body : Made of mild steel duly powder coated Door : Parallel action hinged type insulated with ceramic fibre and has a viewing cap. Power Control : SCR unit (Phase angle thyristor) Temp. Control : Microprocessor based programmable controller, having 1 program x 16 segments (ramp/soak profile). Dual display of set & actual temp. with soft touch keys. With thermocouple break protection & cold junction compensation. Sensor : Pt / Pt-Rh 13% Safety : Over current and Short Circuit Protection. Thermocouple break alarm High Temp. alarm Control Panel : 220 volts, single phase AC Supply Muffle Size : 200 mm X 200 mm X 300 mm (W x H x D) (8 x 8 x 12 inch) Other Accessories : (i) Alumina tray, 130 ml, (length ~150 mm, width ~65 mm and height ~20 mm): 02 (ii) Alumina Low form crucible, 175 ml, (height ~50 mm, lower diameter ~65 mm and upper diameter ~80 mm): 02 (iii) Alumina Boat, 40 ml, (length ~135 mm, width ~25 mm and height ~20 mm): 02 (iv) Hydrothermal Autoclave: 50 ml, Threaded type, Stainless steel with Teflon liner: 01 (v) Black Granite Mortar and Pestle (6-inch inner diameter): 01	1

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Technical Bid		**E-TENDERNO.PUR/30/2020-21**	
Category:"B"		**DEPARTMENT; CHEMISTRY (HEFA)**	
S.No.	**Name of Item/ Equipment**	**Detailed Specifications (Generic)**	**Quantity**
1	**Surface Area and Pore Size Distribution Analyzer**	Measurements: B.E.T, STASA, Volumetric Gas Adsorption Method Surface Area Range: 0.01 m2/g and above (N2/77K) 0.0005m2/g (Kr/77K) Pre Size range : 0.35≥ 400nm Detectable Volume Limit: 0.0001cc/g Pressure Transducer: 0-1000 Torr Accuracy: 0.11% full scale Minimum resolvable pressure: 0.00025 torr Minimum resolvable relative pressure: ≥0.0000003(Nitrogen)	**1**

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NAME OF FIRM/AGENCY

Technical Bid		E-TENDER NO. PUR/30/2020-21	
Category:"C"		DEPARTMENT : EIE (HEFA)	
S.No.	Name of Item/ Equipment	Detailed Specifications (Generic)	Quantity
1	**Electrical Safety Demonstrator**	Study of importance of Earthing in any electrical device. Study of role of Fuse in any electrical or electronic circuit. Study of importance and working of Miniature Circuit Breaker (MCB). Transparent Model of MCB should be provided on board. Fuse with variable supply on board. Simulation diagram of earting circuit printed on board. Ammeter should be provided on board. Trainer should be encased in a plastic molded box. Mains : 230 V ±10%, 50 Hz (Detachable mains chord to be provided) Accessories included : Operating and E Manual & Necessary Patch cords Trainer should be on Legend PCB .Housed in a Molded case with molded cover.	2

2	**Panel to study Different circuits used in Home electrical wiring**	The Panel should consists of Single Phase Energy Meter, MCB, Controlling Switches, Tube Light with Choke, Regulated Switch, Ceiling Fan, etc. Good quality sockets should be provided on board for power supply and load connections. Energy Meter (5 electrical Parameters on display) kWh: Meter Constant : 1600 impulses /kWh Display Counter : 100 impulses /kWh ;Resolution : 0.001kWh Voltage : 10 - 230Vrms, Accuracy ± (1% reading + 2 digits) Current : 0.2 - 5Arms, Accuracy ± (1% reading + 2 digits) Active Power : 10-1500Watt, Accuracy ± (2% reading + 3 digits) Frequency : 45-55Hz, Accuracy ± 0.5Hz Single Phase Meter (3 Electrical Parameters on display) Voltage : 10 - 230Vrms, Accuracy ± (1% reading + 2 digits) Current : 0.2 - 5Arms, Accuracy ± (1% reading + 2 digits) Active Power : 10-1500Watt, Accuracy ± (2% reading + 3 digits) Load specifications Tube Light : 20W, 220-240V with Choke & Starter ; Lamp load : 4 Nos (for series and parallel operation) Ceiling Fan : 50W, :220-240V ; Fan Regulator : 100W Five pin Socket : 2Nos.(5A each) ; Two way switch: 2Nos. 5Aeach Two pole two way switch: 2Nos. 5A(each) Single Phase MCB SPN :Current Rating :6A ; Type : "C" Single Phase MCB SP: Current Rating :1A ;Type : "C" Mains Supply : 230 V ±10 %, 50 Hz BS 10 Type safety terminals & patch cords should be provided For Proper safety . Front Plate : Aluminum Screen Protected Rust free powder coated mechanical structure.	2
3	**Training Panel to study different types of meters & there connectivity**	The Panel should have facility to Study the operation & working of Moving Coil , Moving iron & Dynamometer type Instruments Circuit diagram should be screen printed on the top of the Panel. Inbuilt Variable AC supply : 0 to 230 V; Inbuilt Variable DC supply : 0 to 6 V (with load) Meters Used for study with Transparent front AC Voltmeter (MI) : 0 to 300 V ; DC Voltmeter (MC) : 0 to 1A AC Ammeter (MI) : 0 to 1A ; DC Ammeter (MC) : 0 to 10 V AC Wattmeter (Dynamometer) : 0 to 500 W Mains Supply : 230 V ±10 %, 50 Hz Training panel should be made of rust free robust FRP material . Front Plate : Aluminum Screen Protected	2

4	**Study of working of Single phase Electronic Energy Meter**	Inbuilt Voltmeter, Ammeter, Watt meter as Standard meter for calibration of Energy meter ; Big font LCD (16 x 2) for use as Standard meter/Energy meter calibration Separate Seven Segment Display as Energy meter ;Digital Calibration/ Operation using Keypad Sockets are provided to Connect External Voltmeter, Ammeter and Watt meter for Calibration ; Default and User Calibration modes should be provided to avoid errors during Operation. ; 5 LED Operation Indicators Auxiliary Power Supply : 90 - 270V ±10%, 50Hz Standard meters :Voltmeter Min/Max : 10/300V ;Ammeter Min/Max : 0.1/5A Watt meter Minimum/Maximum : 10/1500W Energy meter Display Resolution : 0.001kWh Frequency : 50Hz ; Fuse : 250mA (2 Nos.) ; 5A (4 Nos.) Socket for connection brought on the top of the box/Module. Load : Resistive Lamp load 1.2 KW in steps of 100 watts to be provided with only switches on the top & lamps to be provided inside the box. On boards MI ammeter 10 A & indication light for power on..	2
5	**Trainer To study Internal Blocks & working of Digital multimeter**	Trainer should be able to demonstrate Voltage Measurement (both AC and DC), Current Measurement and Resistance Measurement. Signal Conditioning, AC to DC Conversion Sections, LED Display and a Continuity Tester should also be available on the training board. Rotary Switches should be provided for the Function, Range and Decimal Selection AC Voltage : 0 to 350 V ; DC Voltage range : 0 to 350 V AC Current range : 0- to 2 A ; DC Current range : 0 to 2 A Resistance : 0 to 2 M ohms ; On Board Fuse : 200mA, 2A Display: 3 ½ digit seven segment , On Board Continuity tester Interconnections: BS 10 type Connectors should be provided for safety at high voltages Mains supply : 230V ±10%, 50Hz Cabinet Housing : Enclosed on a plastic Molded box with molded cover. No components on the top of the trainer.	2

6	**Training Panel to study characteristics of MCB & HRC Fuse**	Main Features & specifications Inbuilt current injection facility ; Transparent MCBs for better visibility of internal structure ; Should have rugged & safe design , BS 10 type sockets & Patch cords should be provided .;16 x 2 big font Alphanumeric LCD display for Display of Time, Current & Temperature ; MCBs should be , Indication lab for mains supply should be provided on Panel mounted with temperature sensor for current temperature analysis Single Phase Variac :Input : 230V ;Output : 0-270V ;Current : 10A Single Phase Transformer :Rating : 1kVA ;Input : 230V ;Output : 230V MCB's : B type, 6A & C type, 2A ; HRC Fuse : 6A Temperature Sensor : LM35, 2 Nos. Mounting Type Mounting with Brass Holder mounded on PCB Display Resolution : 0.1˚C ; Protective Device : 10 A (SPN) Mains Supply : 0 - 220V AC ±10% 50Hz ; Rheostat : 100Ω /5A Rust free powder coated mechanical structure Front Plate : Aluminum Screen Protected	2
7	**Oscilloscope Demonstrator**	Oscilloscope in open form with all components and controls placed on single PCB .. Separate sections for PS, EHT, VA, HA, TB & Trigger for easy identification. Fault creation & Rectification provided .Track printing with different colours on different sections on component board for easy circuit training Legend Printing on PCB for easy identification of components Can be used as a standard 20 MHz Dual Trace Oscilloscope Bandwidth : DC-20 MHz (-3 dB) Channel I, Channel II, Channel I & II Alternate or chopped, Controls provided on PCB. Channel selection signals available at Test points. X-Y operation 1:1 Vertical Deflection (Y) :Deflection Coefficients : 12 calibrated steps 5 mV / cm - 20 V / cm Maximum Input voltage : 350 V (DC + Peak AC) Pre-Amp, Final Amp Outputs at Test Points. Time base:Time Coefficients : 18 calibrated steps, 0.5 µs / cm - 0.2 s / cm with magnifier x 5 to 100 ns /cm, with variable control to 40 ns / cm TB generation at Test Points Trigger System:Modes : Automatic or Variable ; Source : CH I, CH II, External ,Slope : Positive or Negative ;Coupling : AC, TV Frame Component Tester : Test Voltage : Max 8.6 V (Open) rms ;Test Current : Max 8 mA (Shorted) rms ;Test Frequency : 50 Hz, Test circuit grounded to chassis Fault Simulation : Total 15 Faults included Included Accessories :Learning material (CD)., BNC-BNC Cable 1 No., BNC - Prod tip Cable 1 No., Test Prods 1 pair,. Additional Jumpers 10 Should be supplied with 3 3/4 Digit DMM with terminal shutter blocking facility Frequency & Capacitance measurement, Diode , Transistor hfe & Continuity test, , Relative measurement .	2

8	**Benchtop LCRQ-D Bridge -Meter**	Large character LCD display with backlight Fast measurement speed (80mS) 2 signal source output impedance:30Ω, 100Ω Test Parameter : L-Q, C-D, R-Q, |Z|-Q Basic Accuracy : 0.2% ; Equivalents circuit : Series, parallel Rang mode : Auto, Hold ; Trigger mode : Internal Measurement speed : Fast: 12, Med: 5.1, Slow: 2.5 (meas/sec) Correction Function : Open/Short multi-frequency Zeroing Measurement Terminals : Five Terminals Test Frequency : 100Hz,120Hz,1kHz,10kHz, Accuracy 0.01% Output impedance : 30Ω , 100Ω ; Signal level : 0.3Vrms, 1Vrms Measurement Display Range |Z|, R : 0.1mΩ - 99.99MΩ ; C at 100Hz/120Hz : 1pF - 99999μ F ; 1KHz : 0.1pF - 9999.9μ F ;10KHz : 0.01pF - 999.99μ F L 100Hz/120Hz : 1μH - 99999H ; 1KHz : 0.1μH - 9999.9H ;10KHz : 0.01μH - 999.99H D : 0.0001 - 9.999 ; Q : 0.0001 - 9999 ; Δ% : -999.99% - 999.99% Display: Display Mode : Direct ; Large character LCD with backlight Display digits : Primary and secondary display:5 digits Mains : 198-242 V / 48Hz - 60Hz	2

9	**Training Panel to Study Power Measurement using CT & PT**	Main Features & specifications High resolution and accurate meters Digital Voltmeter, Ammeter and Wattmeter Internal variable power source Real time appearance of CT with facility to change primary turns Provided with all the accessories including rheostat In built on panel Single Phase Variac : 0-270V AC, 50Hz Input : 230V ;Output : 0-270V ;Current : 5A Digital Ammeter (2 Nos); Range min/max :0.1A/5A ; resolution : 0.01A AC Digital Voltmeter (2 Nos.);Range min/max : 10V/300V ; resolution : 1VAC Digital Wattmeter (2 Nos.); Range min/max : 15W/500W ; resolution : 1W Current transformer : CT ratio: 1:10 ; Secondary Current rating: 2A potential transformer: PT1: Primary: 230V; Secondary: 115V; PT ratio: 1:2 PT2: Primary: 230V; Secondary: 57.5V; PT ratio: 1:4 Rheostat: 220 ohms ;2.8A ; MCB : 2A (SPN) Mains Supply : 230V AC ±10%, 50Hz Training Panel should have Rust free power coated mechanical structure circuit diagram printed on board & BS 10 type sockets & Patch cords should be provided for safety of user & short circuit protection	2
10	**Experiment setup for Calibration of a Voltmeter & Ammeter using DC potentiometer Meter**	The set up should consist of : Standard Calibrated Digital Voltmeter & Ammeter , Trainer board with Ammeter & Voltmeter to be calibrated , Potentiometer Technical Specifications Analog Voltmeter : 0 - 10 V ;Analog Ammeter : 0 - 1 A Potentiometer Wire : Constantan ;Length : 10 m DC Supply (Standard) : 1.0 V On Board digital Voltmeter : 0-2V ; Digital Ammeter : 0-1A ; Galvanometer: 1999 Variable Resistance : 3 – Decade : X0.1 , X 1 , X 10 Voltage Ratio Factor : 0, 1.5, 15, 30, 150, 300 Total Resistance : 15 k ; Variable Supply : 0 - 12 V Interconnections: 2mm sockets & 2 mm banana Patch cords stackable Mains Supply : 230 V ±10%, 50 Hz; Fuse : 0.5 A	2

11	**B-H curve of iron using a solenoid**	The set up should be able to measure magnetic parameters like Corecivity , Retentivity ,Saturation magnetization Various magnetic phase identification & Hysteresis loss of different ferromagnetic material samples. Magnetic field measurement unit Display : 3½ digit LCD Mains Supply : 230 ±10%/ 50 Hz Sample :Type : Nickel, Hard Steel, Soft Steel Length : 39 mm each ;Diameter : 1.2 mm each Diameter of pickup coil : 3.21 mm Oscilloscope: 30 MHz dual trace Oscilloscope.	2
12	**Theorems Trainer to verify Norton's, Thevenin's, Maximum Power Transfer, Superposition, Reciprocity & Tellegen's Theorems] : -**	Training board should have Constant current source ; On board Voltmeter & Ammeter Straight forward representation of all theorems ; On board equivalent circuits Potentiometer to be provided to vary load resistance DC power supply : +5V & +12 V Regulated ;;Constant Current Source : 3.2 mA Voltmeter Range : Multi range 200mV to 20V ; Ammeter Range : Multi range 200µA to 200mA Interconnections : 2mm Sockets & 2 mm Patch cords Stackable Mains power supply : 90 - 270V ±10%, 50Hz Trainer should be housed in a protected case with cover attached to it to protect it from dust.	2
13	**Kirchhoff's Current & Voltage Law Trainer : -**	No components on the top of the trainer, only Block Diagram/Circuit diagram printed on top. On Board DC Power Supply: +12 V ; On Board DC Ammeter: 3.5 Digit ; LCD/LED Range: 2µA to 200 mA; Interconnections: 2mm Sockets & 2 mm Patch cords Stackable. Fuse : 500 mA slow blow ; Mains Power Supply : 230V ±10%, 50Hz	2

14	**Series & Parallel RLC resonance Trainer**	On Board Signal Generator: Freq.Ranges:1 KHz, 10 KHz,60 KHz, Generator Output : 8Vpp Onboard LCD based Voltmeter and Frequency Counter Voltmeter : 2V, Interconnections : 2mm gold plated Patch cords : 2mm banana stackable & gold plated Main Supply : 90-275V/50 Hz, Multiple combination Of components will be provided . Observation can Be made on oscilloscope or using LCD display for Voltmeter & Frequency counter provided on board Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2
15	**Two Port Network Trainer**	Study of Z, Y& ABCD-Parameters of a Passive Two Port Setup Includes :- Power Supply : 12 V, 5 V DC, Various test point Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2
16	**Two Port Ladder Network Trainer**	Study and verification of Transfer Function of Two port ladder Network Experiment Trainer Board that Contains Power Supply : 12 V DC, Various test point Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2
17	**T & π Network Trainer**	Study and Verification of Image Impedance of Unsymmetrical T & π- Network Study and Verification of Characteristic Impedance of symmetrical T& π- Network Setup Includes :- Power Supply : 5 V DC, Various test point Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2
18	**Transient response of RL & RC circuit with AC & DC Input signals**	Study Transient response of RL & RC circuit with AC & DC Input signals Calculation of time constant of RC and RL circuits Setup Includes :- Power Supply : 5 V DC, Various test point Built in Signal Generator Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2

19	**Transient response of RLC circuit with built in TTL signal**	Study the transient response of a series RLC circuit with TTL for under damped, critically damped and over damped cases Setup Includes :- RLC circuit & Built in Signal Generator Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2
20	**Study interconnection of two port Networks**	Study the cascade connection of Two port network with Loading effect Study series & Parallel connections of two port network with Loading effect Setup Includes :- 2 Separate Two port Resistive Networks Inbuilt DC Power Supply : + 5V & +12 V Trainer will be on Legend PCB with no components on the top of board. Housed in a moulded case with moulded cover on top to protect from dust.	2
21	**Two speed hammer drill machine**	Versatile range of applications due to chisel function; Overload clutch to protect the user and the machine; Forward or reverse rotation for dislodging jammed drill bits Continuously variable speed control for clean drilling starts, Impact stop for drilling in wood and steel Drilling Range: Drilling diameter concrete, hammer drill bits 4 - 20 mm; Opt. appl. range concrete, hammer drill bits 4 - 10 mm; Drilling diameter in concrete with core cutters 68 mm; Maximum drilling diameter masonry, core cutters 68 mm; Maximum drilling diameter steel 13 mm; Maximum drilling diameter wood 30 mm; Maximum drilling diameter concrete 20 mm; Hammer drilling in concrete vibration emission value ah 14 m or s^2; Uncertainty K 1.5 m or s^2 Chiseling: Vibration emission value ah 12 m or s^2; Uncertainty K: 1.5 m or s^2	4

22	**Universal Solderless Breadboard**	: 172.5mmx128.5mm (Minimum) DC Power Supply : +5V, +12V, -12 to 0 to +12V (variable) with 1A Pulse Generator : square, triangle, sine (Frequency Range:1Hz to 1MHz in 6 steps, variable in between Amplitude: 5V (TTL) / 12V (TTL) Pulser Switches (+ve and -ve) : 1 each TTL compatible bounceless switches with LED indicators 16nos. TTL compatible LED output indicators 16nos. 7-Segment display with decoder/driver : 4 nos. On board Section : voltmeter, CRO connector Accessories : Mains cord, operating and experimental manual, connecting leads.	60
23	**Kelvin Bridge**	DC Power Supply : +5V Known Resistance : R1=100KΩ, 20KΩ, 10KΩ ; R3=1KΩ, 200Ω, 100Ω Unknown Resistance : 0.3Ω, 0.4Ω, 0.8Ω ; DPM : 2V LED Display for Null Detection. Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Power Requirement :30 V ±10% 50 Hz (Detachable Mains Cord) Accessories included: Mains cord, E-Manual Trainer should be encased in a plastic molded box with cover ,with no circuitry components on the top only block diagram should be provided on top of trainer. Should be supplied with coloured wall chart with information on various Bridges.	2

24	**De Sauty's and Schearing Bridge on single board**	Inbuilt 1 kHz sine wave generator with variable amplitude Null detector with DPM & Differential Amplifier Sine Wave Generator : Frequency range : 1kHz ±10% Amplitude control output : Up to 15Vpp; Fuse : 500 mA, S/B ; DPM : 200 mV for null detection ; Unknown Capacitor : 0.1µF, 0.22µF, 0.47µF Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Power Requirement :30 V ±10% 50 Hz (Detachable Mains Cord) Accessories included: Mains cord, E-Manual Trainer should be encased in a plastic molded box with cover ,with no circuitry components on the top only block diagram should be provided on top of trainer. Should be supplied with coloured wall chart with information on various Bridges.	2
25	**Wein's Bridge for Frequency Measurement & as Oscillator**	Separate Circuits for of Wien Bridge as an frequency detector & as a oscillator Inbuilt Sine wave Generator & 12V DC power supply On Board null detector with Differential amplifier, ADC and DPM Frequency Measurement by Wien Bridge Section Sine Wave Generator :Freq : 1 kHz to 5 kHz ±10% ; Amplitude : 0 to 2V ±10% Potentiometers : 1k Ω Wien Bridge Oscillator Section: DC Power Supply : ±12V ; Potentiometer : 470kΩ Design of Oscillators : Passive elements & op-amp as amplifier Mains Supply : 230V AC ±10%, 50 Hz Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Power Requirement :30 V ±10% 50 Hz (Detachable Mains Cord) Accessories included: Mains cord, E-Manual Trainer should be encased in a plastic molded box with cover ,with no circuitry components on the top only block diagram should be provided on top of trainer. Should be supplied with coloured wall chart with information on various Bridges.	2

26	**Maxwell's Bridge**	Maxwell's inductance bridge and Maxwell's inductance-capacitance bridge on a single board; Inbuilt 1 kHz sine wave generator with variable amplitude Null detector with DPM DC Power supply : +12V, -12V;Sine wave generator : Fixed Freq. :1KHz ±5% ; Amplitude Control Range : Up to 20Vpp Unknown Inductors : 10 mH, 20mH, 30 mH, 56µH, 24µH, 12µH DPM : 200mV as Null detector ; Unknown Internal Resistance : 470Ω, 10 Ω , 20 Ω , 30 Ω Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Power Requirement :30 V ±10% 50 Hz (Detachable Mains Cord) Accessories included: Mains cord, E-Manual Trainer should be encased in a plastic molded box with cover ,with no circuitry components on the top only block diagram should be provided on top of trainer. Should be supplied with coloured wall chart with information on various Bridges.	2
27	**Hay's Bridge**	In-built sine wave generator ; Adjustable frequency and Amplitude of Sine Wave Digital display for Null detection ;10 turn potentiometer for balancing the bridge Sine wave generator: Frequency : 1kHz to 10kHz ±10%; Amplitude : 0 to 5Vpp DPM : 0-200mV for Null Detection. Unknown Inductors : 58mH ±10% with 58 Ω ±10% of resistance 100mH ±5% with 174 Ω ±5% of resistance ; 116mH ±10% with 116 Ω ±10% of resistance Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Power Requirement :30 V ±10% 50 Hz (Detachable Mains Cord) Accessories included: Mains cord, E-Manual Trainer should be encased in a plastic molded box with cover ,with no circuitry components on the top only block diagram should be provided on top of trainer. Should be supplied with coloured wall chart with information on various Bridges.	2

28	**Wheat Stone bridge to measure Unknown resistance**	Determination of unknown resistance. Determination of resistivity of the material of wire. Verification of effects of resistances in series and parallel. DC Power Supply : 5V Galvanometer Deflection : 30 – 0 – 30 ;Resistance: 80 Ω Unknown Resistance Type : Variable ; Range : 0 – 10 K Ω Wire Samples : Constantan : 1 meter ; Nichrome : 1 meter Fuse : 500 mA Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Mains : 230 V AC ±10% (Detachable mains chord to be provided) Trainer should be on Legend PCB .Housed in a Molded case with molded cover ,Should have in built power supply. Circuit diagram should be printed on the top of the board. Manual: Extensive e manual should be provided Should be supplied with coloured wall chart with information on various Bridges.	2
29	**Carey Foster's Bridge.**	The set up should have: Precise Bridge arrangement with Low temperature coefficient Constantan wire & a board consisting Galvanometer, resistances and DC power supply as a cell DC Power Supply : 3 V Variable resistance : 0-100 Ω Galvanometer :Deflection : 30-0-30 ,Resistance : 80 Ω Wire :Type : Constantan ; Length : 1 m ;SWG : 28 Diameter : 0.37 mm Resistance : 10 Ω (2 Nos.) Bridge scale : 0-100 cm Jockey : Copper Mains Supply : 220V ± 10 % , 50 Hz ;Fuse : 0.5 A Interconnections: 2mm gold plated sockets & 2 mm gold plated Patch cords stackable Trainer should be on Legend PCB with no components on the top of board. Housed in a Molded case with molded cover on top. Should be supplied with coloured wall chart with information on various Bridges.	2

30	**Anderson Bridge**	Resistance : Three continuously variable dials 10K,1K,1K Capacitor : One fixed value Signal Source : in built of 1KHz Galvanometer : Digital LED display with AC/DC null provision sensitivity adjustment Test Inductance : Two nos Interconnections : : 4mm sockets & 4 mm patch cord Main supply : 220V/50Hz AC .Trainer will be encased in a plastic Moulded box with no component on the top of the trainer .Only block/circuit diagram will be provided on the top of the trainer Should be supplied with coloured wall chart with information on various Bridges.	2
31	**Owen's Bridge**	Resistance : Three continuously variable dials. Capacitor : Two fixed value Signal Source : in built of 1KHz Galvanometer : Digital LED display with AC/DC null provision sensitivity adjustment Test Inductance : Two nos Interconnections : : 4mm sockets & 4 mm patch cord Main supply : 220V/50Hz AC .Trainer will be encased in a plastic Moulded box with no component on the top of the trainer .Only block/circuit diagram will be provided on the top of the trainer Should be supplied with coloured wall chart with information on various Bridges.	2
32	**SCR characteristics Trainer : Training Board Should Have**	S.C.R: 400V/1A Power supply 0-50 VDC ,0.15A for Anode - Cathode 0-3V Power supply for Gate - Cathode. Display : Digital 3.5 digit LED/LCD Ammeter & Voltmeter for Measurement for VAK (Anode-Cathode Voltage) , IA (Anode current) & IG (Gate Current) Potentiometer :: One(Variable 1K) ; Trigger LED : One Reset Key to interrupt anode current ; DC supply: Short circuit & overload protected Mains : 220V/50Hz AC ; Patch cords : Necessary for experiment.	2
33	**DIAC characteristics Trainer : Training Board Should Have**	DIAC: One(BR300) Display : Digital 3.5 digit LED/LCD Ammeter & Voltmeter DC power supply : One (0-40V) ; AC power supply : One (40V) Capacitors: One ;Potentiometer: One (Variable 22KW) ;Resistance : One fixed Power supply: Short circuit & overload Protected Mains : 220V/50Hz AC ; Patch cords :: Necessary for experiment.	2

34	**TRIAC characteristics Trainer : Training Board Should Have**	TRIAC : One(600V/2A) ; Display : Digital Ammeter & Voltmeter DC power supply: 1. 0-50V @0.15A for T1-T2; 2. 0-3V for gate – T2 Reset Key to interrupt anode current Display : Digital 3.5 digit LED/LCD Ammeter & Voltmeter for Measurement of VAK (Anode-Cathode Voltage) , IA (Anode current) & IG (Gate Current) Potentiometer : One (Variable 3W);Resistance: One fixed ;Trigger LED : One Power supply: Short circuit & overload Protected ; Mains :220V/50Hz AC ; Patch cords :: Necessary for experiment	2
35	**Study V-I characteristics of UJT & study as Relaxation Oscillator**	Two IC regulated Variable DC Power supplies : 0- 20V each Display : Digital 3.5 digit LED/LCD Ammeter & Voltmeter fo Measurement for Voltage & Current measurements . One UJT 2N2646 or Equivalent.; One variable Resistor 20-120K Two Capacitor PPC 0.1 µF ,0.2 µF DC supply should be short circuit & overload protected Mains: 220V/50Hz AC ; Complete with manual and patch cords.	2
36	**Study of Rectifier & Filter circuit**	Display : Digital 3.5 digit LED/LCD for Voltage measurement Halfwave /FullWave/Bridge rectifiers , L,L-C and Pye filters 10-0-10V AC step down transformer ; One Fix RL 100 ohms , Four Silicon diodes IN 4007 ; Two capacitors 47 µF , one inductor 0.5H Mains Supply: 220V/50Hz AC. Complete with manual and patch cords	2
37	**To draw different waveforms of phase control circuit using TRIAC-DIAC pair and find its average &RMS output voltage and current**	TRIAC: One (400V/2A) ; AC supply : Isolated 1:1 @0.5A Firing circuit : DIAC , RC with two potentiometer Load : Lamp or small fan (optional) Test points: Necessary for observations. Mains: 220V/50Hz AC ; Complete with manual and patch cords.	2
38	**To trigger SCR using relaxation oscillator**	S.C.R. :One Display : Digital 3.5 digit LED/LCD for Voltage measurement across RL Transformer: One low voltage transformer 20V ; One small with 0-1V DC supply Capacitor :One capacitor for phase delay Resistance :Continuously variable potentiometers for R, RC, Pulse (UJT oscillator) And superimposed AC Pulse ; Transformer :One Power supply: Short circuit & overload protected Mains: 220V/50Hz AC ; Complete with manual and patch cords	2

39	**To draw different waveforms of half wave & full wave voltage controller and find its average & RMS. output voltage & current using SCR & anti parallel SCR**	S.C.R.: Two (600V/4A) ;Diode: One(1KV/1A) ; AC supply: 25V AC,10V AC for trigger circuit Digital 3.5 Digit LED Ammeter : One for measuring load current. Load:: Fix value Resistance ;Test points: Necessary for observations on CRO Mains: 220V/50Hz AC ; Complete with manual and patch cords	2
40	**To control the speed of Universal motor using SCR**	S.C.R.: One (600V/12A) ;Bridge: Based on four silicon diode (400V/4A) Trigger circuit : Based upon U.J.T. relaxation oscillator ; Pulse transformer : One (1:1) Motor : One fractional H.P. DC shunt wound motor(60W) Transformer : One double wound step down DC supply : Fixed (30V/0.5A)for field excitation Cabinet : Transparent acrylic top ; Test points : Necessary for observations. DC supply : Short circuit & overload protected Mains: 220V/50Hz AC ; Complete with manual and patch cords	2
41	**To draw the different waveforms of a chopper circuit**	S.C.R.:: Two(600V/12A) ;Inductor : One center tapped with diode Diode Bridge: Silicon diode based with L-C Filter DC power supply : From 100 volt AC(unregulated) Commutation Capacitor : One with free wheeling diode Firing circuit : On DC 12V supply for pulse firing Timing controls: Separate control for on-off time. Motor : A series wound fractional H.P. Universal motor (60W) as load Observation: Separate points for observations of waveforms. Cabinet : Transparent Acrylic top Power supply : Short circuit & overload protected Mains: 220V/50Hz AC ; Complete with manual and patch cords	2
42	**Haemodialysis Machine trainer kit**	Dialysis machine is microcontroller based LCD display 16*2 Dialysis pump Parasitic pump	1
43	**EOG amplifiers & EOG simulators**	EOG amplifier 3 lead electrodes Light simulator	1
44	**Diabetic trainer kit**	Diabetic verboseness DSO output	1

45	**Audiometer trainer kit**	Audiometer with microcontroller DSO output	1
46	**Pacemaker simulator trainer**	Both internal and external simulator Real time measurement DSO output	1
47	**Heart lung machine (Demo)**	Microcontroller based LCD 16*2 Control 0 to 200 rpm Temperature range 0 to 40 degree Celsius Photoelectric detector	1
48	**Defibrillator simulator trainer kit**	Output ECG 0 to 40 mV with Pulse ± 9V Rhythm Indicator Normal and three rhythms with adjustable threshold	1
49	**Respiration rate monitor**	Respiration rate meter with sensor	1
50	**Medical telemetry system and trainer kit**	Analog and digital Real time data transfer and receive LCD display Photoelectric transducer	1
51	**Phonocardiogram system**	Manually operated Audio and visual output Power 230V	1
52	**Ultrasonic blood flow system**	Piezoelectric Doppler type transducer Operating frequency 8 MHz Audio and visual indication	1
53	**X-ray machine demo type**	Dummy X-ray tube Control with full field beam collimator	1
54	**Multi Physicological signal acquisition system**		1

Category:"D"		DEPARTMENT:FOOD ENGINEERING (HEFA)	
S.No.	Name of Item/ Equipment	Detailed Specifications (Generic)	Quantity
1	**Form Fill Seal Machine**	Capacity (pouch per hour) upto 500, Pouch capacity 10-50gm, 50-200 gm, Accuracy max 1%, Filling System – cup Filler, food powders / granules to be packed.	1
2	**Probe Sonication System**	System should be Microprocessor based, programmable along with software to connect with tablet or Pad, Sample operating Range: 0.2 to 1500 mL, Operating frequency: 20kHz or better, Control mode: auto-tuned frequency mode, Number of programmes: 10 No. or more, Power Output: Upto 500 Watts or more, Amplitude setting: 10% – 100%, Pulse/cycle repetition from 1 to 10000 or better, Probes for processing volumes in the range of 0.2 upto 500 mL to be supplied, System should be with sound box stand and Jack, System must be CE, RoHS and EMC certified and copy of certificate must be attached with offer. The system should be provided with all other accessories to make the system operational. Warranty period of the equipment should be minimum one year.	1
3	**Digital Data logging Multiparameter pH cum Conductivity Meter**	It should have the facility to measure pH, conductivity alongwith the data logger for convenient date management. The Meter should be supplied with a single multiparameter multi electrode with pH, conductivity which should be individually replaceable. Instrument should have the following specifications,Accuracy: ORP:± 1 mV, Accuracy 3: TDS:≤0.5% (± 1 digit),Automatic Buffer Recognition: pH 2.01, 4.01, 7.00, 9.21, 10.01,Calibration Curves Display: Slope and assymetry potential should be displayed, Compliance: CE certified; RE directive; FCC approval, Conductivity Accuracy: 0.5% (±1 digit) of measurement range ,Conductivity Measurement Range: 1 uS/cm to 30 mS/cm (probe range),Display: Backlit LCD, Display type : 128 x 64 pixel, simultaneous readings, Inputs: MP-8, Interface Languages; Icon based, Internal Data Storage: 500 results, Ip Rating: IP67, Length: 7.3 in (186mm), Measurement Method: Interval, auto stabilization, manual, mV Accuracy: 1 mV, mV Resolution: 1 mV, Operating Humidity: 0.8 relative humidity (non-condensing),Operating Interface: Keypad, Operating Temperature: 0 to 50 °C,ORP Resolution: 1,Output: Wireless to USB, pH Accuracy: ≤ 0.02 pH (± 1 digit),pH Electrode Calibration: 1 to 3 points calibration, pH Measurement: 2 to 19.99 pH, pH Measurement at stable reading : yes, pH Resolution: 0.01 pH, Resolution: 1 mg/L-1 g/L depending on range, EC: 0.01 uS/cm-1 mS/cm depending on range, ORP: 1 mV, Sample Temperature: pH, ORP, conductivity (or TDS), Temperature Accuracy: 0.2 °C (± 1 digit),Temperature Compensation: Sensor with PT1000, Temperature Measurement: 20 to 150 °C, Water Resistance: IP67, should be supplied with communication software kit and with USB Dongle for wireless data transfer, CDROM Electrode Specifications, Multi-Sensor for simultaneous pH, Conductivity, Probe should have durable protective outer and should have individually replaceable pH, EC, pH-non-refillable gel Ag/AgCI reference with porous pin junction EC: 2-Pole platinum sensor (K=1.0 cm) with integrated temperature sensor, Measurement Range pH: 0 to 14 pH, EC 5 to 30000 us/cm, Temperature Range 0 to 50°C.	1
4	Water bath with shaker	PID microprocessor controller system with fault indication Bath Capacity: 20-25 L Temperature range: ambient +5 °C up to +95 °C. Temperature Resolution: +/- 0,3 °C. Shaking frequency 35 – 160 rpm or better. Capacity: 100 ml x 18 Flask or better. Pt100 sensors Class A in 4-wire-circuit monitoring and taking over the performance at the same temperature value. Digital timer from 1 min. up to 999 hours or continuous operation. Digital display (LED/LCD) of all set parameters, such as temperature and alarm. Calibration facility on controller. Audible and visual alarm at programme end and as input acknowledgement as well as in case of low liquid level; heating is switched off automatically. System with Gable stainless steel cover mounted for condensate.	1
5	**Gloss Meter**	Trigloss meter; 20/60/85 angle measurement. Single button push to measure all parameters, Resolution 0.1 GU.	1

6	**Vacuum Concentrator System**	System should be a Centrifugal Vacuum Concentrator with integrated vacuum pump for biological applications.System and pump should be highly resistant for organic solvents like Acetonitrile, DMSO, chloroform etc. System should be suitable for concentrate of DNA/RNA, nucleotides, Proteins and other liquids or wet sample. Lid should be chemical resistance. Complete system with vacuum port adds for using the integrated vacuum pump separately without disconnecting it. PTFE diaphragm pump should be used to avoid changing pump oil. System should work at room temperature, 30, 45° C, and 60 °C to allow safe and efficient concentration of biological samples. Timer Feature as well as brake function should be there. Centrifuge should have a fixed rotational Speed of 1,400 rpm,System should support multiple lab ware format s (1.5ml/ 2 ml, 15ml conical tubes, 50 ml conical tubes, 2 Micro Titer plates) with different rotors. Pump capacity / Vacuum: should be less than < 20 mbar. Rotors to be supplied: 48 X 1.5ml, 6 X 15 & 50 ml Rotor, System should have Digital Display with keypad to control the parameters, and System must be CE Certified	1
7	**Proofing Chamber**	PID Controlled heat and humidity system70 - 120 Degree F proofing range 50 - 99% humidity range Non-submerged calrod type heaters Interior bumpers protect interior walls from damage, Lighted interior, Digital set Temperature, Humidity, Time, Capacity :max 100 lit.	1
8	**Pasta / Noodle Making Machine**	Kneading Vat Capacity Maximum: 2.5 Kg, Power maximum 01 Kw with dies and Rotating Cutting Knife. The contact parts would be Stainless Steel. Machine ability to knead by using any kind of flour and produce long and short pasta shapes by simply changing the die. external structure must made of anodized aluminium and the parts that are in contact with pasta are made of stainless steel; Motor power: 750 w, Extruded pasta production: 6 kg/Hr bronze and PTFE dies so to obtain pasta with a rough surface, or with ptfe inserts so to get a smoother and more transparent pasta.	1
9	**Mixer**	The Bowl Lift Stand Mixer with maximum 5 lit capacity heavy duty bowl. Ideal for Variable speed mixing that features a removable 4.8 L stainless steel bowl.	1
10	**Convection Oven**	Convection Baking 30-260°C Airplus technology auto reversing fan Auto diagnostic system 99 baking prog. Memory Capacity: 4 460x330 Pitch: 75mm Dimensions: 600x651x509 W xD xH mm	1
11	**Butyro-Refractometer with Circulating bath**	Scale for refractive Index of fats & Oil. Provision to maintain the the desire temp. for the measurement .min. RI 0. 01 with circulating water bath to maintain the temperature.	1

SANT LONGOWAL INSTITUTE OF ENGINEERING &			
		NAME OF FIRM/AGENCY	
Technical Bid		**E-TENDER NO.PUR/30/2020-21**	
Category:"E"		**DEPARTMENT: MECHANICAL ENGINEERING(HEFA)**	
S.No.	**Name of Item/ Equipment**	**Detailed Specifications (Generic)**	**Quantity**
1	**Bottom Loading Furnace**	An (ISO 9001 – 2015 CERTIFIED CO.). Chamber Size (Vertical) : 150 mm High x 150 mm Wide x 150 mm Length Maximum Temperature : 1800 oC Max. Cont. Temperature : 1650 oC ,Heating Elements : Mosi2 Heating Elements Insulation : High Density Ceramic Insulation. Melting Capacity =: 2-3 Kg Cast Iron/ Steel Construction : The Furnace is vertically placed on the 3 ft. High angle iron stand , with control panel on the side .The furnace has opening at the Top and Bottom .The bottom lid is closed by Motorized Lifting . The Top Lid is removed manually Bottom Lid : It has specially designed arrangement to hold Silicon	1
2	**Motorised Torsion Testing Machine**	Torque: 500 Nm ,Torque Resolution -0.1Nm,Maximum test specification diameter-200 mm, Maximum test specification length -500 mm, Torque Measurement Accuracy: </= +/- 0.5% , Angle Measurement	1

3	**Electro- mechanical Spring Testing Machine**	Rated Force: 10 kN ,Cross Head Travel: 500 mm Column Spacing: 250 mm , Test Speed: 1 to 500 mm/min , 0.001 mm Resolution , Machine stops upon load cell disconnection, connector damage or cable snapping. Emergency Stop Button ,Servo Motor Drive, grips, fixture and accessories adapt a test ma- chine for testing of different types of specimen. There can be hundreds of such devices. These include compression plates, tension adaptors, wedge grips with several types of jaws, bollard Capstan grips, Web tension grips, Computer compatible test Machine Controller with USB cable ,Branded PC with i7 processor, 1Tb HDD, 8 Gb RAM, 15-inch cool Monitor and mouse, UPS & printer. Testing Software, pre-loaded on PC plus on separate DVD , user friendly software ,NABL accredited .	1
4	**Digital Fatigue Testing Machine**	Load -1000N,Specimen material with EN-8 material, Holding diameter- 12.7mm & rupture diameter- 6.35mm x 101.6mm long, Specimen speed-Min 1000 , max 5000 rpm, Bending moment-80Nm, Test cycles-999999 cycles, Test rig confirm to DIN 50113 test, Testing with heating facilities up to 200° C or better . Bending moment-80Nm.controlled facilities with , latest software and branded Computer, printer ,UPS.	1
5	**An electrolytic polishing & etching equipment**	A standard equipment should be capable of electrolytically polish various metallic specimens covering range of ferrous as well as non-ferrous materials should comply with all mandatory safety and operational norms.	1

SANT LONGOWAL INSTITUTE OF ENGINEERING & TECHNOLOGY,LONGOWAL

NAME OF FIRM/AGENCY

Technical Bid		**E-TENDER NO. PUR/30/2020-21**	
Category:"F"		**DEPARTMENT: PHYSICS(HEFA)**	
S.No.	**Name of Item/ Equipment**	**Detailed Specifications (Generic)**	**Quantity**
1	X-Band Microwave Test Bench (Gunn	X-Band Microwave Test Bench (Klystron Based) consisting of : Gunn Power Supply (01), Gunn Oscillator with mount (02), Pin Modulator with mount (02), Isolator (01), Frequency Meter (Direct Reading (01), Variable Attenuator (01), Slotted Section-(01), Tunable Probe (02), Detector Mount (01), Movable Short (01), Matched Termination (01), VSWR Meter (Solid State)-(01), Slide Screw Tuner(01), BNC to BNC cable (02), Cooling Fan (01), BNC to Open cable (02), Smith chart of 100 pieces (01), Fixed Short (01), Liquid Dielectric Cell (01) Rectangular Wave Guide (01) and Stands (04). Alongwith following additional components: Gunn Diode =02 Nos., PIN Diode = 02 Nos.., Crystal Detector= 02 Nos.	1

2	X-Band Microwave Test Bench (Klystr	X-Band Microwave Test Bench (Klystron Based) consisting of : Klystron Power Supply (01), Klystron Mount (01), Klystron Tube (01), Isolator (01), Frequency Meter (Direct Reading)-(01),Variable Attenuator(01), Slotted Section (01), Tunable Probe (02), Detector Mount (01), Movable Short (01), Matched Termination (01), VSWR Meter (Solid State)- (01), Slide Screw Tuner (01), BNC to BNC cable (02), Cooling Fan (01), BNC to open cable (02), Fixed Short (01) & Solid Dielectric Cell (01), Rectangular Wave Guide (01) and Stands (04 Nos). Alongwith following additional components: Klystron Tube= 02 Nos. and Klystron Detector = 02 Nos.	1
3	Bridge Type Photo Measuring Microsc	Suitable for linear measurement upto 200mm with leastcount 0.001mm moveable with rotating micrometerscrew with graduated drum head with rack & pinion arrangementcross wire on eye piece	2
4	Millikan Oil Drop Experiment Setup	Millikan Oil Drop experiment setup for measuring elementary charge of electron & to verify quantum nature of electrical charge Input voltage AC 220V, 50 Hz, Plate voltage 0V to 700V Plate Distance 5 ± 0.01 mm, CCD requisition with Microscope signal compatible with TV & Multimedia, Total magnification 60X & 120X Electronic timer for measuring 0-99 secs with 0.01 sec. resolution, TV monitor for display with electronic graduation, Oil sprayer dropper with oil bottle(s).	1
5	Michelson and Fabry-Perot Interferom	Ground Glass Screen, Alignment Aperture, Sodium-Tungsten Lamp with Power Supply, He-Ne Laser with Power Supply, Air Chamber & Pump with Gauge, Manual Counter fitted on one Interferometer Main Frame with following specifications: Fine Travel Resolution = 25 micrometer or less Fabry-Perot Mirrors Dia.=30mm, Wavelength Measurement Accuracy = Relative error: not more than 3% for 100 fringes He-Ne Laser = Power 0.5 to 1 mW Wavelength= 632.8 nm Sodium lamp: 20 W; Tungsten lamp: 30 W adjustable Air Chamber with Gauge Pressure range upto 40 kPa Flatness of Compensator& Beam Splitter = 0.05 λ	1
6	Hall Effect Setup for Metals	Hall Probe: Silver and Tungsten (Contact strip :Press type for Current and Spring Type for voltage, 03 (Three) samples each): High Current Power Supply; Range 0-20 A, Accuracy ±0.5 % regulation ±0.5 %, Display 3.5 digit, & Segment LED: Digital Microvoltmeter; Range 1 mV -10 V , Resolution 01µV, Accuracy ±0.2 %, input impedance > 1000 MΩ, Display 3.5 digit, 7 segment LED with auto-polarity, Electromagnet: Pole pieces 75 mm tapped to 25 mm, Magnetic field 20 KG at 6 mm air-gap, Power 0-90 V, 3A for coils in series and 6 A in parallel: Constant Current Power Supply; Current range 0-3 A per coil, Resolution 0.1 %, Display 3.5 digit, 7 segment: Gaussmeter; Range 1-20 KG, accuracy ±0.5 %, resolution 1 gauss	1
7	e/m by Helical Method Apparatus	DC power supply for apparatus comprises of the following built in parts:HT (High tension) DC power supply continuously variable from 600V to 1000V ± 5% for acceleration voltage control, DC power supply for solenoid 0-60VDC continuously variable, potentio-meters mounted on the front panel for focus control, intensity control and X,Y shift controls, two meters to measure acceleration voltage and solenoid current are mounted on the front panel, 8pin octal base is mounted on the front panel to connect the CRT plug, 1 long solenoid wound on 3.5" dia. PVC pipe with 24 wire gauge mounted on wooden stand and connections brought out at terminals, CRT mounted inside the solenoid	2

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NAME OF FIRM/AGENCY

Technical Bid		**E-TENDER NO. PUR/30/2021**	
Category:"G"		**DEPARTMENT:WORKSTATION**	
S.No.	**Name of Item/ Equipment**	**Detailed Specifications (Generic)**	**Quantity**
1	**Welding simulator with augmented reality helmet**	Augmented reality based with 3D simulation, capable of simulating conventional welding processes like SMAW, GMAW, FCAW and GTAW etc. preferably, having feedback and analysis system. Augmented Reality Images Superimposed on real objects, with 3D Software Simulation using real environment. It should be capable to train in 1F to 6F Positions in Fillet and 1G to 6G Positions in Groove (Downhand to Inclined Positions)	1
		Operator Requirement: The torches to be provided with the welding simulator should be like Real Industrial Torches for real feel and weight. Simulator to guide and train students on All the Skill Sets Like: Arc Length, Work Angle, Welding Speed, Stick Out, Path and Travel Angle etc. Particularly for GTAW set up, it should be capable of guiding the work and travel angle of the filler rod. Operator or student should be able to see the real welding of the workpiece from inside the helmet and manipulate the settings such as touch / rotate / adjust the workpiece to gain comfort as and when required. Students / trainers wearing spectacles must also be able to use it conveniently.	
		Interfacing with a latest configured computer and a laser printer to print the reports of the training etc. should be provided by the supplier to have online access for the technician/students and practice on simulator and Offline access for trainer to evaluate the previous performance should also be possible. A 48 inch HD monitor preferably for around 30 number of students is also required so that they can watch the welding.	
		Design: The welding simulator should possibly run-on single-phase supply and have Low Weight, Metal Body and Sturdy Design.	
		Safety and Quality: The equipment should comply with mandatory safety and quality standards in order to deliver a reliable performance.	
		Guaranty and warranty: The supplier should provide on site guaranty and extended warranty for up to one year with the equipment.	
		Accessories to be supplied with the equipment: All the standard accessories and necessary tooling required should be provided with the equipment.	
		Physical Workpieces: Ferrous and Non Ferrous workpieces comprising of Butt, Fillet, Lap, Pipe to Pipe and Pipe to Plate Joints should also be provided along with the equipment.	