

**A. Clarification of Technical Queries related to Tender Documents of Lab Equipment of Civil Engg: Department.**

S.NO	SPECIFICATIONS AS PER TENDER DOCUMENT	QUERIES OF VENDOR	CLARIFICATION
1	<p>MULTI PURPOSE FLOW CHANNEL (Version 9 m)            Composed by:            Channel, support structure, storage and pumping system.            Flow regulation mechanism, composed of a diaphragm valve.            Flow stabilization system composed by a honeycomb at the entrance to minimize turbulence.            Materials:            All materials used are resistant to corrosion, especially in areas in contact with water.            Support structure: treated and painted steel.            Channel: Stainless steel.            Pumping, storage and recirculation system:            Located on a single level, it does not require high deposits.            Tank capacity: 300 liters.            Manometers: multi-manometer water gauge for reading the pressure taps on the bottom of the channel.            Working section:            Working section (height / width): 450 / 300 mm            Length: 9 m.            Walls of transparent acrylic.            Slope: Adjustable -1%+3% of its length.            Pump:</p>	<p>Section 5.1.02            The length of open flume is specified as 9 meters. It may be rounded off to nearest whole number (multiples of 2.5)</p>	<p>The length of open flume provided must be 7.5 meters.</p>

	<p>Power: 2xw hp (2 pumps 2hp each)  Maximum flow: 50 m<sup>3</sup>/hr.  Maximum height: 14.3 m.c.a.  Stainless steel impeller.  Type: Centrifugal.  Flow-meter: Scale 1000-10000 l/h.  Electrical input: 230V / 50Hz.  Multi-manometer: 4 tubes. Height 250 mm.  Connections with double obturation. Coupling channel with adjustable tilt angle.  Pitot tube + limnimeter connected to a gauge, allowing a great accuracy in the readings. High accuracy caliber. Easy coupling to the channel walls.  Thin plate rectangular weir. Rubber profiles on the side of the spillway, to seal. Easy placement on the flow of the channel. Top of the spillway sharp. Height of the spillway 150 mm.  Vertical Gate. Gate lift system allows a quick opening to prevent overflows or a controlled opening for an easy adjustment to desired height. Easy placement on the walls of the channel. Rubber profiles on the sides of the gate for seal.  Radial gate. Gate lift system allows a quick opening to prevent overflows or a controlled opening for an easy adjustment to desired</p>		
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	<p>height. Easy placement on the walls of the channel. Rubber profiles on the sides of the gate, for seal. Manufacture in stainless steel.</p> <p>Broad crested weir. Easy placement on the bottom of the channel. Rubber profiles on the sides for seal. Dimensions (length x height): 250 x 150 mm. Radios on one extreme of 25 mm and the other with sharp crest.</p> <p>Crump weir. Easy placement on the bottom of the channel. Rubber profiles on the sides for seal. Dimensions (length x height): 273 x 50 mm. Angles in extremes of 15° and 30°.</p> <p>Plate weirs: triangular, rectangular and <i>Cipoletti</i>. Rubber bands for tightness. Easy placement on the channel floor. Sharp top of the weirs. Height of the weirs 190 mm.</p> <p>Level gauge. Accessory composed of a limnimeter, attached to a gauge, which allows great accuracy in the readings. High accuracy gauge. Easy coupling to the walls of the channel.</p> <p>Hydraulic jump model: Easy placement on the bottom of the channel, rubber profiles on the side for seals, sufficient height and slope, capable of producing hydraulic jump on the downstream side</p> <p>Siphon spillway model</p>		
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	<p>Air regulated siphon spillway model          Sluice gate model          Wave generator          Ogee weir and manometer board          Venture Flume          Dam Spillway Model,          Parshall Flume</p>		
2	<p>List of Countries:           Malaysia, EU, USA</p>	<p>Section 5.1.05, 5.1.08           In hydraulic bench, impact of jet and other similar equipment (Francis flow channel), Thailand must be specified in list of countries as they provide them.</p>	<p>Provision of said items from Thailand has been considered and allowed.</p>
3	<p>Francis Turbine          Equipment is designed for the study and displays both the behavior and the characteristics of a Francis turbine.          Turbine housing is transparent so you can see how the water flow turns the wheel. In this case, besides the rotation of the wheel, the movement of the vanes guide the distributor with which the flow regulation turbine inlet is achieved is also observed.          Braking system with electric brake allows working at different speeds in a convenient and simple way. The rotational speed of the engine control by a rheostat included in the top control module, where, in addition, through the various</p>	<p>Section 5.1.01          Please specify whether in hydraulic bench, pumps are connected with it or in separate position.</p>	<p>Source of water from hydraulic bench.</p>

	<p>indicators of the system, you can display all variables that come into play in transforming energy. Regulating valve has water inlet, which allows working with different flows as required. Pressure turbine inlet is read in a vacuum gauge arranged on the structure.</p> <p>Manometer: Bourdon type with glycerin 0-25 m.c.a.</p> <p>Features electric brake: DC generator.</p> <p>Rated speed: 1950 rpm.</p> <p>Rated power: 45 W.</p> <p>Turbine features: 60 mm wheel diameter.</p> <p>Material: Bronze.</p> <p>Number of fixed blades 12.</p> <p>Number of guide vanes: 6.</p> <p>Rated speed: 2000 r.p.m.</p> <p>Other data:</p> <p>Interior diameter of the drive pipe = 27.2 mm.</p> <p>Interior diameter of the outlet pipe = 27.2 mm.</p> <p>Load cell.</p> <p>Speed sensor.</p> <p>Electronic indicators readings.</p> <p>Power supply: 230V / 50Hz.</p> <p>Along with Software testing and data storage facility (Core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with wifi device. 24" LED, keyboard and mouse.)</p>		
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<p>4</p>	<p>Portable Multi. Meter pH/ION/DO2 1.8M Cable 1 Oxygen, Basic Kit with IP67 probes and 1.8M cables, strap, Test/Conformity Certs and 4 X 1.5V AA batteries Shock-proof, water-tight casing to IP67, Automatic or manual temperature compensation. Ranges (resolution) pH -2.000 to 19.999 (0.001). Plastic bodied combination pH/°C electrode, fixed one meter connection cable with DIN plug, buffer solutions, sample beaker, batteries, instructions and carrying case. Portable multi. Meter pH/ION/DO2 1.8M Cable 1 Oxygen, Basic Kit with IP67 probes and 1.8M cables, strap, Test/Conformity Certs and 4 X 1.5V AA batteries</p>	<p>Section 5.2.08 Portable multimeter, German brand specifications are mentioned and usually it's the best in market.</p>	<p>Provision of said item from Germany has been considered and allowed.</p>
<p>5</p>	<p>BOD-Measurement- System The sensor system is a 6- sample system which allows precise measurement of BOD, based on the manometric principle. Manometric respirometers relate oxygen uptake to the change in pressure caused by oxygen consumption, while maintaining a constant volume. Thanks to modern, integral pressure sensors, it is no longer necessary to use mercury</p>	<p>Section 5.2.04 In BOD apparatus, add Thermostatically Dedicated BOD incubator with it.</p>	<p>BOD-Measurement-System The sensor system is a 6-sample system which allows precise measurement of BOD, based on the manometric principle. Manometric respirometers relate oxygen uptake to the change in pressure caused by oxygen consumption, while maintaining a constant volume. Thanks to modern, integral pressure sensors, it is no longer necessary to use mercury for pressure measurement. System comprises: - Complete with 6 sensors, control unit and batteries</p>

	<p>for pressure measurement. System comprises: - Complete with 6 sensors, control unit and batteries - magnetic, inductive stirring system with power supply, 6 sample bottles - 6 adapter caps and 6 stirring bars, 1 volumetric flask, 157ml - 1 volumetric flask, 248ml, 1 x 50 ml bottle potassium hydroxide solution - 1 x 50 ml bottle nitrification inhibitor, 1 user manual Measuring principle: manometric, electronic pressure sensor Ranges: 0 to 40, 0 to 80, 0 to 200, 0 to 400, 0 to 800, 0 to 2000, 0 to 4000mg/l O<sub>2</sub> User-selectable, between 1 and 28 days. Measurement period: Power supply: 3x1.5V alkaline batteries, size "C" IP 54 (Sensor)</p>		<p>- magnetic, inductive stirring system with power supply, 6 sample bottles - 6 adapter caps and 6 stirring bars, 1 volumetric flask, 157ml - 1 volumetric flask, 248ml, 1 x 50 ml bottle potassium hydroxide solution - 1 x 50 ml bottle nitrification inhibitor, 1 user manual Measuring principle: manometric, electronic pressure sensor Ranges: 0 to 40, 0 to 80, 0 to 200, 0 to 400, 0 to 800, 0 to 2000, 0 to 4000mg/l O<sub>2</sub> User-selectable, between 1 and 28 days. Measurement period: Power supply: 3x1.5V alkaline batteries, size "C" IP 54 (Sensor) Thermostatically controlled Dedicated BOD incubator</p>
6	<p>Incubator (Section 5.2.10) Temperature 100°C, Capacity: 200 liters Stainless Steel. FAN CON. Solid Door Power Supply 220-240V 50HZ Fan Convection, 4 Shelves, with Digital Controller and safety thermostat.</p>	<p>Section 5.2.10 and 5.2.15 Two incubators are mentioned. One of them must be corrected to Cool Incubator</p>	<p>Incubator (Section 5.2.10) Temperature 100°C, Capacity: 200 liters Stainless Steel. FAN CON. Solid Door Power Supply 220-240V 50HZ Fan Convection, 4 Shelves, with Digital Controller and safety thermostat.</p> <p>Incubator Temperature +70°C, Capacity: 53L, Power supply 230V 50/60HZ A.C.</p>

	<p>Incubator Temperature +70°C, Capacity: 53L, Power supply 230V 50/60HZ A.C.</p> <p>Provide one with a good quality</p> <p>Incubator (Section 5.2.15) Temperature +70°C, Capacity: 53L, Power supply 230V 50/60HZ A.C.</p>		<p>Provide one with a good quality</p> <p>Cool Incubator (Section 5.2.15) Temperature preferably up to - 10°C, Capacity: 53L, Power supply 230V 50/60HZ A.C.</p>
7	C.O.D Apparatus: Reactor Kit Safety shield etc.	Section 5.2.07 COD apparatus, write Germany in list of countries	Provision of said item from Germany has been considered and allowed.
8	Portable Top Loading Autoclave Aluminum, Capacity 14 liters, Chamber 280mm diameter x 230mm deep. With fittings as described and aluminum liner. Accepts, Electrically heated.	Section 5.2.11 Mention Country names	List of countries:  US, UK, Germany, Italy, Thailand
9	Distilled water Capacity 4 liters Diamond 4.5L/Hour, Power Supply 220-240V A.C. WITH 2 X 1.5KW Heating Elements, 220-240V A.C.	Section 5.2.12 Change name and mention country	Device name: Distillation Device  List of countries:  US, UK, Germany, Italy, Thailand
10	CBR TESTING MACHINE - 50 kN Testing conforming to ASTM D1883, EN13286- 47, BS 1377:4, AASHTO T193, UNI 1000 Universal multispeed load frame, and speed rate is within 0.05 to 63 mm/min with maximum load of 50 kN, speed rate is infinitely variable. Graphic display ¼ VGA color touch-screen. Foreseen of electric end of stroke switch of the load	Section 5.5.13 CBR testing machine, i. Specify loading rate Mention accessories of CBR machine	The Unit must come with all necessary equipment and accessories needed to perform test as per standards mentioned in below paragraph. Moreover, the loading rate must be adjustable so that test can be carried-out as per relevant standards and other research purposes.  CBR TESTING MACHINE - 50 kN Testing conforming to ASTM D1883, EN13286-47, BS 1377:4, AASHTO T193, UNI 1000

	<p>plate to save the machine from wrong manipulations. Power supply: 230V, 1ph, 50-60Hz. Acquisition and data processing system up to 8 analogical / digital channels for load cells and transducers. Graphic and numbers visualization, processing and printing of the test results. Load cell 50 kN capacity, complete with cable and connector. Linear displacement transducer 50 mm stroke, complete with cable and connector. Mounting device for coupling plier and coupling plier. Penetration piston. Software for CBR test, EN 13286-47, CNR UNI 10009, ASTM D1883, BS 1377, NF P94-078, AASHTO T193. Along with Software testing and data storage facility (core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with wifi device. 24" LED, keyboard and mouse).</p>		<p>Universal multispeed load frame, and speed rate is within 0.05 to 63 mm/min with maximum load of 50 kN. Graphic display ¼ VGA color touch-screen. Foreseen of electric end of stroke switch of the load plate to save the machine from wrong manipulations. Power supply: 230V, 1ph, 50-60Hz. Acquisition and data processing system up to 8 analogical / digital channels for load cells and transducers. Graphic and numbers visualization, processing and printing of the test results. Load cell 50 kN capacity, complete with cable and connector. Linear displacement transducer 50 mm stroke, complete with cable and connector. Mounting device for coupling plier and coupling plier. Penetration piston. Software for CBR test, EN 13286-47, CNR UNI 10009, ASTM D1883, BS 1377, NF P94-078, AASHTO T193. Along with Software testing and data storage facility (core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with wifi device. 24" LED, keyboard and mouse).</p>
11	<p>CORE DRILLING MACHINE The range of machines permits the extraction of all kinds of cores (reinforced or ordinary concrete, asphalt, masonry, rocks and so on) with diameters between 20 and 200 mm. By applying special extensions it is possible to reach considerable depths that vary according to the</p>	<p>Section 5.6.01 Check whether we need it electrically operated or fuel powered</p>	<p>The instrument must be electrically powered.</p>

	material in question and the diameter of the hole. Drillings and corings can be carried out at any angle. All machines are wheel-mounted and fitted with handles to facilitate movement.		
12	Desktop Computer having specifications: core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with Wi-Fi device. 24" LED, keyboard and mouse.	Computers mentioned in various sections, specify countries other than mentioned such as Singapore.	The countries mentioned against each equipment does not apply to Desktop Computers.
13	Penetrometer Bitumen - Automatic Conforming to EN 1426, ASTM D5, AASHTO T49, ASTM D217, BS 1377-2, NF T66-004, DIN 52210, IP 49, JIS K 2207 standards. Fully automatic test, simply pressing the START button: approach, touch point, penetration. Measuring range: 0 - 50 mm. Resolution: 0.01 mm. 7" touch screen display equipped with a user-friendly software and clear interface. Test time 5 s (adjustable from 0 to 9999 s). Programmable delay time: from 0 to 999 s. Programmable reference positions for holder assembly: 8. Test simultaneously displayed: up to 10. Real time display of penetration / time curve, average result and test temperature. Electro-magnetic needle probe release to perform the test. Automatic zero at the contact before starting	Section 5.5.9 Remove penetration ball from paragraph. Include Refrigerator heating bath which can perform both cooling and heating.	Penetrometer Bitumen - Automatic Conforming to EN 1426, ASTM D5, AASHTO T49, ASTM D217, BS 1377-2, NF T66-004, DIN 52210, IP 49, JIS K 2207 standards. Fully automatic test, simply pressing the START button: approach, touch point, penetration. Measuring range: 0 - 50 mm. Resolution: 0.01 mm. 7" touch screen display equipped with a user-friendly software and clear interface. Test time 5 s (adjustable from 0 to 9999 s). Programmable delay time: from 0 to 999 s. Programmable reference positions for holder assembly: 8. Test simultaneously displayed: up to 10. Real time display of penetration / time curve, average result and test temperature. Electro-magnetic needle probe release to perform the test. Automatic zero at the contact before starting penetration. Connection: USB port and LAN port for PC connection. Supplied with accessories for determination of needle

	<p>penetration. Connection: USB port and LAN port for PC connection. Supplied with accessories for determination of needle penetration according to EN 1426, ASTM D5 and AASHTO T49 standards (sample cups 55x35 &amp; 70x45 mm, penetration needle, hardened verified, 50g &amp; 100g weights) and USB flash drive for saving data. Power supply: 110-230V 50-60Hz. Water chiller, 7.5 liters capacity with electronic temperature controller with +/-0.1°C accuracy and fluid temperature range between 5 and 30°C. Water bath dish with incorporated thermostatic coil. Temperature probe, PT100: measurement of sample temperature in real time. Penetration needle conforming to EN 1426 and ASTM D5, supplied with official UKAS certificate. Penetration ball. Standard penetration cone conforming to ASTM D217 and EN 13880-2. Long needle, hardened.</p> <p>Along with Software testing and data storage facility (core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with wifi device. 24" LED, keyboard and mouse.)</p>		<p>penetration according to EN 1426, ASTM D5 and AASHTO T49 standards (sample cups 55x35 &amp; 70x45 mm, penetration needle, hardened verified, 50g &amp; 100g weights) and USB flash drive for saving data. Power supply: 110-230V 50-60Hz. Proper Thermostatically controlled device which can be used for both cooling and heating having minimum and maximum temperature range which allows test to be run at relevant standards mentioned. Penetration needle conforming to EN 1426 and ASTM D5, supplied with official UKAS certificate. Standard penetration cone conforming to ASTM D217 and EN 13880-2. Long needle, hardened.</p> <p>Along with Software testing and data storage facility (core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with wifi device. 24" LED, keyboard and mouse.)</p>
14	Tape thermometer	Section 5.4.01 Write specifications of Tape Thermometer and country	<ul style="list-style-type: none"> <li>• Self-adhesive thermometer for monitoring tape temperatures.</li> </ul>

			<ul style="list-style-type: none"> <li>• Preferably, Scale 01 - 44°C</li> </ul>
15	<p>MOULD (STEEL MADE): 50 x 50 x 200 mm EN 1367-4</p> <p>Three-place mould for beams 50 x 50 x 200 mm, complete with N.6 inserts for linear shrinkage determination. Steel made, Vickers hardness &gt; HV 200.</p> <p>Dimensions: 170 x 220 x 60 (h) mm.</p>	<p>section 5.3.04</p> <p>Mention other accessories</p>	<p>No other accessories needed as instrument required for concrete mixing, placing has already been purchased. Similarly, the mould itself comes with necessary arrangement and instruments needed for finding shrinkage.</p> <p>The instrument must be able to determine shrinkage as per ASTM C531, ASTM C157, ASTM C426.</p>
16	<p>Poisons Ratio Measuring Apparatus</p> <p>With computer programs and battery charging device and grease coupling tube.</p> <p>Dimension: 300x240x160 mm</p> <p>Along with Software testing and data storage facility having specifications (core i7 10th generation, 16 gb ram, 256 gb ssd, 1 TB HDD. Motherboard integrated with wifi device. 24'' LED, keyboard and mouse.)</p>	<p>Section 5.3.03</p> <p>Mention specimen shape and dimensions which can be tested with it.</p>	<p>Specimen shape and dimensions are as per ASTM C469.</p>

## **B. Clarification of Administrative queries related to Tender Documents Civil Engg: Department**

- On the request of the vendor(s) the last date of submission of tender documents is extended to **31<sup>st</sup> May, 2021** and technical proposal will be opened on the same day at **10.30 A.M.**
- S.Nos. of the tender documents uploaded on the University and KPPRA Websites are corrected and re-uploaded.
- Page-10, S.No. 33, Quoting prices in C&F (Islamabad/Peshawar/Karachi) are mandatory.