Subject: - Pre bid Clarification of e-tender for supply, installation, commissioning & Maintenance of Laboratory Equipment of Mechanical Engineer for University Main Campus.

Query No.	Page No. (as per DNIT on website)	Bidder Query	Clarification
1	3	In Name of Works where the list of Labs are mentioned Computer Graphics Lab. is missing so **add Computer Graphics Lab. in it.**	No change on page 3. However: • On page 30 "CAD/ CAM MACHINERY LAB" should be read as "CAD/CAM Lab" • The S No. 1 (equipment name: SolidWorks Education Edition 2018-19) on page 32 should be read as S No. 3 clubbed under the equipmentforCAD/CAM Lab
2	82, 83, 84,85 (Annexure-XIII) Earnest Money Deposit	In Annexure-XIII where the List of EMD for all Lab. is given but EMD for Computer Graphic Lab. Is missing so **add the List of Secuirty for this Lab. As well**	• On page 82 "CAD LAB" should be read as "CAD/CAM Lab" • The S No. 1 (equipment name: SolidWorks Education Edition 2018-19) on page 82 should be read as S No. 3 clubbed under the equipment for CAD/CAM Lab
3	25 (Annexure-I) Compliance Sheet (Item No. :1)	In the Item **Cut Section Model of a Sliding Mesh Gear Box of Automobile Lab., the Electric Motor should be (0.5HP, 220V) instead of (0.5HP, 440V)**	The second point in the specification of the equipmentCut-Section Model of a Sliding Mesh Gear Box should be read as: • An Electric motor (0.5 HP, 220V) should provide power to driving shaft at slow speed and working of gear box can be shown for power transmission.
4	25 (Annexure-I) Compliance Sheet (Item No. :2)	In the Item **Cut Section Model of a Synchromesh Gear Box of Automobile Lab., the Electric Motor should be (0.5HP, 220V) instead of (0.5HP, 440V)**	The second point in the specification of the equipment Cut-Section Model of Synchromesh Gear Box should be read as: • An Electric Motor (0.5HP, 220 V) should provide power to driving shaft at slow speed & working of gear box can be shown for power transmission.
5	35 (Annexure-I) Compliance Sheet (Item No. :1)	1. In the Item Hydraulic Ram Test Bench of Fluid Machinery Lab., the Pressure Gauge should be **Bourdon Type Glycerine filled 4"dial size** instead of **Bourdon Type** 2. Also add the Sump Tank having Capacity 140 Ltrs& Overhead Tank having Capacity 50 Ltrs. both made of Stainless Steel 304 Grade 1.5 Thick	In the specification of Hydraulic Ram Test Bench of Fluid Machinery Lab, the third and fourth point (specifications of sump tank and overhead tank) should be read as: Sump Tank having Capacity 140 Ltrs& Overhead Tank having Capacity 50 Ltrs. both made of Stainless Steel 304 Grade 1.5 mm thick

6	35 (Annexure-I) Compliance Sheet (Item No. :2)	1. In the item Francis Turbine Test Bench of Fluid Machinery Lab., the Pressure Measurement should be **Pressure &Vaccum Gauge Glycerine filled 4"dial size** instead of **Pressure &Vaccum Gauge**. 2. Replace tank made of **Stainless Steel** with made of **Stainless Steel 304 Grade 1.5 mm Thick**. 3. Efficiency should be 50 to 55%. 4. Add Graphs : a. Graph unit speed (Nu)vs unit discharge (Qu) b. Graph unit power (Eou) vs unit speed (Nu) c. Graph unit speed (Nu) vs overall efficiency (η) d. Graph Discharge (Q) vs output power (Eo) e. Graph Discharge (Q) vs overall efficiency (η) f. Muscle Curve:Graph speed (N) vs overall efficiency (η)	The technical specifications of S. No 2 of Fluid Machinery Lab, Equipment: Francis Turbine Test Bench should be read as: **Output Power**: 1 kW **Discharge**: 1000LPM **Supply Head**: 15m **Speed**: 2200RPM **Runner**: Curved Vane Type **Efficiency:** 50 to 55%. **Dynamometer**: Rope Brake Drum Type, Drum Diameter 200 mm **For Load Measurement**: Spring Balance Tabular Type **For Pressure Measurement**: Pressure and Vacuum Gauges **Dead Weight**: 1 Set **Sump Tank**: Capacity 200 Ltrs Stainless Steel 304 Grade 1.5 mm thick **Water Circulation**: Centrifugal pump, 5HP, 3 Phase Mechanical seal **Discharge Measurement**: Venturimeter with Differential pressure manometer **Tank:** Stainless Steel 304 Grade 1.5 mm thick **Graphs**: a. Graph unit speed (Nu) vs unit discharge (Qu) b. Graph unit power (Eou) vs unit speed (Nu) c. Graph unit speed (Nu) vs overall efficiency(η) d. Graph Discharge (Q) vs output power (Eo) e. Graph Discharge (Q) vs overall efficiency (η) f. Muscle Curve: Graph speed (N) vs overall efficiency (η)

7	35 (Annexure-I) Compliance Sheet (Item No. :3)	1. In the item Kaplan Turbine Test Bench of Fluid Machinery Lab., replace tank made of **Stainless Steel** with made of **Stainless Steel 304 Grade 1.5 mm Thick**. 3. Efficiency should be 45 to 50%. 4. Add Graphs : a. Graph unit speed (Nu)vs unit discharge (Qu) b. Graph unit power (Eou) vs unit sped (Nu) c. Graph unit speed (Nu) vs overall efficiency (η) d. Graph Discharge (Q) vs output power (Eo) e. Graph Discharge (Q) vs overall efficiency (η) f. Muscle Curve:Graph speed (N) vs overall efficiency (η)	The technical specifications of S. No 3 of Fluid Machinery Lab, Equipment: Kaplan Turbine Test Rig should be read as: **Output Power**: 1 kW **Discharge**: 1000 LPM **Supply Head**: 5 m **Speed**: 1500 RPM **Efficiency:** 45 to 50% **Dynamometer**: Rope Brake Drum Type **Sump Tank**: Suitable CapacityStainless Steel 304 Grade 1.5 mm Thick **Water Circulation**: Centrifugal pump, 7.5 HP, 3 Phase **Discharge Measurement**: Veturimeter with Differential pressure manometer **Tank:** Stainless Steel 304 Grade 1.5 mm Thick **Graphs**: a. Graph unit speed (Nu) vs unit discharge (Qu) b. Graph unit power (Eou) vs unit speed (Nu) c. Graph unit speed (Nu) vs overall efficiency(η) d. Graph Discharge (Q) vs output power (Eo) e. Graph Discharge (Q) vs overall efficiency (η) f. Muscle Curve: Graph speed (N) vs overall efficiency (η)
8	36 (Annexure-I) Compliance Sheet (Item No. :4)	1. In the item Reciprocating Pump Test Bench- Variable Speed of Fluid Machinery Lab., replace tank made of **Stainless Steel** with made of **Stainless Steel 304 Grade 1.5 mm Thick**.	In S. No 4 of Fluid Machinery Lab, Equipment: Reciprocating Pump Test Bench –Variable Speeds the technical specifications of sump tank and tank should be read as: **Sump Tank**: Capacity 50 LtrsStainless Steel 304 Grade 1.5 mm Thick **Tank**: Stainless Steel 304 Grade 1.5 mm Thick

9	36 (Annexure-I) Compliance Sheet (Item No. :5)	1. In the item Pelton Turbine Test Bench of Fluid Machinery Lab., the Pressure Measurement should be **Pressure &Vaccum Gauge Glycerine filled 4"dial size** instead of **Pressure &Vaccum Gauge**. 2. Add tank made of **Stainless Steel** with made of **Stainless Steel 304 Grade 1.5 mm Thick**. 3. Efficiency should be 65 to 70%. 4. Add Graphs : a. Graph unit speed (Nu) vs unit discharge (Qu) b. Graph unit power (Eou) vs unit sped (Nu) c. Graph unit speed (Nu) vs overall efficiency (η) d. Graph Discharge (Q) vs output power (Eo) e. Graph Discharge (Q) vs overall efficiency (η) f. Muscle Curve:Graph speed (N) vs overall efficiency (η)	The technical specifications of S. No 5 of Fluid Machinery Lab, Equipment: Pelton Wheel Turbine Test Bench with Data Logging Facility should be read as: **Output Power**: 1 kW **Discharge**: 350 LPM **Supply Head**: 30 m **Speed**: 1000 RPM **Efficiency:** 65 to 70%. **Impeller**: Bucket Type, **Material:** Nylon-66 **Nozzle and Spear**: Material Stainless Steel **Dynamometer**: Rope Brake Drum Type, Drum diameter 200 mm **Sump Tank**: Capacity 200 Ltrs. Stainless Steel 304 Grade 1.5 mm Thick **Water Circulation**: Centrifugal Pump, 5 HP, 3 Phase **Discharge Measurement**: Venturimeter/Pitot tube with Differential Pressure Transmitter or electro-magnetic flow sensor **Pressure Measurement**: Pressure Transmitter, Output 4-20 mA **Load Measurement**: Load cell with Transmitter **Graphs**: a. Graph unit speed (Nu) vs unit discharge (Qu) b. Graph unit power (Eou) vs unit speed (Nu) c. Graph unit speed (Nu) vs overall efficiency(η) d. Graph Discharge (Q) vs output power (Eo) e. Graph Discharge (Q) vs overall efficiency (η) f. Muscle Curve: Graph speed (N) vs overall efficiency (η)

10	36(Annexure-I)Compliance Sheet(Item No.: 6)	1. In the item Centrifugal Pump Test Bench- Variable Speed of Fluid Machinery Lab., replace tank made of **Stainless Steel** with made of **Stainless Steel 304 Grade 1.5 mm Thick**.	In S. No 6 of Fluid Machinery Lab, Equipment: Centrifugal Pump Test Bench with Variable Speeds the technical specifications of sump tank and tank should be read as: **Sump Tank**: Capacity 110 Ltrs Stainless Steel 304 Grade 1.5 mm Thick **Measurement Tank**: Capacity 70 Ltrs Stainless Steel 304 Grade 1.5 mm Thick **Tank**: Stainless Steel 304 Grade 1.5 mm Thick
11	37 (Annexure-I) Compliance Sheet (Item No.: 1)	1. In the item 1 of Heat Transfer Lab., replace **Control Panel Comprising of : Dimmerstat : 0-230V, 2A Digital Temp. Indicator : 0-300Celsius, with multi-channel Switch Digital Temp. Controller : for Temeprature Controlled rod fin tip** with **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off swtich, mains Indicator etc.**	In the item 1 of Heat Transfer Lab., the control panel specifications should be read as**Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off switch, mains Indicator etc.**
12	37, 38 (Annexure-I) Compliance Sheet (Item No.: 2)	1. In the item 2 of Heat Transfer Lab., replace **Control Panel Comprising of : Dimmerstat : 0-230V, 2A Digital Temp. Indicator : 0-300Celsius, with multi-channel Switch Digital Temp. Controller : for Temeprature Controlled rod fin tip** with **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off swtich, mains Indicator etc.**	In item 2 of Heat Transfer Lab., the specifications of control panel should be read as **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off switch, mains Indicator etc.**

13	39 (Annexure-I) Compliance Sheet (Item No. : 4)	1. In the item 4 of Heat Transfer Lab., replace **Control Panel Comprising of PID Controller (0-199.9Celsius) for steam generator & digital Temp. Indicator (0-199.9Celsius) with with multi-channel Switch, with standard make on/off swtich, mains Indicator etc.** with **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off swtich, mains Indicator etc.**	In item 4 of Heat Transfer Lab., the specifications of control panel should be read as **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off switch, mains Indicator etc.**
14	39, 40 (Annexure-I) Compliance Sheet (Item No. : 5)	1. In the item 5 of Heat Transfer Lab., replace **Control Panel Comprising of : Dimmerstat : 0-230V, 2A Digital Temp. Indicator : 0-300Celsius, with multi-channel Switch Digital Temp. Controller : for Temeprature Controlled rod fin tip** with **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off swtich, mains Indicator etc.**	In item 5 of Heat Transfer Lab., the specifications of control panel should be read as **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off switch, mains Indicator etc.**
15	40 (Annexure-I) Compliance Sheet (Item No. : 6)	1. In the item 6 of Heat Transfer Lab., replace **Control Panel Comprising of : Dimmerstat : 0-230V, 2A Digital Temp. Indicator : 0-300Celsius, with multi-channel Switch Digital Temp. Controller : for Temeprature Controlled rod fin tip** with **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off swtich, mains Indicator etc.**	In item 6 of Heat Transfer Lab., the specifications of control panel should be read as **Control Panel Comprising of PID Controller (0-199.9Celsius) for heater, electronic Energy meter for power measurement & Digital Temp. Indicator (0-199.9Celsius) with multi-channel Switch, with standard make on/off switch, mains Indicator etc.**

<table>
<tr>
<td>16</td>
<td>41, 42
(Annexure-I)
Compliance Sheet
(Item No. : 8)</td>
<td>1. In the item 6 of Heat Transfer Lab., replace
Liquid Chamber : Dia 165 mm, Heater : Dia 100mm Sandwiched between Copper Plates, Power Insulation : Ceramic Wool, Cooling Plates : Material Aluminum for Water Circulation
with
Liquid Chamber : Inner Dia. : 40mm Length : 120mm (approx).
Heater : Rod type Outer Dia. : 38mm Length : 120mm
Cooling chamber : Stainless Steel 304 Grade 1.5 mm Thick. for water circulation
Inner Dia. : 70mm, Length : 120mm .</td>
<td>In the item 8 of Heat Transfer Lab., the specifications should be read as:
Liquid Chamber : Inner Dia. : 40mm
Length : 120mm (approx).
Heater : Rod type
Outer Dia. : 38mm Length : 120mm
Cooling chamber: Stainless Steel 304 Grade 1.5 mm Thick. for water circulation
Inner Dia. : 70mm, Length : 120mm .</td>
</tr>
<tr>
<td>17</td>
<td>45 (Annexure-I)
Compliance Sheet
(Item No. : 2)</td>
<td>In item Slip Gauge Set : 83 Pcs of Mechnical Measurement & Metrology Lab., the Technical Specifications are not clear or must be incomplete</td>
<td rowspan="2">On page 45 (Annexure-I) the technical specification of following MECHANICAL MEASUREMENT AND METROLOGY LABequipment should be read as:
<table>
<tr><th>S. NO.</th><th>Name of Equipment</th><th>Technical Specification</th></tr>
<tr><td>1.</td><td>Sine bar</td><td>Centre distance between rollers is 150 mm ±0.003mm.
Hardness - 60 ± 2 Rc& Tempered</td></tr>
<tr><td>2.</td><td>Slip Gauge Set: 83 pcs</td><td>• 1 Block ; 1.0005 mm
• 49 Block ; 1.01-1.49 in Step of 0.01 mm
• 3 Block ; 0.50-1.5 in Step of 0.50 mm
• 5 Block ; 1.60-2.0 mm in Step of 0.10 mm
• 15 Block ; 2.5-9.5 mm in Step of 0.50 mm</td></tr>
</table>
</td>
</tr>
<tr>
<td>18</td>
<td>45 (Annexure-I)
Compliance Sheet
(Item No. : 9)</td>
<td>In the item Depth Gauge of Mechnical Measurement & Metrology Lab., the Technicsl Specifications are not given</td>
</tr>
</table>

					• 10 Block ; 10-100 mm in Step of 10 mm
			3.	Bevel Protector:	300 mm With carbide edge scale
			4.	Vernier Calliper	Range: 0-200 mm with carbide tip anvil/calliper
			5.	Digital Vernier Calliper	Range: 0-200 mm with carbide tip anvil/calliper
			6.	Micrometer	0-25 mm with carbide tip anvil
			7.	Digital Micrometer	0-25 mm with carbide tip anvil
			8.	Inside Micrometer	50-200 mm with carbide tip anvil
19	49 (Annexure-I) Compliance Sheet (Item No. : 17)	In the item Thermocouple its calibration & application for temperature measurement Apparatus of Mechnical Measurement & Metrology Lab., the detail **Acrylic Water tank with submersible pump & fish tank compressor for cooling purpose is null & void**	9.	Depth Gauge	Range: 0-450 mm, Graduation:0.05mm Made of hardened stainless steel. Base and measuring faces hardened and micro-lapped. Optional wider extension base to be provided
			10.	Vernier Height Gauge	0-300mm Made of hardened stainless steel. Base and measuring faces hardened and micro-lapped.
			17	Thermocouple its calibration and application for temperature	Standard equipment for J, K,E and T calibrations Compact rack type light weight setup consisting of temperature pressure vessel with 750watts heater, Bourden type thermometer, provision to mount one thermistor & 1 k type thermocouple or 2 thermocouple (Standard & under calibration). Signal conditioning circuit for RTD & TC. Computer

			measure ment apparatus | interface
20	53(Annexure-I)Compliance Sheet(Item No.: 5)	In the item Electrolux Refrigerator Test Rig/ Vapour Absorption Cycle Trainer of Refrigeration & Air Conditioning Lab., replace**Refrigerant : Mixture of three fluid system Ammonia (NH3) + Wter (H2O) + Hydrogen (H2) Gases : Non- CEC, Non- HCFC, Non-FCKW, Non- Freon**with **Refrigerant : (NH3)+ Water (H2O)**	In S. No. 5 equipment Electrolux refrigerator test rig / vapour absorption cycle trainer of Refrigeration & Air Conditioning Lab., the specifications of **Refrigerant should be read as**: Refrigerant: (NH_3)+ Water (H_2O)
21	56, 57, 58 (Annexure-I) Compliance Sheet (Item No.: 9)	In the item Model of Cold Storage Plant of Refrigeration & Air Conditioning Lab., **the Last Para. should not be there in the Technical Specficiation of it as it in not the part of this item** **Refrigeration system** **Capacity : 1/3 Ton** **Compressor : Hermatically sealed** **Condensor : Forced Convection air cooled** **Condenser fan : Axial Flow** **Evaporator : Stainless Steel from inner & outer provided** **Expansion device : Capillary Tube** **Accumulator** **Forced Convection Air Cooled** **Insulation : High Density Thermocouple.** **Control & indications Provided for Temperature & pressure 6 Channel facility with digital display** **2 Nos : Dial type pressure gauges**	In S. No. 9 equipment Model of Cold Storage Plant of Refrigeration & Air Conditioning Lab., the last paragraph: "Refrigeration system • Capacity: 1/3 TR • Compressor: Hermetically sealed. • Condenser: Forced convection air cooled. • Condenser fan: Axial flow. • Evaporator: Stainless Steel From Inner & Outer Provided. • Expansion device: Capillary Tube. • Accumulator: Forced convection Air cooled. • Insulation: High Density Thermocole Controls & indications Provided for Temperature and Pressure • 6 Channel facility with digital display. • 2 Nos.; Dial type pressure gauges. • Digital Amp. Meter

		Difgital Amp. meter **Digital Voltmeter** **Digital Energymeter** **Rotameter make for Refrigerant** **Main Switch with Power Switches & Indication Lights** **Water Cooler Body sghall be fabrivcated out of Stainless Steel From Inner & Outer of 50 liter Capacity with Drain**	• Digital Volt Meter • Digital Energy Meter • Rotameter Make for Refrigerant. -Main Switch with Power Switches & Indication Lights -Water Cooler Body shall be fabricated out of Stainless Steel From Inner & outer of 50 Litre capacity with Drain." Should be considered null and void.