



Project Name	Name of Package	Location
Project:193198- Introduction of B. Tech Program at Govt. College of Technology Khar District Bajaur	1. Civil Technology (B.Tech) 2. Electrical Tech: (B.Tech)	GCT Khar Bajaur



CIVIL TECHNOLOGY EQUIPMENT'S FOR B.TCH (GCT Bajaur)

HYDRAULICS LAB

Sr. No	Name of Equipment	QTY
1	Hydraulic Ram Pump Apparatus Pump material: Stainless steel. Reservoir : 150 mm diameter tank. Graduated cylinder : 1500 ml Adjustable supply head : up to 1000 mm Adjustable delivery head : up to 2000 mm Complete with frame.	1
2	Water Current meter cup type Cable drum: aluminium cast 175 mm Φ Cable: Zinc steel rope 3.25 mm Φ Weight : 10 Kg without cable	1
3	Pelton well turbine Construction : 160 mm diameter stainless steel runner. Stainless steel nozzle, and shaft. Stainless steel casing with transparent window Ratings : Maximum speed approx 1800 rpm Maximum power over 40 W. Instruments Pressure : 0-3 kg/cm ² pressure gauge. Torque : measured with 2 spring balances. Speed : Portable tachometer. Complete with frame.	1
4	Dead weight pressure gauge Pressure gauge : 4 in. Bourdon tube , 0-3 kg/cm ² / 0-30 N/cm ² Piston cross-section : 250 mm ² Piston weight : 0.5 kg Calibration weights : 1x0.5 + 2x1.0 + 2x2.0 kg	2
5	Hydrostatic Pressure apparatus Quadrant Inner radius : 100 mm Outer radius : 200 mm Width : 75 mm Depth scale : 1 mm graduation Tank capacity : 6 l, Weights : 2x10 + 2x20 + 2x50 + 2x100 + 2x200g	1
6	Metacentric Height Apparatus Pontoon : 400 mm long x 200 mm wide x 100 mm high 5 mm thick plastics. Horizontal scale : 1 mm graduation. Mast height : 450 mm or as required Maximum angle of tilt : $\pm 13^\circ \times 0.5^\circ$ graduation Vertical sliding weight : 500 g Jockey weight : 200 g	2
7	Bernoulli's Theorem demonstration apparatus Diameters : 28 mm inlet with 14 mm throat. Water manometer : 8 tubes x 450 mm x 1 mm graduation. Total head probe : 3 mm tube.	2
8	Impact of jet apparatus Cylinder diameter : 150 mm Nozzle diameter : 7 mm Target plate diameter : 36 mm Target plates : Flat, 120o cone, 180o hemisphere. Nozzle and target plate material : Plastics Weights : 2x10 + 2x20 + 2x50 + 2x100 + 2x200g	1
9	Orifice and jet apparatus Cylinder diameter : 150 mm Orifice diameter : 4 mm and 8 mm or 3 mm and 6 mm Trajectory probes : 8, stainless steel. Maximum constant head : 420 mm Measuring cup : 1 l	1
10	Pipe friction apparatus Cylinder diameter : 150 mm Adjustable constant head : 800-1000 mm Water manometer : 450 mm x 1 mm graduation. Mercury manometer : 450 mm x 1 mm graduation. Test pipe : Stainless steel, 3 mm approx ID. Test section length : 510 mm. Measuring cup : 1 l	1
11	Cylinder diameter : 150 mm Test pipe inside diameter : 9-11 mm acrylic or 13 mm glass. Length of test pipe : 720 mm Dye reservoir : 0.2 l Measuring cup : 2 l	1
12	Flow meter demonstration apparatus Variable area flow meter : up to 35 lpm. Venturidiameters : 29 mm inlet with 17 mm throat.Orifice plate diameter : 20 mm on 29 mm diameter tube. Pitot tube : On 19 mm diameter tube. Water manometer : 8 tubes x 450 mm x 1 mm graduation. Complete with frame.	1
13	Bends and Fitting Apparatus Pipe diameter (nominal) : 20 mm or 3/4 in approx.. Enlarged pipe diameter (nominal) : 35 mm or 1-1/4 in approx. Bends : 90°Miter bend, 90° small radius bend, 90° large radius bend Fittings : 90° Elbow, 45° elbow (2 each), sudden expansion, and sudden contraction. Water manometer : 8 tubes x 450 mm x 1 mm graduation.	1
14	Free and forced vortex apparatus Cylinder diameter : 250 mm Height to over flow point : 180 mm Orifice diameters : 8, 12, 16 and 24 mm Distance from center of depth probes : 0, 30, 50, 70, 90 and 110 mm Pitot tube measuring points : 15, 25 and 30 mm radius.	1
15	Flow through Orifice Apparatus Cylinder diameter : 150 mm Standard orifice : 13 mm diameter, sharp edge. Maximum head : 370 mm Traverse travel : 0.01 mm division.	1
16	Laminar flow analysis table Channel size : 260 mm wide x 360 mm long, Small holes : 5, Dye reservoir : 0.5 l, Number of streamlines : 19, Models : Made from rubber Circle, 2 Rectangle, 2 Aerofoil and 2 Canal banks.	1
17	Tools Kit (Spanner Set, Plier Set, Screw Driver Set, Mallet/Rubber Hammer, Hammer, L-Key Set)	1



PUBLIC HEALTH ENGG LAB

Sr. No	Name of Equipment	QTY
1	Digital pH and conductivity /TDS meter and thermometer Combination pH / EC / TDS tester / thermometer Temperature in °C or °F EC (Electrical Conductivity) in micro Siemens TDS (Total Dissolved Solids) in ppm Measurement Stability Indicator Replaceable pH Electrode Automatic pH Calibration at standard and NIST Buffer Sets Automatic Temperature Compensation (ATC) Adjustable Temperature Coefficient Factor Rugged, Floating Waterproof Casing Range and accuracy: pH: 0-14±0.05 pH Electric Conductivity(TDS) :0 to 3,999 µS/cm (0-2000ppm/cm) ±2% full scale. Temperature 0.0 to 60.0 ±0.5 °C Resolution : pH: 0.01 Electric Conductivity(TDS) :1µS/cm (1 ppm/cm) Temperature :0.1 °C	1
2	Spectrophotometer Wavelength range 190 nm - 1,100 nm, Photometric accuracy (K ₂ Cr ₂ O ₇) ±0.01A, Wavelength accuracy ±1.0nm, Resolution (Toluene in hexane) >1.5, Stray light (KCl, 198nm) >2. Complete with Cuvettes and Accessories.	1
3	Portable Turbidity meter Ranges: In automatic range mode:0-9,99,0-99,9 and 0-1000 NTS Dimension: 22.2x9.5x8.9 cm	1
4	B.O.D. Apparatus Range: 0 - 700 mg/L Selectable: 0 - 35, 0 - 70, 0 - 350, or 0 - 700 mg/L BOD (Biochemical Oxygen Demand), Drift: < 3 mg/L BOD in 5 days 6x473-ml amber glass BOD bottles, Power supply 115/230V, Power cords, 6x magnetic stir bars	1
5	Bacteriological Analysis kit With consumables for 200 tests.	1
6	Microscope Eyepieces: 10x & 16x Magnification; 10x, 25x 40x Working distance : 10.8, 4.2, 2.8 mm	1
7	C.O.D Apparatus Complete kit with COD Digester, COD Titrator, COD Vessels and Air Condensers Glass Tube 38mm dia, 15 nos (5x3 rows), Sample Volume 20ml. Each. Temp. Range above ambient to 180 deg.C or higher.	1
8	Portable D.O meter Automatic range mode: 0-9.99,0-99.9,0-1000NTU Dimension: 22.2x9.5x8.9cm	1
9	Water bath Volume 22 l, with audible and visible alarm, overheat shut-out safety device, temp. range from amb. To 99.9° C	1
10	Incubator with fan Temperature range: 0 to 45° C Temperature uniformity: ±0.5 @ 20° C Ext. Dimension: 48x53x95 cm	1
11	Autoclave Temp range 105°C to 138°C, Chamber Volume 120 Liter to 310 Liter.	1
12	Manesty (Distilled water plant) Capacity Output 4 Litre /Hr, Heater Load 3 kw, Power On 220/230 Volts A.C. Supply	1
13	Analytical balance 210g x 0.1mg	1
14	Digital Drying Oven 100 Liters, 200°C Temperature	1
16	BOD bottles (300 ml)	20
17	Reagent Bottles 1000 ml, 500 ml)	20



CONCRETE LAB

Sr. No	Name of Equipment	Qty
1	Crack detection Microscope Magnification: 40x, measuring range: 4 mm divisions: 0.02 mm, with an adjustable light source fed by high power batteries(included).	1
2	Compaction Factor Apparatus BS 1881 This test gives an accurate indication of the workability of concrete. It is particularly suitable for mixes with limited workability that have aggregates with max. 38 mm diameters. The equipment consists of two conical hoppers with quick opening traps that allow the concrete to fall freely. A specimen mould, mounted on the base, receives the mix.	2
3	Concrete vibrating table 80 x 40 cm EN 12390-2 To facilitate compaction of concrete in the moulds. Vibrating surface 80 x 40 cm with rubber mat, electric vibrator 3.000 vibrations per minute. Pedal switch to start/stop vibration.	1
4	Concrete Mixer The steel drum has an integral ring gear and is mounted on a steel frame. Drum liters 140, Yield liters 80, Motor kW 0.3	1
5	Temperature controlled curing tank ASTM C 31 ASTM C 192 AASHTO T 23 EN 12390-2 610 liter, The tank be built with reinforced base. Supplied complete with specimen supporting rack. Control unit with digital thermos-regulator (0.1°C) and temperature setting for heating function only (from ambient to 100°C).	1
6	Oven Oven 100 liters, 200°C Temperature Natural convection.	1
7	Heavy duty digital balance (300 kg) Platform : 60 x 45 cm. Zeroing or calibrating key.	1
8	Air Entrainment Meter ASTM C 231 EN 12350-7 Used to determine the air content of fresh concrete, it comprises a sealed vessel of 5 liter capacity. Lid with fast-closing system incorporates a pressure gauge (0-2.5 bar). Range of measurement 0-10%. Graduated scale (0.1% divisions). With tamping rod and air pump. Supplied with calibration certificate.	1
9	Compressometer/Extensometer for 6"x12" Cylinder-Digital Indicator. ASTM C469 Built with lightweight aluminum alloy yokes; other parts with plated steel. Two digital Indicators measuring specimen deformation at the two opposite positions and the transverse deformation simultaneously.	2
10	Vicats apparatus ASTM C 187, ASTM C 191, AASHTO T129, AASHTO T 131, BS 4550,AFNOR P15, AFNOR P 414,EN 196-3 Metallic Frame, measurement of the movement is given by an indicator which moves along a scale graduated in millimetres. The apparatus is supplied complete with glass plate , needle and mould. ASTM/AASHTO needle dia. 1 mm (set of 6) ASTM/AASHTO cone shaped mould in plastic diameter 70 and 60 mm x 40 (h) mm Glass plate, 10 x 10 cm (Approx) Consistency plunger, dia. 10 mm Thermometer (-10 + 50°C) 300 g consistency plunger (dia. 10 mm)	1
11	Digital Balance 6 Kg x 0.1 g	1
12	Moulds Cube 15 cm/side EN 12390-1 ASTM C 31 ASTM C 192 BS 1881 DIN 51229 NF 18-400	4
13	Moulds Cube 5 cm/side EN 12390-1 ASTM C 31 ASTM C 192 BS 1881 DIN 51229 NF 18-400	6
14	Moulds Cylinder 15 cm x 30 cm EN 12390-1 ASTM C 31 ASTM C 192 BS 1881 DIN 51229 NF 18-400	6
15	Capping Apparatus for 15 cm Side EN 12390-3 ASTM C 617 ASTM C 31 ASTM C 192 AASHTO T 23 AASHTO T 126 AFNOR P 416 BS 1881 UNI 6132-72 Complete set. Heating power selection. Stainless steel cup with a capacity of approximately two litres. Stainless steel ladle Pliers for handling 15 cm and 6" cylinders	2
16	ASTM Sieve Set (No. 4, 6, 8, 10, 12, 14, 16, 20, 30, 40, 50, 60, 70, 100 and 200) Frame diameter: 8 inch	3



17	<p>Slump Cone Test Set ASTM C 143, AASHTO T 119, EN 12350-2, BS 1881, BS 5075, NF 18-305 Complete unit Stainless Steel slump cone, plastic scoop, metal funnel to assist filling. Galvanized steel base with graduated rod and strip for scraping and measuring.</p>	1
18	<p>Soundness Test Water Bath EN 196-3 Made of stainless steel with bath dimensions 300 x 150 x 190 (h) mm supplied with cover. Control switch, timer (0 ÷ 60 min.) are in the front panel. Temperature: 100°C. Two heating elements, 1350 W and 200 W, guarantee that the water reaches boiling point within approx. 30 minutes, after which a timer cuts out the more powerful element so that the task of maintaining the water temperature is left to the second heating element. Removable rack for 12 moulds.</p>	2
19	<p>Le-Chatlier Mould AFNOR P 15 AFNOR P 432 EN 196-3 BS 890 BS 4550 Made of chrome plated brass with split cylinder diameter 30 mm x 30 mm high and two needles 150 mm long. Three moulds required for each test.</p>	5
20	<p>Sieve Shaker Electromagnetic UNI EN 932-5 ISO 3310-1 Houses up to 12 sieves diameter 200 mm plus pan and cover or 10 sieves diameter 300 mm plus pan and cover. Timer from 0 to 20 minutes. Variable vibration intensity Adjustable sieving modes: continuous or intermittent. Sieving duration and pauses are programmable.</p>	1
21	<p>Aggregate impact apparatus BS 812-112 Used to determine aggregate impact value. Free fall of hammer during tests and built-in blow counter. Complete with cylindrical measure dia. 75 x 50 mm deep and steel tamping bar dia. 16 mm x 600 mm long.</p>	2
22	<p>Blaine apparatus ASTM C 204 AASHTO T 153 BS 4359 AFNOR P 15 AFNOR P 442 BS 4550 EN 196-6 For determining the fineness of Portland cement in terms of a specific surface expressed as total area in cm²/g of cement. Complete with cell, disk and accessories (thermometer, 1000 filter disks, 100 cc of manometer liquid, silica grease, funnel and brush).</p>	2
23	<p>Le-Chattier Flask ASTM C 188 AASHTO T 133 EN 196-6 Used to determine the specific gravity of sands and cement. Made in glass, 250 cc capacity. Graduated from 0-1 cc and from 18 to 24 cc (0.1 cc graduations). With ground glass stopper.</p>	4
24	<p>Specific Gravity apparatus ASTM C 128 BS 812 en 1097-6 Glass Pycnometer for sands and fine aggregates, 1000 cc capacity with conical top. Sand Absorption Cone and Tamper For fine aggregates. Chrome-plated brass cone (dia. 40 and 90 mm); 25 mm dia. tamping rod. Wire Basket for sample Made of ASTM N.100 Mesh (0.15 mm) 140 mm diameter, 150 mm height</p>	4
25	<p>Cone Penetrometer apparatus Simple and light instrument for measuring static penetration resistance. 3 cones with 30° cone angle and 1 sq. inch sectional area 3 threaded extension rods 300 mm long graduated every 150 mm 1 kN (100 kgf) load ring with stem brake unit for max. force reading and dial gauge (0.001 mm resolution) Supplied with calibration certificate and conversion charts and carrying case</p>	3
26	<p>Concrete Permeability Apparatus BS 1881 Complete pressure head, clamping pliers and anchoring tools, two bottles of distilled water. The pressure head is clamped to the concrete surface either horizontally or vertically and is filled with water, sealed and then adequate pressure is applied. The pressure may be chosen between 0 and 4 bar. Readings on the gauge are effectuated at pre-established intervals</p>	2
27	<p>Blaine Permeability Apparatus ASTM C 204 AASHTO T 153 BS 4359 AFNOR P15 AFNOR P442 BS 4550 EN 196-6 For determining the fineness of Portland cement in terms of a specific surface expressed as total area in cm²/g of cement. Complete with cell, disk and accessories thermometer, 1000 filter disks, 100 cc of manometer liquid, silica grease, funnel and brush.</p>	3
28	<p>Glass ware(set) Complete with measuring cylinders (1000ml, 500ml, 250ml, 100ml), pycnometers (1000ml, 500ml, 250ml, 100ml), beakers (1000ml, 500ml, 250ml, 100ml),</p>	1



29	Wood moisture meter Minimum Depth of Measurement: 3/4" Moisture Content range: 5% – 32% Specific Gravity range of selectable wood species: 0.30-0.70	2
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SURVEYING LAB

Sr. No	Name of Equipment	Qty
1	Alidade brass 18"	02
2	Alidade brass 12"	05
3	Telescopic Alidade , with erect image magnification 8 to 12X with board tripod compass etc...complete set.	1
4	Chains 100 ft	3
5	Compass (Prismatic) 125mm dia with telescopic stand, cover and casing.	3
6	Compass (Surveyors) 1 degree resolution and 1/2 degree accuracy. 125mm dia with telescopic stand, cover and casing.	1
7	Hand level Stadia ratio of 1:32, expendable from 5"-7" .With leather case	4
8	Automatic Level , magnification 32X, air damped technology, minimum focusing distance 0.6m accuracy at 1km double run leveling 2mm or better. Setting accuracy + 15' water and dust proof complete in case with standard accessories tripod and staff rod.	1
9	Tilting Level with erect image magnification 32X (U bubble type)	1
10	Reflector less total station Accuracy 5 second, 1 second reading double side display, GRAPHICAL DISPLAY both side screen. Range without prism 500 meters and with prism 3000 meters, memory 60,000 points, SD memory card, magnification 30X, aperture 45mm, laser plummet, electronic bubble and tube bubble in main body, with following surveying program (RDM, reference point distance, MLM, area, stake out, point coordinates, circle radius, Liner arc intersection, road design, point to line, rectangular coordinate, VPM, COGO function) complete in case with standard accessories, aluminum tripod, single prism target set, with triple prism target set with optical plummet and its tripod	2
11	Optical squares (Stanley) double pattern	5
12	Plane table (30" X 24")	4
13	Planimeter digital Roller-type, 10 ft x 1 ft HV measuring range, Accuracy better than +/-0.2%, Measures to scale, Custom X and Y scale coordinates. Measures regular/irregular/elongated areas, Converts between U.S. and metric	1
14	Staves leveling staff (aluminum)	5
15	Tape thermometer	2
16	Tension handles	5
17	Altimeters in leather case	2
18	Tapes 30 m/100ft	6

GEOTECHNICAL LAB

Sr. No	Name of Equipment	Qty
1	Liquid Limit Set ASTM D 4318 A ASHTO T 89 UNI 10014 BS 1377 With ebonite base and removable brass cup. The height of drop of the cup may be adjusted via the hand crank mechanism. A built-in blow counter is supplied as standard. Grooving Tool AASHTO -UNI	1
2	Sand cone with plate ASTM D 1556 AASHTO T 191 CNR 22 1972 Cone 165 mm diameter made of chromium-plated, accurately machined, steel and with a calibrated valve (12.70 mm dia. hole). Aluminium casting base and 5 litre plastic container provided	2



3	<p>Hydrometer (Practical size sedimentation Set) ASTM D 422 BS 1377 Thermostatic glass bath is divided into two compartments, the first measures 49 x 29 x 30 (h) cm and is where the sedimentation cylinders are placed, the second is smaller and houses the heater and the circulation pump. The heater is preset to maintain a temperature of 20 ± 1°C if the ambient temperature is lower than 20°C. Soil hydrometer type 152 H (ASTM, AASHTO) Range, - 5 to + 60. Lead ballasted with graduated stem (1 g divisions), 1000 cc graduated glass cylinder (5 Required) Graduated glass beaker, 600 cc. Sodium hexametaphosphate, 1 kg</p>	5
4	<p>High speed stirrer Made of Aluminum casting, complete with a removable stainless steel dispersion cup. Speed: 10,000 rpm</p>	2
5	<p>Digital Drying Oven 100 Liters, 200°C Temperature</p>	1
6	<p>Heavy Duty Solution Balance 20 kg, divisions 1 g Stainless steel plate dia. 279 mm. Magnetic damping system. Front beam scale 100 g (divisions 1 g) Rear beam scale 1000 g (divisions 100 g) Tare beam with sliding weight to 2270 g Weight set: 1 x 1 kg, 2 x 2 kg, 1 x 5 kg and 1 x 10 kg A hook can be positioned under the platform for hydrostatic weighing.</p>	1
7	<p>Digital Balance 6 Kg x 0.1 g</p>	1
8	<p>Digital Balance 1 Kg x 0.01 g</p>	1
9	<p>Unconfined Testing Machine ASTM D 1883 AASHTO T 193 UNI 10009 Testing Machine, 50 kN machine consists in its 6 speeds (pre-set and ranging from 0.6 to 50.8 mm/min.). Speed change is made via keypad. It is possible to set intermediate speeds other than those already pre-set. Max Vertical Span 600 mm, Min Vertical Span 100 mm Horizontal Span 380 mm Ram travel 100 mm 2kN Proving Ring with Calibration Certificate Dial Gauge Precision 0.01mm travel 30mm. Load Transmission Device Bracket for Dial Gauge Dial Gauge Datum Bar for Unconfined Test Compression Platen for Unconfined Test</p>	1
10	<p>Direct shear machine ASTM D 3080 BS 1377:7 UNI CEN ISO/TS 17892-10 For 60 cm/side specimen, Variable speed from 0.00001 to 12 mm/min, Max force: 6 kN, All made in stainless steel. Sample cutter 6x6 cm, INOX, Calibrated weights 31.5kg, Brass made shear box 6x6 cm with silicon carbide porous discs. Bidirectional Load Cells of 5 kN capacity, 2 Potentiometric displacement transducers of 25 mm travel, Individual digital display unit of every parameter, Multiplexer with 3-way connector block and window based data acquisition program and processing software for Direct and Residual shear, Different speeds may be selected for forward and reverse drive, Displacement movements: 0.03 µm, Rapid approach speed (unloaded): 12 mm/min, Forward/reverse cycles: programmable up to 20 mm, Number of cycles: no limit to number which may be programmed, Microswitches prevent piston overtravel and dynamometer overload, Leverage system allows applied weights to be amplified by 10, 9, 7.92 and 6.125, A small hand wheel serves to sustain/release the vertical load</p>	1
11	<p>Glass ware Set Complete with measuring cylinders (1000ml, 500ml, 250ml, 100ml), pycnometers (1000ml, 500ml, 250ml, 100ml), beakers (1000ml, 500ml, 250ml, 100ml),</p>	1
12	<p>Sieve Shaker Electromagnetic UNI EN 932-5 ISO 3310-1 Houses up to 12 sieves diameter 200 mm plus pan and cover or 10 sieves diameter 300 mm plus pan and cover. Timer from 0 to 20 minute. Variable vibration intensity Adjustable sieving modes: continuous or intermittent. Sieving duration and pauses are programmable.</p>	1
13	<p>Standard Moisture Tester ASTM D 4944 BS 812 Supplied in a wooden case complete with balance, 4 steel balls to crush sample, tool kit, Tin of calcium carbide, 3 ampoules for dial gauge checking. Choice of sample weight depends on expected moisture. Capacity: samples weighing from 20 to 100 g. Analogical dial gauge (1.6% accuracy). Moisture range: 0 - 1.6 bar.</p>	1
14	<p>Blaine Air permeability apparatus ASTM C 204 AASHTO T 153 BS 4359 AFNOR P15 AFNOR P442 BS 4550 EN 196-6 For determining the fineness of Portland cement in terms of a specific surface expressed as total area in cm²/g of cement. Complete with cell, disk and accessories thermometer, 1000 filter disks, 100 cc of manometer liquid, silica grease, funnel and brush.</p>	2



16	<p>Oedometer Consolidation Apparatus (3 Place) ASTM D 2435, ASTM D 4546, BS 1377, UNI CEN ISO/TS 17892-5 Oedometer, Fixed Fulcrum (3 Required) Load capacity 160 kg on the lever arm, The lever arm adjustment is achieved by means of a screw pin located on the load bridge, Frame and lever arm made of special heat-treated cast aluminum, Load transmission elements made of steel, Lever arm/reaction pin with roller bearings, Articulation of load bridge/plunger with spherical matching, Lever arm counterweight with screw adjustment, Weight hanger with two support plates, Lever arm with triple beam ratios 9/1, 10/1, 11/1, Lever arm release system with screw and adjusting ring nut, Dial gauge/transducer support, Bubble level fitted to check horizontal leveling of lever arm and Weight: 22.5 kg. Consolidation Cell, 20 cm² Section 50.47mm Diameter Specimen (3 Required) Calibrated Weights - 64 kg (3 Required) Dial Gauge, 10mm Travel (3 Required). Three Place Bench Steel Made, Suitable for 3 Oedometers</p>	1
17	<p>Standard Compaction Hammer and Mould ASTM D 558 ASTM D 698 ASTM D 1557 AASHTO T 99 AASHTO T 134 AASHTO T 180</p>	1
18	<p>ASTM Sieve Set(No. 4, 6, 8, 10, 12, 14, 16, 20, 30, 40, 50, 60, 70, 100 and 200) Frame diameter: 8 inch</p>	5
20	<p>Standard Penetration Test apparatus AASHTO T 206, ASTM D1586 compliant equipment. Split Barrel Sampler, hardened machined steel, 1-3/8" inner dia; 18" length(1 pc). Sampling Rod; steel pipe, 1.5 m length. (20 pcs) Vertical Guide; machine steel (1 pc) Pipe Wrench; 24 "length (2 pcs) Drive weight Assembly consisting of: Hammer; steel, 63.5 kg weight (1 pc) Anvil; machine steel (1 pc) Guide Rod (steel, 76.2 cm drop height (1 pc) Tripod Assembly consisting of: Tripod Stand; steel pipe (1 pc) Pulley; 20 cm diameter (1 pc) Rope; 3/4" diameter x 15 m (1 roll)</p>	1
21	<p>Plate load test apparatus ASTM D1194, ASTM D1195, ASTM D1196; DIN1834; BS1377 compliant Load plate diameter:300mm Jack with load capacity range:0-300KN And stroke:120 mm Measuring bridge span: 3000mm Hand pump with rated pressure: 70Kpa Stress test range: 0-25Mpa Two displacement gauges with two normal and two magnetic stands and measurement range 30x0.01mm</p>	1

MATERIAL TESTING LAB

Sr. No	Name of Equipment	Qty
1	Lab Tools including (Digital Vernier calipers, Screw Gauges, Spanner Set, Plier Set, Screw Driver Set, Mallet/Rubber Hammer, Hammer, L-Key Set)	1
2	<p>Strut Apparatus Basic frame: 2 columns and a sliding cross member with loading screw. Maximum strut length: 750 mm. Load cell: 150 kg. Force indicator: 3 1/2 digits. Dial gauge: 0-20 mm. x 0.01 mm. graduation. Weight hanger and weights: 4 x50 + 2 x 100 + 3 x 200 g. Strut supports: Knife edge: 2 each Built – in: 2 each, Struts specimens:6 each with knife edge ends: 3 x 20mm mild steel. Lengths: 500, 550, 600, 650, 700 and 750 mm. 3 each with knife edge ends: 6 (approx..) x 20 x 750 mm mild steel, brass and aluminum.</p>	1
3	<p>Concrete Core Drill EN 12504-1 A highly practical model with base in die-cast aluminium mounted on two wheels at the rear for ease of movement. The support column is in galvanized steel and may be positioned at different angles up to 70° with respect to the base. Mobile, motor support on ball-bearings, shaft thread is 1 1/4" UNC (31.75 mm) with 7 threads per inch.</p>	1



4	<p>Charpy's&lzod impact test apparatus ISO 179, ISO 180, ASTM D-6110, ASTM D256 compliant. Digital with touchscreen display and PC interface. Energy levels (max capacity): 5.5J, 11J, 22J (Izod Testing), 7.5J, 15J, 25J, 50J (Charpy Testing) Span of Charpy: 62mm</p> <p>Izod testing Impact Speed: around 3.5m/s Radius of striking edge R=0.8mm±0.2mm Location of striking edge above top surface of support: 22mm±0.05mm Notch A: 45°±1° Radius of the notch bottom R=0.25±0.05mm Notch B: 45°±1° Radius of the notch bottom R=1±0.05mm</p> <p>Charpy testing Impact Speed: 2.9m/s;3.8m/s Radius of striking edge R=2mm±0.5mm Angle of striking edge: 30°±1° Measurement resolution: 0.01J Notch A: 45°±1° Radius of the notch bottom R=0.25±0.05mm; Notch B: 45°±1° Radius of the notch bottom R=1±0.05mm; Notch C: 45°±1° Radius of the notch bottom R=0.10±0.02mm Single Phase AC 220V power</p>	1
5	<p>Torsion testing Machine Digital Servo Hydraulic type for static, dynamic and fatigue torque ranging from ± 1 Nm to 80 kNm up to maximum 30 Hz frequency.</p>	1
6	<p>Curved bar apparatus Set of calibrated weights (4 x 2N; 3 x 5N; 1 x 10 N) Six specimens: including semi-circle; semi-circular bracket; double davit; quadrant; single davit curved; single davit straight Specimen section approximately 25mm x 3mm, coated steel. Two special hangers for loading and connecting two displacement gauges. Two displacement gauges on moveable stands. Along with Frame and Stand and Comprehensive instruction manual.</p>	3
7	<p>Beam deflection apparatus A range of beam materials and cross sections. Bench mounted test frame. Should include Three reaction-measuring piers incorporating an electronic load indicator. Fourth pier for clamping the end of a beam or cantilever. Three dial gauges on adjustable stands. Four load hangers. Digital display for viewing of forces and deflections. Along with software and comprehensive technical manual. Set of slotted weights included</p>	1

TRANSPORTATION LAB

Sr. No	Name of Equipment	Qty
1	<p>Asphalt mixer machine with EN 12697-35 Complete with bowl and beater. Planetary speeds: 25 - 32 - 39 - 46 - 53 - 60 rpm (clockwise rotation) Beater speeds: 64 - 82 - 100 - 118 - 136 - 154 rpm (anticlockwise rotation. Control panel with heat regulator, electric heating device with heating element</p>	1
2	<p>CBR moulds with surcharge weight ASTM D 1883 EN 13286-47 BS 1377 AASHTO T 193 CNR UNI 10009 Mould diameter 6" x 7" With collar and perforated base plate. Annular Surcharge 2.27 kg ,Split Surcharge 2.27 kg Annular Surcharge 4.54 kg Annular Surcharge 9.08 kg</p>	2
3	<p>CBR Laboratory Set BS 598, ASTM D 1559, CNR 30, EN 12697-12, EN 12697-34, AASHTO T 245 Testing Machine, 50 kN machine consists in its 6 speeds (pre-set and ranging from 0.6 to 50.8 mm/min.). Speed change is made via keypad. It is possible to set intermediate speeds other than those already pre-set. Max Vertical Span 600 mm, Min Vertical Span 100 mm Horizontal Span 380 mm Ram travel 100 mm Load Transmission Device Dial Gauge, Precision 0.01mm 50 kN Proving Ring Complete with Calibration Certificate Bracket for Dial Gauge CBR Mould 6"</p>	1
4	<p>Proctor penetrometer ASTM D 1558 Designed for comparative checking of soil compaction. It may also be used for evaluating moisture/density relationship, determined in the laboratory, on an analogous soil sample. Supplied complete with 9 interchangeable needles: 1" - 3/4" - 1/2" - 1/3" - 1/5" - 1/10" - 1/20"</p>	1



	- 1/30" - 1/40" and carrying case. Graduations 0-40 kg. (division 1 kg)	
5	Bitumen Flash and Fire point test set	1
6	Bitumen Penetration Grading test set	1
7	Bitumen softening point test set	1
8	Soil Specific Gravity test sets (separate set for fine and for coarse particles/aggregate)	1
9	Digital Viscometer AASHTO T 316 , ASTM D4402 compliant. Viscosity Range 100cP-40 million cP Revolutions per Minute 0.01-200RPM Accuracy ±1% Reproducibility ±0.2% Temperature Range 9°—260°C (40°—500°F) Touch screen digital display. 220v single phase 50Hz power.	1
10	Hydraulic Sample Ejector Hand-operated with hydraulic jack (3000 kg capacity). For the extrusion of 4" - 6" samples from moulds. Annular and slotted plates for quick set-up. It enables the extrusion of Marshall, Proctor, CBR samples.	1

APPLIED MECHANICS LAB

S. No	Name of Equipment	Qty
1	Reaction of Beam Apparatus The apparatus should consist of a beam of approx 1m length, two linear spring balances, three load hangers, and a bench top mounting unit. Accessories should include: Supporting main frame, 1m ruler along with set of weights and user manuals.	3
2	Roof Truss Apparatus The apparatus should consist of two rafter struts and a restraining tie mounted on a self-contained bench top base. Both struts and tie must have built-in linear, direct reading spring balances to measure forces. The tie length, and hence angle of truss be variable. Accessories should include: One load hanger for loading at the hinged apex. Along with set of weights and user manuals.	3
3	Toggle Joint Apparatus The apparatus should consist of two pair of links mounted on a base with one end of the links fixed, a central pivoted joint, and the other end restrained by a spring balance to read the resulting horizontal force. Loading applied at the apex pivot by a weight hanger. Variable toggle angles available, and facility to re-adjust to original state. Along with set of weights and user manuals.	3
4	Jib Crane Apparatus The wall mounted crane should consist of a compression jib, and a tension tie which is adjustable, and both incorporate a linear, direct reading spring balance to measure the forces in them. One load hanger to apply loads through the junction of the two members. Set of weights, comprehensive technical manual and set of slotted weights be included.	3
5	Bending moment and Shear force apparatus Should consist of 2 simple supports; a rigid Aluminum alloy beam cut into two unequal lengths, with a frictionless hinge at the joint which permits minimal vertical movement, whilst allowing bending. Analogue spring balance measures direct force at the 'cut' section Moment lever arm mechanism allows bending moment to be calculated Multiple load positions achievable To be bench top mounted Set of slotted weights included	3
6	Center of gravity apparatus The apparatus should include a bench mounted unit with a free standing backboard with a pin in it from which a selection of flat shapes can be hung. A simple plumb bob to be suspended from the same pin. 6 shapes; a circle, isosceles triangle, trapezium, L, T and semi-circle to be provided	3



CIVIL DRAFTING SHOP

Sr. No	Name of Equipment	Qty
1	Drawing Table -Local good quality made <u>Drawing Table Specification:</u> -Top 42"x 30"Height 37"Base constructed of 1"square steel, 18 gauge Designed to allow a 3"overhang at back of base for mounting of drafting machine42"W x 30"D top with pencil ledge Two Ratchet lock mechanisms. Top adjustable 0 to 45 degrees .	20
2	Tee Square Wooden. -Local made. 42"(105cm)Smooth black polish with transparent plastic double edge superior quality.	20
3	Set Square. -Local good quality made 14"(35cm)Set square unbreakable celluloid inch & cm graduation (30-60&45-45) degree.	20
4	Drawing Instrument Set. - Local made /China, Local or Equivalent best quality. -Instruments are held securely in crimson foam molded inserts -Set includes 6-1/2"bow compass, 4-1/2"bow compass, friction divider, pen handle, pen attachment, tube of compass leads and divider points.	20
5	French Curve Set. 18cm & 24cm.12 different curves packed in plastic box. - Local good quality made	20
6	Rot ring Variant B Drawing Pens Set of 8 rotring variant B 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 1.2 Local made.	4
7	Draftsman Stool. Wooden Stool 36" height . Local good quality made	20



2. EQUIPMENT OF ELECTRICAL (B-Tech) GCT Bajaur

1. Electric Circuits Lab

S. No	Item Type Description	Equivalent or better in Specifications to	QTY
1	Digital Oscilloscope	Tektronix: TDS-2022C 2 channels 200MHz 2 GS/s Digital Storage	5
2	Digital Multimeter	Meterman 38XR Resolution 100 μ V 1000V AC/DC 10A AC/DC, 40M Ω	5
3	Dual Power Supply	TTi EX-354D Dual Output, 35V, 4A, 280W	5
4	Function Generator	Tektronix: FG-7005C 0.02Hz to 5MHz	5
5	Protoboard	GS PB-505A, 1.3 to15V, 500mA variable Dc supply 5V DC with 1A power supply	5
6	Parts Cabinet	25 Drawers Cabinet	05
7	DC technology Trainers	(The product equivalent to the following characteristics or in closest match) 1 Experimentation platform with various resistor circuits, capacitor and coil 1 Experimentation platform with voltage divider circuits 1 Experimentation platform with circuits for studying temperature, light and voltage-dependent resistors	4
8	AC technology Trainers	(The product equivalent to the following characteristics or in closest match) 1 Experimentation platform with R, L, C passive components for combination 1 Experimentation platform with RLC resonant circuits, 1 circuit tunable 1 Experimentation platform with 1 power transformer, 1 repeater transformer and load circuits	4
9	Three-phase technology Trainers	(The product equivalent to the following characteristics or in closest match) 1 Experimentation platform with 1 circuit in star configuration and 1 in delta configuration plus resistive and capacitive loads 1 Experimentation platform with multichannel oscilloscope for voltage and current measurement	4
10	Magnetism/ Electromagnetism Trainers	(The product equivalent to the following characteristics or in closest match) 1 Experimentation platform with several specific circuits Transformer with removable iron core Compass needle for investigating magnetic fields Electromagnetic components: reed switches, Hall switches and relays	4
11	Circuit Analysis Trainer It's a lucasNulle card Its part no is SO4204-4C	(The product equivalent to the following characteristics or in closest match) Trainer having provision of setting up resistor networks 2 Constant current and 2 constant voltage sources Plug-in resistors on card It must have the following provisions Introduction to basic equations used in electrical networks	4



		Applying Kirchhoff's equations to a resistor network Analysing resistor networks using Kirchhoff's equations Power matching in resistor circuits Introduction to super position theorem and its application Simplification of resistor networks using Thevenin's theorem Simplification of resistor networks using Norton's theorem Thevenin-Norton equivalencies Analysing resistor networks using the loop or mesh current method Analysing resistor networks using the node voltage method	
13	Unitrain-I Interface with virtual instruments (basic VI)	CO4203-2A	3
14	Unitrain-I Experimenter	CO4203-2B	3
15	Unitrain-I Measurement accessories, shunts and connection cables	SO4203-2J	3
16	Digital multimeter MetraHit One M204D	LM2330	3
17	Unitrain-I Storage case for one system	CO4203-2Y	3
18	Unitrain-I Interface with virtual instruments (basic VI)	CO4203-2A	2
19	Unitrain-I Extended three-phase power supply		3

2. Electrical Machine I Lab

S. No	Item Type Description	Equivalent or better in Specifications to	QTY
1	DC Permanent Magnet Machine	Can be operated as a motor and generator Power: 0.3-3 kW	2
2	DC Shunt Wound Machine	Can Be operated as a motor and generator Power: 0.3-3 kW	2
3	DC Series Wound Machine	Can Be operated as a motor and generator Power: 0.3-3 kW	2
4	DC Compound Wound Machine	Can Be operated as a motor and generator Power: 0.3-3 kW	2
5	Universal Motor	DC Power: about 0.3-3 kW AC Power: about 0.3-3 kW	2
6	Single Phase Transformer	Power: 0.3-3 kVA Frequency: 50 Hz	2
7	Single Phase Transformer with Variable Output	Power: 0.3-3 kVA Frequency: 50 Hz	2
8	Single Phase Auto Transformer	Power: 0.3-3 kVA Frequency: 50 Hz	2
9	Three Phase Transformer	Power: 0.3-3 kVA Frequency: 50 Hz	2
10	DC Motor Field Regulator	Compatible with the above machines	2



11	DC Generator Field Regulator	Compatible with the above machines	2
12	Digital RPM Meter	With 5 Digits Display Range: 0-9999 RPM	2
13	Digital Power Factor Meter	Range: Induct.0-1-0.Capacit Accuracy: $\pm 1\%$	2
14	Magnetic Power Brake Unit Compatible with the Above Mentioned Machines		2
15	Brake Controller Unit	Compatible with the magnetic powder brake unit and above machines Have display to show speed, torque, and power of the motor under test Have display to show voltage and current applied to brake unit	2
16	Coupling Sleeves	For mechanically connecting two machines	5
17	Coupling Guard		5
18	Shaft End Guard		2
19	Power Supply	Input Voltage: 220/400V,3-Phase,50 Hz Output Voltage: Fixed DC: 220V, 10A Var. DC: 0-220V,15A Fixed AC: 220/400 V 3-Phase, 10A, 50 Hz Variable AC: 0-400 V 3-Phase, 15 A, 50Hz	2
20	Load Switch	Three Pole 15 A, 250VDC, 440VAC	2
21	Reversing Switch	Capable of operating 3-Phase Machines 15 A, 440 V	2
22	Star-Delta Switch	Capable of operating 3-Phase Machines 15 A, 440 V	2
23	Selector Switch	Three Pole, 2 Way Current: 15 A Voltage: 250 V DC/ 500 V AC	2
24	Universal Starter	compatible with the above Mentioned AC and DC Machines	2
25	3-Phase Load Resistor	Compatible with the above Mentioned Machines	2
26	3-Phase Load Inductor	Compatible with the above Mentioned Machines	2
27	3-Phase Load Capacitor	Compatible with the above Mentioned Machines	2
28	AC Power Energy Meter	Voltage: 500 V AC Max Current: 15 A AC Max Active Power: 5 kW Reactive Power: 5 kVAR Accuracy: $\pm 0.2\%$	2
29	Ammeter	AC: 10 mA-15 A	2



		DC: 100 uA-15 A Frequency: 20-400 Hz	
30	Voltmeter	AC: 1 V-1000 V DC: 100 mV-1000 V Frequency: 20-400 Hz	2
32	Machine Bed Dimensions	(1500-1700)mm × (500-700)mm × (100-300)mm	2

3. Electrical Machine II Lab

S. No	Item Type Description	Equivalent or better in Specifications to	QTY
1	3-Phase Induction Motor (Slip Ring)	Power:0.3- 3 kW Frequency: 50 Hz	3
2	3-Phase Induction Motor (Squirrel Cage)	Power: 0.3-3 kW RPM: 1300-1500 Voltage: 400-440 V Frequency: 50 Hz	4
3	3-Phase Synchronous Machine with Salient Poles	As Generator: (0.3-3 kVA)*0.8 As Motor: 0.3-3 kW Frequency: 50 Hz	2
4	Reluctance Motor	Power: 0.3-3 kW Frequency: 50 Hz	3
5	Induction Dahlander Motor	Power: 0.3-3 kW RPM: 1300-1500 Voltage: 400-440 V 3-Phase Frequency: 50 Hz	3
6	Single Phase Induction Motor (Capacitor Start)	Power: 0.3-3 kW Frequency: 50 Hz	3
7	Single Phase Induction Motor (Capacitor Start and Run)	Power: 0.3-3 kW Frequency: 50 Hz	3
10	Magnetic Powder Brake Unit	Compatible with the Above Mentioned Machines	2
11	Brake Controller Unit	Compatible with the magnetic powder brake unit and above machines Have display to show speed, torque, and power of the motor under test Have display to show voltage and current applied to brake unit Ranges: RPM: 0-10000 RPM, Torque: 0-20 N-m	2
12	Coupling Sleeves	For mechanically connecting two machines	4
13	Coupling Guard	Coupling Guard	4
14	Shaft End Guard	Shaft End Guard	4



16	Synchroscope / Synchronizing Unit	Containing Dual Voltmeter Dual Frequency Meter Synchroscope	5
20	Dahlander Switch	Voltage: 500 V Current: 15 A	4
27	Selector Switch	Three Pole, 2 Way Current: 15 A Voltage: 250VDC/500VAC	4
30	Frequency Meter	Range: 40-60 Hz	4
31	Machine Bed	Dimensions: (1500-1700)mm×(500-700)mm×(100-300)mm	4

4. Power Systems, Transmission and Distribution Lab

S. No	Item Type	Equivalent or better in Specifications to	QTY
1	Three Phase Transformer	DL 1080TT or Equivalent	2
2	Experiment Transformer	DL 1055TT or Equivalent	2
3	Power Circuit Breaker	DL 2108T02 or Equivalent	2
4	Double bus bar with two disconnecter	DL 2108T02/2 or Equivalent	2
5	Double bus bar with four disconnecter	DL 1080T02/4 or Equivalent	2
6	Line Capacitor	DL 1080T03 or Equivalent	2
7	Petersen Coil	DL 1080T04 or Equivalent	2
8	C.T Load	DL 1080T10 or Equivalent	2
9	V.T Load	DL 1080T11 or Equivalent	2
10	Under Over Voltage time relay	DL 2108T12 or Equivalent	2
11	Inverse Time Over Current Relay	DL32108T12 or Equivalent	2
12	Definite Time Over Current Relay	DL 2108T13 or Equivalent	2
13	Combined Over Current and Earth Fault Relay	DL 2108T14 or Equivalent	2
14	1-Phase Directional Relay	DL 2108T16 or Equivalent	2
15	L/C loads	DL 2108T17 or Equivalent	2
16	Earth Fault Warning Relay	DL 2108T18 or Equivalent	2
17	1-Phase Current Transformer	DL 2109T21 or Equivalent	2
18	3-Phase Current Transformer	DL 2109T22 or Equivalent	2
19	1-Phase Voltage Transformer	DL 2109T23 or Equivalent	2
20	3-Phase Voltage Transformer	DL 2109T24 or Equivalent	2
21	Summation Current Transformer	DL 2109T25 or Equivalent	2
22	Three Phase power Supply	DL 2108TAL or Equivalent	2
23	Variable DC Power Supply	DL 1013T2 or Equivalent	2
24	Three Phase Power Meter	DL 2109T29 or Equivalent	2
25	Variable Three Phase	DL 1013T1 or Equivalent	2



Power Supply			
26	3-Phase kWh meter	DL 2109T28 or Equivalent	2
27	Moving Iron Ammeter	DL 2109T5A or Equivalent	2
28	Moving Iron Voltmeter	DL 2109TPV or Equivalent	2
29	Moving Coil Voltmeter	DL 2109T2VB or Equivalent	2
30	Moving Coil Ammeter	DL 2109T3VB or Equivalent	2
31	Double Frequency Meter	DL 2109T16/2 or Equivalent	2
32	Electronic Tachometer	DL 2025DT or Equivalent	2
33	Reactive Power Controller	DL 2108T19 or Equivalent	2

5. Instrumentation & Measurement Lab

S.No.	Name	Specifications	QTY
1	LVDT Kit	Electro-mechanical Transducers Variable Resistor 10 kΩ, 0.5 W linear. Variable Capacitor (Area) 2.5 – 20 pF. Variable Capacitor (Distance) 15 – 40 pF. Variable Inductor 9 Ω, 23 – 81 μH. Variable Differential Transformer Primary	4
2	Strain Gauge Kit	Electro-mechanical Transducers Variable Resistor 10 kΩ, 0.5 W linear. Variable Capacitor (Area) 2.5 – 20 pF. Variable Capacitor (Distance) 15 – 40 pF. Variable Inductor 9 Ω, 23 – 81 μH. Variable Differential Transformer Primary resistance: 6.3 Ω, 140 turns. Secondary resistance: 2.5 Ω, 140 turns. Strain Gauge 2 off, 120 Ω resistance. An electro-mechanical transducers kit containing six linear displacement transducers and a probe assembly.	4
3	Photo Transducers Kit	Photo-transistor BP X25(or Equivalent). Photo-diode RS components. Photo-resistor RPY33. Lamp holder MBC. 14.4 V, 0.1 A. Optical Filters 9 slide-mounted. 440, 470, 490, 520, 550, 580, 600, 690,700 nm. 1 infra-red. TK2941L (or Equivalent). A light transducers kit containing three photo-electric transducers, a light source, nine coloured and one heat absorbing optical filters.	4
4	Optical Transducer Kit	<p>1. <u>Transducers:</u></p> <ul style="list-style-type: none"> a. Photoconductive Cell. b. Photovoltaic Cell. c. Phototransistor. d. PIN Photodiode. <p>2. <u>Light Source:</u> Filament Lamp.</p> <p>3. <u>Signal Conditioning Circuitry:</u></p> <ul style="list-style-type: none"> a. Power Amplifier b. Current Amplifier c. DC Amplifier d. Comparator. e. Electronic Switch. f. Buffer. <p>4. <u>Input Circuits:</u> Rotary and Slid Potentiometers.</p> <p>5. <u>Output Circuits:</u></p> <ul style="list-style-type: none"> a. Moving Coil Mete b. Relay c. LED <p>6. <u>Interconnections:</u> 4 mm banana sockets.</p> <p>7. <u>Power Supply:</u> 230 V + 10 % 50 Hz.</p> <p>8. <u>Standard Accessories:</u> Detailed Instruction Manual.</p>	4
6.	Probe Oscilloscope	Probe Oscilloscope (DC – 200 MHz)	8
7.	Kelvin's Double Bridge	On board oscillator section. On board circuit for designing Kelvin's double Bridge, On board amplifier section, On board unknown Resistors for conducting the experiment, On board Speaker interface, Test points are provided to analyse signals at various points, With built-in power supply Enclosed in a wooden/plastic box	4



8.	LCR Meter	<p>Measuring ranges</p> <p> Z , R, X 0.01 mΩ → 100 MΩ</p> <p> Y , G, B 10 nS → 1000 S</p> <p>C 0.01 pF → 100 mF</p> <p>L 10 nH → 100 kH</p> <p>D 0.0001 → 9.9999</p> <p>Q 0.1 → 9999.9</p> <p>θ -180 → +180°</p> <p>Δ -999.99% → 999.99%</p> <p>M 1 μH → 100 H</p> <p>N 0.95 → 500</p> <p>General data</p> <p>Basic accuracy 0.05%</p> <p>Measuring frequency range</p> <p>20 Hz → 200 kHz</p>	4
9.	Mechatronics Kit	<p>Custom 12V motor designed for Digilent robot kits (or Equivalent)</p> <p>Motor Adapter for NI myRIO (6002-410-011): Compatible with gear motors and servos</p> <p>Pmod Cable kit: 6", 6-pin Pmod cable</p> <p>Pmod Cable Kit: 6", 12-pin Pmod cable</p> <p>MTE Cable (250-061): 4-pin to 2x2-pin MTE cable</p> <p>6-pin Headers (240-004): 6-pin header and gender changer (5-pack)</p> <p>2x6-pin Headers (240-062): 2x6-pin header (5-pack)</p>	4
11.	Probe (Function Generator)	50Ω	4
12.	Instrumentation module Wheat Stone bridge Operation Amplifier	<p>Wheatstone Bridge with reference potentiometer and selectable value ratio arms. Operational Amplifier with selectable gain and differential input. Oscillator Centre frequency 465 kHz. Frequency Discriminator FM operation and on-board phase sensitive rectifier. A Measurement Package comprising an Instrumentation module containing: Wheatstone Bridge, switched gain, differential amplifier, oscillator with 465 kHz cent frequency, an FM discriminator, a unity voltage gain 4 W power amplifier module and a Test Rig</p>	4
13.	Heat Transducer	<p>Bi-metallic switch Operating temp. 45 °C. Differential 5 °C.</p> <p>Thermocouple Copper constantan junction approx. 50 μV/°C.</p> <p>Thermistor Resistance at 20 °C = 2 kΩ. Platinum resistance at 20 °C = 100 Ω.</p> <p>A thermal transducers kit containing four thermally operated devices, a controlled heat bar, thermometer and all necessary accessories.</p>	4
15.	Cable Analyser	<p>Pocket-sized analyser</p> <ul style="list-style-type: none"> - Tracks cables in walls or channels - Detects cable breaks - Emits different signal tones - RJ -11 connector and alligator clips - Headphone jack - Flashing point indicates non-conductivity - Adjustable sensitivity - Includes connecting cable, batteries and user manual - High quality carrying case 	4
16.	Digital Multimeter	<p><u>AC current:</u> Sector/resolution/accuracy</p> <p>Sector/resolution/accuracy 200 A/100 mA/± 3.0% + 8</p> <p>(50/60 Hz): 200 digits</p> <p>A/100 mA/± 3.0% + 8</p> <p>digits</p> <p><u>DC current:</u> Sector/resolution/accuracy</p> <p>Sector/resolution/accuracy 200 A/100 mA/± 2.8% + 8</p> <p>200 digits</p> <p>A/100 mA/± 2.8% + 8</p> <p>digits</p>	4



		<p><u>AC test voltage</u> (without contact): 100 VAC 100 VAC to 600 VAC to 600 VAC 50/60 Hz 50/60 Hz</p> <p><u>Frequency:</u> Sector/resolution/accuracy Sector/resolution/accuracy 40 to 50 Hz/0.01 Hz/± 40 to 1.2% + 5 digits 50 Hz/0.01 Hz/± 1.2% + 51 to 510 Hz/0.1 Hz/± 5 digits 1.2% + 3 digits 51 to 510 Hz/0.1 Hz/± 0.51 to 1 kHz/0.001 kHz/± 1.2% + 3 digits 1.2% + 3 digits 0.51 to 1 kHz/0.001 kHz/± 1.2% + 3 digits</p> <p><u>Illumination of the</u> white LEDs <u>measurement area:</u> white LEDs</p> <p><u>Diameter of the</u> max. 18 mm <u>conductor:</u> max. 18 mm</p> <p><u>Display:</u> with white LEDs, with white LEDs, backlit backlit LCD with 3 2/3 LCD with 3 2/3 positions positions</p> <p><u>Power:</u> 2 AA batteries 2 AA batteries</p>	
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