

**INSTITUTE OF TECHNOLOGY, KORBA**  
**CIVIL ENGINEERING DEPARTMENT**

**Proposed Budget 2017-18**

<b>S.NO.</b>	<b>NAME OF LABORATORY</b>	<b>Proposed Budget</b>	<b>EMD</b>
1	Environmental Engineering-I Lab	15,00,000.00	75,000.00
2	Concrete Lab	4,00,000.00	20,000.00
3	Surveying lab	10,00,000.00	50,000.00
4	Fluid mechanics lab	5,00,000.00	25,000.00
5	Structural Engineering & Analysis Lab	7,00,000.00	35,000.00
6	Geotech Engineering - Lab	20,00,000.00	1,00,000.00
7	Engg. geology lab	4,00,000.00	20,000.00
8	Transportation Engg Lab	3,00,000.00	15,000.00
9	Consumable For All Lab	1,00,000.00	5,000.00
<b>Total Rs.</b>		<b>69,00,000.00</b>	<b>3,45,000.00</b>

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INSTITUTE OF TECHNOLOGY, KORBA

CIVIL ENGINEERING DEPARTMENT

SPECIFICATION FOR CIVIL LAB EQUIPMENT 2017		PAGE NO.
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2	Concrete Lab	13 to 14
3	Surveying lab	15 to 25
4	Fluid mechanics lab	26
5	Structural Engineering & Analysis Lab	27 to 30
6	Geotech Engineering - Lab	31 to 35
7	Engg.geology lab	36 to 38
8	Transportation engg lab	39 to 41

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**INSTITUTE OF TECHNOLOGY, KORBA**  
**Schedule of Requirements**  
**Package No.-**

Package Name :- Environmental Engg.

S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
1	C_ENV_01	digital Microscope	<p>Specification: Basic Functions</p> <p>Camera Imaging device 1/1.8 inch 2.11 megapixel CCD                      Scanning Mode Progressive scan</p> <p>Total number of pixels Approx. 2.01 megapixels 1688 (H) x 1236 (V)                      Number of effective pixels Approx. 2.01 megapixels 1688 (H) x 1236 (V)                      Frame rate 30 fps (15 fps, double buffer method)</p> <p>Electronic shutter AUTO(1/15 ~ 1/15000), 1/15000, 1/8300, 1/5800, 1/4400, 1/3600, 1/2500, 1/1000, 1/500, 1/250, 1/125, 1/60, 1/30, 1/15                      Slow shutter 1/7.5, 1/4, 1/2, 1, 2, 4, 8, 16                      Gain AUTO/MANUAL, OFF</p> <p>White balance AUTO, MANUAL (R, B)</p> <p>LCD monitor Image adjustment Gamma correction, color correction, edge enhancement</p> <p>Display size 15" LCD color monitor                      Pixel pitch 0.1905mm(H)x0.1905mm(V)                      Number of pixels 1600(H)x1200(V)                      Brightness 200cd/m2(typ.)                      Contrast ratio 500:1(typ.)</p> <p>Light source Viewing angle 170°[H], 170°[V] (type.)                      Lamp 60 W metal halide lamp                      Lamp life 4000 H (average)                      Color temperature 5500±100K</p> <p>Output Analog RGB output UXGA, SXGA, XGA                      Printer output USB2.0(B type)+ictBridge                      LAN 10BASE-T/100BASE-TX/1000BASE-T                      External terminal Round 6 pin                      ACS terminal Round 10 pin                      Remote control RS-232C connector</p> <p>Input Mouse and keyboard input USB 2.0 (Type A)                      USB ports USB 2.0 (Type A) x 6</p>	1

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
			<p>Microphone input MIC jack</p> <p>Record Recording media 160 GB hard disk, CD-R/RW, DVD±R/R, DVD±R/R DL±RW/-RAM</p> <p>Still image format Exif-TFF [non-compressed], BMP [non-compressed], Exif-JPEG [compressed]</p> <p>Compression mode JPEG [4 levels]</p> <p>Number of recorded still pixels Standard: 1600x1200, 1280x960, 1024x768, 800x600, 640x480, 320x240</p> <p>High resolution: 6400x4800, 4800x3600, 3200x2400, 2400x1800</p> <p>Video image format AVI [non-compressed]</p> <p>Number of recorded video pixels 1600x1200(7.50FPS), 1280x1024(7.50FPS), 1024x768(15.00FPS), 800x600(15.00FPS), 640x480(15.00FPS)</p> <p>Image adjustment Contrast, edge enhancement, noise reduction, binarizing</p> <p>Rated voltage AC100 ~ 240V, 50/60Hz</p> <p>Power consumption 250W</p> <p>Ambient temperature 50°C to 40°C (No freezing or condensation)</p> <p>Storage temperature -15°C to 50°C (No freezing or condensation)</p> <p>Relative humidity 25 to 85% RH (No condensation)</p> <p>Atmosphere Corrosive gas prohibited</p> <p>Weight Main Unit Approx. 12 kg</p> <p>Camera Approx. 1kg</p> <p>Size LCD shut 417.4(W)x154(H)x343.1(D)mm</p> <p>LCD open 417.4(W)x429.6(H)x343.1(D)mm</p>	

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
2	C_ENV_02	DIGITAL Spectrophotometer	<p>Measuring principle Lamp Dual Beam, Xenon            Wavelength range (accuracy) 190 to 1100 nm . ±1 nm            Spectral bandwidth 1.8 nm            Photometric accuracy ± .005 nm 1 A, &lt; .00025 at 0.0 A            Absorbance Resolution 0.001 A            Display Graphical with LCD backlight, 9.7 x 7.1 cm (3.8 x 2.8 in)            Scan Scans in 1 nm increments with free selectable wavelength range            Types of determination Water Analysis, Absorbance, Concentration, Transmission, Multiwavelength, Spectrum Scan,            Kinetic, Absorbance ratio, Absorbance difference, 3-point net            Type Of Cuvettes 10mm, 20mm, 50mm, 13 mm-25 mm ( No Adapter necessary ), 100 mm with a adapter            No Of Test Methods Programmed 260 preprogrammed methods for common colorimetric reagents            Interfaces USB type A port for USB stick (front panel), USB type B port for computer (rear panel),            USB type A port for printer (rear panel)            Instrument Supported Quality Control Performance verification tests ensure wavelength accuracy and instrument functionality,            plus built-in filters allow for wavelength verification with no additional equipment required            Power supply Country specific power supply            Power requirements 100 to 240 V ; 50 to 60 Hz            Dimensions 30 W x 40 D x 25 H cm (11.8 x 15.7 x 9.8 in)            Weight 8.6 kg (19 lb.)            SmartStart Test Feature Customise the instrument by placing the most frequently used test methods on first menu            One point adjustment allow a one point adjustment on any preprogrammed method using a known standard to correct for variations in batch to batch reagent chemistries. Reverse Color Feature use a reagent that, when prepared with samples, decreases in color as the concentration of the species being measured in the samples increases</p>	1

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
3	C_ENV_03	BOD Incubator	<ul style="list-style-type: none"> <li>• Selectable incubation temperature from 3 to 50 °C                             <ul style="list-style-type: none"> <li>• Internal sockets to power devices</li> </ul> </li> <li>• Accepts 3 BOD Sensor System 6, or 2 BOD Sensor System 10                             <ul style="list-style-type: none"> <li>• Total volume of 120 liters</li> </ul> </li> <li>• TempSoft™ dedicated software for times and temperatures (+ ramps)                             <ul style="list-style-type: none"> <li>• Auto-Tuning thermoregulation system</li> </ul> </li> <li>• Uniform temperature by the use of forced ventilation                             <ul style="list-style-type: none"> <li>• 3-digit display of internal temperature</li> </ul> </li> <li>• TempSoft™ incorporates high/low alarm thresholds</li> <li>• Constant monitoring according to GLP (Good Laboratory Practice)</li> <li>• Wireless DataBox™ data capture avoids environment disturbance                             <ul style="list-style-type: none"> <li>• Cooling system in A+ class energy rated</li> <li>• Low operating cost</li> </ul> </li> </ul>	1

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
4	C_ENV_04	Determination of Dissolved Oxygen	<ul style="list-style-type: none"> <li>• Sturdy IP 67 waterproof design</li> <li>• Back-lit comprehensive dot matrix display; 7.2 cm (H) x 5.4 cm (W)</li> <li>• Measures oxygen concentration up to 90.00 mg/L and saturation up to 600.0 %                             <ul style="list-style-type: none"> <li>• Salinity, temperature and pressure compensation</li> </ul> </li> <li>• Resolution up 0.01 mg/L or ppm ; accuracy up to ±0.2 mg/L</li> <li>• Enhanced Graphic User Interface design allows users to view all relevant information at a single glance.                             <ul style="list-style-type: none"> <li>• Cal-due alarm prevents outdated calibrations</li> </ul> </li> <li>• Memory stores up to 500 data sets in GLP compliant format</li> <li>• Barometric Pressure Correction 450 to 825 mmHg or 59.9 to 109.9 kPa                             <ul style="list-style-type: none"> <li>• Complimentary CyberComm DAS software provided</li> </ul> </li> <li>• Password protection security for calibration and set up menus</li> <li>• Sturdy rubber boot protects against knocks and doubles up as meter stand</li> <li>• IrDA wireless Information Technology as well as RS232 (LED) protocol for data transmission                             <ul style="list-style-type: none"> <li>• Meter dimension, 183 mm x 95 mm x 57 mm; 460 g</li> </ul> </li> </ul>	1

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
5	C_ENV_05	MICROPROCESSOR DIGITAL CONDUCTIVITY METER	<ul style="list-style-type: none"> <li>• Meter dimension, 183 mm x 95 mm x 57 mm; 460 g</li> <li>• Input DC phono sockets ,6 Pin connector</li> <li>• Auto-off ,2 to 30 Minutes after last key pressed (selectable)</li> <li>• Power supply via 4 x 1.5 V "AA" Alkaline batteries or 9 V DC adapter, 500 mA</li> <li>• Accessories USB / IrDA Interface Adapter</li> <li>• Bench top meter with large screen that displays Conductivity or TDS readings with Temperature in °C or °F</li> <li>• Conductivity Range 0.01 to 200.0 mS/cm</li> <li>• Resolution 0.01 µS; 0.1 µS ; 1 µS ; 0.01 mS ; 0.1 mS with ±1% Full scale accuracy</li> <li>• TDS Range 0.01 to 100 ppt @ 0.5 TDS factor (to 200 ppt @ 1.0 TDS factor)</li> <li>• Splash proof Keypad protects against incidental spills</li> <li>• Compact Footprint Saves Valuable Bench Space</li> <li>• Temperature Range 0.0 to 100.0 °C / 32.0 to 212.0 °F</li> <li>• Ready indicator when readings are stable</li> <li>• Selectable cell constant</li> <li>• Temperature Coefficient 0.00 to 10.00 %</li> <li>• Temperature Normalization 15 to 30 °C</li> <li>• TDS factor 0.40 to 1.00 (adjustable)</li> <li>• Auto-ranging across 5 Conductivity and TDS ranges</li> <li>• Up to 5-point push button calibration</li> <li>• Non-volatile memory holds up to 100 data points</li> </ul>	1

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
			<ul style="list-style-type: none"><li>• Ulitem body conductivity /TDS electrode ,cell constant 1.0, 1 m cable</li><li>• Integral electrode holder , Electrode Arm can be used on either side<ul style="list-style-type: none"><li>• Non-Skid Pads Hold meter steady during operation</li></ul></li><li>• Power Requirement 100 /240VAC SMPS Power Adapter with US/UK/EUR/Japan plug ,9V,6W, CENTRE +ve</li><li>• Dimension 17.5 (L) x 15.5 (W) x 6.9 (H) cm ; 650 g</li></ul>	

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
6	C_ENV_06	DIGITAL WATER & SOIL TESTING KIT	<p><b>Multi-parameter Photometers</b></p> <p>The multi-parameter photometer in the range, is simple-to-use, robust in construction . The photometer dependable results to enable decisions on water quality to be made instantly .</p> <ul style="list-style-type: none"> <li>• Simple operation with automatic set-up for each test.</li> <li>• Rapid access to frequently used tests from a choice of over 100 parameters/methods</li> </ul> <p><b>Technical Specifications</b></p> <p>Instrument Type Dual light source photometer offering direct-reading of pre-programmed test calibrations, Absorbance and Transmittance</p> <p>Wavelengths 450 nm, 500 nm, 550 nm, 570 nm, 600 nm, 650 nm</p> <p>Accuracy ± 1.0% T</p> <p>Display 320 x 240 pixel LCD with backlight and contrast adjustment</p> <p>User Interface On-screen prompts available in English, French, Spanish, German, Italian, Turkish and Mandarin (Chinese)</p> <p>Size (WxLxH) and Weight 150 x 250 x 70 mm, 975g</p> <p>IP Rating IP67</p> <p>Power Supply 3x 1.5V AA batteries (typically 40 hours)</p> <p>Test Cuvettes Automatic centering for cylindrical cuvettes from 13 to 20 mm OD</p> <p><b>Photometer Parameters</b></p> <ul style="list-style-type: none"> <li>• m Alkalinity</li> <li>• p Alkalinity</li> <li>• Alkalinity, Total</li> <li>• Aluminium</li> <li>• Ammonia</li> <li>• Boron</li> <li>• Bromine</li> <li>• Calcium Hardness</li> <li>• Chemical Oxygen Demand (COD)</li> </ul>	1

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
			<ul style="list-style-type: none"><li>• Chlorine, Combined<ul style="list-style-type: none"><li>• Chlorine, Free</li></ul></li><li>• Chlorine, Free (Extended Range)<ul style="list-style-type: none"><li>• Chlorine, High Range</li><li>• Chlorine, Total</li></ul></li><li>• Chlorine, Total (Extended Range)<ul style="list-style-type: none"><li>• Chlorite</li></ul></li><li>• Chromium VI (Chromicol™)<ul style="list-style-type: none"><li>• Chromium, Total<ul style="list-style-type: none"><li>• CODMn</li><li>• Colour</li></ul></li><li>• Copper, Free</li><li>• Copper, Total<ul style="list-style-type: none"><li>• Cyanide</li><li>• Cyanuric Acid</li><li>• DEHA</li><li>• Fluoride</li></ul></li><li>• Hardness, Total<ul style="list-style-type: none"><li>• Hydrazine</li></ul></li><li>• Hydrogen Peroxide<ul style="list-style-type: none"><li>• Iron</li></ul></li><li>• Magnesium Hardness<ul style="list-style-type: none"><li>• Manganese</li><li>• Molybdate</li><li>• Nickel</li><li>• Nitrate</li><li>• Nitrite</li></ul></li><li>• Organophosphonate<ul style="list-style-type: none"><li>• Ozone</li></ul></li><li>• Permanganate Value/Index</li></ul></li></ul>	

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
			<ul style="list-style-type: none"><li>• PHMB</li><li>• Phosphate</li><li>• Potassium</li><li>• Silica</li><li>• Sulphate</li><li>• Sulphide</li><li>• Sulphite</li><li>• Total Alkalinity</li><li>• Total Chromium</li><li>• Total Hardness</li><li>• Total Nitrogen</li><li>• Total Phosphorus</li><li>• Turbidity (Compensated)</li><li>• Zinc</li></ul>	

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
			<p>Soil testing kit</p> <ul style="list-style-type: none"> <li>☑ Simple, field-ready soil test methods for macro nutrients (soil pH, N/P/K), calcium, magnesium and conductivity</li> <li>☑ Includes both the Bluetooth SMART enabled Soiltest 10 photometer and the Multiparameter Pocket Sensor</li> <li>☑ Protected by a waterproof field case with integral work surface for soil testing in any location</li> <li>☑ Size (W x L x H) - 555 x 428 x 211 mm</li> <li>☑ Weight - 9.5 kg</li> <li>☑ Soil tests included:                             <ul style="list-style-type: none"> <li>Parameter Range</li> <li>Soil pH 0 – 14</li> <li>Lime Requirement 0 – 34 tonne/ha</li> <li>Conductivity 0 – 19.9 mS/cm</li> <li>Salinity 0 – 1%</li> <li>Nitrate Nitrogen 0 – 25 mg/l N</li> <li>Phosphate Phosphorus 0 – 150 mg/l P</li> <li>Potassium 0 – 450 mg/l K</li> <li>Magnesium 0 – 500 mg/l Mg</li> <li>Calcium 0 – 2500 mg/l Ca</li> </ul> </li> </ul> <p>Photometric Testing Hardware                      Soiltest 10 Bluetooth, waterproof USB cable, cuvette rack, 8 cuvettes, Check Standards set with certificate</p> <p>Electrochemical Testing Hardware                      Multiparameter Pocket Sensor, pH 4.0/7.0/10.0 buffer solutions, conductivity calibration standard</p>	

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S.NO.	Code	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty.
			<p>Reagents</p> <p>Complete reagent set for 50 tests per each specified parameter including extraction and test reagents</p> <p>Sample Preparation/Accessories</p> <p>De-ion pack, soil sample bags, soil scoops, filter funnels and paper, sample container/dilution tubes, syringes, crush/stir rods, cuvette brush</p> <p>Ancillaries</p> <p>Integrated work surface, instructions, protective foam inserts, IP67 waterproof lockable carry case</p>	

NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSARY IS REQUIRED QUOTE THEM AS EXTRA BUT ESSENTIAL.

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**INSTITUTE OF TECHNOLOGY, KORBA**  
**Schedule of Requirements**  
**Package No.-**

Package Name :-Concrete Technology


S.NO.	Code	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	QUANTITY
1	C_con_01		Flexural Testing Machine(Electrically operated)	<p>Flexure Testing Machine (as per IS 516,BS1861)</p> <p>Flexural testing machine upto 100 KN capacity hand operated For 10 x 10 x 50 and 15 x 15 x 70 cms concrete beams as per IS-516-1959, IS: 4696. •Complete with Hydraulic Load gauge 0-100 KN x 0.5 KN/div. With Calibration certificate. electrically operated for 220V 50HZ Single phase Loading unit 100 KN cap. with a self retracting type jack &amp; hydraulic Pump, Load gauge with maximum load indicating pointer, •The machine has a set of platens, top platen has a self aligning roller fixed at the center and lower one has two rollers of 25 mm dia, equally spaced at a distant of 15 cm. •These rollers are hard chrome plated to increase the abrasion resistance and hardness. Type of Loading: Third point. with specimen mould and all accessories and safety devices (if required) conforming to ISI/BIS/ISO</p> <p align="center">Aim :determination of flexural strength of concrete</p> <p>With all accessories and anti vibrating mounting required,as per I.S.Standards.</p>	1




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S.NO.	Code	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	QUANTITY
2	C_con_02		Air Entrainment Meter	<p>Air entrainment meter in compliance with IS:1199 An entertainment of air in limited percentage improves durability of concrete and very low percentages deteriorate it, measurement of air entrapped in freshly mixed concrete becomes important. The use of chemical additives to increase workability of concrete requires an air content check to be made. Air Entrainment Meters are used to determine air entertained in freshly mixed concrete by pressure method.</p> <p>The apparatus consists of a pressure tight flanged cylindrical measuring bowl of 0.005 cubic meter capacity for maximum size of aggregate 38 mm The bowl is fitted with a removable flanged conical cover assembly with the help of a seal The conical cover has an air valve and a pet cock for bleeding off the water A transparent cylindrical stand pipe which is graduated in air content is fixed to the conical cover assembly</p> <p>Pressure is applied to the specimen with the help of a pressure bulb and the pressure is recorded on the pressure gauge, which is mounted on the stand pipe The whole assembly is mounted on a flat base The instrument is supplied complete with one each following accessories\$</p> <p>Calibration cylinder with spring clamp, trowel, tamping rod, straight edge, rubber mallet and measure.</p> <p>With all accessories and anti vibrating mounting required, as per I.S.Standards. (For Concrete Lab)</p>	1

NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSARY IS REQUIRED QUOTE THEM AS EXTRA BUT ESSENTIAL.

  
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**INSTITUTE OF TECHNOLOGY, KORBA**  
**Schedule of Requirements**  
**Package No.-**

**Package Name :-Surveying Field Work Lab**

S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
1	C_SUR_01	Vernier Theodolite	<p>:Watts_Pattern  Watts Theodolite is designed to meet the requirements of Civil Engineer, Surveyor and Mining Engineer for high grade instruments giving a maximum portability. Both circles are totally enclosed making the instruments suitable for work either above or below the ground. The instrument is supplied with standard accessories in teak wood box with aluminum telescopic tripod stand.</p> <p>Technical Data:  Telescope Model - 20  Image Erect  Length 178 mm  Magnification 25X  Effective Aperture 38mm  Field of View 2.6 M at 100M  Short Focus 1.5M  Stadia Ratio 02:40:00 AM  Stadia Constant 0  Resolving Power 4"  Circle Diameter HZ113mm, V100 mm  Graduation 20'  Vernier Reading 20"  Plate Level Sensitivity 45" / 2mm  Vertical Circle Level 1' / 2mm  Glass diaphragm with stadia 1:100</p>	1
2	C_SUR_02	Line Ranger	As per Standard Specification	2



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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
3	C_SUR_03	Abney Level	<p>The abney level is an engineering instrument which can be used to determine height. It is moderately expensive and of medium size and weight. Although the abney level is relatively robust, the bubble tube can be knocked out of alignment during rough treatment. Angle of inclination of a line from the observer to the target.</p> <p>Specifications</p> <p>Used to determine slope angle, tree heights etc</p> <p>Graduated 0-+/-90 degrees, 0-+/-100% on a stationary arc</p> <p>Vernier reads to 10'</p> <p>Scale pointer incorporates friction thumb lock</p> <p>Includes leather carry case with belt loop</p> <p>With all accessories and ,as per I.S standards.</p>	2



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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
4	C_SUR_04	Tilting Level	<p>LFeatures Of Tilting Level</p> <ul style="list-style-type: none"><li>• Internal focusing telescope having 3 foot screws leveling base with locking arrangement</li><li>• Screw focusing eye piece</li><li>• Highly sensitive spirit bubbles</li><li>• Aperture not less than 3.76 cm</li></ul> <p>Fitted With</p> <ul style="list-style-type: none"><li>• Compass</li><li>• Reader</li><li>• Longitudinal bubble that is mounted with folding reflector fitted along with a telescopic tube</li></ul> <p>Specifications</p> <p>Telescope Image Erect/Invert</p> <p>Magnification 24x</p> <p>Length 175mm</p> <p>Shortest Focusing Distance 1.5mtr</p> <p>Longest Focusing Distance 200/300 mtr.</p> <p>Objective Aperture 40 mm</p> <p>Stadia Constant 1:100</p> <p>Addition Constant 0</p> <p>Bubble Sensitivity 45"/2 mm</p> <p>Nominal Accuracy 2.3mm/km</p>	1

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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
5	C_SUR_05	Electronic Digital Theodolite	<p>angle measurements (Hz, V) Precision 2"</p> <p>Display resolution 1 or 5"</p> <p>Display units DEG (360o 00' 00"), GON (400), MIL (6400), V / % Telescope</p> <p>Magnification 30x</p> <p>Objective aperture 45 mm (1.7 in)</p> <p>Minimum focusing distance 1.35 m (4.43 ft)</p> <p>Stadia multiplication factor/constant 100/0</p> <p>Compensator</p> <p>System Automatic vertical compensator, User set On/Off</p> <p>Working Range ± 3'</p> <p>Operation</p> <p>Display Double side large character back-lit LCD</p> <p>Keys 6 one touch button functions</p> <p>Laser plummet</p> <p>Type Visible laser point</p> <p>Accuracy 1.5 mm at 1.5 m instrument height</p> <p>Environmental conditions</p> <p>Operating temperature -20o C ~ +50° C</p> <p>Protection to dust and water Dust and water resistant, IP54</p> <p>Weight</p> <p>Weight including battery and tribrachv 4.5 kg (9.9 lb)</p> <p>Battery/Power Management</p> <p>Type of battery Rechargeable NiMH, replacement alkaline battery pack</p> <p>Operation period without laser plummet 36 h Dust and Water resistance</p> <p>Carrying case</p> <ul style="list-style-type: none"> <li>• Plumb bob</li> <li>• User-manual,levelling staff ,tripod</li> </ul>	1

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S.No.	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
6	C_SUR_06	Auto level	Telescope Image Erect Magnification 30x Objective Aperture of 30 mm Resolving Power 3" Field of view 1°20' Minimum Focus Distance 0.3 m Stadia ratio 100 Stadia constant 0 Accuracy Standard Deviation of 1km double run leveling 1.5 mm 1.5 mm 2 mm Automatic Compensator Working range ±15' Type Magnetic Circular Vial Sensitivity 8" / 2mm Horizontal Circle Minimum division 1° Reading system Total area 360° Size and Weight Dimensions 130mm x 140mm x L 200mm Carrying case Dust and Water resistance • Plumb bob • User-manual	1

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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
7	C_SUR_07	Total Station	<p>SPECIFICATIONS OF TOTAL STATION</p> <ol style="list-style-type: none"> <li>1. Telescope               <ol style="list-style-type: none"> <li>i. Image - Erect</li> <li>ii. Magnification <math>\geq 30X</math></li> <li>iii. Field of view <math>\geq 22m @ 1000 m</math></li> <li>iv. Minimum focus distance <math>\leq 2.0 m</math></li> <li>v. Resolving power <math>\leq 2.5''</math></li> </ol> </li> <li>2. Angle measurement               <ol style="list-style-type: none"> <li>i. Tilt compensation method - dual axis</li> <li>ii. Tilt compensation range <math>\geq 3''</math></li> <li>iii. Angle accuracy <math>\leq 2''</math> horizontal and vertical</li> <li>iv. Displayed resolution (Least count) <math>\leq 1''</math></li> </ol> </li> <li>3. Distance measurement               <ol style="list-style-type: none"> <li>i. Range (20 km visibility) <math>\geq 1500 m</math> with 1 prism &amp; <math>\geq 3000 m</math> with assembly of 3 prisms.</li> <li>ii. Accuracy (in static mode) <math>\leq 5 mm + 3 ppm</math> of distance</li> <li>iii. Resolution (Least count) <math>\leq 1 mm</math></li> <li>iv. Measurement time <math>\leq 5 s</math></li> <li>v. Prism - Retro reflective type</li> </ol> </li> <li>4. Optical plummet               <ol style="list-style-type: none"> <li>i. Magnification <math>\geq 2.0 x</math></li> <li>ii. Focusing range <math>\leq 0.5</math> to <math>\geq 2 m</math></li> <li>iii. A small Bull's eye Bubble on alidade.</li> <li>iv. Tow Electronic bubbles <math>30''</math> sensitivity at right angles to each other on display panel.</li> <li>v. One Circular Bubble on Tribrach.</li> </ol> </li> </ol> <p>Contd</p> <p>Key board and display - Alpha Numeric keyboard on both sides (identical). Display: 1/4 VGA (320*240 pixels), graphic LCD, colour, illumination, Touch screen Keyboard: (function keys, alphanumeric keys). Angle display: <math>360^\circ \cdot \cdot</math>, <math>360^\circ</math> decimal. Readable under field light</p>	1

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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
			<p>conditions. Marking on keys are clear and non-removable. Graph of entire survey displayed on screen of Total Station with Zoom &amp; Pan facility.</p> <p>6. Pressure &amp; Temperature sensors - In built Temperature &amp; pressure. Sensors for measurement and display of instant atmospheric temperature and pressure in SI system of unit.</p> <p>7. Accessories - Total station should have following original accessories showing company's mark on it in strong carrying case with Data Transfer Cable. Data Transfer Software. Two rechargeable Batteries, One Charger, One CD containing Instruction Manual. Two Single prism with Target Plate and one wooden stand Range, Two pole, Two display, Two Detachable Tribrach, lens cover set, cleaning brush, cover of durable plastic, shock absorbing carrying case with shoulder strap etc in complete.</p> <p>8. Data storage (with pc-software for data retrieval, presentation and archiving)</p> <ul style="list-style-type: none"> <li>• Capacity <math>\geq 10000</math> points on board memory or more</li> <li>• SD Card/CF card slot with 256 MB or more</li> <li>• RS232/USB Interface</li> </ul> <p>9. Focusing Mode:            Three Focusing Mode viz.            a) Auto Focus mode            c) Power Focus mode            d) Manual Focus mode</p> <p>10. Physical            i. Weight <math>\leq 10</math> kg            ii. Temperature range <math>\leq 0</math> to <math>\geq 55</math> ° C fully operational            iii. Humidity 0 to <math>\geq 90\%</math> RH</p> <p>iv. Protection splash waterproof and dustproof</p> <p>11. Power            Batteries Li-ion rechargeable, no memory effect, during changing of batteries</p> <p>ii. Capacity <math>\geq 4</math> hours of continuous measuring</p> <p>iii. Battery charger, adaptor and cables</p> <p>iv. Recharge time <math>\leq 2</math> hours</p> <p>v. Power supply 220 VAC <math>\pm 25\%</math>, 47 to 53Hz</p> <p>vi. Operating temperature 0 to 55 ° C</p> <p>vii. Humidity 0 to <math>\geq 90\%</math> RH</p> <p>12. Other features            i. Tri axis Compensator (in addition to dual axis correction in the (X) and (Y) direction, mechanical error in the instrument is corrected).</p>	

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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
			<p>ii. Range under Normal Conditions:-</p> <ul style="list-style-type: none"> <li>• Single Prism: 5000 to 7000m or more</li> <li>• Distance Accuracy in Prism Mode:               <ul style="list-style-type: none"> <li>a) Up to 10 meters: + (3mm+2ppmxD)mm</li> <li>b) From 10 meters: + (2mm+2ppmxD)mm</li> </ul> </li> <li>• Distance Accuracy in Reflectorless Mode:               <ul style="list-style-type: none"> <li>c) Up to 300 meters: +(5mm+2ppmxD)mm</li> </ul> </li> </ul> <p>The total station shall comprise.</p> <ul style="list-style-type: none"> <li>a. Theodolite with integrated laser distance meter, tilt compensation, digital controller with keypad and display, supporting data storage.</li> <li>b. Data retrieval and communication unit.</li> <li>c. Tripod for the total station.</li> <li>d. Prism poles with associated tripods for prism assemblies.</li> </ul>	



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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
			<ul style="list-style-type: none"> <li>- Batteries Li-ion rechargeable, no memory effect, during changing of batteries.</li> <li>ii. Capacity <math>\geq 4</math> hours of continuous measuring</li> <li>iii. Battery charger, adaptor and cables</li> <li>iv. Recharge time <math>\leq 2</math> hours</li> <li>v. Power supply 220 VAC <math>\pm 25\%</math>; 47 to 53Hz</li> <li>vi. Operating temperature 0 to 55 ° C</li> <li>vii. Humidity 0 to <math>\geq 90\%</math> RH</li> <li>12. Other features               <ul style="list-style-type: none"> <li>i. Tri axis Compensator (in addition to dual axis correction in the (X) and (Y) direction, mechanical error in the instrument is corrected).</li> <li>ii. Range under Normal Conditions:-                   <ul style="list-style-type: none"> <li>• Single Prism: 5000 to 7000m or more</li> <li>• Distance Accuracy in Prism Mode:                       <ul style="list-style-type: none"> <li>a) Up to 10 meters: <math>+(3\text{mm}+2\text{ppmxD})/\text{mm}</math></li> <li>b) From 10 meters: <math>+(2\text{mm}+2\text{ppmxD})/\text{mm}</math></li> </ul> </li> <li>• Distance Accuracy in Reflectorless Mode:                       <ul style="list-style-type: none"> <li>c) Up to 300 meters: <math>+(5\text{mm}+2\text{ppmXD})/\text{mm}</math></li> </ul> </li> </ul> </li> </ul> </li> </ul> <p>The total station shall be of such a design that it functions reliably and accurately under the prevailing environmental and operational conditions.</p> <ul style="list-style-type: none"> <li>• The total station should be able to work efficiently within the temperature range 0° C to + 55° C</li> <li>• Can measure Distance without Reflector 300 to 500 meter to a 90% reflective object (in good condition).</li> <li>• The total station shall be easy to operate and maintain.</li> <li>• The total station shall have all the latest technology of Absolute Encoders.</li> <li>• The total station shall be supplied with the accessories as needed for effective deployment.</li> <li>• All materials of the total station exterior shall be non-corrosive.</li> <li>• All enclosures, cables and connectors shall be sturdy and water resistant.</li> <li>• The total station shall be a rugged design that can cope with the prevailing shock and vibration as experienced in surveying operations and transport by jeep in rough terrain.</li> </ul>	

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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
			<p>The total station shall have an expected technical lifetime of not less than 10 years.</p> <ul style="list-style-type: none"><li>• Operator's and technical manuals, related to the type and model of the total station and the accessories shall be part of the delivery.</li><li>• Power consumption shall be small, to be derived from batteries integrated and/or External batteries.</li><li>• The batteries shall be rechargeable and assembled in packages</li><li>• The connectors and electrical cables associated with the total station shall be reliable and sturdy.</li><li>• The total station shall have Visible Laser Pointer.</li><li>• Date &amp; Time is recorded while modifying or creating a file.</li><li>• On Board pre-loaded graphical software Power Topo Lite or equivalent including Area Perimeter, Volume (Cut/fill) and Licensed copy of Auto Plotter Civil Software should invariably be part of the supply. In built road design function.</li><li>• The total station shall comprise.<ol style="list-style-type: none"><li>a. Theodolite with integrated laser distance meter, tilt compensation, digital controller with keypad and display, supporting data storage.</li><li>b. Data retrieval and communication unit</li><li>c. Tripod for the total station.</li><li>d. Prism poles with associated tripods for prism assemblies.</li></ol></li><li>• The laser output power shall be eye safe.</li><li>• Operational training shall be part of the delivery.</li></ul>	

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S.No	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
			<p>The total station shall be supplied with the accessories as needed for effective deployment.</p> <ul style="list-style-type: none"> <li>All materials of the total station exterior shall be non-corrosive.</li> <li>All enclosures, cables and connectors shall be sturdy and water resistant.</li> <li>The total station shall be a rugged design that can cope with the prevailing shock and vibration as experienced in surveying operations and transport by jeep in rough terrain.</li> <li>The total station shall have an expected technical lifetime of not less than 10 years.</li> <li>Operator's and technical manuals, related to the type and model of the total station and the accessories shall be part of the delivery.</li> <li>Power consumption shall be small, to be derived from batteries integrated and/or external batteries.</li> <li>The batteries shall be rechargeable and assembled in packages</li> <li>The connectors and electrical cables associated with the total station shall be reliable and sturdy.</li> <li>The total station shall have Visible Laser Pointer.</li> <li>Date &amp; Time is recorded while modifying or creating a file.</li> <li>On Board pre-loaded graphical software Power Topo Lite or equivalent including Area Perimeter, Volume (Cut/fill) and Licensed copy of Auto Plotter Civil Software should invariably be part of the supply. In built road design function.</li> </ul>	
			<p>The total station shall comprise.</p> <ol style="list-style-type: none"> <li>Theodolite with integrated laser distance meter, tilt compensation, digital controller with keypad and display, supporting data storage.</li> <li>Data retrieval and communication unit.</li> <li>Tripod for the total station.</li> <li>Prism poles with associated tripods for prism assemblies.</li> </ol> <ul style="list-style-type: none"> <li>The laser output power shall be eye safe.</li> <li>Operational training shall be part of the delivery.</li> </ul>	

NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSORY IS REQUIRED QUOTE THEM AS EXTRA BUT ESSENTIAL.

*S. Prasad*

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Checked by

HOD Civil Engg. Deptt.

**INSTITUTE OF TECHNOLOGY, KORBA**  
**Schedule of Requirements**

**Package No.**

Package Name :- Fluid Mechnics

S.NO	CODE	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	QUANTITY
1	C_FM_01	Cut section model of hydraulic accumulator	Cut section model of hydraulic accumulator as per IS specification	1
2	C_FM_02	Cut section model of hydraulic intensifire	Cut section model of hydraulic intensifire as per IS specification	1
3	C_FM_03	Cut section model of hydraulic crane	Cut section model of hydraulic crane as per IS specification	1
4	C_FM_04	Cut section model of hydraulic lift	Cut section model of hydraulic lift as per IS specification	1
5	C_FM_05	Cut section model of hydraulic ram	Cut section model of hydraulic ram as per IS specification	1
6	C_FM_06	Cut section model of hydraulic jet and fluiding devices analoge and digital	Cut section model of hydraulic accumulator as per IS specification	1
7	C_FM_07	Fluiding devices analoge and digital	Fluiding devices analoge and digital as per IS specification	1

NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSARY IS REQUIRED QUOTE

  
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INSTITUTE OF TECHNOLOGY, KORBA  
Department of Civil Engineering  
Schedule of Requirements  
Package No.-

Package Name :-Structural engg & Analysis Lab(SEA\_A)

S. NO.	CODE	NAME OF PRACTICAL	NAME OF EQUIPMENT	TECHNICAL SPECIFICATION	QTY.
1	SEA_A_01	To determine the flexural rigidity (EI) for a given beam	Elastic properties of beam apparatus	A mild steel beam 2.5 cm x 3 mm in cross section and 100 cm long is pinned to two supporting 70cm one of the beam can be fixed or given a known slope by applying a known moment at the end with the help of suspended load at the other end also a known moment can be applied at various points along the pan of the beam. A dial gauge with 25mm travel (with a magnetic base) is supplied with the apparatus. supplied with the apparatus. With all accessories and anti vibrating mounting pad and ,as per I.S standards.	1
2	SEA_A_02	To verify the Maxwell's theorem of reciprocal deflection	Maxwell's law of reciprocal deflection apparatus	Apparatus consisting of a beam 100 cm long and 12.5 cm x 5 mm in cross section with graduations every 70 cm apart with a 30 cm over hang on the one side a dial gauge with base should also be A dial gauge with 25mm travel (with a magnetic base) is supplied with the apparatus. supplied for measurement the deflection With all accessories and anti vibrating mounting pad and ,as per I.S standards.	1



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3	SEA_A_03	To determine the vertical deflections of a variety of curved bars.	<p>1. Universal frame with variety of curved bars.</p>	<p>T electro-mechanical universal testing machines are used in a wide range of applications in strength of materials for static tests. The test machines accept many types of materials and components as well as complete assemblies and structures. The EM1100 is an industrial design electro-mechanical testing machine with a capacity of 100 kN in traction and compression, adapted for the particular needs of engineering colleges, research and quality control. Tests may be carried out as a function of speed, stress or strain. The analogue/digital interface and the software provided with the EM1100 form a complete package allowing control, data acquisition and analysis using a PC. The advanced, user-friendly software is presented in toolbox form that demands no particular programming knowledge. Data analysis and presentation can be effected off-line. Data from current and previous runs may be transferred as ASCII files for use with spreadsheet and other software.</p> <p>The universal test machine allows a wide range of tests, including :</p> <ul style="list-style-type: none"> <li>- Tension, compression and bending</li> <li>- Cycling up to 1 Hz</li> <li>- Fretting and fatigue</li> <li>- Standard specimen testing</li> <li>- Creep testing</li> <li>- Assembly and structure tests</li> </ul> <p>Fully computer-controlled via PC</p> <ul style="list-style-type: none"> <li>- Specific interface : 4 channels</li> </ul> <p>Acquisition and control : 12 bits</p> <ul style="list-style-type: none"> <li>- Force range : 0 to 100 kN Traction and Compression</li> <li>- Speed range : 0.005 mm/min to 400 mm/min</li> <li>- Drive system : Brushless motor with twin recirculating ball screws</li> <li>- Maximum crosshead travel : 1200 mm</li> <li>- Horizontal clearance : 600 mm</li> <li>- Extension measurement : integral crosshead movement encoder, Resolution : 0.01 mm</li> <li>- Full control of all test functions and analysis from PC. Software packages for full crosshead control (traction, compression, flexion, cycling, creep, stress and strain rate)</li> </ul> <p>Dial gauges for measuring deflections. Weights and hangers to apply loads</p>	1
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				<p>- Strain gauge load cell Capacity <math>\pm 100</math> KN - grade 1 (other on special requirement)</p> <p>- Display of the de strength and the displacement on screen</p> <p>- Extensometer input compatible with all LVDT or strain gauge extensometers</p> <p>- Conform to EMC regulation.</p> <p><b>EQUIPMENT PACKAGE</b></p> <p>Standard equipment for EM1100</p> <ul style="list-style-type: none"> <li>- Universal test machine of 100 kN capacity</li> <li>- Analogue/digital interface</li> <li>- Control and acquisition software</li> <li>- Technical manual</li> <li>1180 x 800 x 2200 mm</li> <li>- 380 V three phase, 50 Hz, 3.5 kW</li> <li>- Personal computer, IBM compatible with RS232 free port</li> </ul> <p>Additional required equipment :</p> <ul style="list-style-type: none"> <li>- Strain-gauged load cells with capacities 100 kN or others ref EM6110</li> <li>- We can offer the following precision extensometers:</li> <li>LVDT induction extensometer Lo 25 to 200 mm dL 10 mm ref V25/10</li> <li>Strain gauge extensometer ref EI602</li> </ul> <p>Other extensometers may be adapted for particular requirements</p> <p>One set of wedge grip 100 kN, Ref. TH109-100</p> <p>One set of flat jaws 1x45° pyramid 0-20 mm, Ref. TH109-EBP20</p> <p>One set of jaws for samples <math>\varnothing</math> 5-20 mm, Ref. TH109-EBV20</p> <p>Dial gauges for measuring deflections.</p> <p>Weights and hangers to apply loads</p>	
4	SEA_A_04	To obtain the horizontal deflection and deformed shape of portal frames with different end conditions.	variety of portal frames	<p>Apparatus consists of 4 panels of a PRATT truss, each panel being 40cm in horizontal direction and 30cm in vertical direction. Load can be applied on each panel point. All tension members are provided with detachable springs so as to obtain appreciable deformation of the member. Direction of the diagonal members may be changed.</p> <p>Apparatus can be used to illustrate visually the nature of forces set up in various members of the Truss. Apparatus is supplied complete with a supporting stand and a set of weights.</p>	1

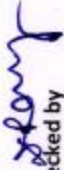
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5	SEA_A_05 To determine the strain in an externally loaded beam with the help of digital strain indicator.	Digital Strain Indicator	<p>Digital Strain Indicator - Multi Channel 10 Channel Digital Strain Indicator                  Digital Strain Indicator - Multi Channel 10 Channel Digital Strain Indicator  <b>SPECIFICATIONS</b>                  Range : 0 to <math>\pm 19999</math> microstrains directly using 4 1/2 digit panel meter.                  Frequency Response: DC to 10,000 Hz                  Accuracy: +/- 1 Digit.                  Input configurations 1, 2, and 4 arms strain gauge networks. (quarter, half and full bridge networks).                  Resistance of Strain Nominal 120 Ohms, 300 Ohms, 600 Ohms in 1, 2, 4 gauge usable arm active networks and other values in 2&amp;4 arm active network.                  Bridge Balance Ten Turn Potentiometer permits to get bridge balanced against difference in gauge resistances used upto <math>\pm 1.5\%</math>.                  Calibration and A calibration switch and circuit is provided either to calibrate or compensate a preload. This circuit produces signal                  Compensation Facility equivalent to 10000 microstrains. This also facilitates the user to study a very small dynamic strain over and above large static strain level.                  Bridge Excitation 5 Volts DC Stabilized.                  Gauge Factor Adjustment 1.5 to 4.5 continuous.                  Indication Digital Panel Meter - 4 1/2 digit.                  Power Supply 230 Volts. 50Hz AC                  Mains measuring systems and graphical menu driven software with data logging, data storage, real-time data display, real-time plotting, data retrieval, data analysis, graphing features. Almost all of our strain measuring systems can be computerized</p>
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NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSORY IS REQUIRED QUOTE THEM AS EXTRA BUT ESSENTIAL.

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P-35/C

**INSTITUTE OF TECHNOLOGY, KORBA**  
**Schedule of Requirements**  
**Package No.-**

Package Name :- Geotech Engg.-II

S.NO	CODE	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty
1	C_GEO-II_01	Determination of bearing capacity of soil by plate load.	Plate Load Test Apparatus with full accessories	<p>Plate Bearing Test Apparatus : IS 1888, BS1377, ASTM D1194, D 1196.</p> <p>Specifications :</p> <p>The basic outfit consists of :</p> <p>50 Tone Hydraulic jack with separate pumping unit fixed to it a 0 -500 KN, x 0.5 KN Pressure gauge and flexible metal pipe 5 meter long- 1 No. Special ball and socket arrangement between the jack and the bearing plate -1 No Extension rod 12mm. diameter x 25cm. long for taking dial gauge readings -16 Nos Magnetic base with female thread on top for holding extension rod 4 Nos Top end plate, 50mm, diameter with male thread for fitting onto the extension rods and Positioning the dial gauge plunger - 4 Nos Column 15cm. dia x 25cm long with flanges complete with four bolts and nuts -2 Nos Column 15cm. dia x 50cm long with flanges complete with four bolts and nuts -1 Nos Bridge support of welded steel angle construction, 5 meter span and stands approximately 30cm, high. Fitted with two quick release clamps for positioning and holding the dial bracket-2 Nos Plane MS Plate 60cms x 60cms. square x 25mm thick Plane MS Plate 45cms x 45cms. square x 25mm thick Plane MS Plate 30cms x 30cms. square x 25mm thick Dial Gauge 0.01mm x 25mm.- 4 Nos</p> <p>Accessories :</p> <p>Plane M.S. Plate 75cm x 25mm thick Plane MS Plate 50cm x 25mm thick Grooved MS Plate 60cms x 60cms x 25mm. thick Grooved MS Plate 45cms x 45cms x 25mm. thick Grooved MS Plate 30cms x 30cms x 25mm. thick Grooved MS Plate 75cms x 75cms x 25mm. thick</p>	1

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S.NO	CODE	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty
2	C_GEO-II_02		flase and firepoint apparatus	<p>Flash and Fire Point Apparatus:</p> <p>Flash &amp; Fire Point Apparatus / Pensky-Martens Apparatus IS: 1209, IS1448 (Part 21), ASTM D 93, BS:2839 For determining the flash point of fuel oils and lubricating oil, bitumen other than cutback bitumen and suspension of solids in liquid, having a flash point above 49°C. The oil cup is made of brass, fitted with a thermally insulated lifting handle. The cup lid, with insulated handle, is fitted with two opposite wedge cams, which engage under pillars secured to the cup flange. This feature facilitates easy removal of the lid by rotating the handle a few degrees to disengage the cams. The shutter opening mechanism is designed for smooth operation and is operated by a spring handle with a knuled knob. A flame exposure device (Gas test jet assembly) is mounted over the lid. The manually operated stirrer has flexible has a flexible shaft. The cup assembly is positioned in a cast iron air bath, fitted with a chrome plated brass top. The air bath is mounted on an upright which serves as a gas manifold. Valve controlled supply With all accessories and ,as per I.S standards. lines for adjustable flames are provided with pilot and test flames. An additional line with control valve supplies gas for use with open flash clip, in accordance with IS: 1448 (P:66), IS: 1209, A ring support is provided for the lid when not in use. Electrical heating, with gas test jet and electric heater with energy regulator. 220V, 50 Hz, Single Phase, AC, as per IS standard. &amp; ISI mark.</p> <p>Note: Materials are required for conducting the practical : Flash and Fire Point Test.</p>	

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S.NO	CODE	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty
3	C_GEO-II_03		Consolidation apparatus electronic	Consolidation apparatus electronic: IS: 2720 (P-xv), IS: 12287; BS: 1377, ASTM D2435, D4546, AASHTO T216. The standard outfit comprises of a fixed ring type of Consolidometer Cell for testing specimens of 60 mm dia x 20 mm thick, but the unit is so designed that specimens of varying sizes from 50 mm dia to 100 mm dia can also be tested. Besides, the same loading ring can be used with floating ring Consolidometer cells, which can be supplied at extra cost. The standard outfit is supplied with a set of weights to give a total pressure of 10 kg/cm. sq. (besides a seating load of 0.05 kg/cm. sq. on the specimen), but an additional set of weights are required to reach the full capacity of 20 kg/cm. sq. Complete with Dial gauge 0.002 mm. Accessories: Additional set of weights. Consolidation apparatus electronic with Digital Indicator, Plug in transducer, Transducer. Consolidation apparatus 3 gang. With all accessories and anti vibrating mounting pad and, as per I.S standards.	1

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S.NO	CODE	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty
4	C_GEO-II_04		Swell Pressure Test Apparatus (electrically operated)	<p><b>Swell Pressure Test Apparatus</b></p> <p>With the help of our state-of-the-art infrastructure and experience of our experts, we have been able to manufacture a wide range of Swell Pressure Apparatus, which is provided with high sensitivity proving ring, 2.5 KN or 5 KN fitted with 0.002 mm dial gauge with certificate in a nice wooden carrying case. These are catering to the requirements of construction, defense and agriculture industries.</p> <p><b>Specifications:</b> Consists of one Load Frame, electrically operated for 220V 50HZ Single phase 50 KN one swell mould, 100mm dia x 127.3 mm ht x 1000c.c. volume with base plate and collar., one Perforated Swell Plate 100 mm dia x 16 mm thick, one spacer 100 mm dia x 12.7 mm thick, two porous stones, one transfer bar, one steel ball and one Soaking Tank, 250 mm dia x 210 mm high. Without dial gauge and proving ring.</p> <p><b>Accessories:</b> High sensitivity proving ring, 2.5 KN or 5 KN fitted with 0.002 mm dial gauge with certificate in a nice wooden carrying case. Dial gauge 0.01 mm x 25 mm travel. With all accessories and anti vibrating mounting pad and, as per I.S standards.</p>	

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S.NO	CODE	NAME OF PRACTICAL	EQUIPMENT REQUIRED	DETAILS OF SPECIFICATION	Qty
5	C_GEO-II_05		Digital Triaxial machine (performing laboratory CBR, Marshall stability and Quick undrained triaxial tests) Apparatus with full accessories	<p>Digital Triaxial machine (performing laboratory CBR, Marshall stability and Quick undrained triaxial tests)</p> <p>BS 598, 1377, 1924; ASTM D3668, D1883; AASHTO T193</p> <ul style="list-style-type: none"> <li>_ Large on-board LED screen display</li> <li>_ Fully variable speed, 0.5 to 50 mm/minute</li> <li>_ Rapid and momentary approach of platen</li> <li>_ Mechanical or electronic measurement</li> <li>_ Triaxial samples up to 100 mm diameter</li> </ul> <p>This 50 kN capacity machine has been designed primarily for performing laboratory CBR, Marshall stability and Quick undrained triaxial tests on one load frame. It is particularly suitable for those laboratories carrying out a mix of these tests, e.g. for road construction. The compact bench mounting design comprises a Specification Dimensions (l x w x h) 550 x 400 x 1470 mm</p> <ul style="list-style-type: none"> <li>Maximum vertical clearance 800 mm</li> <li>Horizontal clearance 265 mm</li> <li>Platen diameter 133 mm</li> <li>Platen travel 100 mm</li> <li>Platen speed range 0.5 to 50.0 mm/min</li> <li>Rapid approach speed 40 mm/min</li> </ul> <p>, mechanical load frame supplied complete with CBR stabilising bar.</p> <p>EL25-3700/01 for 220 - 240 V AC, 50 - 60 Hz, 1ph Accessories</p> <ul style="list-style-type: none"> <li>Electronic Control and Readout Unit</li> <li>CBR Stabilising Bar</li> <li>Platen Adaptor</li> <li>Platen Adapto</li> </ul>	1

NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSORY IS REQUIRED QUOTE THEM AS EXTRA BUT ESSENTIAL.

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**INSTITUTE OF TECHNOLOGY, KORBA**  
**Schedule of Requirements**  
**Package No.**

Package Name :- Engineering Geology

S.No.	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
1	C_EG_01	Crystallographic Model	Crystallographic Model AS PER IS SPECIFICATION	1
2	C_EG_02	Wooden Cabinet	Wooden Cabinet AS PER IS SPECIFICATION	1
3	C_EG_03	Axis of symmetrical of 6 System	Axis of symmetrical of 6 System AS PER IS SPECIFICATION	1
4	C_EG_04	Planes of symmetrical of 6 System	Planes of symmetrical of 6 System AS PER IS SPECIFICATION	1
5	C_EG_05	Crystallographic Axis & Centre of System	Crystallographic Axis & Centre of System AS PER IS SPECIFICATION	1
6	C_EG_06	Collection of Minerals	Collection of Minerals AS PER IS SPECIFICATION	1
7	C_EG_07	Hardness Testing Knife	Hardness Testing Knife AS PER IS SPECIFICATION	5
8	C_EG_08	Model Showing Strike, Dip, Pitch	Model Showing Strike, Dip, Pitch AS PER IS SPECIFICATION	1
9	C_EG_09	Symmetrical Anticline Showing Axis-Axial Plane	Symmetrical Anticline Showing Axis-Axial Plane AS PER IS SPECIFICATION	1
10	C_EG_10	Asymmetrical Anticline Showing Axis-Axial Plane	Asymmetrical Anticline Showing Axis-Axial Plane AS PER IS SPECIFICATION	1
11	C_EG_11	Isoclinals Anticline & Syncline	Isoclinals Anticline & Syncline AS PER IS SPECIFICATION	1
12	C_EG_12	Recumbent Fold	Recumbent Fold AS PER IS SPECIFICATION	1
13	C_EG_13	Fan Fold	Fan Fold AS PER IS SPECIFICATION	1
14	C_EG_14	Model of Normal Fault	Model of Normal Fault AS PER IS SPECIFICATION	1
15	C_EG_15	Model of Reverse Fault	Model of Reverse Fault AS PER IS SPECIFICATION	1
16	C_EG_16	Ridge & Trough Fault	Ridge & Trough Fault AS PER IS SPECIFICATION	1
17	C_EG_17	Step Fault	Step Fault AS PER IS SPECIFICATION	1
18	C_EG_18	Wooden Specimen Tray	Wooden Specimen Tray AS PER IS SPECIFICATION	20

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P-41/c

S.No.	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
19	C_EG_19	<p align="center"><b>Polarizing Petrological Microscope</b></p>	<p>polarizing microscope includes the following:            Objective Lenses: DIN Infinity Corrected Optical System (ICOS) Strain Free Plan 4x, 10x and s40x mounted in smooth-operating, ball bearing mounted, quintuple nosepiece.            Viewing Head: Siedentopf-type binocular head or trinocular head for camera integration. Each head has the eyetubes inclined at 30° with the left eyetube having graduated diopter settings. The interpupillary distance is adjustable between 53mm - 75mm. An 80/20 beamsplitter for the trinocular tube can be engaged for photo work. (100% to eyetubes or 80% to phototube &amp; 20% to the eyetube.) 30mm ID eyetube.            Eyepieces: One KHW10xCP Focusing eyepiece with guide pin and cross-line reticle and one widefield compensating eyepiece F.N. 20 are standard with a 21mm reticle mount. Tube O.D. 23.2mm.            Total Magnification: 40x, 100x, 400x.            Specimen Stage: Ceramic-coated 360 degree rotatable fully indexed stage with vernier and stage clips. Stage is 175mm in diameter.            Illumination: Transmitted Koehler 6v 30w halogen illumination.            Condenser: Strain Free Abbe N.A. 1.25 condenser with iris in dovetail mount.            Focusing: Ergonomically low positioned coaxial focusing controls allow the operator to work with their forearms relaxed on the working surface. Range of travel is 23mm. Rotation of fine focus is 0.2mm per revolution.            Included: Microscope includes Mica 1/4 wave plate, first order red plate, dust cover and operations manual.</p>	1



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P-42/c

S.No.	CODE	NAME OF EQUIPMENT	DETAILS OF SPECIFICATION	Qty
20	C_EG_20	Resistivity meter	<p>Resistivity Meter, depths to 200m Features:</p> <ul style="list-style-type: none"> <li>• Measures voltage &amp; current simultaneously</li> <li>• 200 W new Output Power</li> <li>• 1200 V Peak to Peak</li> <li>• 2.5 A Maximum Current</li> <li>• Automated Electrode Switching System Available</li> <li>• 20 Bit A/D Converter</li> <li>• Chargeability / IP Measurements</li> <li>• Resolution: 10µA</li> <li>• Accuracy: 0.3%</li> <li>• Max. Output Current: 2.5 A</li> <li>• Max. Output Power: 200 W new</li> <li>• Maximum Output Voltage: 600V (1200V peak to peak)</li> <li>• Pulse Duration: 0.5s, 1s and 2s</li> </ul> <p>Receiver:</p> <ul style="list-style-type: none"> <li>• Voltage Measurement Specifications:</li> <li>• Resolution: 1 µV after stacking</li> <li>• A/D Converter: 20 Bit</li> <li>• Accuracy: 0.3%</li> <li>• Output Impedance: 10 MOhms</li> <li>• Input over voltage protection</li> <li>• Input Voltage Range: ± 10V</li> <li>• Automatic SP Bucking: (±10V) with linear drift correction (up to 1 mV/s)</li> <li>• 50Hz and 60Hz power line rejection</li> <li>• Continuous Digital Stacking : Up to 250 stacks</li> </ul> <p>Miscellaneous:</p> <ul style="list-style-type: none"> <li>• LCD display of 2 lines, 20 characters</li> <li>• Weather resistant case</li> <li>• Dimensions: 21 x 31 x 21 cm</li> <li>• Weight: 9.5kg, including battery</li> <li>• Internal 12V 7AH Rechargeable battery &amp; external 12V</li> <li>• Operation Temp rang -20 C to +70 Centigrade</li> </ul>	

NOTE: THESE EQUIPMENT IS REQUIRED TO PERFORM THE EXPERIMENT, IF EXTRA ACCESSORIES REQUIRED QUOTE THEM AS EXTRA BUT ESSENTIAL.

Prepared by Sankar  
 Checked by Dupala

HOD CIVIL  
 Engg. Deptt.



**INSTITUTE OF TECHNOLOGY, KORBA**  
**SCHEDULE OF REQUIREMENTS**  
**PACKAGE NAME: TRANSPORTATION ENGG LAB**





sl.no	code	name of equipment	details of specifications	Qty	Rate
1	c_TE_01	RING AND BALL APPARATUS	<p>Ring and Ball Apparatus, Semi Automatic.            Ref. Standards - IS:1205, ASTM D 36, E 28, IP 198, IP 58, STPIC Pt 3, AASHTO T53, BS:2000, EN 1427</p> <p>For determining the temperature at which a sample of bituminous material loaded by a 9.5 mm dia steel ball, drops a specified distance when heated under specified conditions. Ring and Ball Apparatus is compact user friendly and has better aesthetics. It has magnetic stirrer with heating facility and digital display of temperature, the heating can be adjusted through a PID Controller.            Suitable for operation on 220 V, 50 Hz, single phase, AC supply.</p> <p>Each unit is supplied with a bath of heat resistant glass and the following :            Tapered Rings 2 Nos.            Ball Centering Guide 2 Nos.            Steel Balls of 9.5 mm dia 2 Nos.            Ring holder 1 No.            Electric Heater (Hot Plate) 1 No.            Thermometer IP 60C            Thermometer IP 61C</p>	1	

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2	C.TE_02	STD TAR VISCOMETER	<p>Standard Tar Viscometer, 10mm cup and ball valve  Ref. Standards - IS:1206, IP 72, STPTC.  RT 2, RT 3, BS:2000, (Part 72)</p> <p>For determining the viscosity of cut back bitumen and road oil. The viscometer consists of a chrome plated copper bath, with a drain valve and a central tube to receive the test cup and to position the stirrer, and is mounted on a stand with levelling feet. Stirrer has a curved shield and is provided with an insulated handle, thermometer socket and swivel support for the valve. Supplied complete with 10 mm cup and ball valve as per the model required</p> <p>Standard Tar Viscometer, 10 mm cup and ball valve Electrical Heating with Immersion Heating Elements and Dimmerstat for controlling the temperature. Complete with 10 mm Cup and Valve.</p> <p>Suitable for operation on 220V, 50 Hz, single phase, AC supply.</p>	40	
					

3	c_TE_03	UNIVERSAL PENETROMETER	<p>Universal Penetrometer, Digital Type New Type for Bitumen testing.</p> <p>Enables the determination of liquid limit simply and quickly. The unit is supplied complete with a stainless steel penetration test cone 35 mm long with smooth polished surface with an angle of 30°. Facility exists for adjusting cone height in relation to the specimen.</p> <p>Suitable for operation on 220 V, 50 Hz, Single Phase, AC supply. Penetration Cone:</p> <p>Ref. Standards IS:1448 (Part 60), ASTM D 937, IP 179, BS:4698, ASTM D217, IP 50, ISO 2137.</p> <p>For empirical estimation of the consistency of lubricating grease and petroleum. Made of brass with a hardened steel tip. The stem of the cone is interchangeable with all types of Aimil Penetrometers manufactured to close tolerances, providing a unified cone and ensuring that there is no shoulder between the tip and the body.</p> <p>Weight : 102.5 ± 0.05g</p> <p>Penetration Kit:</p> <p>Ref. EN 1426, 13179-2</p> <p>The equipment consist of the following replaceable parts :</p> <p>Penetration Needle</p> <p>Transfer Dish made of copper.</p> <p>Aluminium Sample Container s ,</p> <p>Set of two.</p>	f.	
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Prepared by

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