MNU-CA-PAMD/2022/28

ANNEX 1
Science Field Work

Category - 1

No	Item	Qty	Pictures
1	Cool box, 10L	2	
2	Measuring tapes (100m, marine grade)	6	
3	Aluminium ruler 1ft	3	
4	Ball peen hammer short handled	1	
5	Sledge hammer short handled	1	
6	Fieldmaster soil sampling sieve set	1	
7	Surface markers (red color, 150cm)	2	
8	Buoys	2	
9	Lifebuoy rings	2	

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ANNEX 1

Civil Engineering lab Items

Category - 2

No	Item	Qty	Specification	Pictures
1	Vicat's apparatus	1	The apparatus consists of a metallic frame bearing a freely movable rod with a cap at top, one vicat mould, split type and glass base plate and one set of needles one each initial needle, final needle and consistency plunger.	
2	Sieves set for sand	1	•Carrying sieve analysis for sand •A full sieve set with sieves ranging from 4.75mm to 0.075mm	
3	Rebound concrete test hammer	1	•Testing concrete with over size aggregates and for testing concrete roads. Complete with grinding stones.	

4	Cylindrical mould	6	• Diameter 150mm • Height 300mm	
5	Specific gravity bottles	2	• To determine specific gravity of clays, sand and gravel of size smaller than 10mm. • Comprises a 1 kg glass jar with brass cone. Locking ring and rubber	
6	Weight balance (50kg capacity)	1		
7	Weight balance (5kg capacity, 1gm acc)	1		

8	Beam moulds (150mmx150mmx600mm)	6	150mm x 150mm x 600mm	
9	Rapid chloride permeability test equipment	1	•1000 to 2000 Low w-c ratio (< 0.40) conventional PC concrete •RCPT Test Apparatus with 4 Port (230~250V AC Power Supply) •Plexiglass chambers - 4 pairs •500mm vacuum desiccator •Vacuum pump •Moisture trap •Temperature probe •Tests Sealant + gun Acrylic sealer + brush	
10	Cover meter/bar tracker	1	•Measure the thickness of concrete cover over steel reinforcement bars and metal pipes. •To identify the location, orientation and diameter of reinforcement bars (rebar).	
11	Carbonation test set	1	•For measuring carbonation depth •Light, handy and portable, it can be used by a single operator without recourse to specialized technical help.	

12	Deflectometer	1	•Used for determining the deflection of bridges, ceilings or any suspended structure	
13	Ultrasonic pulse velocity tester		•For the non-destructive evaluation of concrete homogeneity and determination of Dynamic Elastic Modulus •Ergonomic and compact •Lightweight and portable •Battery operated •Large size digital display 128x64 pixel •Digital calibration	
14	Concrete mix tray	1	•A metal tray of size 100cm X 150cm	
15	aggregate length gauge	1	•Gilson HM-926 Length Gauge measures the elongation index of aggregates for classification. Model has six stainless steel pins set in a brushed aluminum base	
16	Aggregates flakiness	1	•The HM-925 Gilson Thickness Gauge for flakiness index determinations features seven slots for rapid hand trying of particles from each of the seven sieve fractions.	

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ANNEX 1

Civil Engineering lab Items

Category - 3

No	Item	Qty	Specification	Pictures
1	3.3V 5V breadboard power supply kit	10	3.3V 5V steady DC Power Supply Module for breadboard with power adaptor	
2	RLC circuit trainer	3	It is a kit for basic electronics to study different types of RLC combination circuits. This kit must have a built-in signal generator to perform various experiments. RLC values variable	
3	Vacuum pump	2	Diaphragm Vacuum Pump, Single stage with pressure meter	
4	Low voltage power supply	5	Low Voltage variable AC and DC Power Supply, 0-30V with voltage display reading	
5	High voltage power supply	2	High Voltage variable DC Power Supply, 0-35 KV with voltage display reading, with 6.3V for cathode heater	
6	Vernier callipers (basic)	10	Vernier Calliper, Basic, Stainless steel with double scale (0 to 120 mm; 0 to 5 in.) Adjustment roller and locking screw, 0.1 mm x 10 subdivision Vernier	
7	Vernier callipers (professional)	5	Vernier Calliper, Stainless steel with double scale (0 to 120 mm; 0 to 5 in.) Adjustment roller and locking screw, 0.05 mm x 10 subdivision Vernier	
8	Vernier callipers (digital)	2	Vernier Calliper, Stainless steel measuring edges (0 to 120 mm) Adjustment roller and locking screw, digital reading on screen, minimum reading 0.05 mm	
9	Micrometre screw gauge	10	Micrometre Screw Gauge, Stainless Steel, 0-25mm, 0.01	

10	Micrometre screw gauge (digital)	2	Micrometre Screw Gauge, Digital reading on screen, Stainless Steel measuring edges, 0-25mm, 0.01	
11	Measuring tape (metallic, auto retractable)	10	Metallic, auto-retractable measuring tape, double scale (1/8 inches and 1 millimetres minimum reading), 3 meters length	
12	Double walled calorimeter with heater	5	Double walled stainless steel calorimeter for liquids with felt insulation, 150mL capacity, heater 3-6V DC, 5W), thermometer slot, stirrer	
13	Laser distance measure	1	Laser Distance Measure with Backlit Display, 50+ meter range, 2mm or higher accuracy	
14	5 point self-levelling laser	1	Five-Point Plumb and Level Point Projection; alignment level, plumb, 90° and grade points. One example is https://www.jcsmithinc.com/wp-content/uploads/2021/05/GPL100-50G.jpg	

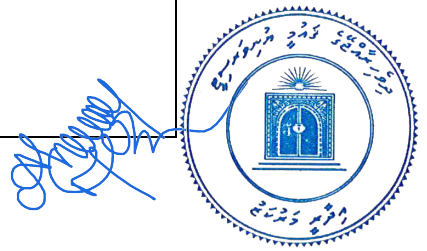
ANNEX 1

Chemistry Lab Items

Category - 4

No	Item	Qty	Specification	Pictures
1	High range nitrite colorimeter - checker	3	Range: 0 to 150 ppm Resolution: 1 ppm Accuracy: @ 25°C/77°F ±3 ppm ±5% of reading Light Source: LED @ 575 nm Light Detector: silicon photocell Method: adaptation of the Ferrous Sulfate method Battery Type: (1) 1.5V AAA Environment: 0 to 50°C (32 to 122°F); RH max 95% non-condensing Dimensions: 86.0 x 61.0 x 37.5 mm approx. Weight: 64 g approx.	
2	Freshwater alkalinity colorimeter	3	Range: 0 to 500 ppm $CaCO_3$ Resolution: 1 ppm Accuracy: @ 25°C/77°F±5 ppm ±5% of reading Light Source : LED @ 610 nm Light Detector: silicon photocell Method: colorimetric method. The reaction causes a distinctive range of colors from yellow to green to blue to develop Battery Type: (1) 1.5V AAA Environment : 0 to 50°C (32 to 122°F); RH max 95% non-condensing Dimensions 86.0 x 61.0 x 37.5 mm approx. Weight: 64 g approx Reagent Set: HI775-26 (25 tests)	
3	Multiparameter benchtop photometer and PH meter (H183300)	1	For replacement of HI83200 multiparameter photometer Wavelength Accuracy±1 nm Light Source5 LEDs with 420 nm, 466 nm, 525 nm, 575 nm, and 610 nm narrow band interference filters Spectral bandwidth8 nm Input Channels1 pH electrode input and 5 photometer wavelengths pH Electrodedigital pH electrode (not included) Logging Typelog on demand with user name and sample ID optional input Logging Memory1000 readings ConnectivityUSB-A host for flash drive; micro-USB-B for power and computer connectivity GLPcalibration data for connected pH electrode Display128 x 64 pixel LCD with backlight Battery Type / Life3.7 VDC Li-polymer rechargeable battery / >500 photometric measurements or 50 hours of continuous pH measurement Environment0 to 50.0 oC (32 to 122.0 oF); 0 to 95% RH, non-condensing Dimensions206 x 177 x 97 mm approx. Photometer/Colorimeter Light Detectorsilicon photodetector Cuvette Typeround, 24.6 mm Number of Methods128	

4	Dissolved oxygen portable photometer	1	Range:0.0 to 10.0 mg/L (as O2) Resolution:0.1 mg/L Accuracy:±0.4 mg/L ±3% of reading at 25°C Measurement Method:adaptation of Standard Methods for the Examination of Water and Wastewater, 23rd Edition, Azide Modified Winkler Method Photometer/Colorimeter Light Source: LED with 466 nm bandpass filter Photometer/Colorimeter Light Detector: silicon photocell Bandpass Filter Bandwidth:8 nm Bandpass Filter Wavelength Accuracy: ±1.0 nm Cuvette Type: round 24.6 mm diameter (22 mm inside) GLP:yes Display: 128 x 64 pixel B/W LCD with backlight Logging Memory50 readings Battery Type/Life1.5 V AA Alkaline (3 pcs.) / > 800 measurements (without backlight) Automatic Shut-Offafter 15 minutes of inactivity (30 minutes before a READ measurement) Environment0 to 50°C (32 to 122°F); 0 to 100% RH (IP67) Weight380 g Dimensions142.5 x 102.5 x 50.5 mm	
5	Ten-parameter test kit, model FF-2	3	Accessories to be included: two 100mL bottles of deionized water, twenty-three reagents, one flask, clippers, one graduated cylinder, one color comparator box, one digital titrator, one delivery tube, two plastic tubes, one thermometer, one BOD bottle, three color discs, a manual, and a carrying case.	
6	HQ4300 portable multi-meter with gel pH, conductivity and dissolved oxygen electrode, 1m cable	3	•Barometric Pressure Measurement: Automatic compensation of DO when using an LDO or LBOD prob •Cable Length1 m •Certifications: CE, FCC, ISED, RCM, KC, ETL Verified: US DOE/ NRCan Energy Efficiency, RoHS •Data Export: USB connection to PC or USB storage device •Data Memory: 100,000 data points •Data Storage: Automatic in Press to Read Mode and Interval Mode. Manual in Continuous Read Mode. •Dimensions (H x W x D)63 mm x 97 mm x 220 mm •Display2p to 3 parameters at a time, dependent on HQ model •Display Type640x480 Colour TFT •DO Measurement Range0.1 - 20.0 mg/L (ppm), 1 - 200% saturation •ISE Direct Measurement RangeYes •Languages English, •Measurement methodProbe specific programmed method settings •mV Resolution0.1 mV •ParameterpH, Conductivity, Dissolved Oxygen •pH Buffer Sets: User-defined custom buffer sets •pH Electrode calibration1 - 3 Calibration points, Calibration summary data logged and displayed •pH Measurement Range: 0 - 14 pH •pH Resolutionselectable: 0.001/0.01/0.1 pH •Probes included PHC10101, CDC40101, LDO10101	



7	Tensette pipette 1.0 - 10.0 ml	3	A Set includes one pipette, a manual and 50 disposable tips.	
8	Tensette pipette 0.1 - 1.0 ml	3	A Set includes one pipette, a manual and 50 disposable tips.	
9	DR300 pocket colorimeter, Nitrate with box	3	Absorbance:0 - 2.5 Abs Data Logger:Last 50 measurements Detector:Silicon photodiode Dimensions (H x W x D): 34 x 69 x 157 mm Display:LCD with backlight Enclosure Rating:IP67, waterproof at 1 m for 30 minutes Measurement method:Cadmium Reduction Operating Conditions:0 - 50 °C; 0 - 90% relative humidity (non-condensing) Parameter:Nitrate Power supply:Four AAA alkaline batteries; approximate life is 5000 tests Range:0.4 - 30.0 mg/L NO3-N Sample cell compatibility:1 cm (10 mL), 25 mm (10 mL) Source Lamp:Light emitting diode (LED) Special Feature:With Box Spectral Bandwidth:15 nm filter bandwidth Wavelength:528 ±2 nm Weight:0.25 kg What's to be included?: Pocket Colorimeter should come as a ready-to-use kit in a sturdy custom carrying case, including batteries, sample cells, and a manual.	
10	Colorimeter	3	•Should be waterproof, dustproof, shock resistant, and has to be drop tested for greater quality assurance. •The instrument should come with an intuitive user interface, large data storage, and a built-in USB port for the easy transfer of information. •The portable colorimeter should also help satisfy core testing needs by offering at least 90 of the most common testing parameters. •Push button backlit display for use in low light areas	

11	Spectroohotometer UV7	1	"Wavelength Range (nm) 190 nm - 1,100 nm Photometric accuracy (K2Cr2O7) ±0.005 A Wavelength accuracy ±0.5 nm Resolution (Toluene in hexane) >1.9 Stray light (KCl, 198nm) >2.3 Pharmacopeia compliant Yes Kinetic Measurements Yes Minimal Scan time 1 s Display 7 inch QVGA Color TFT touch sensitive screen Displayed Resolution 800x400 Dimensions (HxWxD) 8.98 in x 8.19 in x 10.04 in (228 mm x 208 mm x 255 mm) Weight (incl. Terminal) 6.4 kg"	
12	FTIR spectrometer	1	" - Bench top FTIR - With interchangeable sampling accessories - 25 mm, optical aperture - At least 3 Optical path lengths for analysis - Does not take more than 30 x 30 cm of bench space - Approximately 3.6 kg - Pharmaceutical Software package for operation - With library - Interferometer: 60° air bearing interferometer - Type: Double beam - Wavelength Range: 7,000–350 cm-1 / 5,100–600 cm-1 - Speed: >110 spectra/s - Detection: Cooled DlaTGS / PbSe / Bolometer / Silicon / PMT - Dimensions: 6 x 12 x 5 in - Sample Type: Pellets, liquid, and gas - Resolution: less than 2 cm-1 - Weight: 3.8 kg"	
13	Turbidity meter	1	360° x 90° Detection Technology, Should include sealed vials for calibration	

14	Bomb calorimeter	1	•Automatic ignition •Automatic water filling and draining •Automatic oxygen filling, flushing and venting •RFID technology for automatic decomposition vessel identification •New design of the decomposition vessel allows for easier and faster sample preparation •Can be operated with a chiller •Convenient and easy touch screen operation •Control chart view and correction calculation of globally used standards •Ethernet interface for data management via FTP server or connection of a network printer •Removable SD card allows for easier data measurement management, in addition to software updates •Measuring range max. [J]40000 •Touchscreenyes •Working temperature [°C]22 - 30 •Temperature measurement resolution [K]: 0.0001 •Cooling medium temperature [°C]12 - 27 Cooling mediumTap water	
15	Atomic absorption spectrometer	1	•3D Double-Beam Optics and Stable Hardware •Optimal adjustment of the light beam and light beam digital filter, and by using optical components that restrict light losses. •Manual to be included safety mechanisms, including gas leak detectors	
16	Universal measuring instrument, chemistry	3	LEYBOLD Brand Interchangeable CASSY sensors make it possible to measure many different chemical quantities including pH, Conductivity, Pressure, Temperature,Transmission, Illuminance, Voltage, Current, O2 and CO2 concentration. The sensors are detected automatically and the corresponding measuring range is displayed automatically in the large digital display. The connection of an NiCr-Ni (type K) thermocouple is also possible. The calibration of pH, conductivity, O2 and CO2 concentration is internally saved and therefore only needs to be checked from time to time. Additionally it is possible to connect the measuring instrument via the USB port to a computer. Including software for recording and evaluation of measurements.,Measuring ranges: dependent on sensor Measuring range selection: automatic or manual Type K socket: for the connection of an additional NiCr-Ni thermocouple (not included) Calibration: 1 or 2 point (pH, conductivity, O2 and CO2 concentration automatically saved) Display: 5-digit, 7-segment display for numerical values and 7x25 LEDs for displaying units Height of digits: 25 mm USB port: compatible with USB 1.1 and 2.0, full speed, electrically isolated (USB cable included) Supply: 230 V, 50/60 Hz Dimensions: 20 cm x 21 cm x 23 cm