NAGALAND UNIVERSITY

(A Central University Estd. By the Act of Parliament No. 35 of 1989)

Headquarters : Lumami – 798627

No: NU/PF/BRNS/2016-2 Dated 10th June, 2016

TENDER NOTICE FOR PURCHASE OF SOME EQUIPMENTS UNDER BRNS PROJECT

Sealed rate quotations are invited from reputed Original Equipment Manufacturers / Authorized Dealers/ Bidders for supply and installation of the following items. The items and its specifications are given below. The price should be quoted for **FOR Nagaland University, Lumami Campus** and should reach within 15 days of date of publication of this notification.

The quotation should be addressed to:

Project Investigator
BRNS project
Department of Chemistry
Nagaland University
Lumami -798627, Nagaland Email : dipaksinha@gmail.com

1. Item No : GPS device One No (quantity)

Physical & Performance:	
Unit dimensions, WxHxD:	not more than 7 x20 x 4 cm
Display size, WxH:	at least 4 x 5.5 cm
Display resolution, WxH:	160 x 240 pixels
Display type:	transflective, 65-K color TFT
Weight:	less than 275 g with batteries
Battery:	2 AA batteries
Battery life:	20 hours or higher
Waterproof:	yes (IPX7)
High-sensitivity receiver:	yes
Interface:	high-speed USB and NMEA 0183 compatible
Maps & Memory:	
Base map:	yes
Ability to add maps:	yes
Built-in memory:	At least 1.5 GB
Compatible data cards:	microSD™ card
Waypoints/favorites/locations:	More than 2000
Routes:	More than 200
Track log:	More than 10,000 points, 200 saved tracks

2. Item No : Pocket Gamma survey meter One No (quantity)

Application	Gamma exposure meter for wide range gamma dose rate
Detector	Geiger-Muller counter
Measurement range	0.01 μSv/h – 130 mSv/h
Energy range (± 30%)	0.04 – 3 MeV
Operating condition Temp: RH :	 -10 to 50 ^{o}C Upto 95% at 35 ^{o}C
Weight	not more than 300 gm
Size	not more than 150 X 100 X 50 mm
Power requirement	Battery operated
Battery life	Typically six months
Communication with computer	USB interface

3. Item No : Spark Counter One No (quantity)

Detector Type	Solid State Nuclear track detector
Count Capacity	99999 counts
Count Display	On the LCD display
Dead Time	Less than 10 µ for spark registration Sparking Head area = 1 Sq.cm(±0.1% accuracy)
EHT Range	100 Volts to 1000 volts, user settable
EHT Display	4 Digit display on LCD Module
EHT Setting	Independent setting of Pre-sparking & counting Voltage through keys using two digital potentiometers
Counting Gate/Window time	1 to 10 sec. User –settable through keys
Display	32 character backlit LCD Module
Parameters Displayed	Counts and EHT
Operating Keys	5 Nos.
Data Transfer	Through RS 232 serial port for data transfer to a PC
Downloading Software	Provided on a CD
Power	Mains 230 V AC ± 10%
Dimensions	23 cm x 20 cm x 28 cm
Accessories	Microprocessor based control system

4.Constant Temperature Water Bath: One no (quantity)

Specifications

- Heating: 5 to 99 °C
- Dimension : not more than 20x15x10 cms
- Voltage (V) : 170 - 240.0 V AC
- Rating (Watt) : 2.0
- Accuracy in (°C): ±0.5

5.Radon-thoron monitor and accessories

Specifications

1.	Detector type	:	ZnS:Ag scintillation detector
2.	Scintillation volume	:	~ 0.15 L
3.	Sensitivity	:	> 1 CPH/(Bq/m3) for Radon > 0.7 CPH/(Bq/m3) for Thoron
4.	Sampling type	:	Both Diffusion and Flow with interchangeable sampler
5.	Sampling pump	:	Inbuilt noiseless pump with Auto / manual control of power to pump
6.	Sampling volume	:	0.5 to 1 L/min
7.	Measured quantity and its measurement interval	:	Radon mode : User selectable 15 / 60 min Thoron mode : User selectable 15 /30 / 60 min Alpha mode : User settable 1 to 999 min
8.	Response time for Radon and thoron measurement	:	95% of radon value is to be attained within an hour 95% of Thoron value is to be attained within 5 minutes
9.	Minimum detection limit	:	15 Bq/m3 at 1 σ and 1 h cycle for radon / thoron
10.	Upper detection limit	:	10 MBq/m3
11.	Thoron interference in radon	:	< 5% with sniffing mode of sampling
12.	Display	:	LCD touch screen display indicating the current measurement process and also capable of displaying the past measurements with a on-screen key press during on-going measurement.
13.	Date storage memory	:	Memory with storage capacity of at least 30,000 readings
14.	Data communication	:	2-wire RS 485 data communication with USB data port at PC end.
15.	Inbuilt sensor	:	Temperature and Relative humidity sensor inside monitor
16.	Operating power	:	Internal DC Battery operated with backup up to 30 hr Continuous use with 110- 240 V AC 50 Hz main supply.
17.	Dimension and weight	:	portable equipment having dimensions within 35 cm x 20 cm x 14 cm and weight less than 4 Kg
18.	Carrying case	:	Instrument carry case with sufficient cushioning for safe transport of equipment during field use.

19. Software units	:	PC end software with following functions & features: RS485 based data communication with radon monitor Display of current readings and trend from multiple Data downloading in online and offline mode Long distance data communication range Remote operation of radon monitor through software

5.2 Accessory name:	**Mass exhalation chamber**
Used for:	To measure radon mass exhalation rate (per unit mass) /thoron surface exhalation rate (per unit exposed surface area) from Powder samples
Internal dimensions:	100 mm Diameter X 50 mm height
Volume:	0.4 Litre
Sampling	Both diffusion and flow mode
Lid sealing to chamber:	Threaded
Lid sealing to detector:	Threaded compatible to SRM detector and flow mode sampling lid.
Material:	Aluminium
Flow mode sampler:	Threaded disc with two 5 mm nozzles (or std. size)

5.3 Accessory name :	**Radon accumulator**
Used for:	To measure in situ radon flux (per unit area of ground surface) from ground.
Internal dimensions:	200 mm Diameter X 105 mm height
Volume:	3 Litre
Surface area	314 cm^2
Sampling	Both diffusion and flow mode
Connection to detector:	Threaded compatible to SRM detector
Material:	Aluminium double walled
Flow mode sampler:	Threaded disc with two 5 mm nozzles (or std. size)

5.4 Accessory name:	**Water Bubbler Kit**
Used for:	To measure radon/thoron dissolved in water/liquid sample (per unit liquid volume)
Kit contents	sampling bottles – 10 nos, Bubbler – 2 Nos. 500 ml capacity syringe with 10 cm long nozzle – one No. packed in a hard carry case
Sample capacity:	50 ml
Head space volume:	50 ml
Material:	Borosilicate glass

5.5 Accessory name:	**Soil probe**
Used for:	To measure in-situ radon/thoron in pore space of soil.
Probe length	1 meter
Hammering tool:	500 gm hammer.
sampling connector	5 mm size nozzle – one No.

probe handle:	detachable handle for removing the probe from ground
Material:	Hard S.S.

5.6 Accessory name:	**Thoron accumulator**
Used for:	To measure in situ thoron flux (per unit area of surface)
Internal dimensions:	60 mm Diameter X 40 mm height
Volume:	100 ml approx.
Surface area	28 cm2
Sampling	flow mode by two nozzles attached on the chamber walls at 2 cm and 4 cm from bottom and opposite to each other.
Insertion depth mark:	Marking at one cm height along perimeter for indicating insertion depth of accumulator in soil.
Material:	Aluminium
Sealing on surface	Soft gasket (removable) at edge for mounting on plane surface

5.7 **Accessory name:**	**Geo station for continuous radon emission measurement**
Used for:	Radon anomaly detection by measuring in situ radon flux (per unit area of ground surface) from ground continuously.
Power	solar powered with battery back up
Sampling	Both diffusion and flow mode
Material:	Stainless Steel
Pressure relief vent:	0.5 inch size auto shut-off valve connection (2 Nos)

6. Passive equipment

6.1 Pin holes type twin cup dosimeters ***200 nos***

- Simultaneous measurement of radon and thoron using LR-115 (type-II) detector
- Single entry face for both radon and thoron diffusion.
- Discrimination of radon/thoron should be carried out by pin-holes. No additional membrane should be required for radon-thoron discrimination. Thoron entry into the radon chamber through pin-holes should be within 2 %.
- Material: Light weight plastic such ABS with inside metal coating
- Materials should be free from radon/thoron absorption
- Outside coating by a decorative colour preferably wooden
- Easy fixing metal holder for LR-115 detectors of minimum size of 3 cm x 3 cm with suitable number of pin holes for thoron cut off.
- Provision for dosimeter numbering as per user request
- Sensitivity should be at least 0.017 track/cm^2/day/(Bq/m^3) for radon and 0.01 track/cm^2/day/(Bq/m^3) for thoron detection
- Proper sealing should be provided at each threading using Neoprene 'O' ring. Maximum allowable leakage in sealed condition is 0.0005 h^{-1}
- Deployment arrangement: vertically with chain lock system at top with gas entry face downward
- Design should be approved by RP&AD, BARC

6.2 Fabrication of the badge-holders for DTPS/DRPS 200 nos

Specifications:

1. The badge should be of dimensions ~6cm x 3 cm.
2. It should have two slots to accommodate two detectors each of dimension 3x3 cm2.
3. The badge should have two parts. The lower part should have a clip for suspension. The upper part should have two brackets to make the detector grip tight.
4. The material of the badge should be acrylic/hard plastic.
5. The weight should be ~ 20 gms.

6.3 Fabrication of the Wire-mesh capped holders for Direct Thoron Progeny Sensor (DTPS) and Direct Radon Progeny Sensor (DRPS) 200 Nos

Specifications:

The Wire-mesh capped holder will have two parts.

1. The upper part will have two sections having wire-mesh, such that each section will have the dimension of 22 x 22 mm^2.
2. The total dimension of the upper part will be: length 66 mm, thickness 12 mm, breadth 34 mm.
3. The base will have dimensions: length 66 mm, thickness 2 mm, breadth 34 mm.
4. The distance between the wire-mesh and the detector should be 1 cm.
5. The upper part should fit in tightly on the base.
6. The material of the badge should be acrylic/hard plastic.
7. A clip should be fitted at the back-side of the base to use it as personal dosimeter.
8. The weight should be ~ 20 gms.

6.4 Fabrication of integrated sampler (DTPS/DRPS WL monitor)

Specifications:

1. The material of the sampler should be light metal/aluminium.
2. One end of the sampler should be open-faced and the other end should be close-faced for attachment to pump.
3. Distance between the wire-mesh and the detector and that between the Filter-paper and the detector should be 3 mm.
4. The diameter of the sampler should be ~5.5 cm, and height ~1.5 cm.