

**Indira Gandhi Memorial Hospital  
Male', Republic of Maldives  
Biomedical Engineering Department**

**Technical Specifications for Biomedical Test Equipment**

| No | Item Name                                     | Quantity |
|----|-----------------------------------------------|----------|
| 01 | Electrical Safety Analyzer                    | 01       |
| 02 | Multi parameter simulator (Patient Simulator) | 01       |
| 03 | Defibrillator Tester                          | 01       |
| 04 | Digital Pressure Meter                        | 01       |
| 05 | Digital Thermometer                           | 01       |
| 06 | Digital Multimeter                            | 02       |

| No | Item                       | Purpose                                                                                            | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|----------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01 | Electrical Safety Analyzer | For testing electrical safety compliance of medical devices per IEC 60601, NFPA-99, or equivalent. | -Standards Supported: IEC 60601, AAMI/NFPA 99, IEC 62353<br>-Test Functions: Earth/ground bond test, insulation resistance, leakage current (patient, enclosure, earth), point-to-point testing<br>-Test Current (Earth Bond): 200 mA to 25 A AC<br>-Insulation Test Voltage: Up to 500 VDC<br>-Leakage Current Measurement Range: 0.1 $\mu$ A to 20 mA<br>-Accuracy: $\pm 1\%$ or better<br>-Display: 5" or larger color display<br>-Connectivity: USB and Wi-Fi<br>-Data Logging: Internal storage with export options (CSV/PDF)<br>-Power Requirements: (BS1363) 100–240 V AC, 50/60 Hz<br>-Calibration certificate |
|    |                            | <b>Accessories</b>                                                                                 | -Power cord (BS1363)<br>-Test leads<br>-Carrying case                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| No | Item                                   | Purpose                                                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|----------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 02 | Multi-simulator<br>(Patient Simulator) | To simulate physiological parameters for testing patient monitors.           | -Simulated Parameters:<br>ECG (Normal, arrhythmia, neonatal)<br>Respiration<br>IBP (2 channels)<br>NIBP simulation<br>Temperature (T1, T2)<br>-SpO2 (compatible with major monitor brands)<br>-ECG Range: 30–180 bpm<br>-Respiration Rate: 10–100 bpm<br>-IBP Simulation Range: 0–300 mmHg<br>-Temperature Simulation: 25–45 °C<br>-NIBP Cuff Simulation: Adult, Pediatric, Neonatal<br>-Waveform Accuracy: $\pm 2\%$<br>-Display: Touchscreen or tactile buttons<br>-Battery Life: $\geq 8$ hours<br>-Power Supply: Rechargeable Li-ion battery with AC adapter (BS1363)<br>-Calibration Certificate: NIST traceable or equivalent |
|    |                                        | Accessories                                                                  | -Nihon Kohden Cable Set<br>-GE Marquette Eagle/Dash/Solar Cable Set<br>-HP/Phillips intellivue Cable Set                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| No | Item                                   | Purpose                                                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 03 | Defibrillator Tester                   | To test performance and safety of manual, AED, and automatic defibrillators. | -Defibrillation Energy Range: 0–360 Joules<br>-Waveform Compatibility: Monophasic & Biphasic<br>-Energy Measurement Accuracy: $\pm 2\%$<br>-Charge Time Measurement: Yes<br>-ECG Simulation: 12-lead with arrhythmia simulation<br>-Paddle Plate Compatibility: Adult and pediatric<br>-Shock Detection: Automatic with waveform capture<br>-Display: Color LCD with waveform analysis<br>-Memory: Stores >1000 test records<br>-Connectivity: USB, Bluetooth or Ethernet-<br>-Rechargeable Li-ion battery with AC adapter (BS1363)<br>-Battery: $\geq 6$ hours operation per charge                                                |
|    |                                        | Accessories                                                                  | - Nihon Kohden defib/pacer adapter<br>- Phillips defib/pacer adapter<br>- Mindray defib/pacer adapter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| No | Item                                   | Purpose                                                                      | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 04 | Digital Pressure Meter                 | For pressure measurement and calibration.                                    | -Measurement Range: -4 bar to +12 bar<br>-Accuracy: $\pm 0.25\%$ of full scale or better<br>-Resolution: 0.01 bar or better<br>-Display: Digital LCD with backlight<br>-Units: Bar, psi, kPa, mmHg, selectable<br>-Overpressure Protection: Yes<br>-Port Type: 1/4" NPT or compatible<br>-Power Supply: Battery operated or USB rechargeable<br>-Auto Zero & Hold Function: Yes<br>-Calibration: ISO/IEC 17025 certificate                                                                                                                                                                                                          |
|    |                                        | Accessories                                                                  | -Power Supply: Rechargeable Li-ion battery with AC adapter (BS1363)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| No | Item                | Purpose                                                             | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|---------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 05 | Digital Thermometer | For precise surface or air temperature measurements.                | -Temperature Range: -50 to +150 °C<br>-Accuracy: $\pm 0.2$ °C (typical)<br>-Sensor Type: Thermistor or IR sensor<br>-Response Time: <1 second (for IR), <10 sec (for probe)<br>-Display: Digital with °C/°F toggle<br>-Power Supply: Battery (AAA or coin cell)<br>-Features: Auto-off, Data hold, Min/Max record<br>-Probe Type: Surface or penetration (if probe-based)<br>-Calibration Certificate: ISO or NIST traceable                                                                                                                                     |
|    |                     | Accessories                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No | Item                | Purpose                                                             | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 06 | Digital Multimeter  | For general electrical diagnostics in biomedical equipment.         | -Display: 6000–20,000 count LCD, backlit<br>-Voltage Measurement: AC/DC up to 1000V<br>-Current Measurement: AC/DC up to 10A<br>-Resistance: Up to 60 M $\Omega$<br>-Capacitance: Up to 10 mF<br>-Frequency: Up to 1 MHz<br>-Temperature Measurement: Optional (thermocouple input)<br>-Safety Rating: CAT III 1000V / CAT IV 600V<br>-Data Hold, Auto Range: Yes<br>-True RMS: Required<br>-Continuity/Diode Test: Audible<br>-Protection: Overload and fuse protected<br>-Power: 9V battery or equivalent<br>-Accessories: Test leads, case, temperature probe |
|    |                     | Accessories                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No | Item                | Purpose                                                             | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 07 | Software            | Centralized test management solution for biomedical test equipment. | -Interface with test devices<br>Electrical Safety Analyzer<br>Multi-simulator<br>Defibrillator Tester<br>Ventilator Analyzer<br>Infusion Device Analyzer<br>Digital Pressure Meter<br>-Collect data<br>-Generate customizable reports<br>-Support data exchange with a CMMS system.<br>-5 years or more for software license desirable (evaluation not impacted if less)                                                                                                                                                                                         |

**User and Technical Training:**

- Vendors must provide comprehensive user training for all operators and technicians **(Mandatory)**.
- Training should include both hands-on and theoretical sessions.
- Training certificates must be provided to all participants.
- Additional training shall be provided following major software updates or significant equipment upgrades, where applicable.

**Bid Documentation**

Bidders must submit:

- All certificates & test reports.
- Product data sheets & brochures.
- Recommended spare parts & consumables list.
- Official distributorship certification/ letters. **Mandatory**
- Quotation:
  - Must contain detailed pricing for equipment and all provided accessories (per item price)
  - Must contain software/license costs.
- Recommended spare parts and consumables, with **individual unit prices**.
- Annual or periodic software renewal/subscription costs.
- Calibration costs, including:
  - Recommended calibration frequency.
  - Cost per calibration.
  - Estimated total calibration cost over **5 years**
- Completed compliance matrix

**End of Specification**