

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

Technical Specification for Equipment

Technical Specifications for Biomedical Test Equipment

No	Item Name	Quantity
01	Electrical Safety Analyzer	01
02	Multi-simulator (Patient Simulator)	01
03	Defibrillator Tester	01
04	Ventilator Analyzer	01
05	Infusion Device Analyzer	01
06	Digital Pressure Meter	01
07	Digital Thermometer	01
08	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 -Test Functions: Earth/ground bond test, insulation resistance, leakage current (patient, enclosure, earth), point-to-point testing -Test Current (Earth Bond): 200 mA to 25 A AC -Insulation Test Voltage: Up to 500 VDC -Leakage Current Measurement Range: 0.1 μ A to 20 mA -Accuracy: $\pm$ 1% or better -Display: 5" or larger color display -Connectivity: USB and Wi-Fi -Data Logging: Internal storage with export options (CSV/PDF) -Power Requirements: (BS1363) 100–240 V AC, 50/60 Hz -Calibration certificate
		Accessories	-Power cord (BS1363) -Test leads -Carrying case
No	Item	Purpose	Specification
02	Multi-simulator (Patient Simulator)	To simulate physiological parameters for testing patient monitors.	-Simulated Parameters: ECG (Normal, arrhythmia, neonatal) Respiration IBP (2 channels) NIBP simulation Temperature (T1, T2) -SpO2 (compatible with major monitor brands) -ECG Range: 30–180 bpm

			-Respiration Rate: 10–100 bpm -IBP Simulation Range: 0–300 mmHg -Temperature Simulation: 25–45 °C -NIBP Cuff Simulation: Adult, Pediatric, Neonatal -Waveform Accuracy: $\pm 2\%$ -Display: Touchscreen or tactile buttons -Battery Life: ≥ 8 hours -Power Supply: Rechargeable Li-ion battery with AC adapter (BS1363) -Calibration Certificate: NIST traceable or equivalent
		Accessories	-Nihon Kohden Cable Set -GE Marquette Eagle/Dash/Solar Cable Set -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 -Waveform Compatibility: Monophasic & Biphasic -Energy Measurement Accuracy: $\pm 2\%$ -Charge Time Measurement: Yes -ECG Simulation: 12-lead with arrhythmia simulation -Paddle Plate Compatibility: Adult and pediatric -Shock Detection: Automatic with waveform capture -Display: Color LCD with waveform analysis -Memory: Stores >1000 test records -Connectivity: USB, Bluetooth or Ethernet- -Rechargeable Li-ion battery with AC adapter (BS1363) -Battery: ≥ 6 hours operation per charge
		Accessories	- Nihon Kohden defib/pacer adapter - Phillips defib/pacer adapter - Mindray defib/pacer adapter
No	Item	Purpose	Specification
04	Ventilator Analyzer	To verify performance of mechanical ventilators.	-Flow Range: ± 750 mL/min to ± 300 L/min -Flow Accuracy: $\pm 2\%$ of reading -Pressure Range: -10 to +100 cmH₂O -Pressure Accuracy: $\pm 1\%$ or ± 0.1 cmH₂O -Volume Accuracy: $\pm 1\%$ -O₂ Sensor Range: 0–100%, Accuracy: $\pm 1\%$ -Measurements: Tidal Volume, Inspiratory/Expiratory flow, Pressure, Respiratory Rate, I:E ratio -Display: 5–7" color touch display -Modes: Real-time waveform and numeric -Connectivity: USB, Wi-Fi, SD card export -Power Supply: Rechargeable Li-ion battery with AC adapter (BS1363)
		Accessories	-Test Lung
No	Item	Purpose	Specification
05	Infusion Device Analyzer	To test flow accuracy and occlusion alarm of infusion pumps.	-Flow Rate Range: 0.1–3000 mL/h -Accuracy: $\pm 1\%$ or better -Channels: Minimum 4 channels -Bolus Measurement: Yes -Occlusion Alarm Detection: Yes -Data Display: Real-time flow rate and volume -Test Duration: Programmable test period -Memory: Stores up to 1000 results -Connectivity: USB and Wi-Fi

			-Power Supply: Rechargeable Li-ion battery with AC adapter (BS1363)
		Accessories	-Cleaning Solution
No	Item	Purpose	Specification
06	Digital Pressure Meter	For pressure measurement and calibration.	-Measurement Range: -4 bar to +12 bar -Accuracy: $\pm 0.25\%$ of full scale or better -Resolution: 0.01 bar or better -Display: Digital LCD with backlight -Units: Bar, psi, kPa, mmHg, selectable -Overpressure Protection: Yes -Port Type: 1/4" NPT or compatible -Power Supply: Battery operated or USB rechargeable -Auto Zero & Hold Function: Yes -Calibration: ISO/IEC 17025 certificate
		Accessories	-Power Supply: Rechargeable Li-ion battery with AC adapter (BS1363)
No	Item	Purpose	Specification
07	Digital Thermometer	For precise surface or air temperature measurements.	-Temperature Range: -50 to +150 °C -Accuracy: ± 0.2 °C (typical) -Sensor Type: Thermistor or IR sensor -Response Time: <1 second (for IR), <10 sec (for probe) -Display: Digital with °C/°F toggle -Power Supply: Battery (AAA or coin cell) -Features: Auto-off, Data hold, Min/Max record -Probe Type: Surface or penetration (if probe-based) -Calibration Certificate: ISO or NIST traceable
		Accessories	-
No	Item	Purpose	Specification
08	Digital Multimeter	For general electrical diagnostics in biomedical equipment.	-Display: 6000–20,000 count LCD, backlit -Voltage Measurement: AC/DC up to 1000V -Current Measurement: AC/DC up to 10A -Resistance: Up to 60 M Ω -Capacitance: Up to 10 mF -Frequency: Up to 1 MHz -Temperature Measurement: Optional (thermocouple input) -Safety Rating: CAT III 1000V / CAT IV 600V -Data Hold, Auto Range: Yes -True RMS: Required -Continuity/Diode Test: Audible -Protection: Overload and fuse protected -Power: 9V battery or equivalent -Accessories: Test leads, case, temperature probe
		Accessories	-
No	Item	Purpose	Specification
09	Software	Centralized test management solution for biomedical test equipment.	-Interface with test devices Electrical Safety Analyzer Multi-simulator Defibrillator Tester Ventilator Analyzer Infusion Device Analyzer Digital Pressure Meter -Collect data -Generate customizable reports -Support data exchange with a CMMS system.

			-5 years or more for software license desirable (evaluation not impacted if less)
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User and Technical Training:

- Vendors must provide comprehensive user training for all operators and technicians.
- 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.
- Manufacturer's certificates.
- 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