

**APPROVED PVMS**

**SPECIALIZED HEALTH CARE AND  
MEDICAL EDUCATION  
DEPARTMENT**

**GOVERNMENT OF THE PUNJAB**

**PRODUCT VOCABULARY  
MEDICAL STORE(PVMS) OF  
CARDIOLOGY AND MONITORING**



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## APPROVED PVMS

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<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>ECG Machine (3-Channels)</b>
<b>Clinical Purpose</b>	<b>Electrocardiography (ECG)</b> is the process of recording the electrical activity of the heart over a period of time using electrodes placed on a patient's body. These electrodes detect the tiny electrical changes on the skin that arise from the heart muscle depolarizing during each heartbeat.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Three channel ECG on at least 3 inches LCD display.          Display of Three channel ECG simultaneously.          Automatic Operation          Variable gain: 1/2, 1, 2 cm/mV          Thermal recorder for printing out of Three channels simultaneously          Interpretation Software.          Recording Trace speed: 10, 25 and 50 mm/sec          Muscle artifact and AC (50Hz) interference filters          Defibrillator protection          Built in AC Supply and battery operation with 30min backup          Built-in AC interference, Noise filter and Baseline connection.          Capability to interface with LAN/WLAN for data transfer          Paper Rolls, 50</p>	
<p>Accessories:          Complete with standard accessories, including separate patient cables for Adult, Pediatric &amp; Neonatal use with re-usable electrodes(procuring agency will specify the type of cable needed)</p>	
<p>Optional (If any):          Mobile Cart (Local/Imported)          No. of Electrodes</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>ECG Machine (6-Channels)</b>
Clinical Purpose	<b>Electrocardiography (ECG)</b> is the process of recording the electrical activity of the heart over a period of time using electrodes placed on a patient's body. These electrodes detect the tiny electrical changes on the skin that arise from the heart muscle depolarizing during each heartbeat.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Six channel ECG on at least 3-5 inches LCD display.          Display of six channel ECG simultaneously.          Automatic Operation          Variable gain: 1/2, 1, 2 cm/mV          Thermal recorder for printing out of Six channels simultaneously          Interpretation Software.          Recording Trace speed: 10, 25 and 50 mm/sec          Muscle artifact and AC (50Hz) interference filters          Defibrillator protection          Built in AC Supply and battery operation with backup 30 minutes          Paper size: 100-110mm          Built-in AC interference, Noise filter and Baseline correction.          Capability to interface with LAN/WLAN for data transfer          Paper Rolls, 50</p>	
<p>Accessories:          Complete with standard accessories, including separate patient cables for Adult, Pediatric &amp; Neonatal use with re-usable electrodes(procuring agency will specify the type of cable needed)</p>	
<p>Optional (If any):          Mobile Cart (Local/Imported)          No. of Electrodes</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>ECG Machine (12-Channels)</b>
Clinical Purpose	<b>Electrocardiography (ECG)</b> is the process of recording the electrical activity of the heart over a period of time using electrodes placed on a patient's body. These electrodes detect the tiny electrical changes on the skin that arise from the heart muscle depolarizing during each heartbeat.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Twelve Channel ECG on at least 5 inches LCD display            Automatic Operation            Variable gain: 1/2, 1, 2 cm/mV            Thermal recorder for printing out Twelve channels simultaneously.            Interpretation software.            Recording Trace speed: 10, 25 and 50 mm/sec,            Muscle artifact and AC (50Hz) interference filters            Defibrillator protection            Built-in AC operation &amp; battery backup minimum 30mins            Paper size: A4/210mm            Built-in AC interference, noise filter and baseline drift control.            Capability to interface with LAN/WLAN for data transfer            Paper Roll 50.</p>	
<p>Accessories:            Complete with standard accessories, including separate patient cables for Adult, Pediatric &amp; Neonatal use with re-usable electrodes(procuring agency will specify the type of cable needed)</p>	
<p>Optional (If any):            Mobile Cart (Local/Imported)            No. of Electrodes</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Cardiac Monitor</b>
Clinical Purpose	The phrase cardiac monitoring generally refers to continuous monitoring of the heart activity, generally by electrocardiography, with assessment of the patient's condition relative to their cardiac rhythm.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>For Adults &amp; Peads            For monitoring patients vital signs.            Operating Features and Characteristics:            Non fade TFT,LCD color display            Electro-surgical interference suppression/protection            Defibrillator protection            Freeze and cascade facility.            Waveform trache spee: 25 &amp; 50 mm/sec.            Screen size: min. 15" TFT, LCD color display.            Parameters:            ECG :            Numeric: heart rate.            Waveform : real time and freeze ECG trace            Minimum 6 waveforms            NON-INVASIVE BLOOD PRESSURE (NIBP):            Method: oscillometric principle            Numeric: systolic, diastolic and mean pressure            Selectable auto inflate interval settings            Rising cuff/continuous pressure display.            Reusable cuff for adult &amp; paed            TEMPERATURE:            Numeric: temperature selectable in °C/°F.            PULSE OXIMETRY:            Numeric: 0-100% oxygen saturation measuring range.            Waveform-plethysmograph pulse.            Reusable sensor electrode.            ARRHYTHMIA ANALYSIS:            Arrhythmia analysis and ST analysis.            RESPIRATION:            Breath rate display and settable apnea alarms.            Sweep speed; 6.25, 12.5 mm/sec.            Numeric: temperature selectable in °C/°F.            Ac 220v/50HZ            Built-in rechargeable battery for at least 1.5-2 hour.</p>	
Accessories:	

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The system must be complete with all sensors, probes, cables or any other accessories required for measuring all the above selected parameters.

Optional (If any):

Qty of Reusable sensors

Capnography

IBP two channels

Printer 2 channels

Mounting stand preferably imported or high quality (S.S 304L) Local with lockable draws (procuring agency to choose)

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<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Vital Sign Monitor (Adult, pediatric &amp; neonatal)</b>
<b>Clinical Purpose</b>	<b>Vital signs</b> (often shortened to just <b>vitals</b> ) are a group of the 4 to 6 most important signs that indicate the status of the body's vital (life-sustaining) functions. These measurements are taken to help assess the general physical health of a person, give clues to possible diseases, and show progress toward recovery.
<p><b>TECHNICAL SPECIFICATIONS</b></p> <p>For monitoring patients vital signs.</p> <p>Operating Features and Characteristics:</p> <p>Non fade TFT ,LCD color display</p> <p>Electro-surgical interference suppression/protection</p> <p>Defibrillator protection</p> <p>Freeze and cascade facility.</p> <p>Waveform trace speed; 25 &amp; 50mm/sec.</p> <p>Screen size: min. 15" TFT,LCD colour display.</p> <p>Parameters:</p> <p>ECG :</p> <p>Numeric: heart rate.</p> <p>Six Waveforms minimum, real time and freeze ECG trace</p> <p>NON-INVASIVE BLOOD PRESSURE (NIBP):</p> <p>Method: oscillometric principle</p> <p>Numeric: systolic, diastolic and mean pressure</p> <p>Selectable auto inflate interval settings</p> <p>Rising cuff/continuous pressure display.</p> <p>Reusable cuff all sizes</p> <p>TEMPERATURE:</p> <p>Numeric: temperature selectable in °C/°F.</p> <p>PULSE OXIMETRY:</p> <p>Numeric: 0-100% oxygen saturation measuring range.</p> <p>Wave form- plethysmograph pulse</p> <p>ARRHYTHMIA ANALYSIS:</p> <p>Arrhythmia analysis and ST analysis.</p> <p>RESPIRATION:</p> <p>Breath rate display and settable apnea alarms.</p> <p>Sweep speed; 6.25, 12.5 mm/sec.</p> <p>OTHER FEATURES:</p> <p>Trend data; graphical and tabular</p> <p>Capability to interface with LAN/WLAN for data transfer</p> <p>ALARMS:</p> <p>High &amp; low (settable) on all parameters</p> <p>Visual and audible indication of alarms.</p> <p>OPERATING REQUIREMENTS:</p> <p>AC 220 V/50HZ</p>	



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Built-in rechargeable battery for at least 1.5- 2 hour ac power failure at full parameter.
Accessories: The system must be complete with all sensors, probes, cables or any other accessories required for measuring all the above selected parameter
Optional (If any): Qty of Reusable sensors Printer 2 Channel Mounting stand preferably imported or high quality (S.S 304L) Local with lockable draws(procuring agency to choose)

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Pre-configured Neonatal Monitor</b>
Clinical Purpose	The pre-configured neonatal monitor generally refers to continuous monitoring of the vital parameters for neonate patient.
<p><b>TECHNICAL SPECIFICATIONS</b></p> <p>Pre-configured bedside monitor for neonates.  operating Features and Characteristics:  Non fade TFT,LCD color display  Electro-surgical interference suppression/protection  Defibrillator protection  Freeze and cascade facility.  Waveform traces speed; 25 &amp; 50mm/sec.  Screen size: min. 15" TFT,LCD color display.  Capability to interface with LAN/WLAN for data transfer  Parameters:  ECG:  - Numeric: heart rate.  - Waveform : Six Wave forms minimum, real time and freeze ECG trace  NON-INVASIVE BLOOD PRESSURE (NIBP):  - Method: oscillometric principle  - Numeric: systolic, diastolic and mean pressure  - Selectable auto inflate interval settings  - Rising cuff/continuous pressure display.  - Reusable cuff four each size  TEMPERATURE:  - Numeric: temperature selectable in °C/°F.  - Two skin temperature and rectal probes  PULSE OXIMETRY:  - Numeric: 0-100% oxygen saturation measuring range.  - Waveform-plethysmograph pulse.  - Reusable sensor electrode.  ARRHYTHMIA ANALYSIS:  - Arrhythmia analysis and ST analysis.  RESPIRATION:  - Breathe rate display and settable apnea alarms.  - Sweep speed; 6.25, 12.5 mm/sec.  OTHER FEATURES:  - Trend data; graphical and tabular  ALARMS:  - High &amp; low (settable) on all parameters  - Visual and audible indication of alarms.  Capability to interface with LAN/WLAN for data transfer  OPERATING REQUIREMENTS:  - Ac 220v/50HZ</p>	

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- Built-in rechargeable battery for at least 1.5-2 hour AC power failure at full parameter.
Accessories: The system must be complete with all sensors, probes, cables or any other accessories required for measuring all the above selected parameters for neonates and peads.
Optional (If any): Qty of Reusable sensors Printer 2 channels Mounting stand preferably imported or high quality (S.S 304L) Local with lockable draws(procuring agency to choose)

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<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Modular Bed Side Monitor</b>
<b>Clinical Purpose</b>	In medicine, monitoring is the observation of a disease, condition or one or several medical parameters over time. It can be performed by continuously measuring certain parameters by using a medical monitor (for example, by continuously measuring vital signs by a bedside monitor), and/or by repeatedly performing medical tests (such as blood glucose monitoring with a glucose meter in people with diabetes mellitus).
<p><b>TECHNICAL SPECIFICATIONS</b></p> <p>Modular bedside monitor for Adult / Neonates/ Peads. The monitor should take different modules for display of vital sign monitor of Adult /Neonate/Peads. (The procuring agency will specify the requirement)</p> <p>Operating Features and Characteristics:</p> <p>Non fade TFT,LCD color display</p> <p>Electro-surgical interference suppression/protection</p> <p>Defibrillator protection</p> <p>Freeze and cascade facility.</p> <p>Waveform traces speed; 25 &amp; 50mm/sec.</p> <p>Screen size: min. 17" TFT, LCD color display.</p> <p>Capability to interface with LAN/WLAN for data transfer</p> <p>Parameters in module form:</p> <p>ECG:</p> <p>Numeric: heart rate.</p> <p>Waveform : Six Wave forms minimum, real time and freeze ECG trace</p> <p>NON-INVASIVE BLOOD PRESSURE (NIBP):</p> <p>Method: Oscillometric principle</p> <p>Numeric: systolic, diastolic and mean pressure</p> <p>Selectable auto inflate interval settings</p> <p>Rising cuff/continuous pressure display.</p> <p>TEMPERATURE:</p> <p>Numeric: temperature selectable in °C/°F.</p> <p>PULSE OXIMETRY:</p> <p>Numeric: 0-100% oxygen saturation measuring range.</p> <p>Waveform-plethysmograph pulse</p> <p>Reusable sensor electrode.</p> <p>Reusable cuff of all sizes</p> <p>ARRHYTHMIA ANALYSIS:</p> <p>Arrhythmia analysis and st analysis.</p> <p>RESPIRATION:</p> <p>Breath rate display and settable apnea alarms.</p> <p>Sweep speed; 6.25, 12.5 mm/sec.</p> <p>OTHER FEATURES:</p> <p>Trend data; graphical and tabular</p>	

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### ALARMS:

High & low (settable) on all parameters  
Visual and audible indication of alarms.

### OPERATING REQUIREMENTS :

Ac 220v/50HZ

Built-in rechargeable battery for at least 2 hour ac power failure at full parameter.

### Accessories:

The system must be complete with all sensors, probes, cables or any other accessories required for measuring all the above selected parameters for neonates / peads and Adults.

### Optional (If any):

(Procuring agency will select according to its requirement)

IBP Two/ Three/four Channel module , Capnography (EtCO<sub>2</sub>) module

Cardiac Output Module , EEG Module

Printer Two / Three Channel

Qty of Reusable sensors

Mounting stand preferably imported or high quality (S.S 304L) Local with lockable draws(procuring agency to choose)

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>ICU Monitor</b>
Clinical Purpose	The intensity of the care provided in ICU requires monitoring device. Patients in the ICU generally have many wires attached to them for various types of monitoring. Usually measure vital signs & other intensive care parameters of the patient.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Operating Features and Characteristics:</p> <p>Non fade TFT,LCD color display</p> <p>Electro-surgical interference suppression/protection</p> <p>Defibrillator protection</p> <p>Freeze and cascade facility.</p> <p>Waveform traces speed; 25 &amp; 50mm/sec.</p> <p>Screen size: min. 15" TFT/LCD colour display.</p> <p>Parameters:</p> <p>ECG :</p> <p>Numeric: heart rate.</p> <p>Waveform : Six Wave forms minimum, real time and freeze ECG trace</p> <p>NON-INVASIVE BLOOD PRESSURE (NIBP):</p> <p>Method: oscillometric principle</p> <p>Numeric: systolic, diastolic and mean pressure</p> <p>Selectable auto inflate interval settings</p> <p>Rising cuff/continuous pressure display.</p> <p>TEMPERATURE:</p> <p>Numeric: temperature selectable in °C/°F.</p> <p>PULSE OXIMETRY:</p> <p>Numeric: 0-100% oxygen saturation measuring range.</p> <p>Waveform-plethysmograph pulse with pulse strength indication.</p> <p>Reusable sensor electrode.</p> <p>Reusable cuff all sizes</p> <p>ARRHYTHMIA ANALYSIS:</p> <p>Arrhythmia analysis and st analysis.</p> <p>RESPIRATION:</p> <p>Breath rate display and settable apnea alarms.</p> <p>Sweep speed; 6.25, 12.5 mm/sec.</p> <p>OTHER FEATURES:</p> <p>Trend data; graphical and tabular</p> <p>ALARMS:</p> <p>High &amp; low (settable) on all parameters</p> <p>Visual and audible indication of alarms.</p> <p>IBP Dual Channel /Three Channel (Procuring agency to specify)</p> <p>Capnography (EtCO2)</p> <p>Printer Two / Three Channel (Procuring agency to specify)</p>	

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**OPTIONAL:**

Cardiac Out put

**OPERATING REQUIREMENTS :**

Ac 220v/50HZ

Built-in rechargeable battery for at least 1.5 - 2 hour ac power failure at full parameter.

**Accessories:**

The system must be complete with all sensors, probes, cables or any other accessories required for measuring all the above selected parameters.

**Optional (If any):**

Qty of Reusable sensors

Mounting stand preferably imported or high quality (S.S 304L) Local with lockable draws(procuring agency to choose)

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Central Monitoring System</b>
Clinical Purpose	Central Monitoring System make it possible to see the patient's data on the central/main monitor, wherever the patient may be.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Multi-channel central station for 8/16/24 bedside monitors. (Procuring agency will specify the exact requirement)</p> <p>Operating features and characteristics:</p> <p>Colored monitor</p> <p>Resolution minimum 1024 x 1024</p> <p>Laser printer</p> <p>For connection to: Bedside monitors with 19" TFT central station monitor.</p> <p>Parameters :</p> <p>Selectable display of all parameters of bedside monitors</p> <p>As selected.</p> <p>Alarms :</p> <p>All parameters alarms on central station monitor with bed no. Identification.</p> <p>All alarms of each bedside monitors selectable from central workstation.</p> <p>Full Disclosure :</p> <p>Other Features:</p> <p>Ac 220v / 50Hz.</p> <p>Keyboard and mouse</p> <p>Trend data: graphical and tabular</p> <p>Arrhythmia analysis feature.</p> <p>Operating Requirements:</p> <p>Built-in battery and charger for at least 2 hours on ac power at full parameter or imported full sine wave ups.</p>	
Accessories:	
<p>Optional (If any):</p> <p>Qty of Reusable sensors</p> <p>HIS &amp; RIS Connectivity</p> <p>High definition Slave monitor screen size:32" or larger</p>	



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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Defibrillator</b>
Clinical Purpose	Defibrillation is a common treatment for life-threatening cardiac arrhythmia and ventricular fibrillation. Defibrillation consists of delivering a therapeutic dose of electrical current to the heart with a device called a defibrillator.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Biphasic transthoracic (external) defibrillator with LCD colour display Synchronized output with ECG. Energy selection &amp; delivery on control panel and paddles for external defibrillation. Energy selection and delivery on control panel for internal defibrillation. Charging Indicator The energy range should be adjustable for peds and adults up to 200Joules. Charging Time for full energy should be less than 05 sec Screen Size of approx. 5 inch colored. Display of HR, ECG through paddles and Lead I,II &amp; III patient cable. Built in recorder for printing of full summery on standard 50mm paper. Alarms for High and low Heart rate, low battery warning. Built-in Rechargeable battery with charger for minimum 50 shocks at max energy. Auto tester/self check. External Paddles (Adult, Paed, Neonate) AED facility with cable. Pacing facility AC 220V / 50Hz operated.</p>	
<p>Accessories: Complete with standard accessories, including reusable type Adult, Paediatric &amp; Neonatal sensors Original trolley/cart</p>	
<p>Optional (If any): Qty of Reusable sensors Internal Paddle(Adult, Paed, Neonate) Charging Time for full energy should be less than 07 sec ETCo2 Spo2 Disposable pacing pads</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Spiro Meter</b>
<b>Clinical Purpose</b>	A spirometer is an apparatus for measuring the volume of air inspired and expired by the lungs. A spirometer measures ventilation, the movement of air into and out of the lungs. The spirogram will identify two different types of abnormal ventilation patterns, obstructive and restrictive.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Spirometer with 1000 or above test memory          Blue tooth, USB connection          Records best 3 trials          Up to 8 blows on one screen          Screen size at least 5" or above          Internal temperature sensor for BTPS conversion          FVC, VC with breathing pattern plus MVV tests with real time curves          Over 30 parameters with automatic interpretation and test quality control          PRE/POST bronchodilator comparison          Built-in thermal printer for full Spiro-metric report printing.          Rechargeable battery and mains power          Turbine flow sensor.          Auto calibration mode.</p>	
<p>Accessories:          Complete main unit with:          Nose Clip, Mouthpiece &amp; Thermal Paper = 1 each          Operation Manual &amp; Carrying Case= 1 each          Spiro meter software</p>	
<p>Optional (If any):          2 hours backup time through battery or Sine Wave UPS.</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Ambulatory B.P Monitoring System</b>
Clinical Purpose	Ambulatory Blood Pressure Monitoring (ABPM) is when your blood pressure is being measured as you move around, living your normal daily life. It is normally carried over 24 hours. It uses a small digital blood pressure machine that is attached to a belt around your body and which is connected to a cuff around your upper arm. It small enough that you can go about your normal daily life and even sleep with it on.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Computerized Non-invasive, Ambulatory BP for continuous 24/48 hr – switch able monitoring. ( The procuring agency will specify)</p> <p><b>OPERATING FEATURES AND CHARACTERISTICS:</b></p> <p>Main computerized unit with color monitor</p> <p>Keyboard and mouse and Laser Printer for printing reports</p> <p>Data retrieval system</p> <p>Osillometirc system</p> <p>Artifact and motion noise elimination</p> <p>24/48 hour switch able summary and average hourly blood pressure,</p> <p>Day/ Night analysis and % of readings over pre-selected limits</p> <p>Number of Recorders:</p> <p>04 Recorders required with 04 each adult, paediatric and large BP cuff</p> <p><b>PARAMETERS</b></p> <p>Report on Blood Pressure and Pulse Rate in tabular and graphical form summary report of data and histograms</p> <p>Settable BP taking intervals from 10 to 60 mins, independently programmable measurement intervals. Start/Stop facility for patient initiated B.P reading</p> <p>Main unit battery and AC 220/50 Hz operated.</p>	
<p><b>Accessories:</b></p> <p>All allied accessories for the measurement of required parameters should be from original manufacturer.</p>	
<p>Optional (If any):</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Ambulatory (Holter) HR, ECG Monitoring System</b>
Clinical Purpose	A Holter monitor is a machine that continuously records the heart's rhythms. The monitor is worn for 24 /48/72 hours during normal activity.
<b>TECHNICAL SPECIFICATION</b>	
<p>PC based digital Holter monitoring system Holter with 24/48/72 HR ECG Monitoring system, (The procuring agency will specify the requirement)</p> <p>Operating features and characteristics</p> <p>PC based with color monitor of 19"LCD/ TFT monitor, play back module. Keyboard and mouse and laser printer for printing reports. (6CPM for ECG/Grid printing) Full disclosure reports and Superimposition feature, Analysis of ST slope, heart rate, R-R variability &amp; arrhythmias detection including atrial fibrillation. Pace maker detection and analysis.</p> <p>Reports: In tabular and summary form, Graphical and Analytical, Arrhythmia data, Heart rates (min. max &amp; AVG), R-R variability time domain calculations of test duration, ventricular and super ventricular ectopic. ST segment reports: adjustment ST-segment criteria, time duration maximum deviation &amp; slope deviation severity &amp; index number.</p> <p>3 channel simultaneous high resolution Holter Recorder (solid state with even marker, time clock) minimum 48 hours or above recording time. Sampling rate 175/ channel / sec in normal rhythm. Solid-state recorders. Minimum of 3 channel simultaneous acquisition of Holter data. (Two sets of leads per recorder ordered) connectivity: via USB port / flash memory card.</p> <p>Operating requirements:</p> <p>Recorders: Standard long life batteries. (AA) Alkaline, disposable, UPS (imported) for main unit for at least 60-min. back up time</p> <p>Computer: Minimum i5, Hard disk drive 100GB(minimum), DVD R/W, Operating system Windows</p> <p>Printer: HP laser jet , Networking capability</p> <p>Standard PC keyboard, Mouse. High resolution 19" or more colour LCD/TFT monitor with a maximum of 1280 x 1024 resolutions.</p>	
<p>Accessories:</p> <p>All allied accessories for the measurement of required parameters should be from original manufacturer.</p>	
<p>Optional:</p> <p>07 days of ECG recording</p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Event Loop Recorder</b>
<b>Clinical Purpose</b>	This device is attached in much the same way as a Holter monitor. When you feel symptoms of a heart problem, such as palpitations, you press a button on the monitor. Information on your heart’s electrical activity is then sent to your doctor for analysis. This device can be removed for bathing. At the end of the testing period—typically one to four weeks—you return the monitor so the recorded data can be analyzed.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Diagnostic embedded algorithms that automatically capture asymptomatic events.            Single device for patient convenience, comfort and ease of use            Powered by 1 AA Lithium Battery Pack            No patient interaction to transmit data            Transmission of data can be sent wirelessly or also trans telephonically as a backup if the patient is out of cellular network.            On site data download via USB or flash card reader.            Large Single Button Operation for Symptomatic Event Recording and Transmission of Event.            30 Minutes Programmable Looping Memory.            Pacemaker Detection.            Lead Loss Detection.            Simple Patient Operation with One Button Record and Send.</p>	
<p><b>Accessories:</b>            All allied accessories for the measurement of required parameters should be from original manufacturer.</p>	
<p><b>Optional (If any):</b></p>	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Neonatal Respiration &amp; Apnea Monitor</b>
Clinical Purpose	The, subject Electromedical equipment monitors the respiration and apnea for neonate neonatal patient.
<b>TECHNICAL SPECIFICATIONS</b>	
Display of parameters. Selectable time interval 10,15,20,25 second Rechargeable battery operated Indicators for time interval selected Apnea alarm Sensor Capsule type disposable/reusable Audio alarm- Event at apnea/ respiration	
Accessories: Complete with standard accessories	
Optional (If any): Mounting stand preferably imported or high quality (S.S 304L) Local with lockable draws(procuring agency to choose) Reusable Sensors	

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<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>ETT Machine</b>
Clinical Purpose	An Exercise Tolerance Test or Stress Test is used to provide information about how the heart responds to stress. It usually involves walking on a treadmill at increasing levels of difficulty, while the electrocardiogram, heart rate and blood pressure are monitored. By placing the stress of exercise on the heart, the test can help to determine if there is adequate blood flow to the heart during increasing activity and help to determine the best cardiac treatment plan for you.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Dedicated Computer based ETT System.            Analysis of ST levels, ST slopes and ST-index etc.            Report: 12 leads, rhythm and full disclosure arrhythmia, and exercise summary, trend.            Holter and Stress test review.            Display of 12 channels.            Colour monitor of 15".  <b>TREADMILL</b>            Programmable.            Treadmill, medical grade, controllable from main unit.            Speed adjustable from 0-15 km/h.            Emergency stop button.            Bearing capacity of minimum 180kg.            Automatic Blood Pressure measurement Device.            Automatic baseline drift control filter.            Complete integrated full functional workstation.            6KVA UPS for thirty minutes back up time.(Emerson,Liebert,Chloride,MGE or equivalent)            AC 220 V/ 50Hz            Dedicated imported cart supplied by from same manufacturer</p>	
<p>Accessories:            Complete with standard accessories</p>	
<p>Optional (If any):            TV screen size:10-12"</p>	

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Temporary Pace Maker (Single Chamber)</b>
<b>Clinical Purpose</b>	A pacemaker is a small device that's placed in the chest or abdomen to help control abnormal heart rhythms. This device uses electrical pulses to prompt the heart to beat at a normal rate. Pacemakers are used to treat arrhythmias (ah-RITH-me-ahs). Arrhythmias are problems with the rate or rhythm of the heartbeat.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Temporary pacemaker for cardiac pacing  OPERATING FEATURES and CHARACTERIST  Asynchronous and demand mode operation  Sensing: light indication  Pacing: light indication  Calibrated rate, output and sensitivity control  Defibrillator protected  PARAMETERS:  Stimulation control of current output upto 2  Pulsing rate control adjustment upto 150 pp  Sensitivity control upto 8mV  Pulse width 1.5 m sec  Asynchronous and demand mode switch  INDICATORS:  Battery status light indication  OTHER FEATURES:  Portable  Accessories including case and cables  OPERATING REQUIREMENTS:  Standard alkaline battery operation  Backup operation during battery change.</p>	
<p>Accessories:  Complete with standard accessories</p>	
<p>Optional (If any):</p>	



**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Temporary Pace Maker (Dual Chamber)</b>
<b>Clinical Purpose</b>	A pacemaker is a small device that's placed in the chest or abdomen to help control abnormal heart rhythms. This device uses electrical pulses to prompt the heart to beat at a normal rate. Pacemakers are used to treat arrhythmias (ah-RITH-me-ahs). Arrhythmias are problems with the rate or rhythm of the heartbeat.
<b>TECHNICAL SPECIFICATIONS</b>	
Dual chamber multi-mode temporary 'pacemaker for cardiac Pacing <b>OPERATING FEATURES and CHARACTERISTICS:</b> LCD display of all pacing, sensing and warning indicators <b>PARAMETERS:</b> Multi-mode: all combinations of atrial,ventricular&dual;AA,VV,DD,A0,VO,DO,DV Adjustable pacing rate adjustment upto 150 ppm Adjustable pacing voltage upto 10V Sensitivity control upto 8mV Pulse width upto 1.5 m sec <b>OTHER FEATURES:</b> Portable Accessories including case and cables <b>OPERATING REQUIREMENTS:</b> Standard alkaline battery operation	
<b>Accessories:</b> Complete with standard accessories.	
<b>Optional (If any):</b> Qty of Reusable sensors/leads	

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Head Up Tilt (HUTT) System</b>
Clinical Purpose	
<b>TECHNICAL SPECIFICATIONS</b>	
Tilt table with recording system PC based system with licensed window Continuous NIBP monitoring Oscillometric NIBP for reference purpose Continuous Cardiac Output facility Synchronized ECG Heart Rate monitoring Autonomic Function capability Neurocardiogenic syncope	
Accessories: Complete with standard accessories	
Optional (If any): IBP monitoring	

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Intra Aortic Balloon Pump</b>
Clinical Purpose	The <b>Intra-aortic balloon pump (IABP)</b> is a mechanical device that increases myocardial oxygen perfusion while at the same time increasing cardiac output. Increasing cardiac output increases coronary blood flow and therefore myocardial oxygen delivery.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>Self contained Fiber optic based intra aortic balloon pump having mobile console with ECG. Amplifier with possible selection 5 leads arterial blood pressure amplifier. Discriminative Triggering circuit to command balloon actions on patient's ECG arterial blood pressure curve or internal simulator 80 BPM. Color graphic displays at least of 10" for display of arterial and pressure heart rate balloon volume used and alarm conditions with trouble shooting procedures. Wave form displays for ECG, arterial pressure and balloon pressure on three channel memory type oscilloscope. Fall safe system. V Pacing switch. Progressive viewing sequence. Integrated battery power supply to take patient to catheterization labs, operating theatre or other hospital: 60 minute autonomy. CO2 / helium tank wrench. 5 lead ECG cable, male connector pressure, transducer, adopter, chart recorder.</p> <p>220 V, 50 Hz, Ac.</p> <p>System should be complete to display all the parameters.</p>	
<p>Accessories:</p> <p>Complete with standard accessories</p> <p>One spare set of patient cable.</p>	
<p>Optional (If any):</p> <p>Qty of Reusable sensors</p> <p>Disposable balloon catheters of varying sizes for use with the pump 25 nos.(to be decided &amp; justified by procuring agency)</p> <p>Automatic in vivo calibration(to be decided &amp; justified by procuring agency)</p> <p>Automatic and manual helium refilling(to be decided &amp; justified by procuring agency)</p> <p>Control of deflation point in automatic mode(to be decided &amp; justified by procuring agency)</p>	

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Echocardiography Machine (4D)</b>
Clinical Purpose	4D Echocardiography machine make it possible to view the moving picture of 3D echocardiogram.

**TECHNICAL SPECIFICATIONS**

A complete dedicated digital Echocardiography unit for wide range of premium performance application of cardiovascular imaging in pediatrics and adult. Built in workstation / data management system for digital acquisition, storage and review of complete ultrasound studies including static and dynamic clips in DICOM format, read/write zoom. Studies can be reviewed and output to CD / DVD/MOD. The machine must have sharp and high quality image reproduction with heavy duty performance. It should have minimum following specification :

**DISPLAY:**

High resolution 1280x 1024 non interlaced, flicker free.  
Display size Min. 21" LCD TFT, tilt able and swiveable type.

**OPERATING MODES:**

B, 2D,4D Imaging, M-Mode, Power Doppler, HPRF, Spectral Doppler, Color Doppler, Velocity Mode, Pw Doppler, Duplex And Triplex Doppler, CW Doppler Steerable and ECG Gating, Capable of Performing 4D View.

**CONTROL PANEL:**

Alphanumeric keyboard with built-in trackball.  
Direct access to system functions through dedicated keys.  
Indicator lights identify activated keys.  
Audio volume control with bidirectional / stereo speakers and foot switch  
User selectable image magnification control.  
Adjustable transmit focusing control.  
Total and Lateral Gain Compensation controls (6 or more).

**CALIPER / MEASUREMENTS :**

6 to 8 calipers for measurement per screen trace length measurements for:  
Distance, angle, distance depth from skin line, area, circumferences, compound / volume, slope, time, heart rate and acceleration.

**APPLICATION:**

Cardiac, Peripheral, pediatric, adult cephalic and transesophageal with all required software for measurements.

**OPERATING MODES:**

2D tissue, 2D angio flow, color M-Mode, tissue velocity M-mode, tissue strain imaging, disynchrony imaging, continuous wave Doppler, tissue m-mode, pulse wave Doppler, tissue velocity imaging, tissue tracking, tissue synchronization, blood flow imaging, blood flow angio flow imaging.

**DISPLAY MODES:**

Live and stored display format: full size and split screen. Review image format: for still and cine, simultaneous capability B+PW, B+ CFM/TVI+PW, CW, B+ or triplex mode, , B+ color split screen display. 4 D scan, B+Color Screen display, Slice view Tissue Imaging, 4D Mode, 2D mode, M-

## APPROVED PVMS

mode, color Doppler imaging, color flow imaging, color Doppler imaging, color angio, color m-mode, blood flow imaging, blood flow angio imaging, tissue velocity imaging, tissue velocity imaging mode, tissue synchronization imaging mode, PW / HPRF Doppler, CW Doppler, LVO Contrast, Vascular / abdominal contrast, vascular calculations, cardiac measurements

### FRAME RATE

(machine to be quoted with Maximum available frame rate)

Min. 200fps in B-Mode and 100fps in Doppler mode.

### CINE MEMORY

Min. Cine Memory for 1000 frames or 250mb min.

### IMAGE VIEWING DEPTH:

20 – 280 mm or more for cardiac application

### IMAGING MODES / TECHNIQUES:

Tissue harmonic Imaging, Tissue Doppler Imaging, Color Angio, Tissue Velocity Imaging Tissue Imaging (Display real time Doppler shift information from moving tissue to better visualize and quantify myocardial function). Capability to display time difference in myocardial motion in color for CRT (Cardiac resynchronization therapy).

Quantitative strain rate imaging (Doppler & speckle tracking rate): An advanced quantitative technique of Tissue

Doppler Velocity.

Strain rate is a measure of the contractile motion of myocardium.

Auto-Tracking contrast quantification: quantitative technique for on-line assessment of contrast agent images.

Contrast plus sequencing technology: a real time, low mechanical index, non-linear imaging technique for contrast agent examinations. The software should have the capability to show contrast agent only, tissue only or contrast and tissue displays. Contrast Harmonic Imaging capability. Vascular imaging software for carotids with IMT measurement.

### STRESS ECHO

Integrated multi stage stress echo system for advance and flexible stress echo Acquisition and measurement for LV B-Mode imaging. Quantitative analysis for contrast during stress.

examinations

Used with TDI protocols.

### STORAGE DEVICE

Built-in MOD/CD / DVD Drive WITH 10 DISKETTES

### SYSTEM DYNAMIC RANGE

Dynamic range minimum 160 dB or more

### COMMUNICATION SOFTWARE

System should conform to DICOM 3 communication software for:

Image Storage, print, Query / Retrieve, Network Communication.

Probes:

Should be light weight, capable of multiple centre frequencies on transmit for 2D, color Doppler PW/CW (Steerable) Imaging and to perform Harmonics.

### PORTS:

Video Output

USB / RS 232

## APPROVED PVMS

Networking
<p>STANDARD TRANSDUCERS:</p> <p>Linear Probe multi frequency to cover frequency of 6.0-8.0 MHz.</p> <p>Multi frequency Phased array sector probe to cover 2.0/2.5 – 4.0MHz.</p> <p>Multi frequency Phased array sector probe to cover 5.0 – 8.0MHz.</p> <p>CW Pencil Probe</p> <p>Multiplane TEE Transducer (3 – 6 MHz) for adults.</p> <p>Transthoracic /4D Volume probe</p> <p>Accessories:</p> <p>Digital Color Thermal Printer with 10 Packs of 100..</p> <p>Online UPS for 30 min. backup time for complete unit including Printer.(Emerson, Liebert, Chloride, MGE &amp; Riello)</p> <p>Digital B/W Thermal Printer with 50 rolls of papers.</p> <p>Jelly 20 L in bottles.</p> <p>Complete with standard accessories.</p>
<p>Optional (If any):</p> <p>Multiplane TEE Transducer (4 – 6 MHz) for peads</p> <p>4D TEE probe for adult or paed</p> <p>4D quantification</p> <p>Procuring agency will specify &amp; justify the imaging software.</p>

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Mobile Echocardiography Machine</b>
Clinical Purpose	Echocardiogram, often referred to as a cardiac echo or simply an echo, is a sonogram of the heart. Echocardiography uses standard two-dimensional, three-dimensional, and Doppler ultrasound to create images of the heart.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>A complete dedicated digital Echocardiography unit for wide range of premium performance application of cardiovascular imaging in pediatrics and adult. Mobile trolley mounted system with built in workstation / data management system for digital acquisition, storage and review of complete ultrasound studies including static and dynamic clips in DICOM format, read/write zoom. Studies can be reviewed and output to CD / DVD/MOD. The machine must have sharp and high quality image reproduction with heavy duty performance. It should have minimum following specification :</p> <p><b>DISPLAY:</b> High resolution 1280x 1024 non interlaced, flicker free. Display size Min. 19" LCD,TFT, tilt able and swiveable type.</p> <p><b>OPERATING MODES:</b> B, 2D M-Mode, Power Doppler, HPRF, Spectral Doppler, Color Doppler, Velocity Mode, Pw, Doppler, Duplex And Triplex Doppler, CW Doppler Steerable and ECG Gating,</p> <p><b>CONTROL PANEL:</b> Alphanumeric keyboard with built-in trackball. Direct access to system functions through dedicated keys. Indicator lights identify activated keys. Audio volume control with bidirectional / stereo speakers and foot switch User selectable image magnification control. Adjustable transmit focusing control. Total and Lateral Gran Compensation controls (6 or more).</p> <p><b>CALIPER / MEASUREMENTS :</b> 6 to 8 calipers for measurement per screen trace length measurements for: Distance, angle, distance depth from skin line, area, circumferences, compound / volume, slope, time, heart rate and acceleration.</p> <p><b>APPLICATION:</b> Cardiac, Peripheral, pediatric, adult cephalic and transesophageal with all required software for measurements.</p> <p><b>OPERATING MODES:</b> 2D tissue, 2D angio flow, color M-Mode, tissue velocity M-mode, tissue strain imaging, continuous wave Doppler, tissue m-mode, pulse wave Doppler, tissue velocity imaging, tissue tracking, tissue synchronization, blood flow imaging, blood flow angio flow imaging.</p> <p><b>DISPLAY MODES:</b> Live and stored display format: full size and split screen. Review image format: for still and cine,</p>	

## APPROVED PVMS

simultaneous capability B+PW, B+ CFM/TVI+PW, CW, B+ or triplex mode, , B+ color split screen display. Tissue Imaging, 2D mode, , M-mode, color Doppler imaging, color flow imaging, color Doppler imaging, color angio, color m-mode, blood flow imaging, blood flow angio imaging, tissue velocity imaging mode/CRT evaluation tool, tissue synchronization imaging mode, PW / HPRF Doppler, CW Doppler, vascular calculations/IMT, cardiac measurements.

### FRAME RATE

(machine to be quoted with Maximum available frame rate)

Min. 200fps in B-Mode and 100fps in Doppler mode.

### CINE MEMORY

Min. Cine Memory for 1000 frames or 250mb min.

### IMAGE VIEWING DEPTH:

20 – 280 mm or more for cardiac application

### IMAGING MODES / TECHNIQUES:

Tissue harmonic Imaging, Tissue Doppler Imaging, Color Angio, Tissue Velocity Imaging  
Tissue Imaging (Display real time Doppler shift information from moving tissue to better visualize and quantify myocardial function).

Strain Imaging tools: Doppler(Doppler based as well as speckle tracking base)

Quantitative strain rate imaging; An advanced quantitative technique of Tissue Doppler Velocity. Strain rate is a measure of the contractile motion of myocardium.

The software should have the capability to show contrast agent only, tissue only or contrast and tissue displays.

Vascular imaging software for carotids/IMT measurement.

### STRESS ECHO :

Integrated multi stage stress echo system for advance and flexible stress echo Acquisition and measurement for LV B-Mode imaging.

Quantitative analysis for contrast during stress. examinations

Used with TDI protocols.

### STORAGE DEVICE

Built-in CD / DVD Drive WITH 10 DISKETTES.

### SYSTEM DYNAMIC RANGE

Dynamic range minimum 160 dB or more

### COMMUNICATION SOFTWARE

System should conform to DICOM 3 communication software for:

Image Storage, print, Query / Retrieve, Network Communication.

### Probes:

Should be light weight, capable of multiple centre frequencies on transmit for 2D, color Doppler PW/CW (Steerable) Imaging and to perform Harmonics.

### PORTS:

Video Output

USB / RS 232

Networking

220-240VAC 50 Hz

### Accessories:

### STANDARD TRANSDUCERS:



## **APPROVED PVMS**

Linear Probe multi frequency to cover frequency of 6.0-8.0 MHz.  
Multi frequency Phased array sector probe to cover 2.0/2.5 – 4.0MHz.  
Multi frequency Phased array sector probe to cover 5.0 – 8.0MHz.  
CW Pencil Probe  
Online UPS for 30 min. backup time for complete unit including  
Printer.(Emerson,Liebert,Chloride,MGE & Riello)  
Digital B/W Thermal Printer with 50 rolls of papers.  
Jelly 20 L in bottles.

Optional (If any):  
Digital Color Thermal Printer with 10 Packs of 100.  
Multiplan TEE Transducer (3 – 6 MHz) for adults.  
Multiplane TEE Transducer (4 – 6 MHz) for peads

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Angiography system</b>
Clinical Purpose	<b>Angiography</b> or arteriography is a medical imaging technique used to visualize the inside, or lumen, of blood vessels and organs of the body, with particular interest in the arteries, veins, and the heart chambers.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>A fully digital flat panel single plane cardiac Angiography/ cardiac catheterization system dedicated for diagnosis and interventional cardiac procedures.</p> <p>POSITIONING ARM: Frontal Arm stand  The system should be ceiling / floor mounted  Real time display of rotation angulations.  Geometry : C-arm/ G-arm  ROA/LAO +/- 105° or More  Cranial / Caudal : min. +/- 45°  Rotation speed : 20° /Sec or more in LAO/RAO  Isocentric Height: Variable /Fixed.  Auto positioning: Programmable auto positioning of selected.  Angulations, (30 or more) Programmable Positions.)  The control panel can be mounted at any side of the patient table.  All the rotational / Angles should be digital displayed next to the.  Ceiling mounted 56 Inch or more LCD/LED monitor.  Motorized/Manual Parking / rotation of the positioning arm.</p> <p>DIGITAL FLAT PANEL:  Single Plane C-Arm /G-Arm  Image matrix of 1024x1024 x 14 bit or more.  Standard cardiology size with three formats.  Built in temperature stabilizer.</p> <p>DIGITAL FLAT PANEL DETECTOR 12 x 12 Inch or LARGER  Integrated Collision protection feature.  All other standard accessories according to this digital flat panel.  Dose management with fluoro filters range of 0.1/0.2mm to 0.9/1.0 mm Cu  Pixel size of 200 um or better  Removable grid for pediatric application</p> <p>PATIENT SUPPORT/ TABLE:  Catheterization table  Floor mounted with up down/vertical longitudinal and transverse  Rotational movements  Longitudinal stroke : 1000-1500 mm  Lateral stroke 100-300 mm  CPR in any table position  All Table side movement controls.</p>	

## **APPROVED PVMS**

Table top should be of such construction in material and durability to accept patients weight of not less than 150Kg plus 100 kg for resuscitation.

Table dimensions should be able to accommodate patients of all ages.

Table top should have large metal free over hand for unobstructed image coverage.

complete accessories should be provided including arm holder, hand grip, arm support and arm rest and positioning aids.

Left / right table pivoting: +/- 90 degree.

Stent visualization software with integrated tableside control

### **X-RAYS GENERATOR:**

Microprocessor based high frequency using fiber optic for data communication between each imaging system.

Dedicated X-Rays generator of 100KW

Radiographic rating minimum 1000mA

Serial filming exposures with shortest exposure of 1 mS, with automatic KV and mA control for optimum image quality.

The system should have capability of digital radiography and fluoroscopy.

Should have capability of doing digital pulsed fluoroscopy 10/12.5/15 and 25/30 frames per second. Automatic KV mA & pulse width regulations.

### **DIGITAL IMAGING AND ACQUISITION / FLUOROSCOPY:**

Digital System. Acquisition, storage and display in 1024x1024 x12 bit or more at 12.5/15 and 25/30 FPS.

Parallel processing capability / multitasking facility

Real time filtering and road map function.

Magnetic disk capacity for storage of 50,000 images in 1024 x 1024 x 12 bit or more on the magnetic disk of main console.

Minimum scene length to be 10 seconds in 1024 matrix.

Digital Pulsed fluoroscopy with 12.5/15 and 25/30 PLS in 1024x1024 x 10 bit or more.

Images to be stored on the retrieved from archive disk for possible manipulation and quantification using available software packages.

Digital Subtraction Angiography Package.

### **X-RAYS TUBE:**

Minimum of five years unconditional warranty on the x-rays tube by the original manufacture. (To be confirmed by the manufacturer)

Dual Focus with at least 2.4 MHU or better anode heat storage.

Capacity to enable continuous heat dissipation during serial exposure.

Dual focal rotating anode.

Focus 0.5 and 0.9 mm or better.

Dose management with auto adjustment fluoro filters.

### **MONITORING SYSTEM:**

Flat screen LCD/LED 56 Inch of 3840 x 2160 / 8 Mega Pixel

Monitors should be ceiling mounted in the operation room with the original ceiling suspension system.

Two monitors for live images and road mapping in the Examination room 18 inch or larger LCD/LED as back up.

## APPROVED PVMS

Two monitors for live images and road mapping in the control room 18 inch or larger LCD/LED.

All the monitors will be of Medical Graded, complied with international standards for medical monitors

One 56 inch LED TV Monitor for live images and road mapping in the Auditorium remote from the cath lab, complete with all the cabling and hardware required.

### CONTROL :

All the controls of digital imaging system, inch, post processing & quantifications (QCA) analysis shall be in the control room with replay / display of auditorium room image should be available in the examination room.

### RECORDING / ARCHIVING & COMMUNICATION SYSTEM:

Recording/ archiving system should be DICOM-3 compatible.

They digital images should be stored as backup on CD, DVD

DICOM (Send/store, commitment, retrieve/ query)

Ethernet connection to connect with other terminals.

Integrated intercom system.

### BRANDED REVIEW STATIONS (01):

DICOM-3 compatible.

Edge enhancement, adjustable view speeds & post processing.

High Definition Medical Graded 18 inch LCD/LED Monitors.

Online workstations to review studies directly and the facility to review studies on workstations with lossless compression and original image quality as on console.

CD. DVD writer and CD/DVD ROM Drive.

Image storage capacity 3x80 GB with at least 10,000 rpm speed.

And SCSI or equivalent controller at each review station.

Laser black & white printer , 24000 DPI or better (HP, LEXMARK, XEROX, CANON) network ready x1

QCA software

Licenses software with part numbers.

### SOFTWARE/HARDWARE PACKAGES:

Complete Analysis package for the following cardiac applications.

Dynamic pre and post PTCA / Valvotomy comparison with one image live and other reference.

Automatic loop replay after acquisition or fluoroscopy.

Dynamic real time pan / zoom.

Dynamic real time digital imaging processing like edge enhancement or gamma correction , noise reduction (spatial filtration)

They bidders should quote their licensed software with part number in their Principals offer.

Simultaneous display of fluoroscopy and reference images, not only as static images but as dynamic loop.

Standard quantification packages for QCA analysis.

online image density (gray scale ) correction

Facility to review previous studies in the examination room from the patients old CD.

All controls of digital imaging system incl. Post-processing & quantification (QCA) shall be in the examination as well as control room. Automatic positioning of the c-arm corresponding to

## **APPROVED PVMS**

reference image. Store fluoro facility to store fluoroscopy. Stent visualization system latest version by the company. 3-D Coronary visualization/reconstruction software and workstation ( if required)

One latest branded computer with black and white laser printer 2400 dpi at least and 21 inch LED Monitor for reporting.

### **SURGICAL SHADOW LESS LIGHT:**

Ceiling suspended/Floor mounted, For Angiographic and related surgical procedures.

### **RADIATION PROTECTION:**

Ceiling suspended / Floor mounted tilt able lead glass for radiation protection of operators head

& neck regions and lower body parts.

Collision tolerant.

Lower body radiation protection flaps.

Lead lining of room.

### **PHYSIOLOGICAL HEMODYNAMIC MONITORING SYSTEM:**

Multichannel (16 channels or more ) to record at least 4 channels IBP, Cardiac out put with thermo dilution method, Surface ECG in any configuration and simultaneous 12 lead ECG, NIBP and SpO2 measurement.

They system must be complete software for all pediatric & adult , right /left heart, angio/valvular hemodynamic calculations such as gradients, valve areas, shunt. Including annotations and 12 channel ECG.

Digital display of all the parameters like IBP, Heart rate, cardiac output parameter. It should be possible to print the waveforms simultaneously while acquiring the data in the back ground. It should be possible to store the waveforms on the hard disk of the physiological recording system.

System with tableside integrated control of the hemodynamic system in the exam room.

The hemodynamic system Should be from the original manufacturer /Joint venture manufacturer of the angiography system.

### **Optional:**

Integration of image on the examination room monitor for FFR,IVUS,OCT and Hemodynamic system with up-gradation to incorporate CT imaging

Workstation for TAVI procedure along with software

### **ACCESSORIES:**

Pulse oximeter probes ( QTY- 10 (05 pediatric probes, 05 adult probes))

10 x invasive blood pressure reusable transducer with 500 disposable transducer domes.

Disposable transducers (500 No)

Complete 12 lead ECG Cable (10 Nos.)

NIBP (05 Nos.)

Cardiac output (01 Nos.)

Holder for mounting the IBP transducer alongside the patient table.

Two color monitors 18 inch OR more LCD/ LED inside the control room.

DVD /CD writer for archiving of study data and wave from stored on hard disk.

Facility for freezing the homodynamic data and simultaneous recovery of recent data/ compare stored data with current waveform.

## APPROVED PVMS

Laser black & white printer, 2400 DPI or better (HP, Lexmark, Xerox, Canon) network ready x1 with extra toner cartridges (10 Nos.)

QUALITY AND SAFETY STANDARDS FOR ANGIOGRAPHY MACHINE:

FDA 510K and CE(MDD)

OTHER ALLIED ACCESSORIES: (All below given equipment should be from the USA , Europe and Japan origin)

Writeable CDs should be delivered with the system.

Lead glass window size 4x1 meter or more PB equivalent 2.0mm or better.

Pb aprons for the male, Double side with different sizes, Pd equivalent front 0.5mm and back 0.35 mm with belts.(FDA & CE approved) wall mounted hangers.

Pb aprons for the female, Double side with different sizes, Pd equivalent front 0.5mm and back 0.35 mm with belts.(FDA & CE approved)

Thyroid shields.

Pb Goggles.

160 KVA or more true on line sine wave Double conversion UPS for whole system with a minimum back up time eof 10 minutes including room lights, microprocessor based IGBT technology. Display and alarms of parameters. Three phase line voltage of 220 50Hz with all necessary standard parts including batteries.

Programmable contrast media injector with 500 disposable syringes. (Medrad bayer, Angiomat or Medtrone). Two crash cart with three biphasic defibrillators with pediatric paddles , Patient trolleys ( Heavy duty, Hydraulic, Patient Weight capacity 150 Kg with side rails)

Intra Aortic Balloon Pump (IABP) (01 No)

Dual Chamber ACT machines (02 No)

Digital Dosimeters for radiation protection ( 05 No)

200 KVA Prime Power Generator with ATS Panel

INSTALLATION:

Complete building/civil work for state of the art Angio suite including storage aluminum racks, aluminum doors with elbow action controls, paneling , lead lining , flooring , paints etc.

Oxygen and suction system connection with the existing hospital pipeline.

Split air conditioner units for whole suite.

Complete electricity works from power station to Anglo room including earthling, power

Racks, breakers, DB etc. Lead lining of walls, windows and doors complete full length

Pneumatically/Automatically actuated fire protection/Suppression system for the UPS and

Electrical room. As per drawing of the room.

POWER REQUIRMENT:

Three phase with line voltage of 220V. 50 Hz.

TRAINING:

Two visits of application specialist are mandatory for doctors, Local training of technician and one factory training of hospital biomedical engineer; one visit will be immediately after complete installation of the system and second will be following by 3 months.

Accessories:

Complete with standard accessories

Optional(If any):

## **APPROVED PVMS**

1. Procuring agency will specify the single /biplane angiography system.
2. Hybrid Angiography machine will be specified by procuring agency.

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
<b>Generic Name</b>	<b>Dual Head Gamma Camera Complete with Hot Lab</b>
<b>Clinical Purpose</b>	A <b>gamma camera</b> , also called a <b>scintillation camera</b> or <b>Anger camera</b> , is a device used to image gamma radiation emitting radioisotopes, a technique known as scintigraphy. The applications of scintigraphy include early drug development and nuclear medical imaging to view and analyse images of the human body or the distribution of medically injected, inhaled, or ingested radionuclides emitting gamma rays.
<b>TECHNICAL SPECIFICATIONS</b>	
<p>1.1 Two rectangular (&gt; 36 cm x 20 cm FOV) high resolution digital detectors fixed at 90 degrees to each other.</p> <p>1.2 <math>\geq 8.5</math> mm thick NaI crystal</p> <p>1.3 .PMTs:= &gt; 24 PMT tubes per detector</p> <p>1.4 Static, dynamic, planar, SPECT and gated SPECT capability.</p> <p>1.5 Microprocessor controlled energy, linearity and uniformity corrections.</p> <p>1.6 Automated PMT gain stabilization for extended image uniformity</p> <p>1.7 Intrinsic energy resolution for 99mTc <math>\leq 9.5\%</math></p> <p>1.8 Intrinsic spatial resolution: <math>\leq 3.9</math> mm at FWHM in UFOV, <math>\leq 7.6</math> mm at FWTM in UFOV</p> <p>1.9 PHA windows: <math>\Rightarrow 3</math> for simultaneous imaging</p> <p>1.10 Energy range 60-170 Kev</p> <p>1.11 Monitor for gantry position and image display</p> <p>2 Collimators</p> <p>2.1 Low energy general all purpose (2)</p> <p>2.2 Low energy high resolution (2)</p> <p>2.3 Collimator Storer and Collimator Server</p> <p>3 Table/ Chair</p> <p>3.1 Low attenuating material</p> <p>3.2 Maximum patient weight capacity= &gt; 300 lb.</p> <p>4 Acquisition Console</p> <p>4.1 Computer for cardiac planar, SPECT, gated, static and dynamic acquisitions.</p> <p>4.2 Ability to perform gated studies in "list mode" / "frame mode"</p> <p>4.3 Factory protocols for all type of cardiac and non cardiac studies.</p> <p>4.4 Ability to make user defined protocols and edit factory protocols and acquisition parameters</p> <p>4.5 SPECT acquisition: 64x64, 128x128 word matrix, step and shoot / continuous acquisitions over 180 and 360 degrees</p> <p>5 Gating Device</p> <p>5.1 Gating device with patient leads and camera connection for gated planar and SPECT studies.</p> <p>6 Processing Workstation (2)</p> <p>6.1 64 Bit RISC (700 MHz or higher) / Intel XEON processor (3 GHz or higher)</p>	



## APPROVED PVMS

- 6.2 SCSI/ Serial ATA Hard Disk: > 80 GB
- 6.3 24 GB RAM
- 6.4 DVD RW/CD-RW drive
- 6.5 Interface for gamma camera / acquisition computer
- 6.6 10/100/1000 Base T Ethernet card
- 6.7 56 K Fax modem
- 6.8 128 MB graphic card
- 6.9 18 inches flat TFT monitor (1280 x 1024 res.)
- 6.10 Desktop for workstation
- 7 Software
  - 7.1 UNIX/ LINUX/ Windows NT/ Windows XP/Solaris operating system
  - 7.2 TCP/IP, NFS, FTP software for communication with networked (LAN, WAN) computers.
  - 7.3 Patient database management software
  - 7.4 Programming tools for making acquisition, processing and display protocols
  - 7.5 DICOM 3 convert, DICOM transfer (import, export) and DICOM print software
  - 7.6 Postscript printer driver for networked printers (Codonics, Tektronix, HP, Lexmark)
  - 7.7 Licensed Software for converting and exporting images in common PC formats e. g. GIF, TIFF, JPEG, BMP, AVI.
  - 7.8 Quality control software for uniformity, center of rotation, spatial resolution, and linearity correction complying with NEMA
  - 7.9 Image Algebra tools
  - 7.10 Tools for filter back projection reconstruction and reformatting
  - 7.11 Iterative reconstruction software supporting OSEM, MLEM methods
  - 7.12 Choice of filters for 2D and 3D filtering
  - 7.13 Motion correction software
  - 7.14 Cine and 3 D display software
  - 7.15 Image analysis tools
  - 7.16 mage and count manipulation tools
  - 7.17 Tools for Scatter Correction
  - 7.18 Standard software for Gated and non-gated Myocardial Perfusion SPECT
  - 7.19 Standard software for gated blood pool and first pass study for assessment of RV / LV Function
  - 7.20 Software for cardiac shunt analysis
  - 7.21 Emory Cardiac Toolbox / Michigan University 4D MSPECT with 5 normal databases.
  - 7.22 Cedars-Sinai Autoquant Plus (QGS+QPS+QBS) software.
- 8 Imager(Codonics, Hp Printer or Equivalent)
  - 8.1 320 dpi, 12 bit gray scale, 16.7 million colors
  - 8.2 Media: 8x10 Film; A, A4 Gray scale paper; A, A4 color paper; A, A4 color Film
  - 8.3 10/100/1000 Base T Ethernet Card, 256 MB RAM, 10 GB HD and 100MB Zip Disk
  - 8.4 DICOM, PostScript printing
  - 8.5 100 sheets of ChromaVista color paper with ink sheet
  - 8.6 100 sheets of DV film, DV film tray
  - 8.7 Printer drivers
  - 8.8 Network cable

## APPROVED PVMS

### 9 STANDARD ITEMS

9.1 UPS: 10 KVA (Emerson, Liebert, Chloride, MGE) Online uninterrupted power supply (Sine wave) for gamma camera, workstations and printers. Minimum backup time = 30 minutes

### 10 Quality Assurance Tools

10.1 Rectangular flood source holder

10.2 Rectangular refillable flood source (detector head size)

10.3 SPECT phantom holder

10.4 SPECT phantom

10.5 IRC source holder

10.6 Bar Phantom (detector head size)

10.7 Rectangular Cobalt 57 flood Source (740 MBq) (detector head size)

10.8 Cobalt 57 disc sources (100 uCi) for COR / IRC correction

10.9 Cobalt 57 Pen point Marker (100 uCi)

### 11 MOD/ EOD/ DV D Writer for data archive

### 12 Color Laser Printer

12.1 Up to 20 pages per minute black and color printing

12.2 4800 Image quality

12.3 160 MB RAM

12.4 3 paper trays

12.5 PostScript printer drivers for UNIX, LINUX, Windows and MAC

12.6 10/100 Base T Network Card with network cable

### 13 B & W Laser Network Printer

13.1 Up to 24 pages per minute 600 x 600 black & white printing

13.2 128 MB RAM

13.3 2 paper trays

13.4 PostScript printer drivers for UNIX, LINUX, Windows and MAC

13.5 10/100 Base T Network Card with network cable

### 14 Dose Calibrator / Gamma Well Counter

14.1 Console (9 pre-defined isotopes and 5 user defined)

14.2 Ionizing chamber with shielding (1/8 inches)

14.3 Well counter thin wall, deep well, high pressure Argon gas

14.4 Max. Activity = 240 GBq

14.5 Well Detector: Drilled NaI crystal detector, Max count rate 60,000 cps

14.6 Serial port with software

14.7 Auxiliary display with cable

14.8 Data printer

14.9 Ticket Printer

### 15 Survey Meters

15.1 Portable Survey Meter with external GM probe (0-20 mR/h)

15.2 Portable Survey Meter with external GM probe (0-200 mR/h)

### 16 L Shield

16.1 18.5" w x 17.25" d x 26" h

16.2 ¼" Lead Glass

16.3 ¼" Lead shielding

## APPROVED PVMS

- 17 Lead Bins
  - 17.1 Foot operated waste bins
  - 17.2 ¼" thick lead lining
- 18 Syringe Shields
  - Tungsten (2 mm) Syringe shields with lead glass window and safety lock
  - 18.1 For 3CC Syringes
  - 18.2 For 5CC Syringes
  - 18.3 For 10CC Syringes
- 19 Transporter Shielded Syringe Carrier
  - 19.1 1/8 inch lead lined. Size 7x3x3 inches
- 20 Lead Goggles
  - 20.1 Lead Equivalent: 0.75mm front; 0.75mm side
- 21 Lead Gloves
  - 21.1 Flexible vinyl cover
  - 21.2 0.5mm Lead protection
  - 21.3 15" length
- 22 Lead Lined MIBI Boiling Apparatus
  - 22.1 Automatic boiling apparatus
  - 22.2 ¼ inches thick lead casing
- 23 Lead Aprons
  - 23.1 0.5" front, 0.3" back lead wrap around aprons
- 24 Injection stand with Instruments Tray
  - 24.1 Chrome Plated Steel with Adjustable Height (30-45 inches)
- 25 Lead Lined Safe for storage of sealed sources:
  - 25.1 Dimensions: 17.4" w x 17" depth x 19" h (44.2 x 43.2 x 48.3cm)
  - 25.2 I.D.: 12" w x 12" depth x 12" h (30.5 x 30.5 x 30.5 cm)
  - 25.3 Lead Shielding: 2" thick (5 cm)
  - 25.4 Finish: Powder coat
  - 25.5 Door: Key-locked
- 26 Lead Castle U shaped:
  - 26.1 25mm lead protection
- 27 Lead Lined Phantom Cabinet for storage of Flood Sources
  - 27.1 Dimensions: 8.2" w x 25.6" depth x 34.2" h (11.6x 25.1x 36 cm)
  - 27.2 Lead Shielding: .25" thick (.64 cm)
  - 27.3 Door: Key-locked
  - 27.4 Countertop: Stainless steel with 4" backsplash and .5" spill proof lip
  - 27.5 Finish: Powder coat
- 28 Stainless Steel Top Table: 75x75x45 cm
- 29 Treadmill:
  - 29.1 Complete Stress test system as per approved SPECS
- 30 Bicycle Ergometer:
  - 30.1 Maximum Energy upto 400 Watts
  - 30.2 Programmable protocols with 5-50 Watts increments
- 31 Three Channels ECG machine with interpretation software.

## APPROVED PVMS

<p>32 Volumetric Infusion Pump: 32.1 Battery Powered 32.2 Flow rate: 1-999.9 ml/hour 32.3 100 compatible infusion sets 33 Cardiac Defibrillator with monitor and ECG recorder, Biphasic, Colored Screen 34 Transcription System 34.1 Desk set with head phone and foot pedals 34.2 Digital Hand Recorder 35 Power Requirements: 35.1 Complete electrification work and earthing of equipment. 35.2 All equipment for 220 V 50 Hz power supply 36 Documentation 36.1 All English user manuals (Soft and Hard Copies) 36.2 All English service manuals (Hard Copies) 37 Upgrades/ Bug Fixes 37.1 Free upgrades and bug fixes in warranty and maintenance contract period. 37.2 The manufacturer will guaranty the availability of all parts for ten years after installation.</p> <p>Network switches (Giga bit) Isolator for radioisotopes (amercare/Biodex/LamerPax) Aluminum Breakthrough Kit Cardiac Phantom QC Kit for dose calibrator Lead lined ventilation apparatus with 100 mobilizing sets Radioactive decontamination kit Desktop PCs with licensed Window, MS Office and antivirus software Sharps container shield Mobile radiation shield Fridge Capacity: 12 CFT for cold kits Fire extinguisher Digital personal radiation monitors Patient screen DVDs for data archiving External Hard Disks for data archiving (1 TB). Storage and disposal of radioactive vial and waste facility.(3 x 3 x 2)(L x W x H)</p>
<p>Accessories: Complete system with all equipment of hot lab.</p>
<p>Optional (If any):</p>

**APPROVED PVMS**

<b>Clinical Specialty</b>	<b>Cardiology</b>
Generic Name	<b>Wireless Telemetry System</b>
Clinical Purpose	Post Operation usage
<b>TECHNICAL SPECIFICATIONS</b>	
<p>No. of Patient 8          19" or more color display          ECG, Resp, Spo2, NIBP(optional), Temperature(optional)          Touch Screen          Individual side alarm indicator          Audio visual Alarm          Built wifi/LAN Port          72 hours of full Disclosure          Arrhythmia analysis          Paper speed 25 or 50 mm/s          AC and battery operation          All beds data should be shown simultaneously in on screen          Trend parameters heart rate, pulse rate, respiration rate, VPC rate, ST Level, Apnea (Time), Apnea (Frequency), Spo2, NIBP(optional)          Dedicated Transmitter          Defibrillation protection          ESU protection          Battery type AA Type alkaline dry cell battery (should be easily available in the market)          Transmitter selection:(Transmitter type quantity will be select by end user at the time of indent)          Transmitter for ECG          Transmitter for ECG, Resp          Transmitter for ECG, Resp, Spo2          Transmitter for ECG, Resp, Spo2, NIBP(optional)          Range: 200m or more(IO to specify)</p>	
<p>Accessories:          Complete with standard accessories</p>	
<p>Optional (If any):          Qty of reusable sensors/leads</p>	