

Department of Radio Diagnosis

S.No.	Name of Equipment	Specification	Qty required	Suggested Manufacturers Name	Approx Unit cost (Rs.)	Usage
1	Digital subtraction angiography (D.S.A.)	<p>A single plane, ceiling mounted C-arm, digital subtraction angiography (DSA) system with flat panel detector technology for vascular diagnostic and interventional procedures. The equipment should have the following features:</p> <p>A. Mechanical System consisting of C-Arm and Table</p> <p>The C-arm and table system should be for multipurpose diagnostic and interventional procedures</p> <ol style="list-style-type: none"> 1. C-arm should be Multidirectional, ceiling mounted. 2. The C-arm should be able to rotate motorized to both left and right of patient for greater access to patient. 3. All movements should be motorized with C-Arm angulations of minimum RAO/LAO ± 120 deg. / 120 deg. CRAN/CAUD ± 45 	1	<p>Seimens healthcare</p> <p>GE healthcare</p> <p>Philips healthcare</p> <p>Toshiba Medical System</p> <p>Allengers Medical System</p>	<p>Approx.</p> <p>Rs 2.5 crores</p>	<p>DSA is primarily used to image blood vessels. It is useful in the diagnosis and treatment of:</p> <p>Arterial and venous occlusions, including <u>carotid artery stenosis</u>, <u>pulmonary embolisms</u> and <u>acute limb ischaemia</u>.</p> <p>Arterial stenosis, which is particularly useful for potential renal donors in detecting <u>renal artery stenosis</u>. DSA is the gold standard</p>

		<p>deg. at head-end position. With 15 deg / sec or more speed for LAO/RAO and 15 deg / sec or more speed for CRAN/CAUD. In addition, motorized movement of the image intensifier on vertical axis at specified speed must be available.</p> <p>4. System should allow access to the patient from both sides of table.</p> <p>5. Imaging should be possible at any position of the C-arm.</p> <p>6. Motorized parking of C-Arm in case of catastrophe for resuscitating the patient.</p> <p>7. Motorized peripheral position for peripheral and vascular intervention should be available. It should be possible to position the C-arm on the left side as well as on the right side of the patient.</p> <p>8. The system should have user defined various programmed positions of the C-arm.</p> <p>9. Simultaneous movement of any two axes for direct selection of complex/double oblique angulations including cranio-caudal angulations.</p> <p>10. Floor mounted table with carbon fibre</p>				<p>investigation for <u>renal artery stenosis</u>.</p> <p>Cerebral aneurysms and <u>arterio-venous malformations</u> (AVM).</p>
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		<p>table top and swivel capability for easy patient transportation and increasing throughput.</p> <p>11. Table should have free-floating table top with motorized vertical travel and motorized stepping.</p> <p>12. The table should have preferably motorized axis tilt (head-down and head-up).</p> <p>13. System should have provision for collision protection.</p> <p>14. Table edge should be suitable for a wide range of accessories like arm rest, hand grips.</p> <p>15. The table top should be equipped with gantry controls, table system controls, collimation controls and optional Intravenous poles.</p> <p>16. Please specify the range of table travel in longitudinal and vertical directions as well as speed.</p> <p>17. Table should support patient weight up to 160kgs.</p> <p>18. The table should have head to toe coverage without repositioning of the patient. Please specify the table dimensions.</p>				
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		<p>19. System should have well designed footswitch for releasing fluoroscopy, acquisition and table brakes.</p> <p>A. X-Ray system Generator:</p> <ol style="list-style-type: none"> 1. High frequency x-ray generator with automatic regulation of radiation dose rate for all fluoro DSA and acquisition mode. 2. The minimum power ratings should be 100KW or more at 100KV compatible with high-resolution imaging. 3. Fluoroscopy exposure times and mA should be automatically controlled based on fluoroscopic values. 4. System should have pulsed fluoroscopy system. 5. Please specify the fluoroscopy pulse width and the technology used for generating pulse fluoroscopy. Please support advantages of your technology with published data in peer reviewed international journals. <p>B. X-Ray Tube :</p> <ol style="list-style-type: none"> 1. X-Ray tube should be dual focus with high cooling rate to ensure continuous operation, capable of pulsed fluoroscopy. Please specify 				
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	<p>the focal spot sizes and kW outputs.</p> <p>2. Anode heat storage capacity should be 2MHU or above.</p> <p>3. Total heat capacity should be large. Please specify.</p> <p>4. The system should have integrated computer controlled Automatic X-Ray Beam Filtering.</p> <p>5. The x-ray tube should have noiseless operation with latest tube cooling technology, minimum 2 MHU heat storage capacity to run continuously for 6-8 hours without shutting off. Please specify the technology used for tube cooling.</p> <p>6. Anode cooling rate:– Maximum heat dissipation with large cooling capacity. Please specify.</p> <p>C. Digital Imaging System :</p> <p>1. A flat panel detector digital system of 30 x 30cms or more with acquisition and processing in 2 K X 2 K matrix with at least 12 bit digitization. Please specify the detector diagonal and pixel size of the</p>				
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		<p>detector. Smaller size of pixel would be preferred.</p> <p>2. Selection of reference image with C-Arm position.</p> <p>3. Cine loop replay facility & last image hold facility during fluoroscopy.</p> <p>4. Image storage capacity of at least 1,00,000 images in 1024 x 1024 matrix at 10 / 12 bits on the main system disk.</p> <p>5. The system should have on-line & off-line vessel analysis programme. The software should have Auto-calibration facility. The analysis should be possible from table side in the examination room and from the control room.</p> <p>6. The system should have capabilities of ECG display on the live image monitor and archive along with angio images on CD, during the acquisition.</p> <p>7. The system should have direct digital Subtraction Angiography facility in 1024x1024/12 bit matrix. The acquisition frame rate should be from 0.5 frames/sec to 15 frames/ sec.</p>				
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	<p>8. The system should have Peripheral Digital Angiography with stepping with online subtraction display in the examination room with a single contrast injection, while chasing contrast medium bolus.</p> <p>9. The system should have facility for digital 3D rotation angiography with dynamic subtraction image display, the rotation speed should be at least 40-deg/sec. please mention the acquisition frame rate and matrix size. It should be possible to reconstruct the acquired images on a workstation with display in the examination room.</p> <p>10. The digital system should preferably have good processing software suitable for large patients and projections over varying density backgrounds such as spine & lung fields.</p> <p>11. The quantification and evaluation software with automatic and interactive detection of lesions and stenosis quantification is desirable.</p> <p>12. Digital angiography without subtraction also, must be available in the system.</p>				
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		<p>13. The system should have facility for road mapping of good quality.</p> <p>D. Image display system</p> <p>1. Four high brightness 19-inch TFT (LCD) black-and-white flat monitors for flicker-free, distortion-free viewing should be provided, two in angio room and two on console for live and reference image display.</p> <p>E. Control Console</p> <p>1. All system movements of C-arm, table, image display, image review, image post processing and quantification shall be controlled both by the operator at the table in the angio room and in console room.</p> <p>2. The system should have facility for edge enhancement, positive/negative image display, windowing, contrast/brightness, electronic shuttering, image/pixel shifting, vertical and horizontal image reversal, zoom functions.</p> <p>3. The system should have fast and direct access to all series, single images, in both</p>				
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		<p>examination and control room.</p> <p>4. System should have angle/distance measurement, image labeling and patient positioning facilities.</p> <p>5. System should have a dosimeter on the console and also on the inside monitor to display on line, actual radiation dose.</p> <p>6. There should be provision for display of time required for procedures e.g.; balloon inflation etc on the live monitor in the operating room.</p> <p>F. Digital Archiving on Compact Disk</p> <p>1. The system should have FDA approved system for recording in DICOM 3.0 (or higher version) and CD Medical format having capability of bi-directional transfer of images.</p> <p>2. Dynamic viewing of CD images, single frame step by step, fast forward & fast rewind.</p> <p>3. Image transfer from digital system in background mode without affecting the system operation.</p>				
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		<p>4. System should have facility for recording images on CD at control room.</p> <p>G. Essential Accessories</p> <p>1. Floor mounted high –pressure injection system having features of programmed flow rate, volume with variable pressure limits for all type of angiographies with disposable syringes. The system should be compatible with all commercially available syringes. Vendor should ensure supply of these syringes which are well within the expiry date, in small batches as per the requirement of the department. One spare injector must be supplied.</p> <p>2. Multiport, single film (14”x17”) camera with resolution of 600 DPI or more, DICOM ready and online, with laser print technology.</p> <p>3. A DICOM Print facility should be available to connect to a network Laser Printer (The Laser Printer should also be offered.)</p> <p>4. DICOM Software with fast speed CD writer.</p>				
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	<p>5. Lead glass 100x 150 cm for console room.</p> <p>6. Ceiling suspended lead glass radiation protection system and table side protection system.</p> <p>7. Five wrap around type lead aprons, five thyroid shields, five universal lead eye glasses.</p> <p>8. Mattress and arm supports for patient table.</p> <p>9. Suitable UPS with complete back up for the entire system including generator, digital system all essential accessories to continue angio acquisition for 30 minutes. The battery backup of rated capacity should be quoted, for the complete system.</p> <p>10. Separate PC station to down load images from angio equipment for demonstration, conferencing, preparation of teaching aids and presentations related to the angio studies, complete with a high quality LCD projector.</p> <p>11. A 6-channel monitor for ECG, 2 pressures, respiration, SpO2, and NIBP.</p> <p>12. One table mounted radiation protection device, one ceiling suspended examination</p>				
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		<p>lamp.</p> <p>H. Warranty/After sale service</p> <p>1. Five year comprehensive on-site warranty of entire system (Spares and labour) including x-ray tube and all accessories and civil, electrical and air-conditioning works. This will be followed by 5 years comprehensive CMC.</p> <p>2. 95% uptime guarantee should be given. In case down time exceeds 5%, penalty as per Govt. rules will be applied.</p> <p>I. Prices to be quoted separately.</p> <p>1. Hardware & Software required to displays CT like images in the examination room acquired with rotational angiography. Specify the low contrast resolution with standard phantom.</p> <p>2. Multimodality viewing facility to view images from CT and MRI rooms.</p> <p>Vendor should inspect the site of installation and modify the site suitably in respect of the equipment room/ examination room, console,</p>				
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		<p>waiting area including air conditioning at the respective site.</p> <p>Vendor may visit the different site for above said purpose.</p> <p>Demonstration has to be arranged by the company before the price bid opening at their own cost for their quoted models to the technical committee.</p>				
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