RAJENDRA INSTITUTE OF MEDICAL SCIENCES, RANCHI

AMENDMENTS IN SPECIFICATION OF TENDER NOTICE NO. 13277 DATED 06.12.2016

Notice no. ..1508...../RIMS, Ranchi, Dated ..01-03-2017

In reference to corrigendum notice no. 1415 dated 25.02.2017, the amendments / rectifications (in specifications of Radiology, Orthopaedics, ENT, Neurosurgery & PMR equipments) made under NIT No. 13277 dated 06.12.2016 are being enclosed herewith. The intended bidders have to quote in accordance with the amended specification & list for the items in which amendments are made amendment. The amendments details are hereunder :-

(1) Orthopaedics : In previously uploaded final tender paper there are only 04 types of equipment listed in the tender. After amendment, one more item No. (5) "Orthopaedics Instrument set" with detailed specifications is added in the orthopaedics list (having paging from page 21 to 57 total 37 pages). Rest items and specification of orthopaedics equipments will remain same as in previous uploaded final tender paper.

(2) ENT : As decided by the end users during the meeting of technical committee. "No changes required in the previously uploaded specifications of ENT equipments.

(3) P.M.R. : In previously uploaded final tender paper there are 60 types of equipment listed in the tender. After discussion during technical committee meeting the specifications and list of equipment is amended. Few previous items got cut from the previous list and few new items are added. After modification/amendment the new list of 20 types of equipment with specification is enclosed herewith (in 14 pages). The previous list & specifications of PMR department got cancelled after uploading this amended list & specification.

(4) Neurosurgery : As per discussion & decision of technical committee the specifications of item no. (6) "Image guided neuro navigation system for cranial and spinal application for neurosurgery" require amendment. The amended specifications is enclosed herewith (in two pages). Rest items & specifications (Other than item no. 6) will remain same as in previous uploaded final tender paper of Neurosurgery. The bidders have to quote in accordance to amended tender specifications.

(5) Radiology : As per discussion and decision of technical committee the specifications of item No. (1) "MRI 3 Tesla" and Item no. (2) "256 Slice CT Scan machine" require amendment. The amended specification is enclosed herewith (in 31 pages). Rest items and specifications (other than item No. 1 & 2 of Radiology) will remain same as in previous uploaded final tender paper of Radiology. The intended bidders have to quote in accordance with this amended tender specifications.

Note : It is being mentioned clearly that for any of the items under tender notice no. 13277 dated 06.12.2016 the only (one) authorization of principal manufacturer/OEM will be considered for the same product/item. The principal manufacturer should not provide authorization to more than one bidder for participating the same tender in RIMS, Ranchi. In such cases, all the bids or bidders having authorization from the same manufacturer / principal for the same item will be rejected during technical evaluation.

Rest terms, conditions and other list & specification (except amendments) will remain same as per previously uploaded final tender papers. The bidders have to quote accordingly.

Director
Rajendra Institute of Medical Sciences
Ranchi

TECHNICAL SPECIFICATIONS
DETAILED CONFIGURATION FOR 256 SLICE C.T. SCANNER ON TURNKEYBASIS
(Qty - 1)

Sl. N.	Specifications as per tender
**	**The Model offered should be the latest High end model under current production, should be Slip Ring Technology. The detector should be of latest technology having nano panel equivalent of Elite/Stellar/Clarity detector technology. Refurbished-Gold Seal Units will not be accepted. The Offer should meet the Specifications as follows.** **PACS for radiology Department with VNA architecture for long term storage & retrieval of images .Collaborative plat form for video conferencing with clinicians on PACs system .Robotic CD writer for dictating report directly into PACs.Need PACS for at least 4 users simultaneously.**
1	**Manufacturer :**
2	**Type & Model:**
3.	**Country of Origin :**
	The system should be latest state of the art, independent 128 or more rows of detectors with acquisition of at least 256 slices per rotation capable of integrating with any PACS/HIS system. The system should be DICOM - ready with true isotropic volume acquisition and sub millimeter resolution. The model quoted should be, AERB Type approved, US FDA and European CE certified. The essential requirements of the system are as follows:-
	a) Gantry:
	- Aperture: 70 cms or more.
	- FOV: 50 cms or more
	- 3-D laser lights for positioning.
	b) X-Ray Generator:
	- High Frequency type.
	- Power output: 120 kW or higher with single source
	- mA Range: 20-1000 mA (With incremental steps of 10 mA)
	- KV Range: 90-110 or more
	c) X-Ray Tube:
	- Tube Voltage: 100-110 kV or more
	- Anode Heat Storage Capacity of at least 8 MHU or direct cooling tube with
	- Peak Heat dissipation rate of Anode should be at least 1600 Khu/min
	d) Patient Table:
	- Load carrying capacity at least of 180 Kg with positional accuracy of 1 mm or less
	- Metal free scan-able range of 150 cm or more
	- Floating table top with foot pedal/hand control for positioning.
	-carbon fiber table top
	-Facility of positioning aid in horizontal isocenteric positioning of the patient

28/2/17

	e) Spiral Acquisition:
	- Scan Time should be 0.3 sec or less for full 360 degree rotation.
	- Minimum slice thickness should be 0.625 mm or less.
	- Pitch Factor (volume pitch): freely selectable in auto mode and also manually variable between 0.5 to 1.5 or more. Specify all possible pitch selections.
	-Single continuous spiral scan time should be at least 100sec or more.
	- Bolus Triggered or bolus chase spiral acquisition should be available.
	-ECG gating triggered
	- Real time x-ray dose reduction which combines both Z axis and angular tube current modulation to adjust the dose to the size and shape of individual.
	Real time CE fluoroscopy :at 6 to frames per second with 19" color TFT /LCD monitor
	f) Image Resolution:
	1. High contrast resolution should be at least 21 lp/cm for axial and spiral scan at 0% MTF with full FOV.
	2. Low contrast resolution – 4.0mm @ 3% @ 27 mGy surface(CATPHAN phantom on 10 mm slice thickness.)
	g) Data Acquisition System:
	- Detector- Capable of acquiring 256 slices per 360 degree of rotation.
	- At least 128 rows of independent detectors are required with Z-axis coverage of 50mm or more.
	-Detector shall cover 40mm per rotation for standard & cardiac scan in 1:1 pitch
	- Solid state or rare earth detectors of latest technology of low dose and low noise like ELITE/STELLAR/ CLARITY free from repeated calibration.
	-Inbuilt pediatric protocols. Based on infant weight.
	h) Image Reconstruction:
	- High speed 20fps real time reconstruction with display matrix of 1024x1024 or more.
	- Reconstructed slice thickness should be sub-millimeter to 7mm freely selectable.
	-Latest iterative reconstruction technique to reduce noise and reduce radiation dose should be quoted as standard.The image reconstruction rate should be at least 16 images/sec with this reconstruction technique.
	- Scan field & reconstructed field specify
	i) Operator Console:
	- High resolution medical grade LCD color monitors of 19|| or more.
	- Should perform Registration, scheduling, protocol selection, Volume rendering, volume measurements, Multi-planar Reconstruction, and standard evaluation application and all available post processing functions without the help of the satellite workstation.
	- Raw Data storage with at least 1.5TB Hard disc having image storing capacity of 2,00,000 or more in 512x512 format.
	- Auto-voice capability with custom designed key board and mouse.
	- Archiving options: CD-R, DVD, should be available. 5000 rewritable DVDs should be provided.
	- Additional storage of 25 terabytes to be offered. It should be possible to transfer the images from this storage to main console or workstations
	k) Workstation client server architecture (Please quote Four concurrent licenses for the applications given below)
	2. Two way data transfer between the operator console & the satellite workstation should be automatic and standard.
	3. Post Processing Soft-wares
	i) Perfusion CT for whole brain
	ii) CT Angio, VRT, MIP, MPR, 3-D Shaded Surface display, Image Fusion, Vessel segmentation, luminal view.

	iii)Virtual Endoscopy with facility for virtual dissection and computer aided detection of polyps.
	iv) Advanced complete cardiac package with ECG gated studies (prospective & retroprospective tagging) 1-cornary Artery Imaging, 2-Coronary tree extraction 3-one touch volume rendering of whole heart 4-Calcium Scoring, 5-Calcium & coronary angioreporting 6- Myocardial Viability software, 7-Cardiac functional analysis and advanced Vessel analysis including stenosis assessment, arrhythmia editing and reconstruction and diagnosis of patients with arrhythmia during acquisition must be possible , 8.Dynamic myocardial perfusion should be available For complete LV coverage of 8cm or more Facility for prospective and retrospective ECG gating, facility for automatic selection of rotation speed according to heart beat and step and shoot for low dose acquisition should be available. Temporal resolution of 70msec or less should be quoted as standard.
	v) Automatic bone Removal facility for rib cage and skull.
	vi) Dental CT.
	(vii) Auto Liver segmentation display software in different colours, volumetry and virtual surgical plane identification for a comprehensive analysis and quantification of clinical information.
	viii)Bone mineral densitometry soft ware.
	5. Interactive & Automatic Cine display should be available.
	6. Image Evaluation Tools
	i) Parallel evaluation of multiple ROI in circle, irregular and Polygonal forms,
	ii)Statistical Evaluation for area/ volume, S.D, Mean/Max and Histograms.
	iii) Distance & angle measurement, freely selectable, positioning of co- ordinate system, grid and image annotation.
	PLEASE NOTE THE WORK STATION SHOULD BE MADE BY THE MANUFACTURER OF THE CT SCANNER AND MUST BE CE AND US FDA APPROVED.
	iv) Archiving options: Best archiving options to be provided. Additional Archive Storage server of 25 TB which is scalable should be supplied.
	l) Patient communication system:
	1. An integrated intercom and Patient Instruction System (API) should be provided.
	2. Two closed circuit TV for patient monitoring.
	m) Dry Imager:- 2 nos.
	1. Resolution: 16 bits/ 500 dpi or more with minimum two ports.
	2. Support Multiple Film Sizes: one of which must be 17‖x14‖.
	3. DICOM 3.0 Compatible. –attach conformance statement
	***Laser color printer (Paper)** **-DICOM compliant** **-Resolution-at least 1200x1200dpi** **-more than 20ppm**
	n)Defibrillator **-Biphasic, latest model with auto and manual mode. Minimum 50 manual selection upto 200joules** **-The charging time of higher energy level should be less than 7seconds**

28/07/15

	-Disposable defibrillator pads-10 Nos. with each machine should be provided **-Should have external pacemaker facility.** **General anaesthesia machine with circle absorber, vaporizer for halothane & isoflurane and ventilator to provide**
	o) System Configuration Accessories, spares and consumables:
	- Lead Glass 100 cm x 150 cm of 2 mm Lead equivalence as per the requirement of the equipment. As per AERB recommendations Light weight -Radiation protection apparels including Aprons -5 Nos, Gonadal shields -5Nos, Thyroid shields - 5Nos, Lead goggles -5 nos , Lead gloves -5Nos ,collapsible wheel chair with rubberized swivel wheels Standard patient positioning accessories & restraining devices - 2 in number
	Medical illuminator (LED) with light regulator for viewing at least 4 films of 17"x14"size , 6 in number
	- Online UPS of suitable rating should be supplied for the complete system including Gantry, computer system, with at least 30 minutes back up.
	- Dual Head Pressure Injector with 200 syringes of 200 ml.
	- Software for Remote Diagnostics Service should be provided.
	- System must be PACS, HIS/RIS interface ready without any new hardware or software.
	- A free comprehensive software update guarantee for entire life of scanner must be provided.
	- **Real time CT Fluoroscopy** with at least 6 to 8 frames per second with dedicated 19" or more color LCD monitor. Facility table side controls and foot switch for biopsy to be quoted separately.
	p)Phatoms to be provided for regular QA studies .
	q) Instructions to the vendors/suppliers: All companies must give product data sheets confirming the specifications along with the tender. ***The compliance statement must be filled strictly under the heading given in the tender.*** Each specification corroborated in the compliance statement must give the page number where it is listed in the product data sheet. Incompletely filled information will not be considered.
	Vendors are requested to see the site for installation of the CT.
	As there is continuous development of technology latest model available with the manufacturer shall be offered in the tender.
	r) AERB site approval: Vendors shall be responsible for getting AERB Site Plan approval prior to installation and licensing.
	It is the responsibility of the bidders to visit the consignee site for assessing site requirements and readiness.
	The technical specifications given above are the minimum requirements. Higher specification will also be considered at the time of technical evaluation.
	s)Training: On site clinical training of 4 weeks to be provided. **Training : Of two radiologists Inreputed international centre for 2wks for cardiac & recent advanced applications**
	t)Warranty :60 months from date of satisfactory installation& handing over to the department Even during the warranty period, the desired uptime of 95% of 365 days (24 hrs basis) will be ensured. In case the down time exceed the 5%limit, extension of the warranty period will be twice the excess downtime period **The warranty shall cover all the tunkey work including CT tube,camera,UPS,power injector & all consumables.Comprehensive maintenance contract for next five years including all the accessories,turn keywork, CT tube, air conditioning, camera,power injector & all consumables.**
u)Please attach a complete list of spares which will be provided with the equipment	
COMPUTER FOR REPORT GENERATION 1. **Radiology reporting management software for report generation and record keeping.** 2. **Latest available CPU with 16GB RAM ,2TB hard disk ,19" high resolution monitor& high resolution graphic card : 2 in no** 3. **Laser printer with scanner –Black & white**	

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SITE PREPARATION WORK FOR MULTI SLICE CT SCANNER TO BE INSTALLED IN THE CT DEPARTMENT

CIVIL / ELECTRICAL / PUBLIC HEALTH / AIR CONDITIONING WORK ETC

1. The bidder should inspect the shaded area earmarked for the proposed CT scan and submit the plan for complete installation on a turnkey basis. The layout plan and the detailed drawing has to be approved by the Institute authorities.
2. The tendering firm should give a certificate that the proposed CT scan site has been inspected and is adequate for the installation of the quoted model including the air conditioning system.
3. The tendering firms will provide fire detection system and alarm system and fire fighting in the area to be linked with the main fire detection system of the hospital.
4. All drawing and the list of works along with complete specification for civil, public health, electrical, air conditioning must be spelt out and provided along with the tender.

.5 For transportation of CT machine, vendor will modify the transportation route on their own cost if required.

Civil work

1. Preparation of control room, examination room, patient preparation room, computer/auxiliary devices room should be designed with proper lead protection as per AERB recommendations.

2. Whole area should have complete wall to wall vitrified non-slippery tile flooring and dado upto ceiling height ceiling, aluminum doors with proper lead protection as per AERB recommendations and with hydraulic door closers locking arrangements.

3. The aluminum glazed door of thickness 10 gauge with 20 micron anodizing and with 5.5 mm thick wired glass/12mm thick pre-laminated board for the main entrance doors.

4. Antistatic PVC flooring to be done after final installation of machine.

Electrical work and earthing:

1. The firms shall be required to specify the total load requirements for the entire equipment's the air conditioning units, room lighting and for the accessories if any.
2. The electrical work will including wiring, different lights and main switch fittings. The special roof light will be required particularly in the equipments room which should have long life and should not be affected by frequent on and off.
3. The electrical work shall include the following
   a. Wiring – The wires shall be of copper of different capacity as per the load and should be renowned make like FINOLEX, POLYCAB
   b. Switches light and power points should be of modular type and of make MK/ North west.
   c. General lights- Mirror optical type 1x40w or 2x40w PHILPS / CROMPTON/ KESSELEC SCHREDER / WIPRO make
   d. The under ground cable supplying the electricity load should be of HAVELLS/ECKO and INCAB
   e. MCBs / ACBs/ MCCbs should be MDS/ SIEMENS/ABB
   f. Roof light – LED down lighter of PHILIPS / OSRAM/ WIPRO
   g. Main switchgears, fuse units should be L&T / SIEMENS / GE
   h. Telephone cables should be of FINOLEX & R.R cables
   i. Electrical load of the system to be added as per the tender / brand of the equipment.
   j. Complete earthing as per requirement of the system based on the total electrical load.

Air conditioning

1. Whole area needs to be air conditioned. Use of fresh air system with recycling as required as per the size of the area and circulation efficiency. Ventilation is required in toilet
2. Environment specifications

a. Humidity range 40% to 60% relative humidity in all areas except equipment room which shall be as per requirement of the equipment

b. Temperature ranges 22+ / -2 in all areas except equipment room which shall be as per requirement of the equipment.

c. Details for the ducting diffuser, grills etc. to be supplied by vendor,

d. Air conditioning load: Air conditioning load for the data centre shall be as per design with air cool package units having stand by system of makes VOLTAS/ BLUE STAR/ CARRIER. However, the heat load calculation and maintaining temperature and humidity shall be the responsibility of the bidder.

Furniture

a. Revolving chairs with arm on castors - 4Nos.

b. Non-revolving chairs with arm - 6 No.

c. 16 chairs patient waiting area (metallic).

d. Cup board – 1 Nos.

e. Office Table - 1

g. Drug trolleys 1 numbers for patients preparation area

h. Patient trolleys with rubber foam mattress to be kept in the patient preparation room 12).

i. Any other furniture item as per requirement

Miscellaneous

1. One channel stereo musical system with inter room communicating system connecting the reception counter with other cabins of the complex
2. CCTV system should be provided connection the gantry room with the console room with additional CCTV in the entire CT complex area including installation as per requirement approved by HOD.
3. Thin view box (<1") three – in – one configuration – 2 nos.

GENERATOR:

1. 8 hour back up DG set of adequate capacity shall be installed as a standby along with other site preparation jobs in a separate enclosure. The standby generator should be of adequate capacity in support electrical load of CT including equipment.
2. The agency will remove the material (civil/electrical & air conditioning) from the site and will give credit to the Institute for the same including old air condition.

Total 8 pages.

28/7/17

28/7/17

TECHNICAL SPECIFICATIONS FOR 3.0TESLA MRI SCANNER – (Qty - 1)

Whole Body 3.0 Tesla Magnetic Resonance Imaging System optimized for maximal performance in Whole Body and Vascular examinations with superconducting magnet, high performance gradients and digital Radio Frequency System. The vendor should quote the latest model. Any up gradation / new features launched prior to the installation of the equipment should be part of the supply, even if not quoted at the time of submitting the bid.**The vendor should quote the latest with maximum number of channels available with them. Please mention the year of launch of quoted model.The system should be capable of integrating withany PACS/HIS system.**

The offered model should be USFDA and European CE certified approved. Authentic and legible certificate for the same be annexed.

Sr. No.	Specifications as per tender
1	**MAGNET**
A	3.0T active shielded super conductive magnet should be short and non claustrophobic.
B	It should have at least 70 cm patient bore with flared opening with Multi –transmit /Multi-drive /True form or equivalent
C	Magnet length should be less than 200cm.
D	Best homogenesity possible should be given. Specifichomogenecity inVRMS at 10cm ,20cm ,30cm &40cm DSV and at max FOV achievable with the quoted scanner. Homogeneity of magnet should be less than 3.5 ppm over 45 cm DSV.(Guaranteed homogeneity) Homogeneity should be maintained in large FOV, fat saturation and applications like cardiac, functional MRI, diffusion tensor imaging and spectroscopy. System with the highest homogeneity to be quoted
E	The magnet should be well ventilated and illuminated with built in 2 way intercom for communication with patient.
F	Cryogen vessel to be of Helium only with appropriate super thermal shielding and refrigeration facility for minimum Helium boils off . It should have a built in cryo-cooler such that helium consumption does not exceed 0.05 lit/ hour.
G	There should be a Helium level monitoring equipment in the magnet and facility for appropriate quick shutdown of the magnet in the event of emergency
H	Active shielding/Fringe field- quote values for 5 Gauss and 1 Gauss line
I	External shielding-external interference shield (sufficient to house the magnet, anesthesia and physiological monitors) should be provide
2	**Magnet cooling system**
A	- specify the boil off rate -Devices for helium level monitoring in the magnet should be supplied.
B	High performance, highly stable shim system with global and localized automated shimming for high homogeneity magnetic field for imaging and spectroscopy. (3D shimming for volume imaging and CSI).
C	Auto shim should be available to shim the magnet with patient in position. It should take minimum time to shim the magnet with patient in position (specify the time).

3	**GRADIENT SYSTEM**
A	Actively shielded Gradient system in all x y & z planes.
B	The gradient should be actively shielded with each axis having independently a slew rate of at least 200 T/m/s and peak amplitude of 44mT/m,(higher slew rate and peak amplitude will be preferred). These true slew rates should be available in each axis independently, for overall better duty cycle performance of the gradient.
C	The system should have efficient and adequate Eddy current compensation
D	Effective cooling system for gradient coil and power supply
4	**RF SYSTEM**
A	A fully digital RF system capable of transmitting power of at least 25 kW or more with**(dual)**RF power amplifier. System should be capable of multi transmit with multi amplifier driving/ Multi-drive/true shape for better. Specify transmitter frequency range (10-86 MHz), it **should have latest software as standard.**
B	Optical /digital RF receiver system with /high efficient RF receiver system /or its equivalent located on the magnet inside the shielded scan room . It should also have at least 32 independent RF receiver channels with each having bandwidth of 1 MHz or more along with necessary hardware to support quadrature ICP array/Matrix coils. The highest receiver channels available / mentioned in the product catalogue with the vendor should be quoted.The system should have necessary hardware to support quadrature phased array & flex coils.
C	It should support Parallel acquisition techniques with a factor of 12 or more.
D	Should allow remote selection of coils and / or coil elements
E	SAR limits should be as per FDA guidelines for all protocols, including neuro and abdominal imaging
5	**PATIENT TABLE**
A	The table should be fully motorized with computer controlled table movements in: vertical and horizontal directions. Position accuracy should be +/- 1.0 mm or better. Specify the patient load capacity.
B	A CCTV system with LCD display to observe the patient should be provided: Moving table angiography should be possible
C	There should be a hand held or auto alarm for patients.
D	Emergency manual traction of the patient from the table should be possible.
E	Table Technology –Bolus chasing with the automatic/continuous moving table should be offered and should be available with fluoro triggered MR angiography for manual and fast switchover in less than 1 sec for CE-MRA. Latest table technology available with the vendor should be quoted.
6	**PATIENT MONITERING**
	Patient monitoring devices for ECG ,respiratory ,pulse rate ,oxygen saturation ,at the console etc Remote display of gatting signals on magnet & at console .

7	**PATIENT COMFORT FEATURES**
	Two way patient communication with head phone ,microphone &necessary accessories
	Patient alarm
	Lighting
	Music system (complete)
	MR compatible patient trolley (to transfer patient to the magnet table)
	MR compatible wheel chairs-2no.
	Closed circuit TV & CCD video camera for patient monitoring
	Provide other standard patient comfort devices ,with quoted sytem (please specify)
8	**COMPUTER SYSTEM /IMAGE PROCESSOR/ OPERATOR CONSOLE**
A	The main Host computer should have a 19 inches or more high resolution LCD TFT or LED color monitor with 1024 x 1024 matrix display
B	The system should have image storage capacity of 100 GB for at least 200,000 images in 256x256 matrix.
C	Additional storage of 25 terabytes to be offered. It should be possible to transfer the images from this storage to main console or workstations
D	The reconstruction speed should be at least 10,000 images per sec or more for full FOV 256 matrix.
E	The main console should have facility for music system for patient in the magnet room. The system should have DVD/CD/flash drive archiving facility. Supply 5000 DVDs along with the system. The system should be provided with auto DVD writer. It should be possible to record multiple cases on the DVD
F	Two way intercom system for patient communication.
	Patient monitoring devices for ECG, respiratory rate, pulse rate,O2 saturation at console.
G	MRI System should be enabled and networked to RIS / HIS
9	**MEASUREMENT SYSTEM**
A	Largest Field of View should be at least 45 cm in all three axis. Higher FOV will be preferred
B	The measurement matrix should be from 128x128 to 1024x1024.
C	Minimum 2D slice thickness mm should be equal to or less than 0.5mm
D	Minimum 3D slice thickness mm should be equal to or less than 0.1mm

10	**COIL SYSTEM**
A	The main body coil integrated to the magnet must be Quadrature/CP. In addition to this following coils should be quoted
B	Standard Head coil (15 channel or more)
C.	Head coil (32 channels or more) for EPI/DTI and fMRI applications compatible with fMRI projection device quoted with the system.
D	Neuro-vascular Coil with 20 or more channels or Head/Neck Coil combined, capable of high resolution neuro-vascular imaging or combination of head and neck coli for similar coverage.
E	Spine Array/Matrix Coils for thoracic and lumbar spine imaging with at least 32 channels acquisition per exam
F	Body Array/Matrix coil with at least 45 cm z axis coverage for imaging of abdomen, with at least 32 channel Acquisition for body part angiograms and heart. In case one coil cannot provide this coverage then multiple coils should be offered. (The best available body coil with the vendor must be supplied).
G	Suitable surface Coil for Peripheral Angiography application of at least 32 **Channel with coverage of 80 cm or more.**
H	Dedicated Knee Coils at least 12 Channels or more.
I	Flex Coil large
J	Small flex coil 8 channel or more for pediatric applications and for neonatal head and neck imaging.
K	Cardiac Coil/suitable/coil combination, 32 channels or more for dedicated cardiac work.
L	Suitable coil for carotid plaque imaging should be quoted as standard
M	Total number f coils 10 (ten) excluding the main body coil integrated to the magnet.
N	The coil system should permit coverage of 200 cm.
O	A caddy to be provided for storage of coils.
P	Dedicated Breast coil -8channels or more
Q	Dedicated Shoulder coil
R	Dedicated coil for Inner ear & orbit .
S	Dedicated wrist coil (8 channels or more)
T	Endocavitary coil for prostate & uterus evaluation—(Quantity 10)
	The system should continuously monitor the RF coils used during scanning to detect failure modes. RF coils should not require either set up time or coil tuning; Multi coil connection for up to 2 or more coils simultaneous scanning without patient repositioning i.e. like **TIM4G**/GEM/ **FLEX** stream coil combination should be quoted as standard
	The supplier should quote Coils or their combinations exclusively for 10 applications, the number of coils should be thus mentioned as independent and not be having overlapping applications.
	Computer Control System **-The vendor should supply the latest computer system along with the MR system to handle all the latest applications available on the MR platform.** **- During warranty period any hardware updates that are launched globally should be supplies and installed.**

	Host Computer and array processors - **Latest state of the art computer system with suffient RAM (8GB or more) and computational speed to match the single short Echo Planar Imaging (EPI), interactive angiogram , multiplanar three dimentional (3D) reconstruction , surface rendering and dynamic imaging, Vascular imaging/ angiography, and adequate storage(1TB) for images and other applications**
11	**Application Package**
A	**Data acquisition:**
1.	The system should be capable of 2D and 3D acquisitions in conventional, fast and ultrafast spin echo and gradient echo modes so that real-time online images can be observed if needed. All the sequences that are available with the vendor at the time of delivery should be provided as per their manual.
2.	2D multi-slice imaging should be possible in all planes (axial, sagittal, coronal, oblique and double oblique).
3.	Up to 1024 x 1024 matrix acquisitions preferred for all applications
4.	Half Fourier or other techniques to reduce scan acquisition time while maintaining adequate SNR.
5.	3D volume, multiple contiguous slabs, multiple interleaved and multiple overlapping slabs.
6.	Slice thickness in 2D and partition in 3D to be freely selectable.
7.	Dynamic acquisition (serial imaging) with capability to initiate scan sequences either from the magnet panel or from the console.
8.	Dynamic acquisition: number of repeat scans with delay time either identical time interval or selectable.
9.	Auto slice positioning from the localizer images
10.	Maximum-off center positioning both anterior-posterior and lateral direction and should be selectable.
11.	Gating: physiological signals like ECG, pulse, respiratory
12.	External signal triggering (interface for triggering input pulse from external source). The provision should be available at the console also (for fMRI, EEG, etc)
13.	Simultaneous acquisition, processing and display of image data in 2D multi-slice mode.
14.	Selection of voxels from oblique slices should be possible while doing spectroscopy.
15.	Artifact reduction/ imaging enhancement/ image filtering/ image subtraction/ addition/ multiplication/ division techniques:
16.	Flow: 1st and 2nd order flow artifact compensation
17.	Presentation slabs: a number of relocatable saturation bands to be placed either inside oroutside the region of interest
18.	Graphic prescription
19.	Fat saturation techniques: frequency selective RF pulses to suppress fat signals in the measured image FOV. ROI selective (regional) fat suppression should also be given.
20.	Magnetization transfer saturation: Off resonance RF pulses to suppress signals from stationary tissue in FOV

21.	Phase contrast capability in 2D and 3D mode: Image intensity correction
22.	Breath hold acquisition
23.	EPI mode
24.	DTI with MDDW or equivalent with a minimum of **12 and selectable upto 32 directions encoding.**
25.	Data acquisition in all three standard planes (axial, sagittal and coronal) and oblique and double oblique planes or more oblique planes.
26.	Higher matrix acquisition capability in single shot EPI. Acquisition time, TR, TE and slice thickness should be clearly mentioned and supported by data sheet reference.
27.	The vendor should offer multi coil acquisition in order to optimize throughput increase and increased effective FOV. Individual acquisition elements of every coil should be mentioned.
	MPR
	1 . Multi-planar reconstruction (MPR) in any arbitrary plane including curved planes with freely selectable slice thickness and slice increments
	2. Surface Reconstruction and evaluation on reconstructed images with minimum time.
	3.MIP in displaying in cine mode 2D and 3D mode, targeted /segmented MIP in any orthogonal axis with minimum processing time and capable of displaying in cine mode.
	ADC, PERFUSION,
	1. Evaluation and displaying of diffusion images, ADC map, fMRI in reference of EPI optimized sequence.
	2 Perfusion image evaluation with time intensity graph and other statistical parameters
	3.Evaluation packages for calculating rCBV, rCBF, MTT, perfusion map , corrected CBV calculation , Fusion of perfusion map with Contrast enhanced 3D T1 images etc. Mention the packages /software offered with brochure
	4. Flow quantification and evaluation for vascular (high & low) CSF, bladder outlet and cine display.
	BOLD ANALYSIS.
	1. Evaluation of functional images of brain with appropriate statistical algorithms, colordisplayand overlay on base anatomical images.
	2. Software for evaluation of functional mapping (BOLD EVALUATION) and neuro-metabolite mapping.

	VBM
	1. Voxel-based morphometry for segmentation and quantification
	TRACTOGRAPHY
	1. Post-processing packages for DTI and Tractography, estimation of ADC, FA(Lamda, parallel, perpendicular separately and combined) , fibre tracking , fibre statistics and display of fibre tracts on anatomical images(s).
	Co-Registration .
	1. Superimposition on Neurotractography geometry and tensor diffusion field on both functional BOLD mapping and neurometabolite(CSI) mapping.
	Image statistics.
	1. Measurements of distance , area, volume, angle, mean, SD, image addition , subtraction , multiplication , division , interpolation,
	2. Image filtering and image fusion software.
	3. Software for co-registering MRI/fMRI/ MRS/Metabolite mapping with images from CT,PET, and SPECT.
	4. Evaluation features like zoom, rotation, scroll roaming, image synthesis, multi-point T1 and T2 calculation (more than 8) window stretching , text dialogues graphics, sorting, searching , archiving ,recalling etc.
	SPECTROSCOPY
	1. Full post –processing for single –voxel MRS,CSI(multi-voxel MRS) , metabolite mapping with color coding (metabolic images).
	2. Post processing should include FFT, base line correction , curve optimization , automatic phase correction , metabolite imaging, spectral mapping, magnetic resonance spectroscopic imaging(molecular imaging) with bnaming and peak integral values for all in vivo metabolites.
	FUNCTIONAL MRI PROCESSING AND POST –PROCESSING.
	1. Functional imaging with package for BOLD imaging and processing package(capable of real-time processing and display of color overlay (in real time) using 32-channel Head coil being supplied with system.
	2 Complete fMRI solution including audio-visual projection (3D capable) system , with headphones with grey good noise suppression (more than 30 db) (Preferable to have LED/LCD monitor for projection)

	3	Binocular eye tracker cameras, integrated with the visual system(preferable to have separate wearable eye-tracker cameras)
	4	The audio-video projection system should have the capability to project 3D images /movies to the subject, and should be compatible with 32-channel head coil, and should all attachments that may be required for complete integration.
	5	The system should be integrated with stimulus presentation /paradigm generator software, along with permanent license (like Superlab, eprime, Presentation, etc), which is capable of presenting audio-visual picture , audio, video (multiple formats)
	6	The paradigm generator should be synchronized with the scanner(for starting along with measurements)
	7	Integration (and Provision near the console) for external trigger (of the sequence) for synchronizing fMRI acquisition with paradigm.
	8	Provision for serial ports and DB15 ports in the penetration panel for routing SVGA/EEG connections(one each for)
	9	FMRI console should have all functions to develop and integrate the paradigm, to deliver the paradigm and also, to monitor the task being presented. The Volume control option should be available with the operator (at a convenient place at the console)
	10	Post –processing workstation /server with post-processing software and hardware associated. with licenses for processing the BOLD data(with required licensed operating platform)
	11	The system should have integrated MR compatible binocular eye –tracker(binocular), along with eye –tracking software at the console(on separate PC/Laptop)
	12	The entire fMRI hardware package should bVivo, M/s. Philips, Nordic Neurolab, Noraway, Resonance Technology Inc. USA, or better).
	13	Brain voyager post –processing software (along with permanent license)
B	**Imaging pulse sequences:**	
1.	All standard and special pulse sequences available at the time of quote/delivery should be offered and quoted in the bid. Fat suppression for high quality images both inversion recovery and Dixon method/ IDEAL/ 3D Dual Echo/ m-Dixen. The system should acquire motion artifact free images in T2 studies of the brain in restless patients. Dynamic study for pre and post contrast scans and time intensity studies.	
2.	The system should be capable of selecting TR and TEs as per requirement in majority of the pulse sequences.	
3.	Spin echo (SE): multi-slice single echo, multi-slice multi-echo (8 echo or more), SE with symmetrical and asymmetrical echo intervals and fast spin echo. MT-SE imaging sequence.	
4.	Inversion recovery (IR): including short T1 modified IRSE, FLAIR, DIR (Double inversion recovery).	
5.	Gradient echo (GE): with transverse gradient/ RF spoiling and transverse gradient rephasing, e.g., GRASE or equivalent etc. 3D gradient echo with	

	shortest TR and TE, free choice of angle selection, while maintaining SNR
6.	Fast sequences
7.	Fast spin echo and GE sequences in 2D and 3D mode with T1,T2 and PD contrast capable of acquiring maximum number of slices with a given TR at minimum TE, echo train should be at least 256 or more in fast spin echo mode
8.	Half Fourier acquisition capabilities should be available with/without diffusion gradients and in combination with fast spin echo
9.	Fast inversion recovery with spin echo.
10.	Fast gradientspin echo IR multi-slice multi-echo mode with maximum ETL. Sequences should incorporate RF focusing to acquire ultra-fast gradient spin echo
11.	Fast gradient echo sequences should incorporate RF spoiling and other technique to acquire images in ultra-fast 2D and 3D modes, gradient echo with ETL of 255 or more.
12.	Fat and water suppressed imaging sequences
13.	EPI optimized sequences (with and without fat suppression) with ETL of 255 or more.
14.	For T1, T2, PD imaging, perfusion, regular diffusion values (at least 5b, 3 directions) EPI-FLAIR, EPI-IR, EPI-FLAIR diffusion tensor, EPI-MT-FLAIR, tensor diffusion (at least 16 b values in minimum 32 directions) and diffusion studies. Suitable artifact/ fat suppression techniques to be incorporated in the sequence to have optimum image quality.
15.	There should be capability of calculating ADC map(isotropic and anisotropy from the regular diffusion and tensor data)
C	**Special application packages:** The vendor must provide their specialized and optimized imaging sequences with postprocessing packages for (i) neuro, (ii) body, (iii) oncology, (iv) cardiac, (v)Angio, (vi) Ortho, (vii) pediatric and other applications. For example, this includes packages like optional/ premium/ advanced/ application suite/ etc. **Please give details of licences for acquisition post-processing and for special packages quoted for the following applications**
a)	**Neuro Applications**
	Functional Imaging with package for BOLD Imaging and spectroscopic imaging and processing package with paradigm generator (non-goggle based) with large high resolution monitor that can be moved to any part of the exam room. It should be fully integrated with MR console for driving the paradigms. Should have console computer , E prime, microphone, fiber optic cables etc.
i.	Functional Imaging with package for BOLD Imaging and spectroscopic imaging and processing package capable of real-time processing and display

Sanctd 8/2/17

	of color overlay (in real time) using 32-channel head coil being supplied with the system.
ii.	Complete fMRI solution including audio-visual projection system
iii.	The audio-video projection system should be compatible with offered head coil, and should include all attachments that may be required for complete integration
iv.	The system should be integrated with stimulus presentation/ paradigm generator along with licensed software (like superlab, sprime, presentation, etc.) which is capable of presenting audio-visual, audio, video (multiple formats), etc
v.	The paradigm presentation should be synchronize with the scanner (for starting and ending along with measurements)
vi.	Integration and provision near the console for external trigger (of the sequence) for synchronizing fMRI acquisition with paradigm.
vii.	Provision of serial ports and in the penetration panel for routing SVGA/EEG connections (one each for customer use) fMRI console should have all relevant functions to develop and integrate the paradigm to deliver the paradigm and also to monitor the task being presented. The volume control option should also be available with the operator (at a convenient place at the console).
viii.	Post-processing work station / server with post-processing software and hardware associated, with licenses for processing the BOLD data (with required licensed operating platform required like MATLAB, IDL, etc.)
ix.	The system should have the complete hardware & software for visual simulation with facility for generating all paradigms.
2	Arterial spin labelling- **3D/2D**
3	Perfusion imaging of brain with software for rBV, CBV etc analysis.
4	Susceptibility weighted imaging with phase information SWI/SWIp/ SWAN.
5	Multi Direction DTI with minimum of 32 directions (Complete package including DTI quantification and tractography software). **Prospective motion correction enabled software should be part of standard equipment like 3D PROMO/3D PACE/PMC.** Spinal tractography should also be possible.
6	T2 Relaxometry and volumetric analysis for Hippocampus.
7	3D-T2 weighted Turbo Spin for volumetric acquisition reconstructed in any plane e.g. for lumbar spine and for nerve root analysis
8	High resolution imaging for inner earfor visualization of the structures fine structures like cranial nerves . (Appropriate sequences like CISS etc other equivalent) Please specify sequences

	3D sequences forinternal auditory canal imaging.
	Dynamic imaging of pituitary using appropriate sequences
9	The system should have facility for flow quantification of CSF aqueduct, spinal canal, vessel flow. Both retrospective and prospective gating should be possible.
10	Whole spine imaging with fusion software.Whole spine T1,T2 ,IR sequence Whole neuroexamination with automaticplanning, scanning & post processing with single localizer positioning without changing the coils /repositioning .
11	Real time Brain Wave, Pre Acquisition / post processing or Inline BOLD or BOLD Specialist.
12	Sequences such as Double Inversion recovery for "Plaque Imaging' in Carotids to be provided.
	MR ventriculography, cisternography, myelography Diffusion /DTI Sequence package for diffuse including DTI (tractography) study in organs like brain ,kidney ,muscle ,heart ,spine ,breast Prostate etc .There should be capability of calculating ADC map (isotropic and anisotropic from the regular diffuse and tensor data.MR diffuse tensor imaging package with tractography.
b)	**Cardiac applications:**
1.	Complete Advanced Cardiac Applications: Full comprehensive cardiac sequences which includes MR cardiology package for evaluation of heart in long & short axis with black blood cardiac imaging
	Package for coronary artery imaging including sequences for motion compensation –prospective &retroprosopective gating etc
	EPI based sequences for stress perfusion MRI including ability to adjust the cardiac phases required increasing HR
	ECG gating, Morphology/wall motion; Cine perfusion imaging; Myocardial viability imaging; Arrhythmia rejection techniques, Advanced Cardiac Ventricular Measurement Analysis; Cine Cardiac Tagging Techniques; Coronary artery techniques; real time interactive imaging, 2D/3D fast field echo/balanced/steady state techniques. Myocardial tagging, STIR for cardiac use, stress perfusion, CARDIAC MRS , 3D acquisition of whole heart in one breath hold.2D and 3D sequences enabled with delayed enhancement .3D sequence of cine (bright blood & dark blood options).Rapid acquisition of heart using acceleration techniques.3D whole heart sequence (with & without contrast for coronary imaging).Ability to acquire

	multiple arterial and
	venous phases on CEMRA .3D whole heart sequence (with &without contrast for coronary imaging)
	Quantitative flow analysis soft ware .4D TRAK /TRICK-XV/TWIST /Equivalent (with maximum FOV). Provision for timing /stopwatch (MR compatible) for timing drug infusion
2.	Coronary artery techniques, real time interactive imaging, 2D/3D fast field echo/balanced/steady state techniques and evaluation package on workstation.
3.	T1, T2, **T2* imaging.**
c)	**Musculoskeletal:**
1	High resolution imaging for cartilage and musculoskeletal imaging. Parametric MAP beavailable. dGEMERIC or equivalent, radial imaging for menisci and labrum.
2	Whole body screening imaging studies for metastasis should be possible upto 200 cm without repositioning of the patient.
3	The system should have software package for evaluation of bone marrow.
4.	Metal artifact reduction sequence – MAVRIC/MARS / WARP
d)	**Hepatobiliary and abdominal system.**
1	High resolution Abdominal and Liver imaging in breath hold and free breathing modes with respiratory triggered volume acquisitions with navigation and liver fat quantification software, and spectroscopy.
2	The system should have basic and advanced MRCP packages including free breathing and 3D techniques.Pancreatography
3	Liver FAT quantification software should be quoted as standard.
4	Please quote software for MR Elastography as Standard.
5	Flow quantification in vessels & CSF, hepatobiliary system .
6	Fly through faciflity with flow analysis including display of various velocity values

7	Optimized breath hold sequences for abdominal studies including angiogram
8	Pulmonary 2D/3D MRA sequence ,including single breath hold sequence
9	Single sequence for to acquire four different contrast (in phase ,out of phase water only ,fat only)The same technique should be used in other sequences ,for dynamic angiography /T1 quantities analyses
10	Radial /Spiral pulse sequences for ultrafast imaging
11	Suitable artifact /fat suppression technique to be incorporated in all sequences to have optimum image quality .
12	A sequence for differentiation of fluid &cartilage in ortho applications (sequence like DESS or equivalent)
13	Susceptibility artifact correction technique to be incorporated in all sequences to have optimum image quality
	SWI
1	Sequence for susceptibility imaging
2	Sequence for prostate & uterine imaging
15	Sequence for imaging of breast (including sagittal ,bilateral breast imaging in a single acquisition)
e)	**MOTION CORRECTION**
1	Sequence for in-line motion correction for uncooperative patients /children(with soft ware & acquisition sequence like
2	Sequence with ultra short TE
3	Sequence for nullifying CSF pulsations artifact
4	Sequences enabling prospective motion correction in quick time & real time during fMRI
5	Sequence employing arterial spine labeling (ASL)technique
6	Whole body imaging (using body coils & surface coils)
7	Whole body diffuse weighted imaging (using body coils & surface coils)
8	Automated fusion and composing for the above two (without any artifacts)

9	Volume acquisitionfor neuro applications.
f)	**Vascular Imaging**
1	MR angio Imaging Should have 2D/3D TOF, 2D/3D Phase contrast (with and without gating and magnetization transfer saturation), black blood angiography for cerebral, pulmonary, abdominal and peripheral vessels and TONE, CEMRA, Facilities for high temporal and high resolution 4D angio imaging for time resolved vascular imaging with imaging frame of 40 frames/sec or more.For peripheral moving table angiography should be offered covering hip to limbs to be examined in one go with high resolution & high SNR.
2	Bolus chasing with automatic and manual triggering from fluoroscopy mode to 3D position mode with moving table facility for whole body application. Specify table movement. Inline subtraction should be available.
3	"Non contrast enhanced" peripheral angiography for arterial flow with Native/ Trance/inhance sequences.
4	Time resolved angiography with contrast kinetics like 4D TRACK/TWIST/ **TRICKS/TRACKS**
5	Fast acquisition and reconstruction approach like KT Blast/mSense&GRAPPA/ ARC & ASSET for phase contrast velocity mapping
6	Perfusion study in organ systems like kidney, brain, heart etc. quantification of rCBF/ rCBV, MTT, etc, with color maps.
7	Bolus tracking soft ware package
8	Sequence for breath hold angiography withcontrast enhancement
9	Sequence for time resolved angiography withcontrast kinetics
10	ECG triggered non contrast angiography
11	Contrast bolus tracking (including single shot whole body MRA,interactive & automatic tracking etc
g)	**Diffusion Weighted Imaging** with at least b value of 10000 or more.
1	Whole body diffusion weighted imaging with background suppression.
	SPECIAL APPLICATION PACKAGES
	The Vendor must provide their specialized and optimized imaging sequences with post processing packages for
1	a) Neuro (Smart exam / ready brain / smart brain)

	b) Body
	c) Oncology
	d) Cardiac(detailed in (j)),
	e) Angio (including DSA approach , capturing arterial, capillary and venous phases in a single acquisition with a single bolus),
	f) Ortho and MSK,
	g) Liver(including 3D T1 Fatsat for dynamic liver imaging)
	h) Pediatric
	i) Breast
	j) Prostate Smart exam /Smart Brain/Ready Suite/equivalent technique should be quoted in all available imaging packages. Please list other applications available with the Vendor, which,
h)	**Spectroscopy:**
1	The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, Multislice& Multi-angle 2D, 3D Spectroscopy and Chemical Shift imaging in 2D / 3D. The complete processing / Post processing software including color metabolite maps should be available on main console and on all clients currently. Complete prostate, breast, liver spectroscopy hardware (eg VAPOR,CHESS ECT) with all post processing software.If separate coil are needed for carrying out MRS ,it should be provided . Sequence for phosphorussingle voxel and multi voxel spectroscopy should be provided ,with all post processing soft ware. RF sequences for cardiac ,prostate ,breast ,liver musculoskeletal & brain (if there is any specilaised/ optimized sequence available ,the same should be offered)with all post processing soft ware .
2	Water and lipid suppression in automated sequences
i)	Productivity improvement Techniques with availability of "Previous Scans" such as Smart Exam/ DOT engine for Brain, Ortho, Spine etc. to be provided as standard. Integrated exam planning should be possible. All filming, viewing and export options should be possible.
12	**WORK STATION**
	Multimodality Client server Architecture-server with Four concurrent clients capable of rendering **20000** images at peak performance. Workstation hardware should be industry standards and should be the latest with the vendors, as per their globally launched product catalogue. Please quote separate licenses concurrently available for all Four clients for all the application quoted.

	A reputed Anti- Virus Solution as well as for all clients, workstations should be in place. The vendor should provide antivirus updated for five years and make sure of the updated antivirus every week (using automatic update with internet facility by the vendor).
A	Both workstations should work concurrently with multimodality client server architecture-server.
i)	Basic and advance post processing software including MIP, MPR, surface reconstruction and volume rendering technique, image fusion, 3D evaluation in all Four clients concurrently.
ii)	Advanced post-processing offered applications including FMRI, perfusion quantification, advanced diffusion and DTI on all 4 clients concurrently.
iii)	Advanced cardiac evaluation(EF, Calculation, Wall motions, analysis) including perfusion analysis, processing of 2D/3D CSI data, with color metabolite mapping, quantification of CSF flow data, vascular analysis package **on four clients** concurrently. The clients should display cardiac cine images in movie mode with rapid avi creation.
iv)	Image Fusion software : Image filtering and image fusion software for co-registering MRI/fMRI. Calculation of Diffusion of Diffusion/Perfusion Mismatch. Overlay of perfusion and diffusion maps on anatomic maps and DTI Software for fusion of MRI and DSA. Advanced spine application package for nerve root analysis. Whole Body image fusion (composing)
v)	Each Client to have at least 19 inch LCD TFT 2MB pixel color monitor, with hard disk of at least 20TB for at least 100,000 image storage in 256 matrix, and 40 GB RAM capacity. Total 4 client hardware and software to be provided.
vi)	Each of the client should enable printing in laser film camera and color printers
vii)	The PACS should be provided by the vendor for incorporating 4 individual viewing station within the department.
viii)	Archiving options: Best archiving options to be provided. Additional Archive Storage server of 20 TB which is scalable should be supplied.
	SAFETY FEATURES
	The System should have following safety features
A	The magnet system should include an Emergency Ramp Down unit (ERDU) for fast reduction of the magnetic field with Ramp Down time below 3 minutes.
B	The magnet should have quench bands that contain the fringe fields to a specified value in the event of a magnet quench
C	Real time SAR calculation should be performed by software to ensure that RF power levels comply with regulatory guidelines and are displayed on each image
D	The system shall have manual override of the motor drive for quick removal of the patients from the magnet bore
E	Temperature sensor (built in) for magnet refrigeration efficiency must be provided
13	**DOCUMENTATION**
A	One dry chemistry camera with resolution of 500 dpi or more. It should be digital DICOM 3.0 compliant

	i. The camera must be able to process up to 100 films/hour (min.) depending on the size ii. The system must deliver its first film within 80 seconds from request iii. The system must have contrast resolution of 16 bits/pixel or more iv. The system must have at least three online film sizes, and should be capable to print on any of the 8x10,10x12,11x14,14x14, 14x17 sizes. v. The system must not involve any wet process and must give a dry film in single stage (without any users intervention) functionally vi. Start up time should be less than 10 minutes vii. Easy day light loading viii. The system should be freely configurable by the user, to use any of the above mentioned size
B	The camera must be DICOM compatible. (Attach conformance statement.) Film sorting system. (reported and unreported)
14	**UPS**
A	The UPS system should be provided for complete MRI unit with Chiller and emergency lights and for all accessories mentioned in the tender documents with at least 30 minute back up, preferably 150 kVA or more (specify kVA). Genset of adequate wattage to support the ACs and chiller to be provide. An emergency door or hatch should be provided in RF cabin.
15	**SUITABLE RF ENCLOSURE**
A	RF Cabin: The system should be supplied with the imported RF cabin with RF room shielding, RF Door screen, and interiors for the same should be carried out suitably.
16	**ACCESSORIES**
A	Dual head MRI compatible pressure injector with i. Non- Ferrous, automatic syringe size detection ii. It should be capable of performing single dual phase contrast injections, provides saline flush delivery and allows timed contrast delivery. iii. It should be possible to observe progress of injection and view injection results.
B	Water Chiller for Cold Head I Gradients
C	Patient comfort accessories i.e. patient call button, two way communication, music system, head phones, non –magnetic I/V stand, restraint strap, comfort pads, knee support and positioning accessories to be supplied. MR Compatible pulse oximeter should be quoted as standard.
D	Two non-ferromagnetic patient transfer trolleys and two wheel chairs of international make should be provided
E	Coil storage cart/carts capable of storing all the coils offered with the system should be provided
F	MR compatible defibrillator and Anesthesia Machine. **Specification for MRI compatible Anaesthesia machine** 1.Power backup (batter) for anaesthesia ventilator and monitor more than /equal to 45 minutes 2. Incorporated with electrically controlled, electrically driven ventilator with fallowing features. a. Operating modes-Manual/spontaneous, volume controlled, pressure controlled, pressure support, synchronized volume controlled ventilation. b. Breathing frequency 4-60bpm. c. Max minute volume 25L/min. d. PEEP 0-2- cmH2o e. I:E ration- 4:1 to 1:4 f.Tidal Volume – 20 to 1400 ml in volume control. g. Trigger – 2 to 15 lit/min.

	3. Integrated safety feature like oxygen ratio controller and alarm for oxygen failure. 4. Anaesthethic agent vaporizer – 2 position dragger mount , one for Halothane and one for Isoflurane. 5.Gas supply from supplementary with pin index system and MR compatible cylinders with traded connectors. Specification for MRI compatible Anaesthesia monitor. 1. Validated for use in MRI scanners up to 3T outside the magnetic field strength of 300 Gauss. 2. Active remote screen for viewing and controlling the monitor outside the MRI room. 3. Intuitive usability and user automatically when connected to main power. 4. Built in back up batteries charged automatically when connected to main power 5. Improved safety with measurements and alarms of magnetic field strength. Parameters. 1. Hemodynamic options developed specifically for the MRI environment to measure Three –leadeECg , Spo2, NIBP. 2. Airway gas measurements with aneathetic agents and patient spirometry available with compact airway options. Accessories 1. Specifically designed ECG and Spo2 accessories for use in MRI environment. 2. Standard accessories to be used in NIBP, IBP and airway gas monitoring 3. Cart for easy positioning and mobility between care areas. 4. Ambu bag for neonate and child for 2-4 years,. 5. Peadiatric laryngoscope with blade. 6. One portable suction machine.
F	Two hand held metal detector should also be supplied
G	Two Closed circuit CCTV camera at the head side of the patient with viewing panel at the console MR compatible (minimum 2000 Gauss line) cardiac & physiological monitors (ECG ,NIBP,SPO2) for neonates /infants & adults (with all accessories for five years)(Med Rad /In vivo /better models)
	MR compatible anaesthesia machine (for peadiatric& adult use)with dual vaporize (for isoflurene ,halothane) and other accessories (minimum 1000 Gauss line)(phelone /leon better models .
	Provision for external trigger (of sequences) near the console
	Provision for serial ports & DB 15 ports in the penetration panel for routing SVGA/EEG connections(one each for)
	Two quantity :Non magnetic IV stand
	Two quantity :Digital patient weighing Scale (the range of 0-200kg)

MR compatible storage carts & wall mounted cabinets
Coil cabinets to be provided
Network cable & other required materials for complete installation to be provided by the supplier
ANTI VIRUS s/w and Web updates
All the server & work stations in the net work (MRI console & additional work stations ,PACS work stations (fMRI work station etc) that is supplied by the vendor should be provided with antivirus soft ware (periodically updated)for 5 years
The vendors should provide antivirus five years & make sure of the updated antivirus every wk(using automatic update with internet facility by the vendor)
Vendor should ensure that all the above modalities include necessary connections ,image & work list send /receive ,image data storage, scheduling ,patient registration & synchronization functions as per DICOM standards for smooth & effective integration with RIS/PACS.
Radiology reporting software with e record keeping facility with updated antivirus .
Training: On site clinical training of 4 weeks to be provided. **Training : Of two radiologists In reputed international centre for 2wks for cardiac, fMRI & recent advanced applications**
OTHER ACCESSORIES
1. Ten revolving chairs (Godrej make) with ergonomic support
2. Table for the MRI console, MRI additional console/ workstations
3. Necessary desk, chairs& rack for the PACS server & workstation to be provided by the supplier
4. All the necessary interconnecting interfaces , cables, modules and other hardware and software to fully integrate the system for full operational status
5. Uninterrupted power supply (UPS) with sufficient capacity (appropriate rating as required with minimum of 200KVA or more UPS) for 30minutes back up of the full load MR system and its accessories during patient MR imaging
6. PACS system should be connected to the UPS (if a separate UPS is required for this purpose , this should be provided)
7. Two (quantity) MR compatible oxygen cylinders (for the anaesthesia system)

	8. Good quality air curtain at MRI entrance (for patient) to filter the dust and prevent the leakage
	9. Cupboards for patients to keep metallic belongings , watch, wallet, purse etc.
	OPTIONAL SEQUENCES PACKAGES
	Any other special sequence that are available as a product (other than those mentioned in this section)should be offered as an option
	If any optimized package is not included in the main bid , but available with the vendor ,the same application packages should be quoted as Optional. Please list all available packages with the vendor .
	Please list of all applications packages that are available with the vendor, which are optional /premium/advanced/application suite/etc. If these are not listed in the tender, please quote the cost of each package separately (two –bid system)
	Any advanced organ specific imaging with automatic planning , scanning and post –processing application should be quoted
	Rapid acquisition of heart using acceleration techniques.
17	**Warranty and CMC:**
ii)	Warranty: 60 months from date of satisfactory installation & handing over to the department. Even during the warranty period, the desired uptime of 95% of 365 days (24 hrs basis) will be ensured. In case the down time exceed the 5%limit, extension of the warranty period will be twice the excess downtime period
	Warranty shall cover all the turnkey work including 3T magnet ,chiller ,helium and cold head (repair and /or replacement) + labour + spares for the complete system which includes all the accessories supplied such as camera, UPS, Generator, AC etc with 24 hrs manpower for operations (including all consumables like batteries for UPS, etc)
iii)	Note any Liquid Helium due to quenching or due to any other causes during the warranty period shall be borne by the firm.
L	**POST GAURANTEE ANNUAL COMPREHENSIVE MAINTENANCE CONTRACT (CMC)**
i)	The post -warranty (after 5 CMC should be comprehensive and should include magnet, chiller ,helium and cold head (repair and /or replacement) + labour + spares for the complete system which includes all the accessories supplied such as camera, UPS, Generator, AC etc with 24 hrs manpower for operations (including all consumables like batteries for UPS, etc) and maintenance for another 5 years .the vendor should provide the cost of manpower separately .the CMC should be quoted in Indian rupees. The price of post warranty 5 years shall be taken for price comparison.
ii)	The desired up-time during post-warranty CMC is 95% of 365 days (24 hr basis) along with the penalty clause that in case exceeds the 5 % limit, extension of the postwarranty CMC period by the twice the excess down-time period.
M	**MISCELLANEOUS**
	The model with the best and latest technical features available with vendor should be quoted in tender response with original printed data vendor

	sheets the system should incorporate the feature as per the 2016 RSNA standard/declaration.
	All product catalogues in original
	When the vendor data sheet disagree with the bid response, clarification should accompany in the form of letter/certificates from the principal in original.
	List of all installation of the system in the country.
	The compliance statement must be filled strictly under headings given in the tender. Each specification corroborated in the compliance statement must give the page number where it is listed in the original technical data sheets along soft copy.
	Patient queue management system with overhead display and announcement system. **Fire management with safety alarm of whole department.**

SITE PREPARATION WORK ON TURN KEY BASIS FOR 3.0T MRI

The system should be satisfactorily installed & handed over in working condition,with all necessary electrical,AC & civil work undertaken

By the vendor in consultation with user department.Some re –arrangement of the exiting place including relocation of staff place may have to be carried out .

CIVIL/ELECTRICAL/PUBLIC HEALTH/AIR CONDITIONING WORK ETC.

1. The bidder should inspect the area and submit the plan for complete installation on a turnkey basis. The lay out plan and detailed drawing has to be approved by the Institute authorities. The scope of work involved including complete rework of civil, electrical and air conditioning including fire fighting. Any existing unserviceable diagnostic equipments may be relocated / taken away as per the departmental considerations. It will be the responsibility of the tendering firm to ensure that the proposed MRI system site has been inspected and is adequate for the installation of the quoted model including the air conditioning system.
2. The tendering firms will provide fire detection system and alarm & in rooms (inMRI section) and where there is fire alarm. Fire fighting in the MRI system to be linked with the main fire detection system of the hospital as approved by the concerned sectional incharge.
3. In addition to this the supplier has to provide additional facilities in the proposed MRI i.e. a MRI toilet, a counter, waiting hall and a patient preparation room, evaluation room, store for spares,if space permits All drawing and the list of works along with complete specification for civil, public health, electrical, air conditioning must be spelt out and provided along with the tender and needs pre-approval.
4. All the necessary interconnecting interfaces ,cables ,modules and other hard ware & software to fully integrate the system for full operational status.
5. Installation & integration of the uninterrupted power supply.
6. Turnkey items ,UPS ,Generator & other local items have to be quoted in Indian rupees only.
7. Water/Air chiller should be of Good quality with performance.
8. For transportation of MRI machine, vendor will modify the transportation route on their own cost if required.

Furniture:

a) Reception counters with granite.

b) Revolving chairs in the control room and viewing area –4 Nos.

c) 12 chairs patient waiting area – Three in one (metallic).

d) Dark room counter/film processing station.

e) Adequate number of cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement.

f) 1 office table & 4 office chairs (non-revolving).

g) Drug trolleys 1 numbers for patient preparation area.

h) MRI compatible patient trolleys with rubber foam mattress to be kept in the patient preparation room.

i) Any other furniture item as per requirement.

GENERATOR:

1. 24 hour back up DG set of adequate capacity shall be installed as a standby along with other site preparation jobs in a separate enclosure. The standby generator should be of adequate capacity in support electrical load of MRI including equipment and AC plant. .
2. The agency will remove the material (civil/electrical & air conditioning) fromthe site and will give credit to the Institute for the same including old air condition and generator.