TECHNICAL SPECIFICATIONS FOR 1.5 TESLA MRI SYSTEM

The manufacturer/bidder must quote the latest 1.5 Tesla MR System or better as per the specifications below.
The offered model should be the latest model in that segment.
The offered model should be USFDA/ European CE with notified body number or BIS approved (authentic and legible certificate for the same to be submitted).
Also, the vendor will guarantee that the system supplied is not refurbished/older machine and the MR system quoted is the latest best available model in the segment (1.5T MR scanner with 70 cm or more bore) quoted, at the time of delivery and should submit an undertaking in this regard.

S. No	SPECIFICATIONS
1.	**MAGNET & GANTRY**
a)	Magnet should be Normal bore magnet
b)	Magnet Strength should be 1.5 T
c)	Larmor Frequency of the magnet should be >=61 MHz
d)	Bore diameter at isocenter (cm) should be 70 cm
e)	Maximum bore length including flared ends with cover (cm) (to provide maximum comfort and no claustrophobia) should be less than 200cm
f)	Homogeneity of magnet at 45 cm (± 5 cm) DSV/DEV should be equal to or better than 2ppm
g)	Cryogen vessel to be of Helium only
h)	It should have appropriate thermal shielding and refrigeration facility for Zero Helium boil-off.
i)	Helium refill time should not be less than 2 years
j)	The magnet should be well ventilated and illuminated
k)	The front panel of the magnet should have facility for table position and other physiological parameter should be available on gantry or console
2.	**SHIM SYSTEM**
a)	High performance, highly stable shim system with global and localized automated shimming for high homogeneity magnetic field for complete imaging and spectroscopy
b)	Type of shimming should be both active and passive
c)	Auto shim (global and voxel shim) should take minimum time to shim the magnetic field with patient in position. Specify the time for best shim values
d)	Patient specific auto shimmimg facility must be present
3.	**GRADIENT SYSTEM**
a)	The gradient should be actively shielded
b)	Peak Amplitude with each axis independently (mT/m) should be ≥ 33
c)	Standard slew rate, with each axis independently (T/m/sec) should be ≥ 120
d)	Peak amplitude and max slew rate should be achievable independently
e)	The system should have efficient and adequate Eddy current compensation
f)	It should have Effective cooling system for gradient coil and power supply
g)	It should have 100% duty cycle
4.	**RF SYSTEM**
a)	A fully digital RF system with amplifier output of at least 15Kw
b)	It should also have at least 32 independent RF receiver channels "acquisition" with each having a bandwidth of 1 MHz or more along with necessary hardware to support quadrature array / Matrix coils.
c)	Should allow remote selection of coils and / or coil elements

d)	RF system's minimum number of elements that can be connected should be 32/ channel independent
e)	It should support Parallel acquisition techniques with a factor of at least 4 in 2D
f)	Details of RF safety protocols must be specified
5.	**PATIENT TABLE AND ERGONOMICS**
a)	The table should be fully motorized with vertical and horizontal movements that can be controlled from the gantry and the scanning console
b)	It should be able to take a minimum load of 150 kg and scan a length of at least 180 cm
c)	One-time patient positioning should be possible without the need to reposition the patient for scanning different body parts
d)	Continuous table movement during scanning should be possible
e)	Feet first imaging studies should be possible
f)	Facility for manual traction in case of emergency should be there
g)	The table should have patient hand-held alarm system
h)	A colour CCTV should be provided to ensure monitoring of the patient.
i)	A display for the physiological parameters of patient on the magnet facade should be there and also on the control console
j)	ECG triggering, peripheral triggering and respiratory triggering gating to be provided with wired, Bluetooth or wireless sensors for the same. Two-way communication with headphone, microphone and music system should be provided
k)	Adequate adjustable gantry lighting should be available
l)	An integrated infusion stand attached to the table or magnet facade or an MR Compatible Infusion Stand to be provided
m)	One numbers each of MR compatible patient trolley and wheelchair should be provided
6.	**MEASUREMENT SYSTEM:**
a)	The largest Field of View should be at least 45 cm in all three axes.
b)	The measurement matrix should be from 128 x 128 to at least 1024 x 1024. The highest available matrix is to be quoted.
c)	The Minimum 2-D slice thickness should be equal to or less than 0.5 mm with at least 256-slices capability in 2-D mode
d)	The minimum 3-D slice thickness should be equal to or less than 0.1 mm with at least 512-slices capability in 3D mode
7.	**ACOUSTIC NOISE:**
a)	Maximum sound pressure level (SPL) at peak gradient amplitude should be <120
b)	Acoustic noise reduction with latest technology should be <85
c)	Hardware-based and software-based technologies used to reduce acoustic noise should be present
8.	**COIL SYSTEM:**
a)	The main body coil integrated to the magnet must be Quadrature/Circular Polarized coil.
b)	Detachable coils should be light-weight. Weight of individual coils to be specified
c)	The mode of coil attachment to the scanner system may be either wireless or wired — same should be specified
d)	In case of wired connection, at least three cable connectors to be provided on the patient table or the magnet
e)	A/D converter to be provided within the gantry room, preferable with an optic-fibre cable
f)	Number of receiver channels/elements in the individual coils to be specified
g)	A cabinet should be provided for Storage of all coils

h)	The coil systems in combination should permit the coverage of at least 90 cm
i)	The system should monitor the RF coils used during scanning continuously to detect failure modes
j)	There should be a standard multi coil connection for 2 or more coils for simultaneous scanning without patient repositioning
k)	It should allow for remote selection of coils and/or coil elements
l)	Auto coil detect and auto coil select should be available to help reduce workflow time
m)	All coils and sequences should be compatible with parallel acquisition technique allowing maximum parallel acquisition acceleration factor by Four or more (varies by coil)
9.	**COILS TO BE PROVIDED**
a)	System should be offered with the coils as below:
	1) Head Coil with 16 channel or more
	2) Head Neck/Neuro Vascular coil with 16 channels or more Head and Neck coil should have a detachable face - a detachable front section is Intended to help reduce patient anxiety Head and neck Coil should have Patient mirror(s) - include a small mirror that enables the patient to see outside the bore, which can reduce patient anxiety
	3) The embedded Spine coil should be at least 24 channels
	4) Body imaging coil with at least 32 channels applicable for Body and Cardiac applications, with coverage of at least 45cm, either singly or in combination
	5) Dedicated Knee coil with 15 or more channels
	6) Dedicated Ankle coil with 16 or more channels
	7) Dedicated Shoulder coil with 16 or more channels
	8) Dedicated Wrist coil with 16 or more channels
	9) Flex Coils- Large and Small, minimum of 4 channels or more each
	10) Breast Coil with minimum 08 channel with biopsy capability.
b)	Coils should be able to image all of the following parts: Whole CNS (Head + Whole Spine), Chest, Heart, Abdomen, Pelvis, Whole Abdomen, Peripheral Vasculature, Prostate, Colon, Rectum, Cervix, Breast, Temporo-mandibular joint
10.	**SEQUENCES AND APPLICATIONS PACKAGE**
a)	The system should have basic sequences package with Spin Echo, Inversion Recovery, Turbo Spin Echo with high turbo factor of 256 or more, Gradient Echo with ETL factor of 255 or more, single and Multi shot EPI imaging techniques with ETL factor of 255 or more
b)	The system should have facility to do head to toe imaging without shifting the patient
c)	Image acquisition - Patient movement compensated, head and body
d)	Isotropic 3-D (T1) and Isotropic 3-D fast spin echo (T2)
e)	Perfusion imaging, head and body
f)	Single slice, multiple single slice, multiple slice, multiple stacks, radial stacks and 3D acquisitions for all applications
g)	Fat suppression for high quality images both inversion recovery and Dixon method with variable TE and four contrasts in one acquisition viz water-only, fat-only, in-phase and opposed-phase
h)	Magnetization Transfer Saturation
i)	The system should acquire motion artifact free images in T2 studies of the brain in restless patients using the latest technique
j)	Dynamic study for pre and post contrast scans and time intensity studies
k)	Flow quantification in vessels/hepatobiliary system
l)	Flow Artifacts reduction technique
m)	Image addition, subtraction, division facility

n)	Breath hold and free breathing acquisition
o)	3D high resolution T2WI – possibility to reformate data in all sequences
p)	Double Echo steady state like DESS / Proset / Similar
q)	MR angio: 2D / 3D TOF, 2D / 3D phase contrast (with and without gating) magnetization transfer saturation, TONE CEMRA, black angiography for cerebral, pulmonary, abdominal and peripheral vessels
r)	CUBE/SPACE /VISTA / Similar
s)	ADC Maps
A)	**Neuro Applications:**
a)	2D/3D Arterial Spin labelling
b)	Susceptibility weighted imaging equivalent to SWAN-II/SWI/SWIp.
c)	Multi Direction DTI with a minimum of 128 directions. (Complete package including DTI quantification and tractography software).
d)	Advanced Spine Applications package for nerve root analysis
e)	High resolution imaging for inner ear. True FISP Dual excitation like CISS / FIESTA-C/Similar for imaging of internal ear
f)	The system should have facility for flow quantification of CSF, vessel flow. Both retrospective and prospective gating should be possible
g)	Whole spine imaging with fusion software
h)	Perfusion study for brain to be offered as standard. Evaluation package for calculating CBV, CBF, MTT, perfusion map etc.
i)	MR Neurography protocol to be offered.
j)	Functional imaging, neurological
B)	**Cardiac applications:**
a)	VCG gating with Arrhythmia rejection techniques
b)	Morphology/wall motion
c)	Cine perfusion imaging and Myocardial viability imaging
d)	Advanced Cardiac Ventricular Measurement Analysis
e)	Cine Cardiac Tagging Techniques
f)	Coronary artery techniques
g)	2D/3D fast field echo/balanced/steady state techniques
h)	Complete cardiac evaluation package to be included
i)	Iron quantification in myocardium to be offered as standard
C)	**Musculoskeletal:**
a)	High resolution imaging for cartilage and musculoskeletal imaging Parametric Map and "Cartilage Imaging including T1, T2, T2* should be available.
b)	The system should have software package for evaluation of the bone marrow.
c)	Metal-implant artifact reduction technique to be available equivalent to WARP/MEVRIC/MAR
d)	Whole body screening imaging studies for metastasis with at least 180 cm coverage.
e)	Sequences for MRI imaging of joints with metal implants like Advanced WARP/SEMAC/OMAR-XD/Similar should be offered.
D)	**Hepatobiliary and abdominal system:**
a)	High resolution Abdominal and Liver imaging in both breath hold and free breathing modes with respiratory triggered volume acquisitions with navigation and spectroscopy
b)	The system should have basic and advanced MRCP packages including free breathing and 3D techniques.
c)	Sequences and evaluation software for Fat Quantification in Liver and Iron Quantification to be provided
E)	**Vascular Imaging:**

a)	MR Angiography Imaging Should have 2D/3D TOF, 2D /3D PC, MTS and TONE or similar and Contrast-enhanced MRA.
b)	Bolus chasing with automatic and manual triggering from fluoroscopy mode to 3D acquisition mode with moving table facility for whole body application.
c)	Inline subtraction should be available.
d)	"Non contrast enhanced" peripheral angiography for arterial flow equivalent to Native/ Trance/Inhance sequences.
e)	Time-resolved Angiography equivalent to TWIST/4D TRAK/TRICKS-XV
F)	**Breast Imaging:**
a)	Advance package, including diffusion, spectroscopy and perfusion with time intensity curve and fast dynamic 3D breast imaging
b)	Techniques for Bilateral breast imaging including axillary coverage (VIBRANT XV/BLISS/VIEWS/Similar) with suitable coils should be offered with parallel imaging capability and parallel imaging factor 4 or higher.
G)	**Diffusion Weighted Imaging:**
a)	b value of at least 5000 or more in at least 32 directions
b)	Whole body diffusion weighted imaging with background suppression (DWIBS)
c)	DTI with color-coded Tractography and FA maps
H)	**Spectroscopy:**
a)	The system should have Hydrogen Proton Spectroscopy as standard
b)	Single and Multi-Voxel spectroscopy with Multi-slice & Multi-angle 2D, 3D Spectroscopy and Chemical Shift imaging in 2-D/3-D.
c)	The complete processing / Post processing software including colour metabolite maps should be available on the main console and at the workstation
d)	Complete prostate spectroscopy hardware and applications should be provided.
I)	**Functional MRI accessories and post-processing**
a)	Functional Imaging with package for BOLD imaging and processing package (capable of real-time processing and display of colour overlay (in real time).
b)	Complete fMRI solution including audio-visual projection (3D capable) system, with headphones with very good noise suppression (>30dB) (Preferable to have LCD/LED monitor for projection).
c)	The system should be integrated with stimulus presentation/ paradigm generator software, along with permanent license (like Superlab, eprime, Presentation, etc), for task presentation to the subject.
d)	The paradigm presentation should be synchronised with the scanner (for starting along with measurements)
11.	**CONSOLE WORKSTATION:**
a)	One measurement (Main) console capable of data acquisition and all online calculations and Post processing.
b)	Latest computer system with Core i7 processor or better, sufficient RAM (32 GB or more) and computational speed to match the single shot Echo Planar Imaging (EPI), interactive angiogram, multi-planar three-dimensional (3D) reconstruction, surface rendering and dynamic imaging, vascular imaging/angiography, and adequate storage for images and other applications.
c)	Necessary image processor with sufficiently large RAM (32 GB or more) for ultra-fast image reconstruction, capable of performing real-time image reconstruction.
d)	Total hard disk memory capable of storing a minimum of 4 TB or more to be sufficient to store at least 250,000 images of 256 x 256 matrix data size. Systems offering higher storage will be preferred. The system should have CD/DVD archiving facility on the main console and work station
e)	Monitor 24" or more TFT monitor with enhanced graphics accelerator.

f)	There should be a provision of retrieval of the reconstruction data (raw files) in user friendly manner.
g)	DICOM interface to hook DICOM dry/laser camera capable of storing printing 1024 x 1024 matrix size images at least in 16 formats without loss of digital resolution.
h)	The system should be capable to connect to PACS through RIS/HIS at no extra cost. Highest version of DICOM connectivity to be provided.
i)	Zero Foot Print Application - Application viewing images on Tablet & Mobile which is FDA approved from the same OEM who is providing the Modality.
j)	Licenses for acquisition, post-processing and for special packages should be given explicitly listing all the capabilities of the vendor's quoted product (basic standard package, premium packages, etc).
k)	The main console/workstation should have pulse sequence software license that may be required to modify and run pulse sequences. If this is not possible, the vendor should provide the necessary hard and software necessary for such application (like laptop with system interface solution). Appropriate procedures (like research agreement) should be finalized before the installation of the equipment, so that there is no delay in operation of any requirement.
12.	**ADDITIONAL WORKSTATIONS: 03 Numbers**
a)	The workstation from the Manufacturer with preferably the same user interface as of main console is required with the availability of all necessary software including basic post-processing software including MIP, MPR, surface reconstruction and volume rendering technique.
b)	All advanced post-processing offered applications including perfusion quantification, advanced diffusion and DTI including perfusion analysis, processing of 2D/3D CSI data, cardiac post processing and color metabolite mapping should be available in all the workstations.
c)	The workstation should enable printing in laser film camera and colour printers
d)	3 numbers Workstations with Core i7 processor or better, 32 GB RAM or more ,4TB hard drive, with 3 concurrent licences for all basic applications and all should be concurrently capable of advanced applications, Post Processing, 2D view, MIP, MPR, Filming with high resolution monitor of minimum 2 MP resolution, keyboard & mouse with 1000 compatible DVDs. The Workstation should be capable of doing the followings, • 2D flat image view • 3D volumetric reconstruction • Multi-planar reconstruction view • Export a model to a graphic file or to the new series of DICOM images • Print images on paper and film using a DICOM printer • Burning data to CDs, DVDs, and flash drives
e)	Total external storage SSD of at least 20 TB to be provided for long term storage of cases.
f)	Three desktop PC (Core i7 with 8GB RAM, 1TB HDD,21" monitor, keyboard mouse and UPS) to be provided for reporting purposes.
g)	Three high quality black and white laser printers to be provided for report printing purposes
13.	**ANTIVIRUS AND WEB UPDATES:**
a)	All the Servers and Workstations in the network MRI console, additional workstation, PACS workstation, fMRI workstation, etc) that is supplied by the vendor should be provided with antivirus software (periodically updated) for whole life time.

b)	The vendor should provide antivirus updates for whole life time and make sure of the updated antivirus every week (using automatic updates with internet facility by the vendor)
c)	The vendor should ensure that all the above modalities include necessary connection, image & work list send/receive, image & data storage, scheduling, patient registration, and synchronization functions as per DICOM standards for smooth and effective integration to RIS/PACS.
14.	**NETWORKING:**
a)	The vendor should provide Level 3 network Switch (with 32 nodes) or latest, to integrate the network,
b)	Protocol - Ethernet TCP/IP standards - based image transfer with DICOM 3.0 over standard Ethernet IEEE 903 (DICOM send, receive and DICOM query modes).
c)	The vendor should provide the connectivity with PACS, with the user department.
d)	The network speed and cables should match the latest industry standards (eg.10BaseT/100BaseT/1GB).
e)	System should be configured with different IP series, so as not to clash with different equipment already existing in different departments.
f)	The vendor should provide necessary networking and configuration assistance with existing PACS, HIS, RIS.
15.	**FILE DOCUMENTATION:**
a)	DICOM interface to hook DICOM compatible, dockable, latest state of art Dry Laser Camera with resolution of 16 bits/500 dpi or more capable of storing/printing images of 1024 x 1024 (or higher, if available) matrix size in various matrix formats (including 16 format) without loss of digital resolution to be made available on any of the consoles and on the films (Agfa/Fuji/Kodak etc), with three online tray system. The system must have at least three online film sizes, and should be capable to print on any of the 8 X10, 10 x 12, 14 x 17 sizes. The system should be freely configurable by the user, to use any of the above-mentioned size. should be supplied with 500 films of each size.
16.	**PRINTER:**
a)	One Colour Laser Network Printer (PCL6/PS) for printing of colour CSI/Perfusion/BOLD maps and images and film documentation on paper (minimum 24 ppm).
17.	**ACCESSORIES:**
a)	Suitable UPS system should be provided for the complete MRI unit with Chiller and emergency lights with a backup of at least 30 minutes.
b)	Replacement of UPS batteries to be covered under Warranty and CMC
c)	RF Cabin: The system should be supplied with RF cabin with RF room shielding, and RF Door screen and interiors for the same should be carried out suitably
d)	Water/Air Chiller for Cold Head and Gradients
e)	Medical Gas Piping in gantry room
f)	Fire Fighting System, Smoke Detectors in all rooms along with 6 Fire Extinguishers (at least two MRI Compatible)
g)	Hand held metal detectors - 2 in numbers
h)	Digital patient weighing scale – 1 in number
i)	Closed circuit CCD camera for patient observation.
j)	Music system (complete)
k)	Phantoms for image quality audits with Cart
l)	MRI Compatible Dual Syringe Pressure Injector: Independent dual Syringe Pressure Injector with the following Features: Non- ferrous, automatic syringe size detection,

	performs single and dual phase- contrast Injections, provides Saline flush delivery Must be compatible with 5, 7 & 10 ml pre-filled contrast syringe and 50 ml syringes for both saline & contrast (100 Nos of 50 ml Syringes with 100 nos. of tube connectors should be provided). Must be able to observe the progress of Injection and view injection result at the working console.
m)	One MRI compatible Multi parameter Vital Signs Patient Monitor of 500 Gauss/ Compliance and One Slave monitor in console room with following modules provision to monitor the following (all MR compatible): Heart rate, Wireless ECG, Respiration, NIBP Size of Cuffs (adult & paediatric neonatal) 2 sets each. Oxygen saturation-MR compatible Wireless Pulse oximeter with an adult, paediatric probe, and neonatal probes 2 sets each. Should have plethysmograph perfusion factor, ETCO2 and ETAA (end-tidal anaesthetic agents), IBP Module 2 sets.
n)	One non-magnetic patient transfer trolley should be provided
o)	Walk through Ferromagnetic metal detector-01 no
p)	LED- 4 films view box for 14" X 17" film size- 3 Nos.
q)	MR compatible Wheelchair- 2 No.
r)	Table for the MRI console, MRI additional console/ workstation, fMRI workstation.
s)	All the necessary interconnecting interfaces, cables, modules and other hardware and software to fully integrate the system for full operational status
t)	Mobile MRI compatible Anaesthesia workstation with in-built ventilator: Specifications: Electronically driven Piston ventilator: Ventilation modes - Volume Controlled Ventilation, Pressure Controlled Ventilation, Pressure Support, SIMV/PS, Manual Ventilation, Spontaneous Breathing; LCD colour screen; 2 vaporizers (Isoflurane & Sevoflurane); Carbon-dioxide absorber canister; Continuous monitoring of inspiratory O2 concentration, breathing frequency, tidal volume (expiratory), minute volume (expiratory), peak airway pressure, PEEP, and mean or plateau pressure; Audible and visual alarms; breathing systems (modules for Mapleson D circuit, Bain circuit and closed circuit); breathing circuits suitable for use in MRI environment (adult and neonatal); pressure gauges for gas cylinders; MRI compatible oxygen cylinder for Anaesthesia machines (Size E: 4 numbers); endotracheal suction unit; central brake; integrated safety functions, length of tubing connecting the wall station outlets to the anaesthesia machine should be adequate enough to move the machine freely in desired location inside MRI suite.
u)	MRI compatible Syringe infusion pumps: 3 numbers capable of being stacked in a single cabinet. The pumps should have battery backup and a mechanism for providing infusion dose as well as a bolus.
v)	Storage cabinet for all coils
w)	Others: i. MRI compatible stethoscopes: 1 adult & 1 paediatric. ii. Wall outlets (2 for compressed oxygen, 1 for air, 1 for N_2O, and 1 for vacuum suction) iii. MRI compatible wall suction apparatus: 1 iv. MRI compatible Pressure transducer stands: 2 v. MRI compatible Magill's forceps: 3 sizes: Adult, paediatric, infant -02 each vi. MRI compatible anaesthesia masks - Sizes: 0, 1, 2, 3, 4, 5-02 each vii. MRI compatible temperature probes: adult & paediatric -1 each viii. MRI compatible Laryngoscopes: Adult, Paediatric -02 each ix. Endotracheal tube exchanger: 1 number; it should have the facility to administer oxygen x. Gum elastic bougie: 2 (adult and paediatric) xi. Guedel airways: One set of all sizes xii. Stylets for endotracheal tubes (adult & paediatric)-02 each

	xiii. Two (quantity) MR compatible oxygen cylinders with flow meter and stand (for the anaesthesia system).
18.	**CERTIFICATIONS AND REPORTS:**
a)	The following should be specified • Availability of test report/QA and QC report as per NABH from parent manufacturer • Product certification • Product Certificate Number • Product Certificate Date • Product Certificate issuing authority • Four-digit number of notified body If product is EU-CE certified • Conformity to Manufacturer's Certification • Certification, performance and safety standards specific to the device
b)	Submission of copies of all the certifications and test reports to the buyer along with supplies
c)	Magnet system should include an Emergency Ramp Down unit (ERDU) for fast reduction of the magnetic field with ramp down time below 3 minutes
19.	**DOWNTIME:**
a)	Maximum acceptable down time of equipment during the warranty period not to exceed five percent calculated separately for each year.
b)	If the down time exceeds this level, then the warranty period to be extended by twice the period of downtime exceeding 5%.
20.	**TRAINING:**
a)	Training of two radiologists for 02 weeks each at premiere heath centre/ Teaching Hospital in India
b)	On-site training of all Faculty members & Technicians.
21.	**EXPERIENCE CRITERIA:**
a)	Bidder should have proven track record in Central/State government/PSU and should have at least 3 installations of the same system during the last three years with satisfactory performance report from the HOD of the User department of Institution. Also, company and model name of the unit offered should be clearly mentioned.
22.	**SCOPE OF TURNKEY**
a)	i. The MRI unit is to be installed on turnkey basis ii. Turnkey would include dismantling and disposal of redundant fixtures and execution of all necessary civil, electrical, plumbing and air conditioning work at site iii. The layout plan and other site requirements are to be finalized as per user unit requirement. iv. Work related to anaesthesia workstation and layout of gas pipelines as required by the anaesthesia department to be done. v. The supplier shall be required to undertake all the pre-installation, site preparation work in the area as per the layout plan. vi. The bidder will inspect the site for feasibility before tendering and submit the layout plan for approval by the HOD. vii. The MRI complex will comprise of various rooms like MRI Examination room, console room, reporting room, changing room, electrical equipment and UPS room and any other required room for MRI facility. The site work will be as per approved plan. viii. During construction, modifications can be permitted by the user department of the hospital for more efficient utilization of space and resources.

	ix. All items to be used should he of very good quality and are to be used only after the approval is granted by the department or other relevant hospital authorities. In case the same is not done, the vendor shall have to dismantle the existing material and carry out fresh work at his own cost. x. Rates of the following components of turnkey project should be quoted with system. I. Civil II. Electrical III. Public health (water supply)and fittings), if any IV. Furniture and other items V. Miscellaneous
b)	INSTALLATION ON SITE - MODIFICATION BASIS
	(i) The system should be installed and handed over in working condition, with all the necessary electrical, air- conditioning and civil works undertaken by the vendor in consultation with the user department. Some re- arrangement of the existing place including relocation of staff place may have to be carried out.
	(ii) All the necessary interconnecting interfaces, cables, modules and other hardware and software to fully integrate the system for full operational status.
	(iii) Installation and integration of the uninterrupted power supply (UPS).
	(iv) The Site-Modification items, UPS, Generator and other local items have to be quoted in Indian rupees only
	(v) Water/ Air chiller should be of good quality, with performance guaranteed during summer months also.
c)	CIVIL WORKS
	Fire alarm (along with new/existing panel) should be provided in all rooms, wherever site modification is being carried out, and in the rooms (in the MRI section), where there is no fire alarm. The vendor should discuss with the engineering section and the department before quoting for Site-Modification.
d)	AIR-CONDITIONING WORKS
	Air-conditioning that is required for the MRI equipment, examination room, and Console areas have to be carried out
	Necessary adequate air-conditioning units. The vendor should discuss with the engineering section and the department before quoting for Site-Modification.
	The installation of the MR system should be complete with all accessories.
23.	**HARDWARE UPGRADE and SOFTWARE UPDATE/UPGRADE**
a)	The MR system should be regularly maintained in the latest version of computing software, including software platform upgrades released for the respective system that can prepare it for future enhancements. If a HW upgrade is required to run the latest software version to its normal performance, the respective HW should be upgraded at no additional costs during the complete life of the system.
b)	The MR computing software system should offer built- in security controls to protect the system from vulnerabilities that can result in cyberattacks or inappropriate access to patient data. The built-in security should comply with the latest international standards of data security and encryption, as well as with existing regulations to protect personal and protected health information (e.g., GDPR, HIPAA, any local regulation), during the complete life of the system.
c)	Software upgrades/ updates (where hardware upgrades are not required) like new pulse sequence, new application package, etc, should be provided within one month

	after release worldwide (any country, viz. North America / Europe / Germany, etc). In case, the same is not provided in time, the parent company should undertake the responsibility to implement the same. This is to make sure that the machine stays updated with similar products for full life span of the equipment.
24.	**STANDARD AND SAFETY**
a)	Should have import/manufacturing license from Central licensing Authority or State licensing authority of CDSCO for Medical Devices and copy of valid license should be submitted for the quoted model. In case the vendor has not yet obtained import/manufacturing license from CDSCO for the quoted model, proof of application for CDSCO medical device license to be submitted in the bid document and valid CDSCO license to be produced at the time of supply/ NOA for the quoted model
b)	Original Product Datasheet of main unit and all accessories, including all items to be provided. All agreements should be binding on Principal. The principals should be responsible for any lacuna or deficit in service or supply.
c)	All items in the supply order should be supplied during the time of installation. No exceptions will be allowed.
d)	Items under Agreement should be finalized well in advance (after receipt of supply order), so that there is no delay in delivery of software or coil or any other accessories.
25.	**WARRANTY PERIOD:**
a)	The vendor should guarantee the service and spare support for 5 Years for the entire system.
b)	The warranty period of the 1.5 T MRI system commences from the date of handing over (from the date of issue of Inspection Note) the fully functional unit of all coils and the accessories supplied (such as UPS including batteries replacement as when required, AC, etc.) to the Institute, against manufacturing defects of material and workmanship. The Helium Supply and cold head repairs (including replacement, if needed) should be included in the warranty period.
26.	**POST GUARANTEE ANNUAL COMPREHENSIVE MAINTENANCE CONTRACT (CMC):**
a)	The post- warranty (after 5 years) CMC should be comprehensive and should include helium and cold head (repair and / or replacement) + labour + spares for the complete system which includes all the accessories supplied such as UPS, AC, etc. (including all consumables like batteries for UPS, and maintenance for another 5 years.
b)	Note: Any Liquid Helium filling due to quenching or due to any other causes during the warranty & CMC period shall be borne by the firm.
c)	If a particular coil is not working for more than 5 days and due to which patient work suffers, the firm will be asked to pay penalty of half-a-day beyond 5 days for each day that it is not working.
27.	**Buy Back:** Buyback option where applicable may be duly evaluated
28.	**DOCUMENTATION** Should provide 2 sets (hard copy and soft copy) of: 1. User, technical and maintenance manuals should be supplied in English/Hindi language along with machine diagrams; 2. List of equipment and procedures required for local calibration and routine maintenance; 3. Service and operation manuals (original and Copy) to be provided; 4. Advanced maintenance tasks documentation; 5. Certificate of calibration and inspection,

	6. Satisfactory certificate for any existing installation from government hospital
29.	**SERVICE SUPPORT CONTACT DETAILS (HIERARCHY WISE; INCLUDING A TOLL FREE/LANDLINE NUMBER):** Contact details of manufacturer, supplier and local service agent to be provided; Any Contract (AMC/CMC/ad-hoc) to be declared by the manufacturer.
30.	**RECOMMENDATIONS OR WARNINGS:** Any warning sign would be adequately displayed
31.	**ENVIRONMENTAL SPECIFICATIONS:**
	Temperature and Relative humidity ranges to be maintained as per prescribed standards. Air conditioning load: the heat load calculations and maintaining the desired temperature and humidity in toto shall be the responsibility of the bidder.