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| **Technical Specifications of Permanent magnet MRI System for Rural Health Centre Punhal Khan Chandio, Disrict Shaheed Benazirabad.** | | |
| Latest generation 1.5 Tesla superconductor MRI systems, with clinical application software's with coils to cover the whole body on turnkey basis. The quoted model must be the latest and successful MRI having large installed base around the world. The bidder must indicate the number of MRI installed worldwide and in Pakistan. | | |
| **S. No.** | **ITEM SPECIFICATIONS** | **DESCRIPTION OF SPECKS** |
| 1. | **MAGNET** |  |
| 1.1 | Type | Vertical Magnetic Field Permanent |
| 1.2 | Magnet Poles | Non Conducting Type, Eddy Current free |
| 1.3 | Field strength | .25 Tesla or hiher |
| 1.2 | Shimming method | Auto Shimming in 3 Axis |
| 1.3 | Shimming method | Second order shimming method for better homogeneity should be provided as standard feature |
| 1.5 | Aperture Height | 36 cm or more Fully open type |
| 1.6 | Gantry Weight | 11500 Kgs or less |
| 1.7 | Guass Line | 2.0 x 1.9 m or less |
| 1.8 | Magnet homogeneity *I* stability | 3.5 ppm (plane plot method) or less. |
|  | Gantry Opening | 200 degrees in front or better  60 degrees rear or better |
| 2. | **RF SYSTEM:** |  |
| 2.1 | Transmitting power | 5 KW or more. |
| 2.2 | Type | Digital |
| 2.3 | Transmitter Coil | QD 4 channel output |
|  | IMPORTED RF CABIN | As pr recommendation of the manufacturer  Dimension of cabin should be compatible with the system |
| 3. | **COILS:** |  |
| 3.1 | Body array Coil | Parallel imaging technique compatible. |
| 3.2 | Head *I* Brain Array Coil | Parallel imaging technique compatible. |
| 3.3 | Spine Coil | Minimum coverage 75 cm or more. |
| 3.4 | Neurovascular coil |  |
| 3.5 | General purposes flex coil/package |  |
| 3.6 | Dedicated Knee coil |  |
| 4. | **GRADIENT SUBSYSTEM:** |  |
| 4.1 | .Gradient Magnetic field Intensity | 22 mT/M or more |
| 4.2 | Slew rate | 50 T/m/sec or more " |
| 4.3 | Rise Time | 0.5 ms or less |
| 4.4 | Cooling System | Must be AIR COOLED |
| 5 . | **RESOLUTION PARAMETER:** |  |
| 5.1 | Slice thickness – 2DFT | 2.2 mm or less. |
| 5.2 | Slice thickness – 3DFT | 01 mm less |
| 5.3 | Maximum number of Slices in 2D and 3D | 256 or more |
|  | Multiple Slab 3D |  |
| 6. | **PATIENT COUCH:** |  |
| 6.1 | HEIGHT | MORE THAN 690MM |
| 6.2 | WIDTH | MORE THAN 720MM |
|  | LENGTH | MORE THAN 2200 MM |
|  | Lateral Movement | 100mm or more  650mm or more |
|  | Weiht bearing capacity | 130kg or more |
| 7. | **OPERATING CONSOLE:** |  |
| 7.1 | Standard console |  |
| 7.2 | Display monitor | 18" or more High resolution LCDITFT monitor (non interlaced and flicker free) |
| 7.3 | Key board & Mouse |  |
| 8. | **COMPUTER:** |  |
| 8.1 | Type | Multitasking, real time interactive control. |
| 8.2 | Performance | Simultaneous scanning, image acquisition, image, reconstruction, processing and filming etc. |
| 8.3 | Clock Speed | 2.6 GHz or better |
| 8.4 | Word size | 64bit *I* 32 bit parallel array processing. |
| 8.5 | Hard Disk Capacity | 30 GB or more. |
| 8.6 | Dicom package | DICOM 3.0 Query Retrieve, Import/Export. Storage & Print and work list. |

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| 9. | WORK STATION FOR RADIOLOGIST:  (As recommended by *manufacturer* Vendor). |  |
| 9.1 | Multimodality DICOM compatible  workstation with 18" or more **TFT** or LCD color  monitor (Non -interlaced and flicker free). |  |
| 9.2 | Software for image manipulation including  3D, surface shaded display, MIP, MPR,  Curved MPR, etc. |  |
| 9.3 | Capable of interactive windowing window  pre- sets, geometry manipulations, stack &  tile *viewing,* cine, *movie* export, sequence  generation of *volumes* & projections,  annotations & measurements along with  Print capability etc. |  |
| 9.4 | CD/DVD Writing capability. |  |
| 9.5 | One additional workstation to be placed at PUMHS Nawabshah with facility of emote transfer of images from MRI unit |  |
| 10. | 10. **IMAGING TECHNIQUES:** |  |
| 10.1 | Scan region | Whole body |
| 10.2 | Image Reconstruction | 2D Fourier Transformation, 3D Fourier  Transformation Method |
| 10.3 | Applicable Nucleus | Hydrogen Nucleus (Proton) |
| 10.2 | Image Type . | Spin Echo Image (SE)  Inversion recovery Image (IR)  Gradient Echo Image (GE)  Multiplanar Reconstruction (MPR)  Maximum &Minimum Intensity Projection  Fast protocols & motion correction for uncooperative patients |
| 10.3 | Fast SE | 2-256 Echo train |
| 10.4 | Fast IR | 1 or 2 Echo time |
| 10.5 | Slice thickness | 0.11-100mm |
| 10.6 | Slice Plane. | Sagittal  Coronal  Double Oblique  Multi Angle |
| 10.7 | Scan Matrix | 512 X 512 or more preferable |
| 10.8 | Spatial Resolution | Minimum 0.2MM |
| 10.9 | Multicslice | 256 or more |
| 10.10 | Multi Echo | 4 Echoes or moe |
| 10.11 | Field of View | 320mm or more with choice o selection |
| 10.12 | SEQUENCES   1. Spin Echo (2D and 3D) 2. Gradient Echo 3. GE (2D and 3D) 4. GR (2D and 3D) 5. SARGE (2D and 3D) 6. RF SARGE 7. Inversion Recovery (STIR, FLAIR, FIR) 8. Fast Spin Echo 9. 2D and 3D 10. SSFSE |  |
| 10.13 | ANIOGRAPHY   1. 3D time of flight 2D 3D with SSP, MOTSA and MTC 2. Phase Contrast 2D and 3D 3. Contrast Enhanced |  |
| 0.14 | FLOW COMPENSATION |  |
| 10.15 | MTC PULSE |  |
| 10.16 | MRCP |  |
| 10.17 | MR MYELOGRAPHY |  |
| 10.18 | MR UROGRAPHY |  |
| 10.19 | EPI based Diffusion-weighted Imaging |  |
| 10.20 | Fat/Water separation |  |
| 10.21 | OTHER NECESSARY SOFTWARE AS STANDARD   1. Suppesson of various motion artifacts caused due to body motion, respiration and blood flow. It should be applicable with various sequences. 2. Non-contrast angiography specially for diabetic patients. 3. RF-Fat saturation |  |
| 10.22 | SCAN FEATURES   1. Reconstuction Matrix upto 1024 square 2. Gated imaing (cardiac, respiratory and pulse) 3. Band width optimization 4. High resolution scan 5. Half Echo 6. Dual Slice 7. Cine imaing 8. Joint Motion Studies 9. Off centre imaing 10. Mid-display 11. Image processing |  |
| 11 | **ADVANCED SOFTWARE/ APPLICATIONS** |  |
| 11.1 | Any advanced softare/application may be mentioned here |  |
| 12. | **PATIENT COMFORTS:** |  |
| 12.1 | In bore | Lighting and *ventilation.* |
| 12.2 | Patient call system | For patient to signal the emergency. |
| 12.3 | Intercom | Integrated two-way communications between patient  and operator. |
| 12.4 | Patient observation | CCD camera to observe patient during examination |
| 13. | **INTERANTIONAL SAFETY AND QUALITY STANDARDS:** |  |
| 13.1 | FDA 510K approval, CE Marked, JIS |  |
| 13.2 | Country of origin: USA/UK/JAPAN/EEC |  |
| 13.3 | Year of launching globally, certification must be provided |  |
| 13.4 | Number of units sold out in Pakistan with good reputation |  |
| 13.5 | Name and qualifications of trained Engineering staff |  |
| 14 | ACCESSORIES TO BE OFFERED WITH SYSTEM: |  |
| 14.1 | Online sine wave UPS for whole system with a minimum backup of 10 minutes on full load. |  |
| 14.2 | RF Cage / Shielding with interior decor outlets of oxygen / and suction with non- magnet suction unit and oxygen flow meter including Electrical and Air conditioning need according to system requirement Renovation, Fixture & Furniture of MRI magnet room will be responsibility of vendor. |  |
| 14.3 | Non- ferrous / patient monitor with ECG, NIBP, SP02. |  |
| 14.4 | Latest Dry/laser imager DICOM compatible up to *14x17* inch film size. |  |
| 14.5 | Patient entertainment system (Audio CD player) |  |
| 14.6 | Non-ferrous patient trolley with IN stand, |  |
| 14.7 | Non-ferrous Wheel chair |  |
| 15.8 | Non-ferrous hand held Metal detector, |  |
| 14.9 | Non - ferrous fire extinguisher. |  |
| 14.10 | Quality Assurance and Quality Control Accessories for daily and monthly quality control of MRI unit. |  |
| 15. | POWER REQUIREMENTS: |  |
| 15.1 | Single phase line voltage of 220V, 50Hz. |  |
| 15.2 | Power requirement less than 12kVa |  |
| 16. | TRAINING: |  |
| 16.1 | Training of two weeks for two Radiologists in an English-speaking country on the same supplied model at the expense of the vendor (mention the detail of each expense of training, like air fare, boarding/lodging, daily allowance and |  |
| 16.2 | On site availability of application specialist for Radiologist and technologist for 04 weeks |  |
| 17. | WARRANTY & POST WARRANTY AGREEMENT & MAINTENANCE CONTRACT: |  |
| 17.1 | Warranty period shall be of three years starting from date of full functional commissioning, |  |
| 17.2 | Maintenance of the machine / equipment during the whole period of warranty shall be responsibility of the vendor failing which, the vendor will have to pay down time penalty as indicated in terms and condition. |  |
| 17.3 | An annual optimal uptime of 95% is considered as an acceptable level of performance. Uptime shall be defined as time available to user for data acquisition and processing on all working days throughout the year. |  |
| 17.4 | If the uptime percentage for the measurement period shall fall short of 95% annually, the following formula will be  applied to determine additional days in the  warranty *I* service contract period:   * 100 - 96% No penalty. * 95 - 90% the warranty period will  be extended by 01 times the  number of days as extra down  time. * 89 - 80% the warranty period will  be extended by 02 times the  number of days as extra down  time. * Below 80% the warranty period  will be extended by 03 times the  number of days as extra down  time. |  |

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| 17.5 | Down time is defined as the failure in the  equipment operation to acquire or process  the data, resulting in inability to carry out  the required procedure properly. |  |
| 17.6 | Down time will start as the end user  notifies the designated service *I* facility  verbally or in writing. The response time of  12 to 24 hours will be considered as  normal depending upon the location of  unit. |  |
| 17.7 | Down time will end when satisfactory  repairs have been affected and the system  is again fully functional with all parameters  available for clinical use. |  |
| 17.8 | The scheduled preventive maintenance  shall not be considered as down time and  shall not be more than three days. |  |
| 17.9 | Manufacturer *I* supplier will be responsible  for preventive maintenance of the system  as per service manual. |  |
| 17.10 | Vendor will mention the rate of service  . Charges with and without parts for the  complete system, after the expiry of five  years warranty period on yearly basis  along with the bid. This should also include  Price major breakable arts. |  |
| 17.11 | Manufacturer *I* supplier will guarantee the  availability of spare parts and accessories  for the s stem for at least ten ears. |  |
| 17.12 | Manufacturer *I* supplier should also  confirm that in event of the services costs  falling or reducing in line with the  manufacturer policy worldwide due to  technical innovations or other reviews,  they will reduce the maintenance cost  accordingly . |  |
| 18. | **OPTIONAL ITEMS -IF AVAILABLE**  **WITH VERNDOR (NON-AVAIABLITY**  **WILL NOT BE THE BASIS FOR**  **TECHNICAL ACCEPTANCE *I***  **REJECTION.** | **Mention separate price of each component.** |
| 18.1 | Dedicated Shoulder array coil |  |
| 18.2 | Circular coils (Maximum available size) |  |
| 18.3 | Flexible body coil (Maximum available  size |  |

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| 18.4 | Breast coil with complete application and evaluation package. |  |
| 18.5 | Cardiac coil with complete application and evaluation package. |  |
| 18.6 | MRI compatible Biopsy package for neurosurgical studies *1* work including MRI stereotactic frame with accessories application |  |
| 18.7 | 16 channel receiving system |  |
| 18.8 | Diffusion Tensor Imaging (DTI) To perform Multi Directional diffusion weighted imaging for visualization of white matter tracts in Fractional Anisotropy maps. |  |
| 18.9 | 2K (2048x2048) imaging matrix. |  |
| 18.10 | Higher slew rate. |  |
| 18.11 | Detachable table and extra set of head, neck and spine coils. |  |
| 18.12 | Quad scans allowing simultaneous excitation of up to four slices. |  |
| 18.13 | Accessories to handle claustrophobic patients . |  |
| 18.14 | Non ferrous anesthesia machine |  |
| 18.15 | Connectivity with local HMIS/RIS systems. |  |
| 18.16 | Two Desktop computers with 64bit Dual processors of latest technology, 02MB cache RAM at 01 GHz, HD 100GB or more, *DVD/CD* RW, *10/100/1000* Base T Ethernet LAN, 56K modem, Graphics Card, Networking card, 17" TFT LCD display with other standard accessories. Operating System software with CT Viewer DICOM compatible software should be included. Vendor will install *1* network these computers from CT scan rooms to consultant's rooms. |  |
| 18.17 | Two Laser Black & White Printers, capable of printing on multi-size papers, 1200 dpi or better. |  |
| 18.18 | Eight film viewers’ illuminators, 14"x 17" size, with variable light control, 4x1 formats. |  |
| 18.19 | Manufacturer and supplier shall be responsible for rectifying all problems at their own expense and manage any defect or fault in the system developing at any time during installation and commissioning period. |  |
| 18.20 | Any additional option available with each manufacturer must be offered as optional. |  |
| 18.21 | MRI Compatible dual channel Contrast Media injector. |  |
| 19. | **OTHER TERMS AND CONDITIONS FOR MRI SCANNER INCLUDING BID EVALUATION CRITRION** |  |
| 19.1 | Tender is invited as per SPPRA rule 46-3. |  |
| 19.2 | For technical bid each vendor is requested to fill up the above mentioned Performa with the desired information in the last column, on the same MS word format in YES or NO form, with verifiable references (along with proper pagination, paragraph & line description) |  |
| 19.3 | Vendor must also enclose a soft copy on  CD / USB in addition to hard copy of for  technical evaluation committee. |  |
| 19.4 | Any wrong information / figure or hiding of  facts will lead to disqualification from the  tender. |  |
| 19.5 | Only sole distributors in Pakistan or  manufacturer are illegible to participate. |  |
| 19.6 | Pricing of standard configuration with  accessories and services should be  quoted separately. |  |
| 19.7 | Pricing of Optional configuration and post  warranty terms should be quoted  separately. |  |
| 19.8 | Technical evaluation will be based on the  standard configuration with accessories  and services of the whole unit. Annexue---- |  |
| 19.9 | Commercial Evaluation will also be based  on the standard configuration with  accessories and services of the whole unit. |  |
| 20 | PRE-SHIPMENT INSPECTION |  |
| 20.1 | Pre-shipment inspection by two Radiologists will be arranged by bidder at his/her own cost. |  |
| 21 | Installation Requirements |  |
| 21.1 | Electrical work regarding MRI system including wiring of UPS, earthing & DB. |  |
| 21.2 | Air-conditioning including HVAC for MRI Magnet Room and split AC for Console Room |  |
| 22 | **Alternative Proposal.** |  |
| 22.1 | If any bidder elects to submit alternative proposal(s) complete information on the alternative items including all data relating to technical specifications in Vol. I, II & III shall be given as per Annexure “F”. |  |
|  | **Cost on C&F basis. (LC charges will be  borne by the vendor)** |  |
|  | **Cost on F.O.R. basis.** |  |