Amendment No.20

Date: 21.11.2014

Subject: Amendment no.20 to the Tender Enquiry Document for Sch.12, System A

Ref: (i) Tender Enquiry No.: HLL/PCD/PMSSY/AIIMS-II/11/13-14 dated 19.12.2013 and subsequent amendments published thereafter.

The revised technical specifications for Schedule 12, System A for Advanced High Energy Linear Accelerator System and Low energy LINAC are as follows:

Section VII
Technical Specifications

Schedule 12, System A

ADVANCED HIGH ENERGY LINEAR ACCELERATOR		
Please quote latest state-of-the-art machines capable of delivering advanced high precision Radio Therapy.		
A	**ESSENTIAL PARAMETERS**	
	Parameters	***Specifications***
1	Photon Energy	6 MV and 15 MV (BJR11)
	Electron Energy	Minimum 6 energies 4-18 MeV
2	RF Source	Magnetron / Klystron. Please specify
3	Waveguide Type	Standing / Travelling, Please specify
4	Electron Gun	Sealed / Unsealed
5	Treatment Modes	Normal - TSD / TAD
		Rotation - CW / CCW
		ARC - CW / CCW
		Dose rate - MU/degree
6	Dose-Rate	Photons: 100 - 600 MU/min in steps or higher dose rates. Please specify.
		Electrons: Minimum 600 MU/ minutes at the isocentre or higher. Please specify
7	Field Size - Photons	Maximum: 40 x 40 cm^2 (or more) Please specify
		Minimum: 0.5 x 0.5 cm^2 , Please specify.
		Penumbra: ≤ 8 mm for 10 x 10 cm^2 field at 10 cm depth
	Electrons	4-5 applicators, please specify
		A method to obtain irregular field shapes should be provided.
8	Beam Flatness	± 3% as defined in IEC 60976 / 60977 for entire range of field sizes.
		Stability of flatness with gantry rotation, please specify
9	Focal Spot size	≤3 mm dia. at the X-ray target
10	Beam Symmetry	±2 % for 10x10 cm^2 and above
11	Gantry	Rotation ±180° (360° total)
		Read out - Digital and Mechanical
		Accuracy dig-readout 0.5°
		Control - Hand pendent and control-console
		Target - Axis Distance : 100 ± 0.2 cm
		ODI Range : 75 cm to 150 cm
		ODI Accuracy ± 0.1 cm
		Gantry Rotation Isocentre ≤ 2 mm dia. Sphere. Please specify.
12	Collimator	Rotation: ± 95° about mid position
		Control: Hand pendent and control- console
		Readout accuracy : ± 0.5°
		Collimator Rotation Isocentre ≤ 2 mm dia. Sphere
		Virtual/ Dynamic Wedge
13	Asymmetric Collimators	X & Y both Asymmetrical
		Travel ranges & over travel range. Please specify
14	Multi-leaf collimator (MLC)	No. of Leaves (120 leaves and above) **please specify all options and quote separately for each option.**
		Independent drives for each leave

		Maximum field size 40x40 cm^2
		Please specify MLC motor specifications and endurance test report
		Capable of performing Conformal therapy (IMRT, SRT, SBRT) procedures.
		Interface between MLC & latest R&V System should be provided.
		Facility to treat patients conventionally, using blocks without MLC.
		Work Station HW/SW – Specify details
		In-Room monitor: please specify numbers and type
		Integration (full Networking) with Planning System and Simulator / CT Simulators etc.
		Specify following parameters:
		Max. leaf retracting position
		Over travel (jaws)
		Over center travel of MLC leaves (>10 cm) for IMRT treatments
		Max. field length
		Leaf height & material.
		Coincidence of light & x-ray field
		Penumbra
		Transmission
		Interleaf leakage
		Leaf position accuracy
		Max. carriage speed
		Max. leaf speed
		Positional accuracy of the leaves during treatment.
		Inter-digitation of leaves if available
15	Auto Field Sequencing	AFS should be available
16	Portal Imaging :	Latest software for analysis (MV/KV/DRR)
		Should fully integrate with Accelerator
		Should be able to take images at any Gantry angles with variable X-Y-Z movements, Robotics Arm with remote control.
		Imaging area should be 40 x 30 cm^2 with energy range 4 - 25 MV
		Should have latest Digital technology with High Resolution Imaging (Amorphous silicon flat panel technology) - please specify
17	IGRT System	Latest SW & HW
		Retractable arms
		X- ray tube: radiography, fluoroscopy, CBCT
		Flat panel detectors. Please specify resolution
		CBCT reconstruction, registration (MV-MV, KV-KV, KV-MV)
		Fully integrated with latest R & V system and TPS
		3D image data should be reconstructed from series of 2D projection images acquired as the linear accelerator gantry is rotated
		Phantoms used for dosimetry, please specify.
18	Treatment Couch	Versatile extended range couch with indexed immobilization
		Longitudinal, Lateral, Vertical and Rotation: please specify range of movements
		Electrical / Mechanical Control

		Control-Local and/or Remote
		Fully Carbon Fiber table top. Should have option for providing tools for fixing immobilisation devices.
		Electrical backup & Mechanical Control (in case of power failure)
		Minimum height from floor - specify
19	Networking	An open Record & Verify System latest version (HW & SW) for Linear accelerators
		Transfer of all parameters from Simulator, CT-simulators, MRI, PET-CT, PACS etc. & Treatment Planning System, and other TPS to the Linear Accelerator for automatic treatment setup & delivery should be provided.
		Transfer of DRR/ Fluoroscopy images through R&V system for comparison with portal imaging
		Transfer & Execution of Conformal & IMRT treatment plans from Treatment Planning System should be provided.
		All required interfaces should be provided.
		Transfer and execution of MLC position parameter for normal and IMRT treatment including step & shoot and/or dynamic and/or rotational IMRT techniques from TPS.
20	Accessories	Dynamic / Motorized / Physical Wedges. Please specify.
		Mechanical Front pointer (SSD indicator)
		Accessory mount - shadow block tray
		Blocks – set of divergent / non-divergent
		Side Rails on both sides of Couch for Mounting Accessories.
		CCTV Camera (Two no.s). One wide angle & one remote control with remote zoom & focus facility.
		In-room Colour flat Monitor LED 20” or higher
		Laser Alignment System (4 cross Green laser system)
		Interface Mount to be provided for Simulator to simulate accessories like Shadow Block Tray etc. of the quoted Accelerator model.
		Manual retraction tool (manual crank) for couch in case of power failure
21	Dosimetry System	Built-in chambers. Two separate sealed chambers
		Precision : ± 1% or 1 MU
		Linearity : ± 1% or 1 MU
		Reproducibility ± 2% or 1 MU
		Dose Rate Dependence :please specify
22	Safety System as per IEC / AERB standards	X-ray absorbed dose due to leakage radiation (excluding neutrons) outside useful beams (As per AERB)
		Emergency switches
		Door interlocks
		Collimator transmission: as per AERB specification- please specify
		Neutron dose inside the treatment area and outside the treatment area, as per international standards
		Various Beam off interlocks

23	Leakage Radiation as per IEC / AERB standards	Head leakage. Please specify.
		Collimator transmission. Please specify.
		Neutron Dose: Please specify
24	Treatment Planning System	**Five** workstations (**Two** dose calculation engines (licences) and **Three** contouring stations)
		Latest HW/SW, upgradable for next 10 yrs
		DICOM3 and full DICOM family
		DICOM RT Import/export from all existing CT/MR/PET/PACS/C-ARM etc
		Image registration (rigid / deformable)
		Atlas based contouring **(optional)**
		Specify dose calculation algorithm for 3DCRT / IMRT/ VMAT / Electrons / other.
		Import /export- Image/structure set /plan/ dose etc. to all machines and integration with network. (HW/SW)
		Server (backup/restore) – latest HW/SW and upgradable for next 10 yrs
		Latest Network colour Printer. Please specify.
25	Manuals / Data book	Operator, System and Schematic manuals.
26	Essential Spare Parts	Provide the list of standard spare parts supplied with the machine.
27	Upgradation	Accessories
		Hardware / Software upgrade for 10 years
28	UPS	for all above systems for minimum of 30 minutes.
29	**Dosimetry and QA**	**RADIATION THERAPY BEAM ANALYZER**
		Require a full-fledged three dimensional Water Phantom & Dosimetry System and therapy be analyser for performing Off-axis profiles, PDD, point dose measurement, beam symmetry tuning, D rate constancy check, vector scan and TG51 lead foil measurement for low and high energy Photon, electrons. All the measurements should be computer controlled and user friendly.
		All components comply with national and international regulations and safety rules. All components of the system; all available options are controlled by the same software that runs under Microsoft Windows of latest version of Windows 2000 and Windows XP. The system should suitable to measure pulsed radiation with fluctuation dose rate Ion Chamber:
		Necessary thimble ionization chamber should be there for measurement of field and reference signal plane parallel chamber should be there for electron measurement. The necessary holding devices extension cables for the above chambers must be included. The chamber specification should be quoted. The position accuracy should be better than ±0.1mm. The chambers should be properly calibrated and given necessary calibration certificate.

		The positioning tool should be there to allow easy and exact positioning of the chamber's geometric centre in the central beam and at the water surface. Apart from this the exact position of the chamber the radiation beam should be possible via software.
		The detector unit should be driven by stepper motor and step length should be adjustable in steps of mm. The scanning speed should be adjustable between 5mm/s and 50mm/s in 5mm/s small steps. Further the delay times for each step should also be adjustable by the user. The acceleration of the step movement should also be changed as and when required.
		The system should allow simultaneous movement in available direction for any vector scan
		The zero point, reference point and limit of the different detector units should be stored separately and permanently in the control unit.
		The control pendant should display the actual position of the chamber position at any given measuring time.
		Water Phantom/ Radiation Field Analyzer:
		The scanning volume should be large enough to scan and should not be less than 48x40x48 cm To avoid bending of the tank's walls by water pressure and water absorption of the acrylic material 1 wall thickness should be not less than 2.0 cm
		The motor of the moving mechanism should not touch not touch nor dip to the water to avoid mechanical stress to the acrylic tank.
		The reproducibility of a position should be ±0.1 mm throughout the whole phantom
		The digitally driven stepper motors should provide hysteresis free movements (stick and slip free).
		The lift table should be electrically as well as manually operable.
		The velocity of the vertical motion should be quoted and preferably should have two vertical velocities. The Water Tank must be rotatable into positions 0 degree, ± 45 degree and ±90 degree.
		A highly accurate Positioning device directly supplied by the principals must be included.
		Water reservoir
		The water reservoir should be large enough to store the water and can be pump and drain to the water phantom as quick as possible. The water Reservoir must be able to hold the entire weight of the water without any change
		The weight of the whole assembly can be push or pull though the wheel with polyethylene or equivalent. The lifting carriage should be electromechanical/elevating screw mechanism that keeps the height absolutely accurate
		The Lifting carriage and Water Reservoir must be imported and directly from the suppliers and must complete with all facilities including TPR and TMR measurements. Completely Integrated Lifting Carriage and Water Reservoir.

		The Water Reservoir must be compatible for TPR measurements and hence for TPR measurements 1 pump of the reservoir should drive automatically and electromagnetic valves makes sure that no water can flow the phantom tank to the reservoir during automatic TPR measurement.
		The water reservoir should have a safety circuit that avoids the dry pump running Control Unit/Electrometer:
		A separate control unit for controlling the movement of the detector in any three directions should possible.
		A separate electrometer to collect the ions/dose from the chamber/detector should be there The voltage to the chamber should be adjusted in the electrometer in steps of 50 V. The polarity of the chamber should be toggled between +/-. The electrometer should also be able to measure absolute doses for low and high energy photon and electron.
		The gain of the electrometer should be automatic depending upon the signal collected by the field and reference detector. Further the user should also be given an option to change the gain to field an reference separately.
		Necessary software to use the electrometer for absolute measurements should be provided.
		The time constant should allow 10ms measurement times.
		The external dosimeter should also be connecting to the water phantom.
		The control unit should permanently store zero point, reference point and limit points for water phantom, air scanner and mechanical film densitometer separately.
		These different sets of limits , zero and reference points can be retrieved independently.
		The co-ordinates of the probe should display for all directions, simultaneously on a control pendant.
		The control pendant can be attached either to the water tank or to the control unit.
		The communication between the control unit and the computer should performed by a standard RS23; interface.
		The high voltage for the probe should be switchable independently for each decreased in different voltage and sign of the measuring signal can be reversed.
		A solid, water equivalent phantom made up of slabs of different thicknesses shall be provided by the vendor for external beam teletherapy dosimetry. It shall be possible to use this phantom for both photon and electron beam dosimetry. The phantom shall be free of contaminants and air bubbles. The slab shall be of 30x30 cm or more size totalling a thickness of 30 cm.
		QA tools: Additional One Pressurised ION Chamber to be supplied.
		Control Computer:

		The latest version of windows computer should have all the latest features with colour monitor and with printer/plotter (colour) and branded UPS (45 min. back-up).
		The software:
		Measurements can be done against time, against a monitor signal or against reference chamber
		Within the moving range arbitrary points can be measured.
		An arbitrary vector scan measurement should be possible.
		Point dose measurement, Beam symmetry tuning and TG5I foil measurement should also be possible
		2D planes can be measured at any solid angle
		Isodose can be displayed and plotted that can constructed out of profiles and depth dose curves or measured matrices. The Isodose level should be freely closable Warning before unsaved date in the RAM should be overwritten.
		The Isodose levels can be chosen after the measurement and without the necessity to have the water phantom connected.
		Multiple closed Isodose lines and hot spots should be detected automatically.
		Single measuring points, complete curves and parts of curves should be re-measured from a user definable point.
		During the measurement the measuring curve should be display graphically and online on the screen.
		A special measuring program allows a dose rate constancy check including a statistical evaluation.
		Any kind of open, regular shaped, blocked or wedged field can be measured.
		Fields from asymmetric collimators can easily be measured.
		A special measuring routine for service purposes allows to easily checking the beam with respect to symmetry, flatness, homogeneity and energy.
		Implemented routines allow the measurement, formatting and transferring of basic date to all-important therapy planning systems.
		ION chamber based Survey meters to be provided.
		Secondary standard Dosimeter with appropriate thimble chamber and parallel plate chambers with latest calibrations to be provided. Including pin point chamber for small field dosimetry with phantoms, barometer and thermometer.
		Solid equivalent slab water phantom with adapters for the above mentioned chambers should be provided.
		Film Dosimetric software should be provided for treatment verification Administrative Data:
		Comprehensive documentation of the measured data by automatic saving of the used measuring environment should simplify the interpretation of data even a long time.

		The used measuring routine data can be reused either unchanged or with some of the parameter changed Data can be printed and plotted in numerical and graphical form on all printers and plotters that art supported by windows.
		The administrative data can be changed after saving the measuring data. All measuring data should furnished automatically with their administrative information and comprehensive filter function allows the easily selection of specific data.
		The necessary software to network the 3D TBA system with the 3D TPS in the department of Radiotherapy must be offered.
		Data analysis:
		Various normalization should possible viz. normalization to maximum for depth dose curves normalization to maximum or centre for profiles and normalization to maximum, enter, position and value for isodose lines.
		Homogeneity and symmetry should be calculated automatically and various national and international protocols can be selected.
		Depth dose curves can be analyses according to the protocols DIN 6800/2 IAEA TR277, ICRU 35 CRMRI no.2, AAPM TH21/TG 25 and NACP.
		Data transfer and data presentation
		Modules should allow automatic formatting and transferring of measured data to treatment planning system available in the department.
		The measured data can be stored in two different ASCII formats (with selectable separation characters).
		ASCII -data can be sent from external computers and be imported in to the water phantom software Image date for film dosimetry can be imported in to water phantom software. Data can be display graphically on the screen.
		Crosshairs should allow the easy manual evaluation of a curve.
		Plotting / printing of the measured data and correction functions can be printed (alphanumerically) and plotted (graphically).
		ARRAY DETECTOR
		One Array device must be based on ion chamber array resulting in an effective measuring field of 27 cm x 27 cm and giving the facility to use with slab phantom for measurements. The chamber must be vented plane-parallel square shaped ion chambers with 5mmx5mmx5mm size and centre to centre spacing must be 10mm.
		It should be able to use for the dose verification of IMRT beams and routine quality control of high energy photon and electron beams by using the software and also it should be able to check the MLC leaf positioning. It should be able to measure the dose from dynamic and static fields in one run and display the readings in both dose rate and absorbed dose mode.
		It should be able to perform the QA for high energy beams and dose verification for IMRT, IMAT, ARC beam techniques. It should be capable of doing complete pre-treatment patient plan verification with on measurement.

		Cylindrical & Rotational Phantom with inclinometer, lifting trolley & complete drive assembly with related software module for VMAT dynamic IMRT techniques. There should be a slot & provision to insert the 2D Ion Detector Array System into the Rotational Phantom for taking synchronous measurements with the Linac Gantry Rotation. The detector should always be perpendicular to the beam & thus removing the angular dependence.
		The software should have the functionality like 3D volume analysis and CT overlay.
		One additional Array Device with 900 or above liquid filled ionisation chamber for patient plane verification & quality control of small fields. Detector spacing should be 2.5mm & the maximum fit size should be above 10x10 cm & below 12 x 12cm essentially for use with Small field dosimetry. The Array device should also be usable for Stereotaxy work This Array device should be usable with the Cylindrical & Rotational Phantom
		One parallel plate chamber for electron dosimetry, one number of pin point chamber for small fit dosimetry along with the calibration certificate for all these chambers.
		Calibrated Barometer and thermometer to be included.
		26. Immobilization devices
		4 set Universal treatment base plate Made of Carbon Fibre Immobilization devices having a total solution to treat Paediatric to Adult, Head and Head & Neck Breast, Thorax, Abdomen, Pelvic with facility to make custom made Supine and prone head rest for Individual Patients to maintain an accuracy of less than 2mm. along with appropriate thermo Sheets 200 no.s: 40 for head, 40 H&N, 40 for breast, 40 for thorax, 40 for abdomen and pelvic.
		The same base plate shall be upgraded by adding localizer box, thorax abdomen bridges, wedges, Upper Arm support, lower arm support, Indexed Couch stoppers, knee rest, feet fix to adopt for SBRT and SRS/SRT frameless and there shall be 4 set of each to be provided.
		The vendor shall provide 4 set of carbon fibre based Head rest, prone Head rest universal, Paediatric Supine, Cushion for shoulder. Breast board Carbon fibre with all required Accessories.
		The vendor shall also provide the following :
		1. Water bath with digital Temperature control - 1 no
		2. Bolus : 0.5cm - 3 no.s & 1.0cm - 3 no.s
		3. Body calliper - 2 no.s
		4. Heat Gun - 1 no
		5. Essential tools set - 1 no
		6. Electron Foam cutter - 1 no
		7. CT markers - 300 no.s
		8. Alloy dispenser - 1 no
		9. Melting Alloy - 20 Kg
		10. Styrofoam foam 30 x 30 x 1.5 cm - 100 nos.
		11. Vacuum cushions

		12. For Head and Neck - 6 no.s
		13. For Thorax - 10 no.s
		14. For Abdomen - 10 no.s
		15. And for whole body - 10 nos.
		16. Suitable Vacuum pump - 1 no
B	**OPTIONAL ITEMS : (price to be quoted separately)**	
1	Beam Matching	Beam Matching for 6MV (for transferring of patient) with Low Energy Linear Accelerator.
2	Flattening Filter Free beam	Unflattened beam, please specify energy
3	Volumetric Arc delivery	Volumetric Arc delivery
4	4D-Gating	HW/SW
C	**INSTALLATION REQUIREMENTS :** please specify the following details	
1	Physical Dimensions and Weights	Modulator
		Stand
		Gantry
		Auxiliary cabinet
		Patient Treatment Couch
		Control Console
2	Electrical Requirements	Load - Standby
		Ready
		Beam ON
		Input Voltage -Typical International:
3	Cooling Water (please specify)	Temperature
		Flow
		Pressure difference (To specify)
4	Air Conditioning	Temperature
		Relative Humidity
		Air changes (To specify no. per hour)
5	**SITE - MODIFICATION :**	**The Site - Modification Scope of Work – Advanced High Energy LINAC**
		1. 1. The prospective bidders shall inspect the proposed site for ADVANCED HIGH ENERGY LINAC at each of the AIIMS (Bhubaneswar, Jodhpur, Raipur, Bhopal, Patna, and Rishikesh) and Dr. Rajendra Prasad Govt. Medical College, Tanda before submission of tender.
		2. Tenderers are advised to acquaint themselves with access to site, location of work, local labour problems and any other matter relating to availability and carriage of construction materials. Adopting standard operation/ incorporating IG procedure for GRIHA requirement during construction/ post construction.

	3. The construction of the concrete shell of the Bunker (LINAC ROOM) is in the scope of the respective institute. The Site - Modification work shall include all other site preparation work required the installation and functioning of ADVANCED HIGH ENERGY LINAC at the proposed site.
	4. The bidders are required to submit the plan for the ADVANCED HIGH ENERGY LINAC Centre on a Site - Modification basis. The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Air-conditioning and Fire fighting for the construction of ADVANCED HIGH ENERGY LINAC Centre.
	5. The scope of work as per regulatory guidelines will be provided and finalised by HLL and respective AIIMS / RPGMC, Tanda.
	6. The bidder should inspect the site and submit the required structural and architectural drawings along with the bid.
	7. The bidder has to work in conjunction with the consignee institute to facilitate all statutory local and regulatory approvals.
	8. While preparing the plan, the following aspects have to be addressed.
	a) Care should be taken to provide easy negotiation of the patient stretchers / trolleys through corridors and doors.
	b) Adequate Radiation shielding as per AERB norms
	c) Furniture like desk, chairs, shelves etc.
	d) Patient stretcher and other furniture / accessories to make the ADVANCED HIGH ENERGY LINAC functional.
	9. The cost of Site - Modification work for the area measuring 220m^2 and Air-conditioning of 27 TR capacity will be considered for Ranking / Evaluation purpose.
	10. Bidders have to quote the Unit Rates of the following components of Site - Modification work and detailed BOQ should be mentioned:
	a) Civil works - sq.ft/cubic ft, running metre, Kg etc
	b) Electrical work like per metre price, unit price for panel, isolation, etc
	c) Public health (plumbing and sanitary fittings) like per metre length of pipe, number of points, etc
	d) Air Conditioning (HVAC) – rate per tonnage, type of false ceiling and sq.ft rate, etc
	e) Interior Furnishing & Furniture
	f) Miscellaneous
	Scope of work for Site - Modification work :
	The bidder should inspect the proposed site and submit all the detailed structural and architectural drawings and BOQ for the proposed ADVANCED HIGH ENERGY LINAC Centres along with technical bid of the tender.
	The ADVANCED HIGH ENERGY LINAC CENTRE shall consist of the following rooms:
	a. LINAC Treatment Room
	b. Control room
	c. Equipment room

		d. Change room
		e. Treatment Planning Room
		f. Patient waiting area
		g. Chiller room / enclosure
		h. AHU room
		Construction work to be done as per the final plan / scheme approved by the Consignee.
		The actual area of Site - Modification work done will be considered for payment, based on the site measurements and the unit rate quoted by the bidder.
		CIVIL WORK
		1. Construction / modification work including construction of brick wall if any, plastering, flooring as per the approved plan and equipment layout plan.
		2. Construction renovation/ modification demolition, exaction, filling work including construction of full or half brick wall if required, plastering, flooring as per the approved plan and equipment layout plan. Necessary openings/ niches/ cut-outs, wherever required as per drawings and asked for by the Engineer-In-Charge, shall be provided by the contractor without any extra cost.
		3. Making surface good for floor modification for installing the LINAC.
		4. Platform for unloading and shifting the LINAC; if necessary.
		5. Cable tray, trench & channel – necessary trenches, cable tray and channels at required locations.
		a) Flooring
		1. 600 x 600 mm vitrified tiles with 100mm tile skirting to match in LINAC room , control room, lobby and patient preparation areas, Consultant's room, TPS room etc.
		2. 50 mm thick cement concrete flooring with Vinyl flooring in LINAC equipment / UPS room.
		Note: Providing and laying approved quality, colour, design and shade fully homogeneous 600 x 600mm (thickness to be specified by the manufacturer) Vitrified tile flooring (Marbonite or Granamite, confirming to IS code 15622 with water absorption less than 0.08%) flooring in pattern as detailed in drawing or as directed by the EIC and grouted with matching colour approved quality readymade grout, curing, cleaning etc to required line level etc. all complete at all leads, lifts and heights to the entire satisfaction of the EIC. Providing and fixing 2-3mm thick POP protection over polythene covering sheet to flooring areas till handed over and cleaning, etc all complete as per drawings & specification and as directed by EIC with 100mm tile skirting to match in LINAC room, control room, lobby and patient preparation areas, consultant's room, TPS room etc.
		Mode of measurement (finished surface area of the tiles shall be measured and paid. Rate shall be inclusive of providing and laying levelling course, PVC spacers, providing and applying epoxy grout and no additional payment shall be made for wastage.

		3. 50 mm thick cement concrete flooring at all heights and locations including scaffolding, preparing the surfaces, neat cement finishing to correct line or as required to receive architectural finish, level and plumb, curing where ever required complete as per specifications and drawings, with Vinyl flooring in LINAC equipment/UPS room.
		4. The entire complex will be made rodent/pest proof.
		b) Painting
		1. Two coats Plastic Emulsion Paint over 2 coats of wall putty including primer in all areas except LINAC ROOM.
		2. LINAC ROOM Walls – High quality High density Vitrified Tiles clad on the side walls up to false ceiling.
		Note: Providing all tools, tackles, materials, manpower for applying plastic enamel paint over 2 coats of wall putty including primer in all areas except LINAC ROOM, of approved brand and manufacture and approved shade finished with roller to wall & ceilings surfaces, in 2 coats over a coat of approved quality primer on the plastered/ POP surface, POP board/ gypsum board surfaces including scaffolding, preparation of surface, sanding, light sanding, work platform, painting equipment/ apparatus etc. required to complete interior grade finish etc. at all heights & levels complete as per drawings & specification and as directed by EIC.
		3. LINAC ROOM Walls – High quality High density Vitrified Tiles clad on the side walls up to false ceiling.
		c) False Ceiling
		Acoustical tile for ceiling with light weight insulating material of high quality supported on grid or finished seamless with support above ceiling. Finished with white paint or powder coated with white paint, if metallic. Ceiling height to suit the equipment mount and clearances.
		PLUMBING WORK
		1. All water pipes and fittings shall be of high density polythene of approved and standard make. The gratings shall be brass chrome plated. All plumbing accessories should be of standard make.
		2. Chiller Piping and control panel.
		Note:
		1. Tenderers are advised to visit the site of work to acquaint themselves about the levels of sub soil water, drainage facility for dewatering, accessibility to site etc. and quote the rates accordingly.
		2. All sanitary wares & CP brass fitting & fixtures shall be of first quality with ISI mark (unless otherwise specified) and shall be of the make as per the latest approved list of materials as per list of approved make/model, if any. They shall be got approved by the Engineer-in-charge before incorporating in the work.
		3. All the items include testing after completion of the work. Concealed/underground GI pipe line is to be wrapped with hessian cloth and painted with two coats of anticorrosive paint.

		Disposing off: The surplus excavated materials by mechanical transport lead up to 2KM to the nearby dumping pits/dumping areas within AIIMS / RPGMC Tanda campus identified by Engineer-in-charge, including all lifts, loading, unloading, stacking etc. complete as per specifications & as directed by the EIC.
		ELECTRICAL WORK
		1. The supplier shall be required to specify the total load requirements for the LINAC centre including the load of air conditioning , room lighting and for the accessories if any. The supply line will be provided by the Institute up to one point within the LINAC centre. The mains panel & distribution panel should be provided by the supplier. Few lights in each room shall be connected to the UPS to provide emergency lighting.
		2. The electrical work shall include the following:
		a. Wiring – All interior electrical wiring- with main distribution panel board, necessary MCBs, DB, joint box, switch box etc. the wires shall be of copper of different capacity as per the load and should be renowned make as listed below.
		b. All the internal wiring including that of telephone, LAN, DICOM & PACS etc. will be of concealed variety.
		c. Double earthling with copper plate for the LINAC and all accessories should be as well as the earthing for the AC should be done by the supplier.
		d. Switches light and power points should be of modular type and of standard make as listed below.
		e. General lights – Mirror optical type 1X28 W or 2X28 W/CFL fittings 2X36, 3X36 W with electronic ballasts
		All wires used must be FRLS (Fire Retardant with low smoke) type only
		AIR CONDITIONING:
		All rooms mentioned above need to be air-conditioned. Package Air Conditioners and split AC units may be used according to room requirement and suitability. Humidity control should be provided to effectively eliminate moisture condensation on the equipment. The Air conditioning system should be designed with standby provision to function 24 x 7.
		The outdoor units of AC should have grill coverings to prevent theft and damage.
		Ventilation is required in toilet.
		Environment specifications:
		a) Humidity range: Relative humidity 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment.
		b) Temperature ranges: 22 +/- 2° C in all areas throughout the year, except equipment room which shall be as per requirement of the equipment.
		c) Air conditioning load: The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the supplier.

FURNITURE:
a) Revolving chairs height adjustable, medium-back with hand-rest – 6no.s.
b) Chairs for patient waiting area – Three-seater (chrome plated). - 4 no.s.
c) Cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement. – 4 no.s.
d) Drug trolleys for patient preparation area. – 1no.
e) Patient trolley with rubber foam mattress to be kept in the patient preparation room. - 2 no.s.
f) Name boards for all rooms. All the rooms in the complex will be signposted.
g) Sun film & ventilation blinds will be put up in all windows.
h) Tables for all Workstations.
i) Changing rooms should have change lockers and dressing table.
j) Dustbins (plastic with lid) - 10 no.s.
All furniture items should be of standard make as mentioned in the table below.
FIRE SAFETY MEASURE:
1. A fire alarm system of reputed make with smoke/ heat detectors, indicator panels, call boxes, electronic sirens and wiring will be installed. Audio call bell system with intercom & remote locking /unlocking facility to be provided at the main door of the complex.
2. Supplying, Installing Dry chemical power type fire extinguisher of 5kgs capacity, with initial filling in brand new cylinder with power coated finish, fitted with Gun metal union, high pressure CO2 gas cartridge, discharge hose, wall mounting bracket etc. complete, confirming to IS:2171 of approved make & complete as directed by EIC.
MISCELLANEOUS:
1. LED X-ray Film viewer with adjustable brightness; capable of holding 3 films of 14”x17” size. – 4 no.s.
2. Cabling of Network (LAN) connectivity and required CISCO switches for networking the LINAC, TPS, CT simulator, Brachytherapy and any other workstation used within the site.
3. Broadband connection with static IP for REMOTE SERVICE of LINAC system.
SUGGESTED MANUFACTURERS / BRANDS:
A . **FLOORING :** VITRIFIED TILES - Somany, Kajaria , H&R Johnson, Marbonite, Granamite
B . **PAINT** :- Dulux, Asian Paints , Nerolac
C . **PLUMBING** : - Kohler, Jaguar , Grohe , Roca
D . **SANITARY ITEMS** :- CERA, Hindware, Parryware
E . **ELECTRICAL -**
1. CABLES - Finolex, Havells ,V-Guard
2. SWITCHES - Legrand, L&T, Crabtree , Roma
3. DISTRIBUTION BOX , MCB - Legrand, L&T, Siemens, Havels

		4. LIGHT FITTINGS - Philips / Crompton / Wipro.
		F . **AIR CONDINTIONING: -** Daikin, Hitachi, Blue Star, Voltas.
		G . **FURNITURE :** - Hermen Miller , Godrej , Featherlite
		GENERAL POINTS for Site - Modification :
		1. All items of work under this contract shall be executed strictly to fulfil the requirements laid down under "Basis of design" in the specifications. Type of equipment, material specification, methods of installation and testing and type of control shall be in accordance with the specifications, approved shop drawings and the relevant Indian Standards, however capacity of each component and their qualities shall be such as to fulfil the above mentioned requirement.
		2. The rate for each item of work included in the schedule of quantities shall, unless expressly stated otherwise, include cost of;
		3. All materials, fixing materials, accessories, appliances tools plants, equipment, transport, labour and incidents required in preparation for and in the full and entire execution, testing, balancing, commissioning and completion of work called for in the item and as per specifications and drawings.
		4. Wastage on materials and labour.
		5. Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and for the job in accordance with the contract documents, good practice and recognize principles.
		6. Mode measurement shall be as per specification.
		7. In the event of conflict between schedule of quantities and other documents including the specifications, the most stringent shall apply. The interpretation of the Architect/ Engineer shall be final and binding.
		The following items to be quoted as OPTIONAL (price to be quoted separately)
		1. Closed circuit cameras of reputed company should be provided in the examination room, console room, linear accelerator and waiting areas.
		2. Patient waiting hall: Provision of 42" size flat screen colour television with close cabinet & DTH disc with setup box & CD/DVD Player.
		3. Music system for all rooms and waiting areas in the centre.
	Any requirements for installation of equipments should be mentioned; otherwise handing over fully functional machine will be the responsibility of the vendor.	
D	**FINANCIAL BID** (specify separately for desirable items)	Separately
		Cost
		Quote separately for equipment, R&V and MLC
		Insurance up to installation & commissioning approval by AERB

		Transport and rigging
		Installation
		Essential spare parts
		Up-gradation of equipment
E	**VALIDITY OF QUOTATION**	Please specify
F	**WARRANTY:** applicable from the date of commissioning approval by AERB.	**5 Years for complete System and 5 years CMC**: includes 4 preventive maintenance/ year and all breakdown visits. All bought out items used in system / supplied by the bidder should also be included in the warranty.
G	**INDIVIDUAL WARRANTY.** Please specify No. of Years	1. Accelerator Guide (Beam Centre Line)
		2. Bending Magnet
		3. Electron Gun
		4. Vacuum Pumps
		5. X-ray Target
		6. RF Source: Magnetron/Klystron
H	**UPTIME GUARANTEE (95 %) / PENALTY CLAUSE**	Uptime of at least 280 days per year (9 am to 9 pm - excluding Sundays and holidays) during warranty or CMC / AMC period. The time will be calculated 2 hours after the reporting to engineer/ company by phone or email till engineers hand over the machine for treatment. In case of failure the compensation of Rs. 30,000 per day or part there of the lost period will be payable to respective AIIMS / RPGMC, TANDA.
I	**DELIVERY SCHEDULE**	Please specify
J	**TRAINING OF STAFF**	Radiation Oncologist
		Medical Physicist
		Radiotherapy technologist
K	**EQUIPMENT CERTIFICATION**	AERB type approval: please enclose certification.
		US FDA / CE approvals: please enclose certification(s).
		Enclose certification of calibration and inspection
		Log book with instruction for daily, weekly, monthly, quarterly and yearly maintenance check list.
L	**OTHER INFORMATION**	No. of similar models: India / World (enclose list of institutions)
		No. of certified engineers in India
		(enclose list of names)
		Remote Diagnostics Facility (India / Abroad) availability
		All consumables required for installation, standardization testing of system should be included in the cost
		One digital camera for patient position photograph
		A two-way communication system
		Provide compliance to all points listed above
M	**ANY OTHER DETAILS**	Please specify

LOW ENERGY LINEAR ACCELERATOR		
Please quote latest state-of-the-art machines capable of delivering advanced high precision Radio Therapy.		
A	**ESSENTIAL PARAMETERS**	
	Parameters	***Specifications***
1	Photon Energy	6 MV (BJR 11)
2	RF Source	Magnetron / Klystron. Please specify
3	Waveguide Type	Standing / Travelling, Please specify
4	Electron Gun	Sealed / Unsealed
5	Treatment Modes	Normal - TSD / TAD
		Rotation - CW / CCW
		ARC - CW / CCW
		Dose rate - MU/degree
6	Dose-Rate	100 - 600 MU/min in steps or higher dose rates. Please specify.
7	Field Size	Maximum - 40 x 40 cm^2 (or more) Please specify
		Minimum - 0.5 x 0.5 cm2 Please specify.
		Penumbra ≤ 10mm for 10 x 10 cm^2 field at 10 cm depth
8	Beam Flatness	± 3 % as defined in IC 60976 / 60977 for entire range of field sizes.
		Stability of flatness with gantry rotation, please specify
9	Focal Spot size	≤ 2 mm dia. at the X-ray target
10	Beam Symmetry	± 2 % for 10x10 cm^2 and above
11	Gantry	Rotation ±180° (360° total)
		Read out - Digital and Mechanical
		Accuracy dig-readout 0.5°
		Control - Hand pendent and control-console
		Target - Axis Distance : 100 ± 0.2 cm
		ODI Range : 75 cm to 150 cm
		ODI Accuracy ± 0.1 cm
		Gantry Rotation Isocentre ≤ 2 mm dia. Sphere. Please specify.
12	Collimator	Rotation: ± 95° about mid position
		Control : Hand pendent and control-console
		Readout accuracy : ± 0.5°
		Collimator Rotation Isocentre ≤ 2 mm dia. Sphere. Please specify.
13	Asymmetric Collimators	X & Y both Asymmetrical
		Travel ranges & over travel range. Please specify
14	Multi-leaf collimator (MLC)	No. of Leaves (80 leaves and above) ; **please specify all options and quote separately for each option.**
		Independent drives for each leave
		Please specify MLC motor specifications and endurance test report
		Capable of performing Conformal therapy (IMRT, SRT, SBRT) procedures.
		Interface between MLC & latest R&V System should be provided.
		Maximum field size 40x40 cm^2
		Leaf width at isocentre ≤ 10 mm

		Facility to treat patients conventionally, using blocks without MLC.
		Work Station HW/SW – Specify details
		Integration (full Networking) with Planning System and Simulator / CT Simulator.
		Specify following parameters:
		Max. leaf retracting position
		Over travel (jaws)
		Over center travel of MLC leaves (>10 cm) for IMRT treatments
		Max. Field length.
		Leaf height & material.
		Coincidence of light & X-ray field
		Penumbra
		Transmission
		Interleaf leakage
		Leaf position accuracy
		Max. carriage speed
		Max. leaf speed
		Positional accuracy of the leaves during treatment.
		Inter-digitation of leaves if available
15	Auto Field Sequencing	AFS should be available
16	Portal Imaging :	Latest software for analysis (MV/KV/DRR)
		Should fully integrate with Accelerator
		Should be able to take images at any Gantry angles with variable X-Y-Z movements, Robotics Arm with remote control.
		Imaging area should be 40 x 30 cm^2 with energy range 4 -25 MV
		Should have latest Digital technology with High Resolution Imaging (Amorphous silicon flat panel technology)- please specify
17	IGRT System	Latest SW & HW
		CBCT
		Flat panel detectors. Please specify resolution
		CBCT reconstruction, registration (MV-MV, KV-MV)
		Fully integrated with latest R&V system and TPS
		3D image data should be reconstructed from series of 2D projection images acquired as the linear accelerator gantry is rotated.
18	Treatment Couch	Versatile extended range couch with indexed immobilization Movements: Longitudinal, Lateral, Vertical and Rotation
		Electrical / Mechanical Control
		Control-Local and/or Remote
		Fully Carbon Fibre table top. Should have option for providing tools for fixing immobilisation devices.
		Minimum height from floor - specify
19	Networking	Connectivity to Record & Verify System
		Transfer of all parameters from Treatment Planning System for automatic treatment setup & delivery should be provided.

		Transfer of DRR/ Fluoroscopy images through R&V system for comparison with portal imaging
		Transfer & Execution of Conformal & IMRT treatment plans from Treatment Planning System should be provided.
		All required interfaces should be provided.
		Transfer and execution of MLC position parameter for normal and IMRT treatment including step & shoot and/or dynamic and/or rotational IMRT techniques from TPS.
20	Accessories	Dynamic / Motorized / Physical Wedges. Please specify.
		Front pointer - mechanical
		Accessory mount - shadow block tray
		Blocks – divergent / non-divergent
		Side Rails on both sides of Couch for Mounting Accessories.
		CCTV Camera (Two no.s) One wide angle & one remote control with remote zoom & focus facility.
		In-room Colour flat Monitor LED 20" or higher
		Laser Alignment System (4 cross Green laser system)
		Interface Mount to be provided for Simulator to simulate accessories like Shadow Block Tray etc. of the quoted Accelerator model.
		Manual retraction tool (manual crank) for couch in case of power failure
21	Dosimetry System	Built-in chambers. Two separate sealed chambers
		Precision : ± 1% or 1 MU
		Linearity : ± 1% or 1 MU
		Reproducibility ± 2% or 1 MU
		Dose Rate Dependence :please specify
22	Safety System as per IEC / AERB standards	Door interlock
		Emergency switches
		Various Beam off interlocks
23	Leakage Radiation as per IEC / AERB standards	Head leakage. Please specify.
		Collimator transmission. Please specify.
24	Treatment Planning System	**Four** workstations (**Two** Dose calculation engines (licences) and T**wo** floating contouring licences).
		Latest HW/SW upgradable for next 10 yrs
		Dicom3 and full DICOM family
		Import/export from all existing CT/MR/PET/PACS/C-ARM etc
		Image registration (rigid / deformable)
		Atlas based contouring **(optional)**
		Specify dose calculation algorithm for 3DCRT/ IMRT / VMAT / Electrons / other.
		Import /export- Image/structure set/plan/ dose etc. to all machines and integration with the network. (HW/SW)
		Server (backup/restore) – latest HW/SW and upgradable for next 10 yrs
		Latest colour Network Printer. Please specify.
25	Manuals / Data book	Operator, System and Schematic manuals.
26	Essential Spare Parts	Provide the list of standard spare parts supplied with the machine.

27	Up-gradation	Accessories
		Hardware / Software upgrade for 10 years
28	UPS	for all above systems for minimum of 30 minutes.
B	**OPTIONAL ITEMS : (price to be quoted separately)**	
1	Electrons	If Available please mention details
2	Beam Matching	Beam Matching for 6MV (for transferring of patient) with High Energy Linear Accelerator.
3	Volumetric Arc delivery	Volumetric Arc delivery
4	4D-Gating	HW/SW
5	IGRT with KV imaging	Retractable arms
		X- ray tube: radiography, fluoroscopy, CBCT
6	**Software subscription for entire system**	**Please quote.**
C	**INSTALLATION REQUIREMENT :** please specify the following details	
1	Physical Dimensions and Weights	Modulator
		Stand
		Gantry
		Auxiliary cabinet
		Patient Treatment Couch
		Control Console
2	Electrical Requirements	Load - Standby
		Ready
		Beam ON
		Input Voltage -Typical International:
3	Cooling Water (please specify)	Temperature
		Flow
		Pressure difference (To specify)
4	Air Conditioning	Temperature
		Relative Humidity
		Air changes (To specify no. per hour)
5	**THE SITE - MODIFICATION**	**The Site - Modification Scope of Work – Low Energy LINAC**
		1. 1. The prospective bidders shall inspect the proposed site for LOW ENERGY LINAC at each of the AIIMS (Bhubaneswar, Jodhpur, Raipur, Bhopal, Patna and Rishikesh) and Dr. Rajendra Prasad Govt. Medical College, Tanda before submission of tender.
		2. Tenderers are advised to acquaint themselves with access to site, location of work, local labour problems and any other matter relating to availability and carriage of construction materials. Adopting standard operation/ incorporating IG procedure for GRIHA requirement during construction/ post construction.

		3. The construction of the concrete shell of the Bunker (LINAC ROOM) is in the scope of the respective institute. The Site - Modification work shall include all other site preparation work required the installation and functioning of LOW ENERGY LINAC at the proposed site.
		4. The bidders are required to submit the plan for the LOW ENERGY LINAC Centre on a Site - Modification basis. The scope of work includes complete Civil work, Electrical, Plumbing, Furnishing, Air-conditioning and Fire fighting for the construction of LOW ENERGY LINAC Centre.
		5. The scope of work as per regulatory guidelines will be provided and finalised by HLL and respective AIIMS / RPGMC, Tanda.
		6. The bidder should inspect the site and submit the required structural and architectural drawings along with the bid.
		7. The bidder has to work in conjunction with the consignee institute to facilitate all statutory local and regulatory approvals.
		8. 2. While preparing the plan, the following aspects have to be addressed.
		a) Care should be taken to provide easy negotiation of the patient stretchers / trolleys through corridors and doors.
		b) Adequate Radiation shielding as per AERB norms
		c) Furniture like desk, chairs, shelves etc.
		d) Patient stretcher and other furniture / accessories to make the functional.
		9. The cost of Site - Modification work for the area measuring 200m^2 and Air-conditioning of 24 TR capacity will be considered for Ranking / Evaluation purpose.
		10. Bidders have to quote the Unit Rates of the following components of Site - Modification work and detailed BOQ should be mentioned:
		a) Civil works like sq.ft/cubic ft, running metre, Kg etc
		b) Electrical work like per metre price, unit price for panel, isolation, etc
		c) Public health (plumbing and sanitary fittings) like per metre length of pipe, number of points, etc
		d) Air Conditioning (HVAC) – rate per tonnage, type of false ceiling and sq.ft rate, etc
		e) Interior Furnishing & Furniture
		f) Miscellaneous works
		Scope of work for Site - Modification work :
		The bidder should inspect the proposed site and submit all the detailed structural and architectural drawings and BOQ for the proposed LOW ENERGY LINAC Centre along with technical bid of the tender.
		The scope of work as per regulatory guidelines will be provided and finalised by HLL and respective AIIMS. The bidder should inspect the site and submit the required structural and architectural drawings along with the bid.
		The LOW ENERGY LINAC CENTRE shall consist of the following rooms:
		a) LINAC Treatment Room

		b) Control room
		c) Equipment room
		d) Change room
		e) Treatment Planning Room
		f) Patient waiting area
		g) Chiller room / enclosure
		h) AHU room
		Construction work to be done as per the final plan / scheme approved by the Consignee.
		The actual area of Site - Modification works done will be considered for payment, based on the site measurements and the unit rate quoted by the supplier.
		CIVIL WORK
		1. Construction / modification work including construction of brick wall if any, plastering, flooring as per the approved plan and equipment layout plan.
		Construction renovation/ modification demolition, exaction, filling work including construction of full or half brick wall if required, plastering, flooring as per the approved plan and equipment layout plan. Necessary openings/ niches/ cut-outs, wherever required as per drawings and asked for by the Engineer-In-Charge, shall be provided by the contractor without any extra cost.
		2. Making surface good for floor modification for installing the LINAC.
		3. Platform for unloading and shifting the LINAC; if necessary.
		4. Cable tray, trench & channel – necessary trenches, cable tray and channels at required locations.
		a) Flooring
		1. 600 x 600 mm vitrified tiles with 100mm tile skirting to match in LINAC room , control room, lobby and patient preparation areas, Consultant's room, TPS room etc.
		2. 50 mm thick cement concrete flooring with Vinyl flooring in LINAC equipment / UPS room.
		Note: Providing and laying approved quality, colour, design and shade fully homogeneous 600 x 600mm (thickness to be specified by the manufacturer) Vitrified tile flooring (Marbonite or Granamite, confirming to IS code 15622 with water absorbtion less than 0.08%) flooring in pattern as detailed in drawing or as directed by the EIC and grouted with matching colour approved quality readymade grout, curing, cleaning etc to required line level etc. all complete at all leads, lifts and heights to the entire satisfaction of the EIC. Providing and fixing 2-3mm thick POP protection over polythene covering sheet to flooring areas till handed over and cleaning, etc all complete as per drawings & specification and as directed by EIC with 100mm tile skirting to match in LINAC room, control room, lobby and patient preparation areas, consultant's room, TPS room etc.

		Mode of measurement (finished surface area of the tiles shall be measured and paid. Rate shall be inclusive of providing and laying levelling course, PVC spacers, providing and applying epoxy grout and no additional payment shall be made for wastage.
		3. 50 mm thick cement concrete flooring at all heights and locations including scaffolding, preparing the surfaces, neat cement finishing to correct line or as required to receive architectural finish, level and plumb, curing where ever required complete as per specifications and drawings, with Vinyl flooring in LINAC equipment/UPS room.
		4. The entire complex will be made rodent/pest proof.
		b) Painting
		1. Two coats Plastic Emulsion Paint over 2 coats of wall putty including primer in all areas except LINAC ROOM.
		2. LINAC ROOM Walls – High quality High density Vitrified Tiles clad on the side walls up to false ceiling.
		Note: Providing all tools, tackles, materials, manpower for applying plastic enamel paint over 2 coats of wall putty including primer in all areas except LINAC ROOM, of approved brand and manufacture and approved shade finished with roller to wall & ceilings surfaces, in 2 coats over a coat of approved quality primer on the plastered/ POP surface, POP board/ gypsum board surfaces including scaffolding, preparation of surface, sanding, light sanding, work platform, painting equipment/ apparatus etc. required to complete interior grade finish etc. at all heights & levels complete as per drawings & specification and as directed by EIC.
		3. LINAC ROOM Walls – High quality High density Vitrified Tiles clad on the side walls up to false ceiling.
		c) False Ceiling
		1. Acoustical tile for ceiling with light weight insulating material of high quality supported on grid or finished seamless with support above ceiling. Finished with white paint or powder coated with white paint, if metallic. Ceiling height to suit the equipment mount and clearances.
		PLUMBING WORK
		1. All water pipes and fittings shall be of high density polythene of approved and standard make. The gratings shall be brass chrome plated. All plumbing accessories should be of standard make.
		2. Chiller Piping and control panel.
		Note:
		1. Tenderers are advised to visit the site of work to acquaint themselves about the levels of sub soil water, drainage facility for dewatering, accessibility to site etc. and quote the rates accordingly.
		2. All sanitary wares & CP brass fitting & fixtures shall be of first quality with ISI mark (unless otherwise specified) and shall be of the make as per the latest approved list of materials as per list of approved make/model, if any. They shall be got approved by the Engineer-in-charge before incorporating in the work.

		3. All the items include testing after completion of the work. Concealed/underground GI pipe line is to be wrapped with hessian cloth and painted with two coats of anticorrosive paint.
		Disposing off: The surplus excavated materials by mechanical transport lead up to 2KM to the nearby dumping pits/dumping areas within AIIMS campus identified by Engineer in charge, including all lifts, loading, unloading, stacking etc. complete as per specifications & as directed by the EIC.
		ELECTRICAL WORK
		1. The supplier shall be required to specify the total load requirements for the LINAC centre including the load of air conditioning , room lighting and for the accessories if any. The supply line will be provided by the Institute up to one point within the LINAC centre. The mains panel & distribution panel should be provided by the supplier. Few lights in each room shall be connected to the UPS to provide emergency lighting.
		2. The electrical work shall include the following:
		a. Wiring – All interior electrical wiring- with main distribution panel board, necessary MCBs, DB, joint box, switch box etc. the wires shall be of copper of different capacity as per the load and should be renowned make as listed below.
		b. All the internal wiring including that of telephone, LAN, DICOM & PACS etc. will be of concealed variety.
		c. Double earthling with copper plate for the LINAC and all accessories should be as well as the earthing for the AC should be done by the supplier.
		d. Switches light and power points should be of modular type and of standard make as listed below.
		e. General lights – Mirror optical type 1 x 28 W or 2 x 28 W/CFL fittings 2 x 36, 3 x 36 W with electronic ballasts.
		AIR CONDITIONING:
		All rooms mentioned above need to be air-conditioned. Package Air Conditioners and split AC units may be used according to room requirement and suitability. Humidity control should be provided to effectively eliminate moisture condensation on the equipment. The Air conditioning system should be designed with standby provision to function 24 x 7.
		The outdoor units of AC should have grill coverings to prevent theft and damage.
		Ventilation is required in toilet.
		Environment specifications:
		a) Humidity range: Relative humidity 60% and 80% in all areas except equipment room which shall be as per requirement of the equipment.
		b) Temperature ranges: 22 +/- 2° C in all areas throughout the year, except equipment room which shall be as per requirement of the equipment.
		c) Air conditioning load: The heat load calculations and maintaining the desired temperature and humidity shall be the responsibility of the

		supplier.
		FIRE SAFETY MEASURE:
		1. A fire alarm system of reputed make with smoke/ heat detectors, indicator panels, call boxes, electronic sirens and wiring will be installed. Audio call bell system with intercom & remote locking /unlocking facility to be provided at the main door of the complex.
		2. Supplying, Installing Dry chemical power type fire extinguisher of 5kgs capacity, with initial filling in brand new cylinder with power coated finish, fitted with Gun metal union, high pressure CO2 gas cartridge, discharge hose, wall mounting bracket etc. complete, confirming to IS:2171 of approved make & complete as directed by EIC.
		FURNITURE:
		a) Revolving chairs height adjustable, medium-back with hand-rest – 6 no.s.
		b) Chairs for patient waiting area – Three-seater (chrome plated). - 4 no.s.
		c) Cupboard with laminate door shutters for storage of spare parts and accessories and records as per requirement. – 4 no.s.
		d) Drug trolleys for patient preparation area. – 1no.
		e) Patient trolley with rubber foam mattress to be kept in the patient preparation room. - 2 no.s.
		f) Name boards for all rooms. All the rooms in the complex will be signposted.
		g) Sun film & ventilation blinds will be put up in all windows.
		h) Tables for all Workstations.
		i) Changing rooms should have change lockers and dressing table.
		j) Dustbins (plastic with lid) - 10 no.s.
		All furniture items should be of standard make as mentioned in the table below.
		MISCELLANEOUS:
		1. LED X-ray Film viewer with adjustable brightness; capable of holding 3 films of 14”x17” size.– 4 NO.S
		2. Cabling of Network (LAN) connectivity and required CISCO switches for networking the LINAC, TPS, CT simulator, Brachytherapy and any other workstation used within the site.
		3. Broadband connection with static IP for REMOTE SERVICE of LINAC system.
		SUGGESTED MANUFACTURERS/BRANDS:
		A . **FLOORING :** VITRIFIED TILES - Somany, Kajaria , H&R Johnson, Marbonite, Granamite
		B . **PAINT** :- Dulux, Asian Paints , Nerolac
		C . **PLUMBING** : - Kohler, Jaguar , Grohe , Roca
		D . **SANITARY ITEMS** :- CERA, Hindware, Parryware
		E . **ELECTRICAL -**
		1. CABLES - Finolex, Havells ,V-Guard
		2. SWITCHES - Legrand, L&T, Crabtree , Roma

		3. DISTRIBUTION BOX , MCB - Legrand, L&T, Siemens, Havels
		4. LIGHT FITTINGS - Philips / Crompton / Wipro.
		F . **AIR CONDINTIONING :**- Daikin, Hitachi, Blue Star, Voltas.
		G . **FURNITURE :** - Hermen Miller , Godrej , Featherlite
		GENERAL POINTS:
		1. All items of work under this contract shall be executed strictly to fulfil the requirements laid down under "Basis of design" in the specifications. Type of equipment, material specification, methods of installation and testing and type of control shall be in accordance with the specifications, approved shop drawings and the relevant Indian Standards, however capacity of each component and their qualities shall be such as to fulfil the above mentioned requirement.
		2. The rate for each item of work included in the schedule of quantities shall, unless expressly stated otherwise, include cost of;
		3. All materials, fixing materials, accessories, appliances tools plants, equipment, transport, labour and incidents required in preparation for and in the full and entire execution, testing, balancing, commissioning and completion of work called for in the item and as per specifications and drawings.
		4. Wastage on materials and labour.
		5. Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and for the job in accordance with the contract documents, good practice and recognize principles.
		6. Mode measurement shall be as per specification.
		7. In the event of conflict between schedule of quantities and other documents including the specifications, the most stringent shall apply. The interpretation of the Architect/ Engineer shall be final and binding.
		The following items to be quoted as OPTIONAL (price to be quoted separately)
		1. Closed circuit cameras of reputed company should be provided in the examination room, console room, linear accelerator and waiting areas.
		2. Patient waiting hall: Provision of 42" size flat screen colour television with close cabinet & DTH disc with setup box & CD/DVD Player.
		3. Music system for all rooms and waiting areas in the centre.
D	**FINANCIAL BID** (specify separately for desirable items)	Separately
		1. Cost
		2. Quote separately for equipment, R&V and MLC
		3. Insurance up to installation & commissioning approval by AERB
		4. Transport and rigging
		5. Installation
		6. Essential spare parts
		7. Up-gradation of equipment

E	**VALIDITY OF QUOTATION**	Please specify
F	**WARRANTY:** applicable from the date of commissioning approval by AERB.	**5 Years for complete System and 5 years CMC**: includes 4 preventive maintenance / year and all breakdown visits. All bought out items used in system / supplied by the bidder should also be included in the warranty.
G	**INDIVIDUAL WARRANTY.** Please specify No. of Years	1. Accelerator Guide (Beam Centre Line).
		2. Bend Magnet
		3. Electron Gun
		4. Vacuum Pumps
		5. X-ray Target
		6. RF Source Magnetron/Klystron
H	**UPTIME GUARANTY (95 %) / PENALTY CLAUSE**	Uptime of at least 280 days per year (9 am to 9 pm - excluding Sundays and holidays) during warranty or CMC/AMC period. The time will be calculated 2 hours after the reporting to engineer/ company by phone or email till engineers hand over the machine for treatment. In case of failure the compensation of Rs. 30,000 per day or part there of the lost period will be payable to respective AIIMS / RPGMC, TANDA.
I	**DELIVERY SCHEDULE**	Please specify
J	**TRAINING OF STAFF**	Radiation Oncologist
		Medical Physicist
		Radiotherapy technologist
K	**EQUIPMENT CERTIFICATION**	AERB type approval : : please enclose certification
		US FDA /CE approvals : : please enclose certification(s).
L	**OTHER INFORMATION**	No. of similar models: India / World (enclose list of institutions)
		No. of certified engineers in India
		(enclose list of names)
		Remote Diagnosis Facility (India / Abroad) availability
		Provide compliance to all points listed above
M	**ANY OTHER DETAILS**	Please specify

All other terms and conditions of the tender enquiry remain unaltered.