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PART-II (PRICE-BID FORMAT)

BOQ

DX type Air conditioning work for neutron generator hall

Sr. No.	Item	Qty.	Supply (in Rs.)				Installation, testing & commissioning (ITC) (in Rs.)			
			Unit rates Basic (D)	Applicable GST (E)	Amount Basic (C*D)	GST Amount (C*E)	Unit rates Basic	Applicable GST	Amount Basic (H*C)	GST Amount (C*J)
A	B	C	D		F	G	H	I	J	K
Quotation should be based on the following:										
1	SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF DX TYPE AIR HANDLING UNIT									
	GI, centrifugal, double skin Air Handling Units (outer skin 20G, inner skin 22G) compatible with DX Condensing Units, as per Technical Specifications, Drawings & Bases Of Design. Each AHU should be complete with:									
	<ul style="list-style-type: none"> AHU insulation shall be of 43/50mm thick PUF(Density 38 Kg/Cum) Fan section with dynamically balanced, low-noise, Centrifugal DIDW backward Curve SA fans; EFF-1 TEFC squirrel cage induction drive motors, etc. Refer AHU specifications for fan sizing & motor/fan RPM. Fan model must be selected for lowest noise level and highest efficiency. It will be subject to IPR EIC approval during Detailed Engineering stage 									
	<ul style="list-style-type: none"> Coil sections with 6-R DX cooling coil (face velocity 450 FPM for Dehumidified CFM). Refer AHU specifications for coil sizing. Cooling coil shall be selected to satisfy CFM as well as tonnage capacity. Coil shall be intertwined type, i.e. circuiting should be done to provide refrigerant flow through the entire coil face even if only one condensing unit is working. Condensing units should not be piped to totally separate coil sections. However each refrigerant circuit should be maintained separate: mixing of refrigerant from different cond. units is not allowed. Two coils (Working & Standby) shall be installed in "series" inside the AHU (i.e. one after the other) (Expansion device for cooling coil must be designed & supplied by Cond. Unit mfr) 									
	<ul style="list-style-type: none"> Filter sections with 20 Micron Filters. All filters should be washable-type. AHU-mounted opposed blade aerofoil design SA dampers. Dampers shall be considered part of AHU supply, not to be paid separately 									
	<ul style="list-style-type: none"> Sandwich insulated SS drain tray, mixing chamber for return air/fresh air with Rain protected Fresh Air Intake, adequate no. of access doors & blank sections, flexible connection at fan connection, spring type vibration isolators for fan + motor assembly, internal covering, thermal break etc. 									

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	<p>NOTE 1: AHU must have lowest possible noise level. Fan & motor selection (i.e. size, RPM, poles) will be subject to Consultant's approval during Detailed Engineering stage.</p> <p>NOTE 2: AHU configuration (i.e. single-tier or double-tier, access door side, piping connection side, SA/RA connection side & cutout sizes as per respective ducting size without the need for transition duct, etc.) shall be decided as per site condition & final layout/working drawings.</p> <p>The following are suggested parameters for AHUs. Bidders to confirm the same from their end:</p>									
1.1	<p>AIR HANDLING UNIT - 01 FOR GENERATOR HALL TR/CFM : 17/7500 No of coils in AHU : 02 nos. coil each with 17 TR capacity. No. of ref. circuit per coil : 02 nos. ckt (8.5 TR X 2 Nos.) Static Pressure : 63 mm (incl. coils installed one after the other) Motor HP: 7.5HP or suitable</p>	1 Nos.								
2.0	<p>SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF DUCT MOUNTED ELECTRICAL REHEATERS 4.5 kw Electrical Re-heaters with Thyristor Based Power Controllers to modulate load from 0 to 100%, with Modulating Humidistat & Airstat/Geysersstat, Fibre glass insulated heavy gauge corrosion resistant steel construction housing, with matching duct flange. <u>Suitable for installation in vertical supply air duct</u></p>	1 Nos.								
3.0	<p>SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AIR-COOLED CONDENSING UNITS Air-cooled condensing units of specified tonnage capacity, each complete with the following major items:</p> <ul style="list-style-type: none"> • Scroll compressor/s with accessories • Air-cooled condenser/s with accessories; having high heat-transfer efficiency seamless copper tube coils with aluminium fins, low-noise direct-driven propeller fans, TEFC motors, etc. • Copper refrigerant piping within Cond. Unit incl. fittings, valves, supports, insulation, etc. • Control panel of Cond. Units (supplied by Cond. Unit mfr) • Controls, safety cutouts including high & low pressure cutouts, oil safety cutout, adjustable thermostatic control of room temperature at RA level; refrigerant filters & dryers, copper control tubing, expansion device, etc. (Expansion device for cooling coil must be designed & supplied by Cond. Unit mfr) <ul style="list-style-type: none"> • Condensing unit stand base frame, made from galvanised steel sections with epoxy/powder coating • Rubber vibration isolators & mounting arrangement for vibration-free operation of all equipment • Refrigerant & oil 									
	<p>NOTE: (1) All items necessary for the completeness of unit shall be deemed to be included in the A/C Contractor's scope whether explicitly mentioned above or not.</p>									
3.1	8.5 TR Condensing Units Working (Single Compressor)	2 Nos								

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3.2	8.5 TR Condensing Units Stand By (Single Compressor)	2 Nos								
4.0	<p>SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF SET OF REFRIGERANT PIPING WITH INSULATION BETWEEN COND. UNITS & AHUs Set of refrigerant piping, insulation, pressure testing & refrigerant gas & oil charging, etc; for the above machines NOTE:Include refrigerant pipes, pipe fittings, angles/flats supports, accessories, minimum 19mm thick Class O nitrile rubber insulation for entire piping system as per Technical Specifications. Exposed refrigerant piping should be with factory laminated "Arma-Check GC" 200 GSM glass cloth for UV and mechanical protection and manufacturer recommended adhesive sealant applied at all joints. Refrigerant piping on terrace shall be installed on GI pipe tray, and finally covered with GI sheet cover for protection.</p> <p>Additional layer of UV paint over GC for all exposed to atmosphere piping for weather protection of pipes & insulation and prevention of rain water ingress. UV-protection layer / GC must be applied immediately on installation of pipes without waiting for total completion, to prevent deterioration of insulation due to sun-light.</p> <p>Piping rate should include pressure testing, vacuumising and initial & final charging of refrigerant gas with required top-up quantity as per piping actual length and operating / commissioning parameters. All pipings should be laid in suitable cable trays. NOTE:1RMT= 1Mtr Suction & 1Mtr Liquid line</p>	80 Rmt								
5.0	<p>SUPPLY AND INSTALLATION OF MS STANDS FOR CONDENSING UNITS Hot-dip galvanized MS stands of adequate weight-bearing capacity, to be placed either on Terrace slab or on outside structural platform (provided by civil agency)- as shown in Tender Drawings. Rates to include double rubber pads & galvanized MS plates for each leg. Stand should be fixed on terrace by cement concrete or by bolt as per instruction of IPR EIC. <i>(Bidder to quote unit rate and NOT per kg rate)</i></p>	4 Nos.								
6.0	<p>RTV SEALED DUCTING FOR AIR CONDITIONING Supply, fabrication, installation and testing of GI, air-tight ducting & plenums fabricated out of prime quality LEAD-FREE LFQ sheets with 120GSM; Complete with necessary supports, expansion fasteners, etc. (ALL DUCTING SHOULD COMPLY WITH BIS CODE) (Rate to include necessary splitters/turning vanes, etc.)</p>									
6.1	24 Gauge (0.63mm) for duct sizes up to 750mm	30 SqMt								
6.2	22 Gauge (0.80mm) for duct sizes between 751 and 1500mm	350 SqMt								
6.3	20 Gauge (1.0mm) for duct sizes between 1501 and 2250mm	5 SqMt								
7.0	<p>Painting for visible ducts (Supply and Installation) Painted with metallic spray painting of approved shade & finish, approved by EIS. Refer tender documents for further details.</p>	300 SqMt								

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8.0	Supply and installation of Opposed blade type manually operated AL duct dampers <i>(NOTE: AHU mounted Aluminium dampers are part of AHU cost. Not to be measured here)</i>	1 SqMt								
9.0	Supply, fabrication, installation and testing of Motorised type fire dampers in SA/RA duct, with auxiliary switch/contactor, control wiring & interlocking for switching OFF the AHU of respective floor in case of fire. Fire dampers shall be approved by TAC & FIA and also as per UL 555 specifications including temperature/time rating.	2 SqMt								
10.0	Supply and installation of Fresh air assemblies comprising of SS bird screen, rain louvers, Flexible connection at expansion joint & opposed-blade type fresh air damper; fixed on the wall surface with wooden frames <i>(The colour shade & finish shall be as approved by the Architect/Interior Designer) Size: 500mm X 350mm</i>	1 No.								
11.0	Supply, and installation of Fire retardant flexible canvass connection at outlet of each AHU. Provide zipper to facilitate temperature measurement for AHUs (not required for HATs) <i>Rate per Machine; not per Outlet</i>	2 Nos.								
12.0	Supply, and installation of GRILLES AL Powder coated, SA/RA Grilles/Diffusers: NOTES: 1. The shade & finish of all grilles & diffusers shall be as approved by the Architect/Interior Designer. 2. SA grilles shall be with adjustable vertical & horizontal deflection louvers where required. Rear louvers of black colour									
12.1	750mmx150mm Adjustable Double Deflection <u>AL Powder coated</u> SA Grilles with Volume Control Damper(VCD) SA grilles shall be with adjustable vertical & horizontal deflection louvers where required. Horizontal louvers shall be in front; vertical louvers shall be on rear and of black colour	12 Nos.								
12.2	<u>1200mm x 300mm AL Powder coated RA Grilles with Volume Control Damper(VCD)</u>	4 Nos.								
13.0	ACOUSTIC LINING FOR AC DUCTING Supply, and installation of Acoustic lining for entire main SA ducting, using 25mm thick resin bonded fibreglass rigid boards, having 48 KG/CuMt density with BLACK glass woven cloth factory laminated on one side, fixed with GI nut- bolts & washers and covered with GI cross wire	330 Sqmt								
14.0	ACOUSTIC LINING FOR COLLARS & DROPPERS Supply, and installation of Acoustic lining for SA & RA Collars & Droppers, using 12mm thick resin bonded fibreglass rigid boards, having 48 KG/CuMt density with BLACK glass woven cloth factory laminated on one side, fixed with GI nut- bolts & washers and covered with GI cross wire	20 Sqmt								

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15.0	ACOUSTIC INSULATION OF AHU ROOM Supply, and installation of Acoustic Insulation of AHU room walls & ceiling, using 25mm thick resin bonded fibreglass rigid board having 48 KG/CuMt density & 0.032W/m K thermal conductivity; with Glass woven cloth factory laminated on one side, fixed in GI angle grid-work with GI Screw & washers and covered with GI cross wire	150 Sqmt								
16.0	CONDENSATE DRAIN PIPING Supply, and installation of 40mm dia GI drain piping up to drain header/drain point (for AHU). Piping within AHU Room to be insulated & plastered	10 Rmt								
	ELECTRICALS									
17.0	Supply, fabrication, installation and testing of Panel Boards Electrical panel boards having incoming & outgoing feeders, TPNE bus bars, ELCB/MCCB for Air Handling Units, Condensing Units, Heaters, etc. Including Energy meter, indicating lamps, Digital voltage and current meters, interlocking for controls, safety cutouts & fire dampers interlocking, condensing unit, safety cutouts of compressors, etc. AHU feeder shall be with VFD. Incoming feeder shall have MCCB/MCB of required rating & indicating lamps, Outgoing feeders shall be with MCCB/MCB of required rating. Provide embossed tags for easy identification of each outgoing feeder, mentioning Circuit No. and HP. ALL PANELS TO BE FUSELESS TYPE.									
17.1	Panel Board P1 located in AHU Room having feeders for 1 No. Air Handling Unit (with VFD), 2 Nos. Condensing Units(Working), 2 Nos. Condensing Units(Stand By), 1 No. feeders for Reheaters, and 2 Spare feeder of 32 Amps with MCB	1 No.								
17.2	Supply, laying and termination of armored electrical cable for power supply and flexible / armoured control cable for all controls with connections in perforated GI cable tray/ MS channel (of required size) etc. Armoured Aluminium/Copper power & control cabling (incl. terminations) from respective Panel board to Air Handling Units, Condensing Unit, controls/cutouts, fire dampers, Re-Heaters, Microprocessor Control Panel, etc. (Cable sizes as per tender). All cables/wiring shall be FRLS. Control cable should be laid in PVC pipes/conduits for isolation from power cable.	1 Lot								
17.3	Supply, installation and testing of Earthing for all the equipments. GI double earthing for A/C equipments, Electrical panels & controls	1 Lot								

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18.0	<p>Microprocessor based Remote Control Unit for DX AHU System along with temp sensor: Providing and fixing a Microprocessor based Remote Control Unit for control the entire DX AHU Air Conditioning system as per technical specification. Controller Unit shall be completely factory wired internally and mounted in the AHU Room.</p> <p>Microprocessor control should be loaded with features like display unit, auto switch on/off compressors, auto restart on power restore, runtime equalizer for the compressors/ condensing units, on/ off scheduling & time delay between compressors starts in case of multi compressor /condensing units, switch off the condensing units when AHU get off/ tripped due to any reason, anti-recycle time delay to protect compressors from instant start/restart, and stepless control of reheaters by Humidistat</p> <p>Compressors shall be interlocked with AHU fan so that it cannot start unless fan is on. Reheaters shall be interlocked with AHU fan so that heaters cannot start unless AHU fan is on. Other details as specified in technical specification.</p> <p>The VENDTOR shall be solely responsible for the completeness and correctness of the internal wiring, integration and for the proper functioning of the connected equipment.</p>	1 Set								
	<p>TOTAL AMOUNT (Inclusive of all applicable taxes and duties including all materials, labour, installation, testing, balancing, commissioning, special duty/cess, GST, works contract tax, clearance charges & freight, lifting-shifting, handling, insurance, etc).</p>									

Sr. No.	Description	Amount (n Rs.)
1	Total Basic amount for supply (Rs.)	
2	Packing, Forwarding (if any) (for supply)	
3	Applicable GST amount for supply (Rs.)	
4	Total Basic amount for ITC (Installation, testing & commissioning) (Rs.)	
5	Applicable GST for ITC (Installation, testing & commissioning) (Rs.)	
6	Insurance (if any) (for supply portion)	
7	Other charges (freight etc. in Rs.) (for supply portion)	
	Grand Total (1 to 7) (Rs.)	

NOTES:

- [1] Tonnage capacity specified is "Nominal".
- [2] Quantity-limit or unit rate should not be given by tenderers where quantity is mentioned as 01 Lot, 01 Set or as required such items shall be strictly on lot basis and not on variable or countable basis.
- [3] Bidder should submit leaflets/photographs of each type of machines along with quotations. Submit leaflets of all available models. Highlights the quoted model. Quote for all cordless remote controls.
- [4] No deviation in makes of items under the excuse of long delivery period, or non-availability in small quantity, shall be allowed.
- [5] All cables/wiring shall be FRLS. All cabling/wiring should be installed in PVC conduits to facilitate replacement in case of any fault in future.
- [6] IPR reserves the right to add / delete any or all of the items mentioned in BOQ.