Sr.	Item Description	Qty	Unit	Rate	Amount
				RS	Rs
No	**PART 'A' Central Air-Conditioning and Ventilation Systems:**				
1	**WATER COOLED OILAND LUBRICATION FREE MAGNETIC BEARING CENTRIFUGAL CHILLERS:**				
	Supply, installation, testing & commissioning of AHRI certified Water-cooled oil free Magnetic bearing centrifugal chiller , Complete with Centrifugal compressor/s(Dual or Multiple), oil free check valve, Unit Mounted Variable Speed Drive with Standalone Active Harmonics Filter connected to PCC (Point of Common Coupling) of 03 Nos Chillers to filter any harmonics generated from Chiller plant. Harmonics filter to limit THDI to be less than 5% at PCC level. Total Harmonic Distortion ≤ 5% at PCC (as per IEEE 519-1992) with a displacement power factor of 0.95 at 100% load , complete with Shell & Tube Falling Film /Flooded type evaporator & Condenser along with Control panel having Micro-processor based controls with Touch Screen display in English for all operating parameters such as chilled water inlet, chilled water outlet, operating pressures etc.The chiller shall be charged with R134a Refrigerant. The drive motor shall be suitable for 415V +/-5%, 3 phase, 50 cycles/sec . The chiller should be insulated as per manufacturers standard. Flange connection with Counter Flanges/victaulic connections shall be part of the Chiller Package. Compressor shall be able to unload up to 15 % of the total load of its rated capacity & designed to operate at condenser entering water temperature of 60 deg F as well to ensure stability control.Unit sould be equipped with capacitor bank or Power off Energy Feedback Technology to protect the bearings during any sudden breakdown conditions. Chilling machine should be in line with the below technical specification and drawings :-				
	Actual cooling capacity shall not be less than 225 TR at design conditions as indicated below :	3	Nos.		
	Chilled Water In temperature : 54 Deg F				
	Chilled Water Out temperature : 44 Deg F				
	Fouling Factor in evaporator : 0.0005 FPS				
	Cooling Water In temperature : 90 Deg F				
	Cooling Water In temperature : 97.5 Deg F				
	Fouling Factor in Condenser : 0.001 FPS				
	Permissible Pressure drop in Condenser & Evaporator : 4-6 Meter or as per OEM				
	COP should be at least 6.5 at AHRI conditions				
	IPLV should be at least 0.35 KW/TR at AHRI conditions (Quoted Chilling machine should comply to at least one value of the above indicated COP or IPLV)				
	OEM provided software selection sheet in accordance with ARI 550/590 at above mentioned parameters shall be submitted with the bid. .				
	Compressor				
	single or multiple, Single/Dual Stage Magnetic Bearing Inverter centrifugal compressor, direct driven by Permanent Synchronous Magnet motor with Class "F" Insulation,Complete with automatic capacity control through Combined operation of VFD & Inlet guide Vanes, safety switches, as per specifications. Multi-Compressor units shall have independent refrigerant Circuits or as per manufacturers standard catalogued units in that capacity range as per OEM.				
	Necessary drive arrangement				
	Suitable capacity (IP54) Refrigerant Cooled Permanent Synchronous Magnet motor having Efficiency more than 97%, suitable for operation on 415+10% volts, 50 HZ, A.C. Supply.				
	1 No - matching shell and tube water cooled condenser of Steel shell and integrally fined copper tubes. Refrigerant sight glass shall be provided in the condenser shell for checking moisture content and refrigerant level.				
	1 Lot- Refrigerant piping fittings, valves and accessories to inter connect compressor, condenser, chillers and expansion valve.				

	1 Set - Microprocessor based control panel with minimum 10 inches colored touch screen display/as per OEM standard complete with accessories. The chiller controller shall be factory wired and unit mounted on the chiller machine. Separate mounting of chiller controller is not acceptable, so that any shifting of the chiller will not necessitate sensor field wiring.				
	Microprocessor controller shall be able to synchronous the parameter backup , run smoothly even in case No display or failure of touch screen,data recording etc.				
	Lot- Water flow switches/differential pressure switche at inlet and outlet of condenser and chiller, water drain and air purge valves wherever required.				
	Lot- Welded flanges/victauliccoupling at the inlet and outlet piping connections of evaporator and condenser of chillers.				
	Lot- Suction line and chiller insulation with minimum 19 mm thick polyvinyl nitrile rubber insulation duly insulated at manufacturer works				
	Lot - Frame work for mounting the above condenser, chiller compressor and motor with base plate complete with anti vibration neoprene rubber pads.				
	Lot-Factory/Site Charged refrigerant gas				
	Vendor shall submit the following software selection sheet with the proposal 1. Computerised sheet @ site conditions to verify Ikw/TR @ duty conditions & NPLV as per AHRI relief 2. Computerised sheet @ AHRI conditions to verify COP & IPLV @ AHRI Conditions				
	The scope of vendor shall include:				
	a) Unloading, unpacking, shifting up to location, installation on foundation, leveling.				
	b) Pre-commissioning checks and tests. If required Additonal Charging of refrigerant and oil, trial operation and adjustment/settings until satisfactory operation as per design is established.				
	c) Commissioning of the chiller package.				
	d) Providing 3 sets of detailed technical data, drawings, operation and service manuals, parts list.				
	e) Training of Owner's personnel in normal operations, safety precautions and service procedures.				
	Refrigeration capacity : 225 TR (2 # working+1Standby)				
	Chilled water flow rate : 540 GPM				
	Condenser water flow rate :1050 GPM				
	The cost of BMS compatible card shall be included in each chiller)				
	The cost of junction box for cable connection to Chilling machine shall be included in the quoted price.				
	(Approved Makes:Daikin/Climaveneta/Trane/York/Carrier//DB/Kirloskar/Voltas/Bluestar)				
2	**Water Circulation Pumps :**				
	Supply, installation, testing and commissioning of centrifugal Vetical Inline long coupled Chilled water,Condenser waterr pump sets with SS/Bronze impeller, SS shaft for water recirculation complete with IP55 protection TEFC Sq. Cage induction motor IE5 efficiency with class "F" insulation, coupling guard and IP55 motor suitable for Operation on 415 ± 10% volts, 3 Phase,50Hz A.C. supply, inside/outside type factory fitted mechanical seal and all pumps shall be PN16 rated etc. conforming to technical specification & as per following parameters complete with IP55 motor. Condenser water pumps conforming to the drawing and specifications (company assembled & factory fitted). The VFD shall show flow and head on its disolay. And the VFD for Primary,condenser pumps is only used as head saving purpose. Suitable suction guide and triple duty valves to be supplied by pump manufacturer with pumps.The quotated rates shall be inclusive of its insulation and cladding on chilled waterr pumps. Pump performance characteristics shall be as follows as per drawing and				
	(Approved Makes:(Armstrong/Grundfoss/Xylem)				
a)	**Chilled Water Primary Pumps:**				
	Water flow Rate : 540 US GPM				
	Head : 12 m	3	Nos.		
	(Including one standby)				
b)	**Chilled water secondary Pumps**				
	Water flow Rate : 540 US GPM				

	Head : 22 m				
	(Including one standby)	3	Nos.		
c)	**Condenser water Pumps (insulation,cladding not required on these pumps) with motor mounted IP55 VFD:**				
	Water flow Rate :1050 US GPM				
	Head : 22 m	3	Nos.		
	(Including one standby)				
e)	Control panel housing VFDs and PLC with duly downloaded software for sensorless/DPT Operation	1	No		
3	**Cooling Towers :**				
	Supply, installation, testing and commissioning of FRP construction Induced draft Counter flow type rectangular or bottle shaped Cooling towers, Each tower shall be complete with FRP cold water basin, honeycomb design PVC fill, Casing, Hot water distribution system, ladder, 2 nos of 5.5. kw motor suitable dia axial flow fan with statically/dynamically balanced belt & pully drive, coupled with TEFC, IE 5, Class F Insulation, IP55 induction motor suitable for 415±10% volts, 50 Hz, 3 phase power supply. Basin shall be provided with accessories like quickfill, makeup & drain, brass construction float valve, overflow pipe etc. Separate motor shall be provided in each cell of multi cell towers. Tower shall be selected on the basis detailed in the schedule. Tower shall be suitable for outdoor installation next to occupied areas and shall be low noise as per specifications:				
a)	300 TR Capacity (CT water in 97.5 F/ CT water out 90 F)	2	Nos.		
	(Both working)				
	(Approved Make:Paharpur//Mihir/Delta)				
4	**Expansion tank, Pressurization unit with built in vacuum degasser**				
	Supply, installation, testing & commissioning of Pressurized Expansion Tank, Pressurization Unit with vacuum cylinder c/w break tank as detailed in specification. High and low pressure alarm setting shall be selectable by the user. Expansion and pressurization of the chilled water system to be provided by an integrated pump with pressurized expansion tank(s). Max ambient temp 45 Deg C and total Static height above the expansion tank 35M. The total Volume checked by vendor. The system shall consist of following : 1) Pressurization Unit with vacuum degasser c/w Pumps,vacuum cylinder, Break tank, float valve, over flow connection, pressure sensor for system and for vacuum cylinder, solenoid valve, isolation Valve, NRV, Drain Valve, flood protection in the event of a serious leak, Pipe fittings c/w Controller & display, full unit duly tested, housed in a mild steel cabinet. 2) Pressurized Expansion Tank 1600 liter made from top quality steel and finished with a gleaming red epoxy-powder coating c/w high quality butyl rubber removable bladder, Nitrogen filling for longer maintenance of pre pressurization 3) Controller : controllers for pressurization as well as vacuum degassing with IP 44 rating. bright LED display showing srolling messages and status of the main operating components, top up function, flood limiter/shut down function in event of serious leak. in case of any fault, controller shall display fault code and generate alarm. Modbus RTU/RS 485 connectivity.				
	(Approved Make - Flamco/ Spirotech/Caleffi)				
	The total Expansion tank Volume for chilled water circuit = 800 liters and static head of approximate 25 mts to be considered .	1	No.		
5	**Floor Mounted AHUs :automatic flow control valves**				

	Supply,installation,testing and commissioning of sheet metal sectionalised construction draw thru chilled water type AHUs in Double Skin outer skin 0.6 mm precoated GI and Inner Skin 0.6 mm plain GI with 25 mm thick CFC free - PUF injection of density 40 kg.m3 with 25 mm thick CFC free - PUF injection of density 40 kg.m3 drain pan shall be 20 guage SS304 tray duly insulated with 13 mm closed cell nitrile foam insulation. Material of Cpper tube shall be copper with minimum thickness of 25 guage/0.5 mm and outer dia of 9.52mm/3/8".cooling coils shall be in Copper tube and Aluminium fins 12 FPI construction. Each Air Hndling Units shall be with filters sections with prefilters & finefilters . AHU fan shall be EC type with suitable fan of Rosenberg & motor and VFD for energy saving during varying ambient temperatures.it shall be directly driven and shall have vibration isolators,double Canvass connections and all accessories as required. connections, coil size shall be selected for face velocity of 500 FPM.Air moving capacities shall be as detailed below as per drawings.and specifications.(All these AHUs shall be floor mounted type with thermal break profile and shall be suitable for connection to a chilled water systems) as per drawings and specifications.				
a)	15,000 cfm with 6 row cooling static pressure 55mm	4	No.		
b)	10,000 cfm with 6 row cooling static pressure 55mm	6	Nos.		
	(Approved Make:VTS/ZECO/Edgetech/REVO/Climecon/HMX)				
6	Supply,installation,testing and commissioning of sheet metal sectionalised construction draw thru chilled water type AHUs in Double Skin outer skin 0.6 mm precoated GI and Inner Skin 0.6 mm plain GI with 25 mm thick CFC free - PUF injection of density 40 kg.m3 with 25 mm thick CFC free - PUF injection of density 40 kg.m3 drain pan shall be 20 guage SS304 tray duly insulated with 13 mm closed cell nitrile foam insulation. Material of Cpper tube shall be copper with minimum thickness of 25 guage/0.5 mm and outer dia of 9.52mm/3/8".cooling coils shall be in Copper tube and Aluminium fins 12 FPI construction. Each Air Hndling Units shall be with filters sections with prefilters & finefilters . AHU fan shall be EC type with suitable fan of Rosenberg & motor and VFD for energy saving during varying ambient temperatures.it shall be directly driven and shall have vibration isolators,double Canvass connections and all accessories as required. connections, coil size shall be selected for face velocity of 500 FPM.Air moving capacities shall be as detailed below as per drawings.and specifications.(All these AHUs shall be floor mounted type with thermal break profile and shall be suitable for connection to a chilled water systems) as per drawings and specifications.	1	No		
a)	12,500 cfm with 8 row cooling static pressure 60mm static pressure	4	No.		
	(Approved Make:VTS/ZECO/Edgetech/REVO/Climecon/HMX)				
	Ultrasonic Humidifier :				
7	Supply,installation,testing and commissioning of of Ultrasonic Humidifier with all accessories for 10,000-15,000 cfm AHUs as per drawings and specifications.	10	Nos		
	(Approved Makes:Rapid cool/Emerald)				
	Exhaust Propeller Fans :				
8	Supply,installation,testing and commissioning of Propeller type free discharge exhaust fans complete with motor ,fan ,exhaust Louvers as per drawings and specifications.				
a)	450 mm dia (for Plant Room/Basement areas)	5	Nos		
	(Approved Makes:Caryaire/Ostberg/Greenheck)				
9	**Condenser Water Piping :**				
	(For Plant room and Cooling Tower Only)				
	Supplying, fixing, testing and commissioning of condenser water pipes of following sizes of MS 'C' class along with necessary clamps, vibration isolators and fittings such as bends,tees etc.but excluding valves, strainers,gauges etc.adequately supported on rigid supports duly painted / buried in ground excavation and refilling etc.as per specification and as required complete in all respect.				
	Note:- The Pipes size 150mm & below shall be M.S.'C' class as per IS:1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS:3589, from minimum 6.35mm thick M.S. Sheel for pipes upto 350 mm dia.And from mininum 7mm thick MS sheel for pipes of 400 mm dia and above.				
a)	300 mm dia.	110	RM		

b)	200 mm dia.	40	RM		
c)	150 mm dia.	25	RM		
d)	80 mm dia	20	RM		
e)	50 mm dia	10	RM		
	(Approved make:Jindal/TATA/SAIL)				
10	**Condenser Circuit Valves :**				
	Supply,fixing,testing and commissioning of following size valves,guages and strainers for condenser water circulation as per drawings and specifications.				
a)	Butterfly Valves (manual) with CI body SS disc nitrile sheet and O-ring & PN 16 ppressure rating as specified. (Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
	300 mm dia.	3	Nos.		
	200 mm dia	12	Nos.		
	150 mm dia	8	Nos.		
	100 mm dia.	2	Nos.		
	50 mm dia.	4	Nos.		
b)	**Balancing Valve**				
	200 mm dia	3	Nos		
	(Approved make :Advance/Lehri/AIP/Castle/SKS)				
c)	**Check Valve**				
	200 mm dia.	3	Nos		
	(Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
d)	**300 mm dia Pot Strainer**	1	Nos		
	(Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
	Neoprene Single Arch Flexible pipe Connection PN-16 to be used at pump suction /discharge and chilling machines				
f)	200 mm dia	12	Nos		
	(Approved make :Easyflex/Resistoflex/Dunlope)				
g)	flow switch	3	Nos		
	(Approved make :Emerald/RC/Honeywell/danfoos)				
10	Supply,installation,testing and commissioning				
	of following Thermometers and pressure guage				
	as per drawings and specifications for the				
	condenser water circuit complete with fittings				
a)	**Industrial type pressure guage**	12	Nos		
b)	**Murcury in glass industrial type thermometer**	6	Nos		
	(Approved make :H GURU/Feibig/Emerald)				
11	**Side stream Filtration System**				
	Supply, Installation, testing and commissioning of **SIDE STREAM FILTRATION SYSTEM** to remove unwanted solids from Condenser loop using a centrifugal-action vortex separator. Control of solids in the recirculated cooling water system shall be accomplished via a side-stream flow of 10-30% of the full-stream system flow through a completely assembled separation / filtration package. The package's pump shall provide sufficient pressure for the re-introduction of side-stream fluid back into system flow.The side steram filteration unit shall have a flow rate of **210 USGPM** and pressure drop of 0.2 - 0.8 Bar, Maximum working pressure of 10.3 Bar and Maximum operating temperature of 38 deg.C. The complete packaged unit shall consist of the following as per drawings and specifications.(Approved make:Lakos/Wingert/Towerflow)	1	set		
a)	Pump				
	End-suction, single stage; TEFC motor; cast iron housing; iron impeller; bronze shaft sleeve; silicon carbide mechanical shaft seal; flooded suction required.				
b)	Seperator				

	Centrifugal-action design, incorporating a true tangential inlet and mutually tangential Swirlex internal accelerating slots, employed to promote the proper velocity necessary for the removal of the separable solids. The internal accelerating slots shall be spiral-cut for optimum flow transfer, laminar action and particle influence into the separation barrel. Avoid Dome type or Dumbbell type of Separator construction to prevent the lack of internal method of acceleration. The separator's internal vortex shall allow this process to occur without wear to the accelerating slots. Separated particle matter shall spiral downward along the perimeter of the inner separation barrel, in a manner which does not promote wear of the separation barrel, and into the solids collection chamber, located below the vortex deflector plate. The separator shall be of unishell construction with SA-36, SA-53B or equivalent quality carbon steel, minimum thickness of .25 inches (6.35 mm)				
c)	Automatic Purge Valve				
	An electrically-actuated valve shall be programmed at appropriate intervals and duration in order to efficiently and regularly purge solids from the separator's collection chamber.				
d)	Electrical control				
	IEC starter with overload module; HOA selector switch; re-set/disconnect/trip switch; Power requirement: 380/415 volt, 3 phase, 50 Hz.				
e)	Skid Plate				
	Steel, 3/16-inch (5 mm) minimum thickness, structural steel framework on TCI-0825 and larger units.				
12	**Insulated Chilled Water Piping:**				
	Supply,laying/ fixing,testing and commissioning of following nominal sizes of chilled water piping inside the building (with necessary clamps,vibration isolater and fittings but excluding valves, strainer, gauges etc.) dully insulated with following closed cell elastometric nitrile rubber of minimum 45 kg / cu m density, thermal conductivity 0.037 W/MK or better at 20 deg mean temperature class'O' insulation applied by suitable adhesive complete including repairing of damage to building etc. as per specifications and as required complete in all respect.				
	Note:- The pipe of sizes 150mm & below shall be M.S.'C' class as IS:1239 and pipe size above 150mm shall be welded black steel pipe heavy class as IS:3589,from minimum 6.35mm thick M.S. sheet for pipe upto 350mm dia.and from minimum 7mm thick M.S. sheet for pipes 400mm dia and above.Note: For burried piped insulation should be 63 mm PUF and HDPE cladding shall be done as per specification.				
a)	200 mm dia. (32 mm thick insulation)	100	RM		
b)	150 mm dia. (32 mm thick insulation)	50	RM		
c)	125 mm dia. (32 mm thick insulation)	25	RM		
d)	100 mm dia. (32 mm thick insulation)	75	RM		
e)	80 mm dia (32 mm thick insulation)	75	RM		
	(Pipe Make TATA/Jindal/SAIl insulation make Armacell/K-flex/Armaflex/Supreme)				
	Chilled water Circuit Valves :				
13	Supplying,fixing,testing and commissioning of following valves, strainers,gauges in the chilled / hot water/plumbing duly insulated to the same specifications as the connected and adequately supported as per specifications				
i)	Butterfly Valves (Manual) with CI body SS Disc, Nitrile Rubber seal and O- ring PN16 pressure rating for chilled water / hot water circulation as specified.				
a)	200 mm dia	3	Nos		
b)	150 mm dia	18	Nos		
c)	125 mm dia	2	Nos		
d)	100 mm dia	2	Nos		
e)	80 mm dia.	22	Nos		
f)	50 mm dia.	2	Nos		
	(Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
ii)	Balancing Valve with built in measuring facility with CI body flanged construction with EPDM coated disc with long pitch protected out pipe insulation & PN 16 pressure rating for chilled water / hot water circulation as specified.				
a)	150 mm dia	3	No		

	(Approved make :Advance/Lehri/AIP/Castle/SKS)				
iii)	**Pressure Indepenedent Balancing cum control Valve** SITC of PIBFCV complete with actuators suitable for cooling and heating applications. The valve shall be diaphragm based (cartridge is not accepted) with working component to be replacable on site with different KV values at different preset flow points (must be duly published in product data sheet) so client can check and verify and submit commissioning data with true flow measurement using KVmethodology at site without using manufacturer's measurement instrument. the valve must have full stroke operation. max differential pressure of 800kpa and IP54 rated actuator with power supply of 24 V AC accepting various signals (0-10 VDC / 2-10 VDC or 4-24 mA) (Approved make: Fresse/Danfooss/Flowcon)				
a)	80 mm dia.for AHUs	5	Nos.		
b)	65 mm dia.for AHUs	6	Nos.		
iv)	**NRV** with dual plate of CI ss plates vulcanised NBR seal flanged end PN 16				
a)	150 mm dia.	6	Nos		
	(Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
v)	**Y-Strainers** of ductile CI body flanged ends with SS strainers with insulation				
a)	150 mm dia.	6	Nos		
b)	80 mm dia.	5	Nos		
c)	65 mm dia.	6	Nos		
	(Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
vi)	**Neoprene Single Arch Flexible pipe Connection** PN-16 to be used at pump suction /discharge and chilling machines				
a)	150 mm dia	18	Nos		
b)	80 mm dia.	22	Nos		
	(Approved make :Easyflex/Resistoflex/Dunlope)				
vii)	**Pot Strainer**				
a)	200 mm dia	1	No		
	(Approved make :Advance/Lehri/AIP/Castle/SKS/Emerald)				
viii)	**Flow switch**	3	Nos.		
	(Approved make :RC/Emerald/Honeywell)				
19	Supply,installation,testing and commissioning of following Thermameters and pressure guage as per drawings and specifications for the Chilled/hot water circuit complete with syphon and fitttings				
a)	**Industrial type pressure guage**	46	Nos		
b)	**Murcury in glass industrial type thermometer**	28	Nos		
	(Approved make :H GURU/Feibig/Emerald)				
	Drain Piping :				
20	Supply,installation,testing and commissioning of "B" class GI drain piping complete with fitting etc & nitrile foam insulation with sealing tapes & 28 G Aluminium cladding complete as per drawings and specifications of below sizes.				
a)	65 mm dia	50	Rmt		
21	Supply,installation,testing and commissioning				
	of **Air Vents** 15 mm dia.	20	Nos		
	(Approved make :Anergy/Rapidcool/Emerald)				
22	Supply,installation,testing and commissioning				
	of 1" dia **Ball valves** for drain with fittings etc.	15	Nos		
	(Approved make :Anergy/Rapidcool/Emerald)				
23	**Rectangular Ductwork :**				
	Supply,installation,balancing and commissioning of factory fabricated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets,elbows splitter,dampers,vanes,hangers,supports etc.as per approved drawings and specifications of following sheet thickness complete as required.				
a)	24 Gauge (thickness 0.63 mm sheet)	150	M2		
b)	22 Guage (thickness 0.80 mm sheet)	150	M2		
	(Factory made ducts : ZECO/Dustech/Climecone)				

24	**Duct Insulation :**				
	Supplying and fixing of following thickness duly laminated aluminium foil of mat finish closed cell nitrile rubber insulation (class'O") on existing ducts after applying two coats of cold setting adhesive (CPRX compound). The joint shall be sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per required and as per specifications.				
a)	19 mm thickness	150	M2		
	(Approved Make:A-Flex/Armacell/K-Flex)				
25	**Duct Acoustic Lining :**				
	Supply and fixing of accostic lining of supply air duct and plenum with 25mm thick risn bonded glass wool having density of 32 kg/m3,25mm x 25mm GI section of 1.25 mm thick,at 600 mm centre to centre covered with Reinforced Plastic tissue paper and 0.5mm thick perforated aluminium sheet fixed to inside surface of ducts with cadmium plated nuts,bolts,stick pin,CPRX compound etc. complete as required and as per specification.	150	M2		
	(Approved Make:Kimmco/UP Twiga/Owens Corning)				
26	**AHU Room Acoustic Lining :**				
	Supply, fixing acoustic lining on wall and ceiling of AHU rooms with 50 mm thick, density 32 kg/cu.m resin bonded glass fiber insulation friction fixed in 610 mmx610 mm frame work made of 25x50x50x50x25 mm made out of 0.6 mm thick GI sheet U shaped channel and covered with reinforced fiber glass tissue and finished with 0.80 mm perforated aluminium sheet etc. complete as required and as per specifications.	300	M2		
	(Approved Make:Kimmco/UP Twiga/Owens Corning)				
	Grilles/Diffusers/Louvers/VCDs/FDs :				
	(Approved Make:Caryaire/Conaire/Airflow/Trueair)				
27	Supply,installation,testing and commissioning of MS powder coated grilles with dampers,louvers for **Fresh air intake** in AHUs/HRVs.	2	M2		
	(Approved Make:Caryaire/Conaire/Airflow/Trueair)				
28	Supply,installation,testing and commissioning of MS pwder coated **Exhaust Grilles/louvers** without dampers but with wire mesh jali for exhaust.	2	M2		
	(Approved Make:Caryaire/Conaire/Airflow/Trueair)				
29	Supply,installation,testing and commissioning of GI construction Volume control Dampers complete with neoprene rubber gaskets, nuts,bolts,screws linkages,falnges etc as per specifications.	2	M2		
	(Approved Make:Caryaire/Conaire/Airflow/Trueair)				
	Fire Dampers				
30	Supplying,fixing,testing and commissioning of fire dampers in supply air duct/main branch and return air path as and where required sizes i/c control wiring,the damper shall be motorised and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored.The spring return action shall be inbuilt mechanism and not externally mounted.The damper shall also be closed in the event of fire signal complete as required and as per specifications.				
	(Approved Make:Caryaire/Conaire/Airflow/Trueair)				
a)	Fire dampers	10	M2		
b)	Actuators	10	nos		
31	Supply,installation,testing and commissioning of flexible duct connections constructed of fire resistance **flexible double canvas** sleeve as per the drawings and specifications.	5	M2		
	Main HVAC Panels				
32	Supply, installation, testing and commissioning				
	of the following integrated cubicle type dead				
	front extensible sheet steel control panel, anchoring				
	of panel to foundation. The panel shall be suitable for				
	415Volts/3Ph/50Hz.Quoted price shall also include				
	Rubber mats etc. The panel shall have separate compartment				
	for bus bar and cable alleys. The following components				
	and accessories shall be mounted within each control				
	panel.				
a)	**INCOMER**				

i)	One set of 1250 Amps Electrically operated draw out type				
	4 pole ACB with 6 NO & 6 NC contacts and complete				
	with the following				
ii)	0-500 Volts digital type Ammeter with selector switch				
iii)	0-1250 Amps digital type Ammeter with 8000/5Amps				
	CTs and selector switches.				
iv)	Overvoltage tripping mechanism for persistent voltage				
	exceeding 110% of the rated voltage for more than 5 minutes				
v)	CT operated over current and earth fault relay(IDMT) with CTs				
	,1250/5A SP 10 protection class VA burden				
vi)	Phase indicating Lamps with toggle switches and control fuses.				
b)	**Bus Bars :**				
	Aluminium Bus bar with heat shrinkable sleeves rated at				
	1600 Amps for 3 ph and neutral phase. Bus bar shall have				
	maximum current density of 0.8amps/mm2 and the neutral				
	phase bar of not less than 50% capacity				
c)	**Outgoing:**				
i)	3 nos. 500 Amps MCCB(50 KA) with neutral link for				
	225 TR water cooled chilling machine compressor motor.				
	compartment shall contain CT operated ammeter of 0-500 Amps range				
	with selector switch and indicating lamps with fuse and toggle switch				
	for ON and Trip status of motor.(one spare)				
ii)	3 nos. 32 Amps contactor with TP MCCB 63 A(50KA-Motor Duty) with neutral link and 5.5 kw DOL starter with VFD bypass arrangement and all accessories for primary chilled water pump motor.				
	The compartment shall contain CT operated ammetre of				
	0-40 A range selector switch and indicating lamps with fuse and				
	and toggle switch for ON and Trip status of motor.(one spare)				
iii)	3 nos. 40 Amps contactor with TP MCCB 100 A(50KA-Motor Duty) with neutral link and				
	11.0 kw star delta starter with VFD bypass and all accessories,outgoing feeder				
	for secondary chilled water pump motor. The compartment				
	shall contain CT operated ammeter of 0-150 Amps range with				
	selector switch and indicating lamps with fuse and toggle switch				
	for ON and Trip status of motor.(one spare)				
iv)	3 nos. 80 Amps contactor with TP MCCB 160 A(50KA-Motor Duty) with neutral link				
	and 22 Kw star delta starter with VFD bypass and all accessories to				
	outgoing feeders for condenser water pump motor. The compartment				
	shall contain CT operated ammeter of 0-160 Amps range with				
	selector switch and indicating lamps with fuse and toggle switch				
	for ON and Trip status of motor.(one spare)				
v)	6 nos.32 Amps contactor with TP MCCB of 32 A(50KA-Motor Duty) with neutral link and				
	5.5 kw direct on line starter and all accessories outgoing feeders for				
	cooling towers fans motors. The compartment shall contain CT				
	operated ammeter of 0-32 Amps range with selector switch and				
	indicating lamps with fuse and toggle switch for on and trip				
	status of motor.(one spare)	1	set		
	(Approved Make;Tricolite/Advance/Zenith)				
	Control Panel in Air Handling Units :				
33	Supply,installation,testing and commissioning of the following				
	cubicle type openable front ,sheet steel wall mounted control				
	panels sleeve type Al. bus bar including anchoring into				
	the wall.These panels shall be complete in all respects				
	as per the drawings and the specifications.				
	The panel shall include the following accessories :				
I)	MCCB as per rating given below.				
ii)	Terminal block for power distribution.				
iii)	Single Phase Preventor.				
iv)	Phase indicating lights and indicating lights for ON/TRIP status				
v)	Digital type Ammeter and suitable size CT and selector switch				
vi)	Time delay relay for automatic restart of AHUs motors.				
vii)	Auto/Manual stop selector switch shall be provided in each				
	AHU Panel.The same should provide potential free contact				
	for position monitoring to BMS system.				

viii)	All starters shall have suitable potential free contacts				
ix)	Wiring for microswitch for stopping the fan when fire				
	dampers closes.				
	(Approved Make;Tricolite/Advance/Zenith)				
	The number of AHU panel shall be as detailed below :				
a)	63 amps TP MCCB with 1 No.7.5KW star Delta Starter for AHU	11	sets		
	(AHUs shall have soft start thru VFD but starters required for Bypass)				
34	**Power Cabling :**				
	Supply, laying and testing of undernoted sizes of aluminium conductor XLPE insulated PVC sheathed & sleeved armoured and overall PVC sleeved 1.1 KV grade power distribution cables conforming to relevant IS code and as per specification in ground (in existing trenches) through pipe or on wall / racks cable trays including dressing and clamping the cable with MS zinc passivated clamps etc. as required.				
b)	3.5 C X 240 mm2 Aluminium Cable	125	RM		
b)	3 C X 35 mm2 Aluminium Cable	100	RM		
c)	3 C X 16 mm2 Aluminium Cable	150	RM		
d)	3 C X 10 mm2 Aluminium Cable	200	RM		
	(Approved Makes; Polycab/RR cables/Dicab/ Agilon)				
35	Supply, laying and testing of undernoted sizes of copper conductor XLPE insulated PVC sheathed & sleeved armoured and overall PVC sleeved 1.1 KV grade power distribution cables conforming to relevant IS code and as per specification in ground (in existing trenches) through pipe or on wall / racks cable trays including dressing and clamping the cable with MS zinc passivated clamps etc. as required.				
a)	3 C X 6 mm2 Aluminium Cable	100	RM		
b)	3 C X 4 mm2 Aluminium Cable	100	RM		
36	Supply,installation,testing and commissioning of				
	perforated 2mm CRCA sheet steel powder coated				
	cable trays of following sizes complete with joints,				
	coupling plates and nut bolts etc including providing				
	and fixing of MS hangers etc as required as per				
	the drawings and specifications				
b)	300 mm wide and 62.5 mm deep	100	RM		
c)	450 mm wide and 62.5 mm deep	100	RM		
37	**Earthing :**				
	Supply,installation,testing and commissioning of				
	double earthing continuity conductor of GSS from				
	Panels to respective equipment as per drawings				
	and specifications.				
a)	25 mm X 5 mm strip	100	RM		
b)	6 SWG wire	100	RM		
38	Civil foundation work for 3# Chilling machine, 9 # Pumps, 3# Cooling Towers, 11# AHUs including making any opening and repairing it for pipe,ducts,cables,tray and Chilling machine passage to Basement.	1	lot		
				Subtotal Part"A" (HVAC)	**0**
38	**Buyback of Old HVAC Plant Equipments:**				
	120 TR Capacity Reciprocating Type water Chilling Machine with all associted items and accessories	4	Nos.		
	Cooling Towers with accessories with 7.5Kw Motor	2	Nos.		
	Chilled water Pumps with accessories	4	Nos.		
	Condenser water Pumps with accessories	4	Nos.		
	Airhandling Units cfm with accessories	10	No		
	Associated MS piping,Valves etc.	1	lot		
	Main HVAC Electrical Panel + Control panel with accessories	2	No		
	Total Buyback amount (Rs)				**0**

			Total	**Subtotal "A" after deducting Buyback amount (Rs.)**	**0**
	Part "B" HVAC Annual Maintenance Contract (AMC) :				
39	Cost of comprehensive all inclusive Annual Maintenance Contract (AMC) of the central chilled water system (225 TRX 3 Nos Magnetic Chillers, 3 Nos. Chilled Water Primary,3 Nos. Chilled Water Secondary Pumps,3 Nos. Condenser Pumps,275 TRx 3Nos. Cooling Towers,Side stream filtration system, Close type Expansion Tank) for a period of 1 years after the expiry of one year mandatory free warranty period with consumables and taxes as detailed year wise below:				
40	1st year Comprehensive Annual Maintenance cost After expiry of DLP for Air-Conditioning system equipments as above.	1st Year	Lot		0
				Subtal Part (B)	**0**
				Total Amount (Part A+B) Rs.	**0**
	Cost of CAMC for one Year shall be considrered while arriving at L1 Vendor			**GST -Extra**	