

HVAC

		Unit	Qty	Rate	Amount
	HVAC WORKS (Research Block)				
1a	WATER CHILLING PLANT				.
	Supply at site with full cover insurance ,fire or any other				
	contingencies.Incliding local transport,unloading,storing,handling,errection,balancing and commissioning of the entire plant as per specifications with al accessories as required etc complete.				
	WATER COOLED SCREW				
	(R-134A/410) EACH WITH SEMI SEALED /				
	SEALED / SINGLE / MULTIPLE				
	COMPRESSOR OF MINIMUM CAPACITY				
	Supply at site, including , local transport, unload, store, handle, erect,balance and commission of the entire plant as per specifications including all accessories as specified				
	150TR	Nos	3		
	Overall Chiller efficiency offered shall have COP \geq 4.95				
1	Comprising of Screw Compressor as per specifications				
2	Drive motors of suitable ratings 415Volts 50 Hz AC supply and starter panel with soft starter				
3	Water cooled condensor with all accessories.				
4	Water chiller with all accessories				

		Unit	Qty	Rate	Amount
	LOT-integral mounting frame for all the components.				
5	LOT-refrigerant piping & valves.				
	LOT-insulation of chiller and suction line				
6	LOT-first charge of refrigerant and lube oil.				
7	LOT-vibration isolation pads.				
	Automatic capacity control unit to regulate				
8	the capacity down to 20%				
9	Micro-processor control panel.				
10	Safety controls as per spec and control wiring and interlock between pumps shall be included in the chiller cost.				
11	LOT-Thermometer for water inlet and outlet and water flow switches.				
12	Isolators at the incoming side. Including capacitor power supply and earthing must be terminated . MCCB's as a part of the chiller.				
13	R.C.C foundation along with PCC/RCC sub base with bolts and nuts , spring mounts and finishing the slabs as well as openings and finishing of civil structures				
	copper cable & Isolator for chiller to be included in the chiller cost				
1b	SITC Building management system software	lot	1		
	Data Link / Micro Gateway for integration with third -party BMS on Modbus / BACNET protocol				
1c	Factory Testing of chiller at four points as per AHRI 550/590-2003 Conditions	job	1		

		Unit	Qty	Rate	Amount
	Sub Total				
2.a.	CHILLED WATER PRIMARY PUMPSETS				
	Supply, Installation, testing & commssioning the chilled water primary pumps as per specification including all accessories as specified and as required				
	Endsuction Chilled water Pump sets complete with TEFC sq.cage induction motor (WITH MECHANICAL SEAL) stainless steel shaft, bronze impeller, base plate couplings, pressure gauges (2 Nos. with syphon and gauge cock, anti vibration springs. guards etc. including insulation as per specifications:				
	Including Factory made base frame & RCC Foundation				
	Capacity : 360 USGPM				
	Head : 45 feet				
	Motor : 7.5 H.P (as per OEM standard)	No.	4		
	(1 Stand by)				
	RPM -1440				
	(3 working one stand by)				

		Unit	Qty	Rate	Amount
2.b.	CHILLED WATER SECONDARY PUMPSETS				
	Supply, Installation, testing & commssioning the chilled water secondary pumps as per specification including all accessories as specified and as required				
	Endsuction Chilled water Pump sets complete with TEFC sq.cage induction motor (WITH MECHANICAL SEAL) stainless steel shaft, bronze impeller, base plate couplings, pressure gauges (2 Nos. with syphon and gauge cock, anti vibration springs. guards etc. including insulation as per specifications:				
	Including Factory made base frame & RCC Foundation				
	Capacity : 360 USGPM				
	Head : 80 feet				
	Motor : 10 H.P((as per OEM standard)	No.	4		
	(1 Stand by)				
	RPM - 1440				

		Unit	Qty	Rate	Amount
	(3 working one stand by)				
2.c.	VFD				
	Supply, Installation, Testing & commissioning of complete IP 20 VSPS control panel (IP 55 if panel is to be installed under open air) consisting of adjustable frequency drive (AFD) for each pump, one dedicated microprocessor based pump controller per zone housed within this enclosure panel with parallel pumping software duly down loaded and single / multiple differential pressure sensor / transmitters as per the site requirement. The entire system along with secondary pumps as described above must be sourced from single manufacturer only, to ensure unit responsibility. The VFD should be incorporated with RFI (radio frequency interface) filters which can control THDi [Total Harmonic Distortion Current] below 3%, auto bypass starter compactable to the third party bms	Lot	1		
2.d.	CONDENSOR WATER PUMPSETS				
	Supply, Installation, testing & commssioning the condensor water pumps as per specification including all accessories as specified and as required				

		Unit	Qty	Rate	Amount
	Endsuction Chilled water Pump sets complete with TEFC sq.cage induction motor (WITH MECHANICAL SEAL) stainless steel shaft, bronze impeller, base plate couplings, pressure gauges (2 Nos. syphon and gauge cock, anti vibration springs. guards etc.) including insulation as per specifications:				
	Including Factory made base frame & RCC Foundation				
	Capacity : 600 usgpm				
	Head : 70 feet				
	Motor : 15 H.P (as per OEM standard)	No.	4		
	(one stand by)				
	RPM - 1440				
	(3 working one stand by)				
2.e.	COOLING TOWERS -CTI/JCI Approved				
	Supply, Installation, testing & commssioning the cooling towers as per specification including all accessories as specified and as required				

		Unit	Qty	Rate	Amount
	150 TR Cooling towers of actual capacity complete in all respects as per technical specifications and equipment schedule complete with FRP casing, FRP fan cylinder, PVC louvers, PVC drift eliminator polypropylene nozzles, drive assembly, HDG fan guard/bird screen, non-clogging nozzle type water distribution system. PVC fill, Galvanized steel ladder with railings, make up, quick fill, drain over flow connections, provision for equalizer line etc. as per specifications. Including R.C.C foundation along with PCC/RCC sub base with bolts and nuts and finishing the slabs or any opening etc.				
	EWT = 97.5 degree F				
	LWT = 90 degree F				
	WET bulb = 82 degree F				
	150 TR - CTI Approved				
	150 TR FRP INDUCED DRAFT CROSS FLOW TYPE WITH VERTICAL AIR DISCHARGE COOLING TOWERS				
	Motor suggested 7.5 HP	No.	3		
	Flow rate = 600 usgpm				
	Sub Total				
3	DOUBLE SKIN AIR-HANDLING UNITS WITH VFD & PLUG FANS				

		Unit	Qty	Rate	Amount
	Supply, Installation, testing & commssioning the AHU's as per specification including all accessories as specified and as required				
	VFD driven AHU with plug fans and VFD starter panel with all necessary connections with pressure sensors (minimum 2 nos.) and cabling to be included.				
	VFD's with RFI Filter suitable for First Environment noise control upto 50 Mtr, Inbuilt DC link choke for Harmonic mitigation, and Alphanumeric Display, Input Voltage: 380-480V, 3 Ph, IP-20				
	All AHU's will be given only one power input cable. Any looping should be done by OEM in case of multiple motors in one AHU				
a	Pre-Plasticised Sheet/ powder coated , Extruded				
b	Aluminium panta post frame work				
	Fan section, coil section, filter section, with necessary Insulations, drain pan, etc.				
c	Cooling coil of copper tubes and aluminium fins (min. 10fins per inch) and required number of rows deep.				
d	TEFC sq.cage induction motor of required rating including mounting and fixing arrangements				
e	Plug fan with VFD Drives				
f	anti vibration springs/				
g	isolator bearings etc				
h.	10 mm thick synthetic media filter with frame. 90% efficiency down to 20 micron.				

		Unit	Qty	Rate	Amount
i	Insulation of all section with fire retardant insulation material as per manufactures standard.				
j	Air vent on cooling coil with globe valve/screwed plugs.				
k	Insulation of Drain pan as per specifications.				
l	Double canvas connections of fire retardant quality for connecting AHU's to ducting/plenum.				
m	Insulated drain piping with trap till the out let of the AHU. Balance will be measured in the chilled water piping				
n	Thermostat Thermowell at the inlet and outlet of cooling coils, gauge cocks at the the inlete and outlet of coiling coils for pressure gauges (only provision) duct damper				
o	including Control wiring to make M/V in close position				
p	while AHU is OFF with relays etc. Including R.C.C foundation along with				
q	PCC/RCC sub base with bolts and nuts and finishing the slabs or any opening etc good as same				
	Limit switch in door and inspection lamps to be fixed				
	Lockable off push button to be provided near AHU if				

		Unit	Qty	Rate	Amount
	machine is 3mtrs and above far from respective				
	pannel board to be included in the Ahu cost.				
I	25 TR, 10000 CFM, 20 sqft/4 row.	No	8		
	(Double Skin Floor mounted Horizontal AHU with mixing box, fine filters, heater capacity 4.5KW, Thermal break)				
II	14 TR, 5600 CFM, 11.2 sqft/4 row.	No	2		
	(Double Skin Floor mounted Horizontal AHU with mixing box)				
III	10 TR, 4000 CFM, 8 sqft/4 row.	No	1		
	(Double Skin Floor mounted Horizontal AHU with mixing box, fine filters)				
IV	10 TR, 4000 CFM, 8 sqft/4 row.	No	1		
	(Double Skin Floor mounted Horizontal AHU with mixing box)				
V	8 TR, 3200 CFM, 6.4 sqft/4 row.	No	1		
	(Double Skin Ceiling suspended AHU mixing Box)				
VI	4 TR, 1600 CFM 3.2 sqft/4 row.	No	16		
	(Double Skin Ceiling suspended AHU with fine filter, mixing Box, heater capacity 1.5KW, thermal break)				
VII	TREATED FRESH AIR UNIT WITH HEAT RECOVERY				
	WHEEL & VFD DUAL MOTOR FOR SUPPLY RETURN FANS				
	Summer Ambient conditions: DBT – 95 deg F, WBT- 82 Deg F				
	Return air condition: DBT- 75 Deg F , RH– 55%				
	SUPPLY FAN Static - 60 to 70 mm WG				
	Return fan - 40 mm to 60 mm WG				

		Unit	Qty	Rate	Amount
	Efficiency 80- 85%				
a.	TFA WITH HRW - LEFT SIDE	No	1		
	Supply cfm = 8200 cfm				
	Return cfm= 7300 cfm				
b	TFA WITH HRW - RIGHT SIDE	No	1		
	Supply cfm = 6000 cfm				
	Return cfm= 5400 cfm				
	Notes:				
1	AHU Static				
a	for AHU's with fine filters - 55 MM Static				
b	for all other AHU's - 40 MM Static				
2	fine filter efficiency 99.9% down to 5 micron				
	Sub Total				

		Unit	Qty	Rate	Amount
4	FAN COIL UNITS AND CASSETS				
	Supply, installing, testing and commissioning of FCU's each complete with filters of 20micron filtering capacity , coil section with chilled water cooling coil and fan section with forward curved multi blade centrifugal blower and suitable TEFC Sq.cage induction motor, extended drain pan copper connections from isolating ball valve to fan coil unit cooling coil complete flare-nuts, nipple, brazing of pipe joints, etc. with expansion loop, providing and fixing GM ball valve(with SS ball) with Y strainer for inlet of cooling coils, pipe connection between drain outlet and drain piping with 2nos. hose S clamps, providing and fixing male-female Copper connections from isolating ball valve to fan coil unit cooling coil (15mm/19mm OD) complete flare-nuts nipple, brazing of pipe joints etc. with expansion loop. extended tray double skin & with room thermostat cum fan speed selector switch				
	INCLUDING 2 WAY TYPE PRESSURE INDEPENDENT VALVE (ON/OFF)				
a	1.5 TR Hideway FCU	No	1		
b	Four way cassetts				

		Unit	Qty	Rate	Amount
1	4 TR cassette unit	No	6		
2	3.5 TR cassette unit	No	4		
3	3 TR cassette unit	No	3		
4	2.5 TR cassette unit	No	2		
5	2 TR cassette unit	No	13		
6	1.5 TR cassette unit	No	6		
7	1 TR cassette unit	No	23		
	Sub Total				

		Unit	Qty	Rate	Amount
5.a.	CHILLED WATER PIPING (Pre insulated piping)				
	Supply, receive, store, handle, install, test and				
	commissioning of the following chilled water				
	with MS class(B) pipes, with high tech				
	supports with insulation complete with all				
	fittings such as bends, tees, elbows, reducers				
	flanges, special fittings, suspension hangers,				
	supports etc. as reqd. for installation as per				
	site conditions and as per specifications.				
	Underground piping shall have bitumen				
	coating. Piping insulation shall be expanded				
	polyurethane foam with 36 kg/cu m minimum				
	density, .90% minimum closed cell content,				
	minimum compressive strength of 40 psi and				
	thermal conductivity of 0.14 Btu-in/hr/ft ² /OF.				
	The insulation shall completely fill the annular space				
	between the service pipe and jacket and shall be				
	bonded to both, the service pipe & jacket.				
	All the fittings & bends shall be finished with the				
	same finish as specified for preinsulated pipe,				
	supplied by the same company				
	RCC opening as good as same all supports				
	Pipes to be welded with V-cut grooves as per specifications.				
	MS CLASS(B) IS 3589 PIPING:				
	wall opening as good as same				
	FACTORY FABRICATED				
i	250 mm dia.	RM.	20		

		Unit	Qty	Rate	Amount
ii	200 mm dia.	RM.	65		
iii	150 mm dia.	RM.	20		
iv	125 mm dia.	RM.	100		
v	100 mm dia.	RM.	30		
vi	80 mm dia.	RM.	15		
vii	65mm dia.	RM.	90		
viii	50mm dia.	RM.	45		
ix	40mm dia.	RM.	450		
x	32mm dia.	RM.	45		
xi	25mm dia.	RM.	270		
xii	20mm dia.	RM.	250		
	Site fabricated				
	Site fabricated pipe with PUF injection insulation & GI cladding for part plant room & AHU room area & valve insulation with openable boxing for inspection.				
xiii	250 mm dia.	RM.	75		
xiv	125 mm dia.	RM.	115		
b	Drain water piping with Ball valves				
	Supply and fixing in position of condensate drain water & indoor unit drain to the floor trap piping with 9mm thick nitrile rubber insulation and with necessary fittings like elbows, tees and reducers etc. Openings as good as same.				

		Unit	Qty	Rate	Amount
1	25 mm dia. GI	RM.	300		
2	20 mm dia PVC	RM.	350		
c	<u>VALVES:</u>				
	Supply, installation, testing & commissioning of the following valves as per the specifications and as required. Butterfly valve shall cast iron body with black nitrile seat. All butterfly valves shall be provided with locking devices & PN 16 Rating. Valve above 300 mm dia shall be gear driven.				
	BUTTERFLY VALVES:				
1	250 mm dia.	No.	2		
2	125 mm dia.	No.	22		
3	65mm dia.	No.	16		
4	50mm dia.	No.	4		
5	40 mm dia.	No.	6		
d	BALL VALVE.				
	25 mm dia.	No.	32		
e	FLOOR ISOLATION/SHAFT BUTTERFLY VALVE				
1	80 mm dia	No.	2		
2	65mm dia.	No.	20		

		Unit	Qty	Rate	Amount
3	50mm dia.	No.	2		
4	32 mm ida.	No.	2		
5	20 mm ida.	No.	2		
f	DRAIN VALVES FOR PLANT ROOM, COOLING TOWER, SHAFT RAISER				
1	125mm dia.	No.	2		
2	40 mm dia.	No.	18		
3	32 mm ida.	No.	6		
g	NON RETURN VALVES				
	Supply, installation, testing & commissioning of the following non return valves as per the specifications and as required. Non Return valves up to 65mm size shall be of gun metal with screwed female ends. Valves of 65mm and above shall be of CI with flanged ends.				
	125 mm dia.	No.	8		
h	BALANCING VALVE WITH PROVISION FOR FLOW MEASURMENT				

		Unit	Qty	Rate	Amount
	Supply, installation, testing & commissioning of Balancing Valve, with Cast-iron body, 90 Deg C maximum operating temperature; built-in locking device for Tamper-Proof positioning; flanged connections; Valves shall have connections with isolation device for portable differential pressure meter with integral seals, Flow accuracy shall be 5%+/- , nessory insulation as per specification				
	125 mm dia.	No.	3		

		Unit	Qty	Rate	Amount
i	SUCTION GUIDE				
	Supply, installation, testing & commissioning of the following suction guides as per the specifications and as required.				
	125 mm dia.	No.	8		
j	Y STRAINER FOR AHUs				
	Supply, installation, testing & commissioning of the following Y strainers as per the specifications and as required.				
1	65 mm dia	No.	8		
2	50 mm dia	No.	2		

		Unit	Qty	Rate	Amount
3	40 mm dia	No.	3		
4	25 mm dia	No.	16		
k	PRESSURE GAUGE				
	Supply, installation, testing and commissioning of Indicating-dial type pressure gauges of Dry type made of Stainless steel or cast aluminum case, 114-mm dia, Pressure-Element Assembly: Bourdon tube, Pressure Connection : Brass, NPS 12mm dia bottom outlet type, Dial: Satin-faced, non-reflective aluminum with permanently etched scale markings, Pointer: Red or other dark-color metal, Window: Glass, Accuracy: Grade A, plus or minus 1 percent of middle half, Stainless Steel U-Siphon and 15mm Brass body ball valve as per specification				
	For chiller, pumps, AHU				
	Plant room				
	Dial type pressure gauges.	No.	22		
	AHU				
	Dial type pressure gauges.	No.	58		
l	THERMOMETERS : Supply, installation, testing and commissioning of Dial type thermometers with Stem with Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation, Stainless Steel U-Siphon and 15mm Brass body ball valve as per specification				

		Unit	Qty	Rate	Amount
	Plant room				
	Dial type thermo meter.	No.	22		
	AHU				
	Dial type thermo meter.	No.	58		
m	DIFFERENTIAL PRESSURE SWITCH				
	Supply, installation, testing & commissioning of the following differential pressure switch as per the specifications and as required.	No.	3		

		Unit	Qty	Rate	Amount
n	MOTORISED CUT OFF VALVE 125 MM				
	Supply, installation, testing & commissioning of the following motorized cut off valves as per the specifications and as required.	No.	3		
o	750 L Pressurized Tank				
	Design, supply, installation, testing and commissioning of Pressurised chilled water expansion tank with Make up connection for closed loop system along with necessary pneumatic devices and accessories and MS 'C' section supports in order to keep chilled water under pressure. The tank shall be precharged steel tank with replacable heavy duty butyl rubber bladder. The tank shall have 50mm system connection and 20mm drain and charging valve connection to facilitate on-site charging of tank. The tank shall be fitted with lifting rings and floor mounting skirt for vertical installation. The tank shall be constructed according to section 8 of ASME boiler and pressure vessel code and stamped 125psi working pressure. The contractor shall submit calculation regarding the above data. Pumps shall be of N+1 configuration. including with control wiring	No.	1		

		Unit	Qty	Rate	Amount
p	Air Separators				
	Supply, installation, testing & commissioning of a common air separator on the return water line located at the pump suction and suitable for Secondary pump water flow; the separator shall be complete with high capacity air vent, flanges, service valve, non return valve, isolation butterfly valve for makeup water inlet.				
	Capacity suitable for 1080 USGPM and 250 mm NB CHW Header line	No.	1		
q	AUTO AIR VENTS including Ball Valves				
	Supply & install of airvents / purge valves at the highest points in chilled water piping complete each floor with pipes nipple welded to pipe, hex nipple, socket, U-pipe connection at outlet of air vent etc. as required.	No.	40		
r	FLEXIBLE CONNECTORS:				
	Supply and fixing flexible connections with control				
	rods for pumps and chiller & condensor				
	125 mm NB	No.	22		

		Unit	Qty	Rate	Amount
s	2 WAY TYPE PRESSURE INDEPENDENT BALANCING CUM MODULATING FLOW CONTROL VALVE				
	Supply, Installation, testing and commissioning of Pressure independent type 2 way modulating flow Control valves in a single Unit of Valve. PN16 Rating. DN 15 to DN 32 Brass Body Ext. Threaded DN 40 & DN 50 Cast Iron Body, Ext. Threaded DN 65 to DN 100 Cast Iron body, Flanged Ends Connection Duly mounted with a BMS compactable Modulating actuator IP54 Type suitable for 24V AC for AHU / FCU as per specification				
1	65mm dia.	No.	8		
2	50mm dia.	No.	2		
3	40 mm dia.	No.	3		
4	25 mm dia.	No.	16		
	Sub Total				
6.a.	CONDENSOR WATER PIPING.				
	Supply, receive, store handle, install test and				
	commission the following condenser water piping				
	with GI class (B) pipes complete with all fittings				
	such as bends, tees, elbows, reducers, flanges,				
	special fittings, suspension hangers, supports,				
	etc. as reqd. for installation as per site				
	conditions and as per specifications.				

		Unit	Qty	Rate	Amount
	opening as good as same				
	GI class (B) IS 3589 piping				
1	250mm dia.	Rm.	160		
2	150mm dia.	Rm.	100		
b	BUTTERFLY VALVES:				
	Supply, installation, testing & commissioning of the following butterfly valves as per the specifications and as required.				
	150 mm dia	No.	20		

		Unit	Qty	Rate	Amount
c	NON-RETURN VALVE				
	Supply, installation, testing & commissioning of the following non return valves as per the specifications and as required.				
	150 mm dia	No.	4		
d	SUCTION GUIDE				
	Supply, installation, testing & commissioning of the following suction guides as per the specifications and as required.				
	150 mm dia.	No.	4		
e	FLEXIBLE CONNECTORES:				
	Supply and fix flexible connections with control				
	rods for pumps and chiller.				
	150 mm NB	No.	14		

		Unit	Qty	Rate	Amount
f	BALANCING VALVES				
	Supply, installation, testing & commissioning of Balancing Valve, with Cast-iron body, 90 Deg C maximum operating temperature; built-in locking device for Tamper-Proof positioning; flanged connections; Valves shall have connections with isolation device for portable differential pressure meter with integral seals, Flow accuracy shall be 5%+/-				
	150 mm dia	No.	6		
g	THERMOMETER	No.	14		
h	PRESSURE GAUGE	No.	14		
i	DIFFERENTIAL PRESSURE SWITCH	No.	3		
j	MOTORISED CUT OFF VALVE 150 MM	No.	6		
	Total for Item No: 6				

		Unit	Qty	Rate	Amount
7	SHEET METAL WORK				
	Supply, fabricate, handle and erect factory fabricated GSS ducting as per drawing, complete with all fittings such as tee bends, special off-chutes, turning vanes, splitter dampers, ins.doors, transformation pieces slip on flanges etc. as reqd. as per IS 655 including suspension and supporting arrangement for plenums, ducts, complete as reqd. and as per specs.(only hitech supports shall be used) wall opening as good as same				
a	RECTANGULAR DUCT				
1	0.63mm GSS ducting	sq.m.	1950		
2	0.80mm GSS ducting	sq.m.	1550		
3	1.00mm GSS ducting	sq.m.	400		
b	GRILLES & DIFFUSERS				
	Supply and fix the following grilles and diffusers as per specifications. Machine made, powder coated, supply and return air grilles and diffusers of design to be approved				
	(Material : Al)				
i	Supply air grille/diffuser with vcd	Sq.m	22		
ii	Return air grille/diffuser w/o vcd	Sq.m	30		

		Unit	Qty	Rate	Amount
iii	Factory made fresh air dampers with louvers and control lever.	Lot.	2		
iv	Supply, Fabrication, installation and testing of the insulated flexible ducting, complete with connecting rings, duct supports etc as per standards and specification.				
a	300 mm dia	Rm	20		
b	350 mm dia	Rm	200		
v	Insulated Plenum Box (450x450x400) made of 22G G.I & Spigot & Butterfly Dampers with necessary threaded rods for supporting.	Nos	75		

		Unit	Qty	Rate	Amount
f	DUCT DAMPERS				
	Supply, fix, balance, and commission louvre type smooth supply air duct dampers made of extruded aluminium linkage, lever, fixing arrangement etc.complete brass bushings	sq.m	12		
g	FIRE DAMPERS.				
	Supply and fix 1 1/2 hour fire rated fire dampers air ducts (main line) with fusible link & microswitch to shut of corresponding Ahu (including control cable.)	sq.m	20		
h	DUCT INSULATION & LINING				
i	Thermal insulation				
	supply & fixing of 9 mm thick class o nitrile rubber insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3	Sq.m	2800		
ii	Acoustic insulation				
	supply & fixing of 10 mm thick acoustic insulation with adhesive as per the recommendation of the manufacture with density 140-180kg/m3	Sq.m	400		
iii	Non ac area duct insulation				
	supply & fixing of 19 mm thick armacell insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3	Sq.m	700		
	SUB TOTAL				

		Unit	Qty	Rate	Amount
8	VENTILATION SYSTEM				
a	supply, installation, testing and commissioning Direct driven axial flow fans suitable for mounting on wall or duct in standard galvanized/ powder coated steel construction with required rating, single motor and flexible connection to connect with ducting / plenum.				
	EXHAUST FANS				
1	2750 cfm exhaust fans	Nos.	1		
2	2250 cfm exhaust fans	Nos.	4		
3	1750 cfm exhaust fans	Nos.	4		
4	800 cfm exhaust fans	Nos.	6		

		Unit	Qty	Rate	Amount
5	80 cfm exhaust fans	Nos.	7		
b	SHEET METAL WORK				
	Supply, fabricate, handle and erect GSS Factory Fabricated rectangular duct as per drawings. complete with all fittings such as tee bends, special off-chutes, turning vanes, splitter dampers, ins.doors, transformation pieces etc. as reqd. as per IS 655 including suspension and supporting arrangement for plenums, complete as reqd. and as per specs.(only hi-tech supports shall be used) ducts, joining with easy slip on flange, gasket, corner piece, cleat etc wall opening as good as same				
	1. 0.63mm GSS ducting in sq.m.	Sqm	550		
c	Flexible Ducting				
	Supply, Fabrication, installation and testing of the flexible ducting, complete with connecting rings, duct supports, Plenum box etc as per standards and specification				
	100 dia	Rm	250		
d	GRILLES & DIFFUSERS				
	Supply and fix the following grilles and diffusers as per specifications				
	(material : Al)				
	Return air grille/diffuser with vcd	Sqm	3		
	SUB TOTAL				

		Unit	Qty	Rate	Amount
9	ADDITIONAL WORKS				
a	ISOWALL BOXING				
	Supply and Fixing ISOWALL 50 mm thick EPS, both side GI coated sheet panels with access door for Split unit rooms and ceiling, making return air boxing with necessary angels, sealant etc.-	Sq.m.	5		
b	Exposed roof insulation				
	supply & fixing of 12 mm thick class o nitrile rubber insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3	Sqm	600		
c	ACCOUSTIC LINING OF AHU ROOMS				
	Supply, installing and testing of accoustic lining of AHU rooms, walls and ceiling with 15 mm thick nitrile rubber with adhesive as per the recommendation of the manufacture with density 140-180kg/m3	Sqm	1		
10	ELECTRICAL WORK				
	Supply, installation testing and				
	commissioning of extensible type, cubical				
	panel comprising of switch fuse units, busbar,				
	cable alley, fabricated from 20mm thick				
	CRCA sheets duly rust inhibited and stove				
	enamel painted complete with heavy duty				
	rubber gaskets, hinged compartment doors,				
	removable gland plate for cable entry, sheet				
	steel or 5mm thick compartment segregation,				
	name plate, interconnection busbar, mounting				
	channels etc. including fully automatic				
	star/delta/DOL starters for pumps depending on OEM standard				
	Variable				

		Unit	Qty	Rate	Amount
	Speed drives suitable for cubicle				
	panel mounting inside the main panel				
	for secondary pumps				
	Control wiring, interlocks, push buttons, indication				
	lamps etc. for the outgoing shall be included				
	in this panel.				
	All the panels shall be compactable for BMS & CPRI Approved				
	All mandatory and statute sanction orders and approvals from the electrical inspectorate and KSEB shall be obtained .				
	All incoming and out going switch ratings are sa per KSEI standard				
	a) INCOMING				
	1 No. MCCB				
	b) BUSBARS				
	3 phase and neutral Aluminium bus bars with				
	bus supports in suitable bus chamber.				
	c) METERING				
	ammeter with CT's and selector				
	switch.				
	0-500 volts voltmeter with selector switch and fuses.				
	0-250 Amp ammeter with CT's and selector switch.				
	d) 1 set R.Y.B lmps with fuses.				
	e) OUTGOING				
	TPN MCCB/ MPCB for				
	pumps, cooling tower's, ahu's.				
	1 No. earth bus(CU) throughout the panel with				
	earthing bolts				

		Unit	Qty	Rate	Amount
a	Pumps panel	Nos.	1		
	Total HP-120 HP				
b	Basement floor panel 1	Nos.	1		
	Total HP-18 HP				
c	Ground floor panel 2	Nos.	1		
	Total HP-48 HP				
d	First floor panel 3	Nos.	1		
	Total HP-48 HP				
e	Second floor panel 4	Nos.	1		
	Total HP-48 HP				
f	Third floor panel 5	Nos.	1		
	Total HP-48 HP				
g	Terrace floor panel 6	Nos.	1		
	Total HP-38 HP				
11	THREE PHASE DB WITH SINGLE PHASE OUTLET FOR UNITS				
a	Three Phase 12 Way DB	Nos.	3		
b	Three Phase 6 Way DB	Nos.	3		

		Unit	Qty	Rate	Amount
12	ISOLATORS.				
a	3 Phase 16A to 63A	Nos.	29		
b	I-Phase 6A to 32A	Nos.	36		
c	Lockable off push button near pumps. & CT	Nos.	15		

		Unit	Qty	Rate	Amount
13	CABLES				
	Supply and laying of 1.1 Kv PVC insulated PVC sheathed steel armoured cables of approved make and laying and fixing of PVC insulated PVC sheathed cable of 1.1Kv grade on surface/cable tray as required and making end termination with brass compression gland for PVC sheathed cable of 1.1Kv grade and fabricating and installing MS cable trays including horizontal and vertical bends, reducers, tees, cross members and other accessories as required and duly suspended from ceiling with MS suspenders including painting etc. (IN R.M.)				
i	3 core 16 sq.mm Al. cables	Rm.	120		
ii	3 core 6 sq.mm Al. cables	Rm.	440		
iii	4 core 6 sq.mm Al. cables	Rm.	375		
iv	4 core 4 sq.mm Al. cables	Rm.	1000		
v	3 core x 1.5 sq mm copper shielded armor cable	Rm.	200		
vi	3 core x 1.5 sq mm copper cable	Rm.	200		
vii	6 core x 1.5 sq mm copper cable	Rm.	100		
14	EARTHING				
	Supply and laying earthing for various equipments and motors.				
	10 SWG copper wire	Rm.	1250		

		Unit	Qty	Rate	Amount
	SUB TOTAL				

		Unit	Qty	Rate	Amount
SUMMARY SHEET					
No	DESCRIPTION				AMOUNT
1	Chillers				
2	Pumps (chilled water , condensor water, cooling tower, VFD)				
3	AHU				
4	FCU				
5	Chilled water piping and Valves				
6	Condensor water piping and valves				
7	Sheet metal work				
8	Ventilation system				
9	Additional work				
10	Electrical works				
	TOTAL for HVAC works except Animal house				

		Unit	Qty	Rate	Amount
	ANIMAL HOUSE				
1	DOUBLE SKIN AIR-HANDLING UNITS WITH VFD & PLUG FANS				
	Supply, Installation, testing & commssioning the AHU's as per specification including all accessories as specified and as required				
	VFD driven AHU with plug fans and VFD starter panel with all necessary connections with pressure sensors (minimum 2 nos.) and cabling to be included.				
	VFD's with RFI Filter suitable for First Environment noise control upto 50 Mtr, Inbuilt DC link choke for Harmonic mitigation, and Alphanumeric Display, Input Voltage: 380-480V, 3 Ph, IP-20				
	All AHU's will be given only one power input cable. Any looping should be done by OEM in case of multiple motors in one AHU				
a	Pre-Plasticised Sheet/ powder coated , Extruded				
b	Aluminium panta post frame work as per OEM standards				
	Fan section, coil section, filter section, with necessary Insulations, drain pan, etc.				
c	Cooling coil of copper tubes and aluminium fins (min. 10fins per inch) and required number of rows deep.				
d	TEFC sq.cage induction motor of required rating including mounting and fixing arrangements				
e	Plug fan with VFD Drives				
f	anti vibration springs/				

		Unit	Qty	Rate	Amount
g	isolator bearings etc				
h.	10 mm thick synthetic media filter with frame. 90% efficiency down to 20 micron.				
i	Insulation of all section with fire retardant insulation material as per manufactures standard.				
j	Air vent on cooling coil with globe valve/screwed plugs.				
k	Insulation of Drain pan as per specifications.				
l	Double canvas connections of fire retardant quality for connecting AHU's to ducting/plenum.				
m	Insulated drain piping with trap till the out let of the AHU. Balance will be measured in the chilled water piping				
n	Thermostat Thermowell at the inlet and outlet of cooling coils, gauge cocks at the the inlete and outlet of coiling coils for pressure gauges (only provision) duct damper				
o	including Control wiring to make M/V in close position while AHU is OFF with relays etc.				
p	Including R.C.C foundation along with				
q	PCC/RCC sub base with bolts and nuts and finishing the slabs or any opening etc good as same Limit switch in door and inspection lamps to be fixed Lockable off push button to be provided near AHU if machine is 3mtrs and above far from respective pannel board to be included in the Ahu cost.				
I	9 TR, 3600 CFM, 7.2 sqft/4 row. Double skin ceiling suspended AHU	No	1		

		Unit	Qty	Rate	Amount
II	16 TR, 4100 cfm, 8.2 sq.ft. / 6 Row	No	1		
	Double skin floor mounted AHU with fine filter, Mixing Box				
III	16 TR, 3550 CFM, 7.1 sqft/6 row.	No	1		
	Double skin floor mounted AHU with fine filter, Mixing Box				
IV	15 TR, 5200 CFM, 10.4 sqft/4 row.	No	1		

		Unit	Qty	Rate	Amount
	(Double Skin Ceiling suspended AHU mixing Box)				
V	12 TR, 1300 cfm, 2.6 sqft/4 row.	No	1		
	(Double Skin Ceiling suspended AHU with fine filter, 2 KW Heater)				
VI	TREATED FRESH AIR UNIT WITH HEAT RECOVERY				
	WHEEL & VFD DUAL MOTOR FOR SUPPLY RETURN FANS				
	Supply at site, including, local transport, unload, store, handle, erect,balance and commission of the entire HRW AHU as per specifications including all accessories as specified and as required				
	Summer Ambient conditions: DBT – 95 deg F, WBT- 82 Deg F				
	Return air condition: DBT- 75 Deg F , RH– 55%				
	SUPPLY FAN Static - 60 to 70 mm WG				
	Return fan - 40 mm to 60 mm WG				
	Efficiency 80- 85%				
a.	TFA WITH HRW- ANIMAL HOUSE	No	1		
	Supply cfm = 5500 cfm				
	Return cfm= 3750 cfm				
	Notes:				
1	AHU Static				

		Unit	Qty	Rate	Amount
a	for AHU's with fine filters - 55 MM Static				
b	for AHU's with fine filters, Hepa Filter, Heater - 110 MM Static				
c	for all other AHU's - 40 MM Static				
2	fine filter efficiency 99.9% down to 5 micron				
	Sub Total				
2.a.	CHILLED WATER PIPING (Pre insulated piping)				
	Supply, receive, store, handle, install, test and				
	commissioning of the following chilled water piping				
	with MS class(B) pipes, with high tech				
	supports with insulation complete with all				
	fittings such as bends, tees, elbows, reducers				
	flanges, special fittings, suspension hangers,				
	supports etc. as reqd. for installation as per				
	site conditions and as per specifications.				
	Underground piping shall have bitumen				
	coating. Piping insulation shall be expanded				
	polyurethane foam with 36 kg/cu m minimum				
	density, .90% minimum closed cell content,				
	minimum compressive strength of 40 psi and				
	thermal conductivity of 0.14 Btu-in/hr/ft ² /OF.				
	The insulation shall completely fill the annular space				

		Unit	Qty	Rate	Amount
	between the service pipe and jacket and shall be				
	bonded to both, the service pipe & jacket.				
	All the fittings & bends shall be finished with the				
	same finish as specified for preinsulated pipe,				
	supplied by the same company				
	RCC opening as good as same all supports				
	Pipes to be welded with V-cut grooves as per specifications.				
	MS CLASS(B) IS 3589 PIPING:				
	wall opening as good as same				
i	80 mm dia.	RM.	20		

		Unit	Qty	Rate	Amount
ii	65mm dia.	RM.	40		
iii	50mm dia.	RM.	40		
iv	40mm dia.	RM.	40		
b	Drain water piping				
	Supply and fixing in position of condensate drain water & indoor unit drain to the floor trap piping with 9mm thick nitrile rubber insulation and with necessary fittings like elbows, tees and reducers etc. Openings as good as same.				
	25 mm dia. GI	RM.	60		
c	<u>VALVES:</u>				
	BUTTERFLY VALVES:				
	Supply, installation, testing & commissioning of the following butterfly valves as per the specifications and as required. Butterfly valve shall cast iron body with black nitrile seat. All butterfly valves shall be provided with locking devices & PN 16 Rating. Valve above 300 mm dia shall be gear driven.				
i	50mm dia.	No.	6		
ii	40 mm dia.	No.	4		
d	FLOOR ISOLATION/SHAFT BUTTERFLY VALVE				
ii	80 mm dia.	No.	2		
iii	65mm dia.	No.	1		

		Unit	Qty	Rate	Amount
iv	50mm dia.	No.	1		
v	40 mm dia.	No.	2		

		Unit	Qty	Rate	Amount
e	Y STRAINER FOR AHU'S				
	Supply, installation, testing & commissioning of the following Y strainers as per the specifications and as required.				
i	50 mm dia	No.	3		
ii	40 mm dia	No.	2		
f	PRESSURE GAUGE				
	Supply, installation, testing and commissioning of Indicating-dial type pressure gauges of Dry type made of Stainless steel or cast aluminum case, 114-mm dia, Pressure-Element Assembly: Bourdon tube, Pressure Connection : Brass, NPS 12mm dia bottom-outlet type, Dial: Satin-faced, non-reflective aluminum with permanently etched scale markings, Pointer: Red or other dark-color metal, Window: Glass, Accuracy: Grade A, plus or minus 1 percent of middle half, Stainless Steel U-Siphon and 15mm Brass body ball valve as per specification				
	For chiller, pumps, AHU				
	AHU				
	Dial type pressure gauges.	No.	10		

		Unit	Qty	Rate	Amount
g	THERMOMETERS : Supply, installation, testing and commissioning of Dial type thermometers with Stem with Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation, Stainless Steel U-Siphon and 15mm Brass body ball valve as per specification				
	AHU				
	Dial type thermo meter.	No.	10		
h	AUTO AIR VENTS including Ball Valves				
	Supply & install of airvents / purge valves at the highest points in chilled water piping complete each floor with pipes nipple welded to pipe, hex nipple, socket, U-pipe connection at outlet of air vent etc. as required.	No.	5		
i	2 WAY TYPE PRESSURE INDEPENDENT BALANCING CUM MODULATING FLOW CONTROL VALVE				
	Supply, Installation, testing and commissioning of Pressure independent type 2 way modulating flow Control valves in a single Unit of Valve. PN16 Rating. DN 15 to DN 32 Brass Body Ext. Threaded DN 40 & DN 50 Cast Iron Body, Ext. Threaded DN 65 to DN 100 Cast Iron body, Flanged Ends Connection Duly mounted with a BMS compactable Modulating actuator IP54 Type suitable for 24V AC for AHU / FCU as per specification				

		Unit	Qty	Rate	Amount
i	50mm dia.	No.	3		
ii	40 mm dia.	No.	2		
	Sub Total				

		Unit	Qty	Rate	Amount
3	SHEET METAL WORK				
	Supply, fabricate, handle and erect factory fabricated GSS ducting as per drawing, complete with all fittings such as tee bends, special off-chutes, turning vanes, splitter dampers, ins.doors, transformation pieces slip on flanges etc. as reqd. as per IS 655 including suspension and supporting arrangement for plenums, ducts, complete as reqd. and as per specs.(only hitech supports shall be used) wall opening as good as same				
a	RECTANGULAR DUCT				
i	0.63mm GSS ducting	sq.m.	675		
ii	0.80mm GSS ducting .	sq.m.	550		
iii	1.00mm GSS ducting	sq.m.	135		

		Unit	Qty	Rate	Amount
b	GRILLES & DIFFUSERS				
	Supply and fixing the following grilles and diffusers as per specifications. Machine made, powder coated, supply and return air grilles and diffusers of design to be approved, (Material : Aluminium)				
i	Supply air grille/diffuser with vcd	Sq.m	8		
ii	Return air grille/diffuser w/o vcd	Sq.m	12		
iii	Factory made fresh air dampers with louvers and control lever.	Lot.	1		
d	Supply, Fabrication, installation and testing of the insulated flexible ducting, complete with connecting rings, duct supports etc as per standards and specification.				
i	300 mm dia	Rm	10		
ii	350 mm dia	Rm	90		
e	Supply and fixing Insulated Plenum Box (450x450x400) made of 22G G.I and Spigot & Butterfly Dampers with necessary threaded rods for supporting.	Nos	45		
	Supply installing, testing and commissioning of Factory Fabricated HEPA filters of efficiency 99.9% down to 0.3 microns in filter plenum of 18 Gauge with rubber Gaskets In SS suitable frame work with 70% perforated grille				

		Unit	Qty	Rate	Amount
	Ultra Clean Ventilation arrangement of A/C inside the Lab comprising of SS supply plenum, including the 1.5" flanges on all sides. material ISS 304, 2B finish). HEPA filters 0.3microns, efficiency 99.97% EU13. The HEPA filters will be fixed to the plenum using M6 SS rode, 304 Q type SS bolts and nuts). SS perforated sheets Mat finish. Hole size 23mm x 7mm oblong shape with 70% perforation., Sizes as per the drawing				
	Hepa filters for 4100 cfm, Zone 2	Nos	1		
	Hepa filters for 3550, Zone 3	Nos	1		

		Unit	Qty	Rate	Amount
	Hepa filters for 1300 cfm	Nos	1		
g	STRIP HEATERS				
	Supply, install, testing and commissioning of strip heaters comprising thermostat, humidistat, safety thermostat, contactors. Minimum capacity of strip heaters shall be 3 KW				
	7.5 KW	Nos	1		
	4.5 KW	Nos	1		
f	DUCT DAMPERS				
	Supply, fixing, balance, and commission louvre type smooth supply air duct dampers made of extruded aluminium linkage, lever, fixing arrangement etc.complete brass bushings	sq.m	4		
g	FIRE DAMPERS.				

		Unit	Qty	Rate	Amount
	Supply,fixing,testing and commissioning of Motorised Fire dampers complete with actuator and control panel with required lengths of control wiring as per site requirements. Damper shall be with 16G GI Sheet construction ,16G GI casing and 16G GI blades 150 mm wide complete with chrome plated spindles ,self lubricating bushes, With 18G 400 mm Extended sleeve, 1 1/2 Hrs fire rating as per UL-555 certified by CBRI. The damper shall be motorised so as to close the damper and trip the AHU in the event of fire automatically and open the same in case of power being restored.The damper shall also be closed in the event of fire signal and should be compatible for BMS as per specification. Also DC/AC power should provided for dampers and all necessary equipments for the same considered.	sq.m	8		
	Motorized Damper Actuators with control panel & temperature sensors -7 Nm torque	Nos	10		
h	DUCT INSULATION & LINING				
1	Thermal insulation				
	supply & fixing of 9 mm thick class o nitrile rubber insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3	Sq.m	980		

		Unit	Qty	Rate	Amount
2	Acoustic insulation				
	supply & fixing of 10 mm thick acoustic insulation with adhesive as per the recommendation of the manufacture with density 140-180kg/m ³	Sq.m	230		
3	Non ac area duct insulation				
	supply & fixing of 19 mm thick armacell insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m ³	Sq.m	180		
	SUB TOTAL				
4	ELECTRICAL WORK				
	Supply, installation testing and commissioning of extensible type, cubical panel comprising of switch fuse units, busbar, cable alley, fabricated from 20mm thick CRCA sheets duly rust inhibited and stove enamel painted complete with heavy duty rubber gaskets, hinged compartment doors, removable gland plate for cable entry, sheet steel or 5mm thick compartment segregation, name plate, interconnection busbar, mounting channels etc. including fully automatic star/delta/DOL starters for pumps, Variable Speed drives suitable for cubicle panel mounting inside the main panel for secondary pumps Control wiring, interlocks, push buttons, indication lamps etc. for the outgoing shall be included in this panel.				

		Unit	Qty	Rate	Amount
	All the panels shall be compactable for BMS & CPRI Approved				
	All mandatory and statute sanction orders and approvals from the electrical inspectorate and KSEB shall be obtained.				
	All incoming and out going switch ratings as per KSEI standard				
	a) INCOMING				
	1 No. MCCB				
	b) BUSBARS				
	3 phase and neutral Aluminium bus bars with bus supports in suitable bus chamber.				
	c) METERING				
	ammeter with CT's and selector switch.				
	0-500 volts voltmeter with selector switch and fuses.				
	0-250 Amp ammeter with CT's and selector switch.				
	d) 1 set R.Y.B lmps with fuses.				
	e) OUTGOING				
	TPN MCCB/ MPCB for pumps, cooling tower's, ahu's.				
	1 No. earth bus(CU) throughout the panel with earthing bolts				
a	Upper Basement floor panel 1	Nos.	1		
	Total HP-43 HP				
b	Supply and fixing ISOLATORS				
i	3 Phase 16A to 63A	Nos.	9		

		Unit	Qty	Rate	Amount
ii	I-Phase 6A to 32A	Nos.	10		
	Control box & DIGITAL DISPLAY PANEL inside the rooms with indication lamp , ON/OFF of AHU, thermostat control of Rooms , cooling & heating mode, humidity control etc. Digital display of RH/TEMPERATURE, pressure (including pressure sensor & necessary control), wiring from AHU to unit etc. as per dwg / picture attached	Nos.	5		
c	CABLES				
	Supply of 1.1 Kv PVC insulated PVC				
	sheathed steel armoured cables of approved				
	make and laying and fixing of PVC insulated				
	PVC sheathed cable of 1.1Kv grade on				
	surface/cable tray as required and making				
	end termination with brass compression gland				
	for PVC sheathed cable of 1.1Kv grade and				
	fabricating and installing MS cable trays				
	including horizontal and vertical bends,				
	reducers, tees, cross members and other				
	accessories as required and duly suspended				

		Unit	Qty	Rate	Amount
	from ceiling with MS suspenders including				
	painting etc. (IN R.M.)				
i	4 core 6 sq.mm Al. cables	Rm.	110		
ii	4 core 4 sq.mm Al. cables	Rm.	220		
d	EARTHING				
	Supply and laying earthing for various				
	equipments and motors.				
	10 SWG copper wire	Rm.	300		
	SUB TOTAL				

		Unit	Qty	Rate	Amount
5	VENTILATION SYSTEM				
a	supply, installation, testing and commissioning Direct driven axial flow fans suitable for mounting on wall or duct in standard galvanized/ powder coated steel construction with required rating, single motor and flexible connection to connect with ducting / plenum.				
	EXHAUST FANS				
i	2000 cfm exhaust fans - Dirty wash	Nos.	1		
ii	1350 cfm exhaust fans with Hepa Filter - Zone 5	Nos.	1		

		Unit	Qty	Rate	Amount
b	SHEET METAL WORK				
	Supply, fabricate, handle and erect GSS Factory Fabricated rectangular duct as per drawings. complete with all fittings such as tee bends, special off-chutes, turning vanes, splitter dampers, ins.doors, transformation pieces etc. as reqd. as per IS 655 including suspension and supporting arrangement for plenums, complete as reqd. and as per specs.(only hi-tech supports shall be used) ducts, joining with easy slip on flange, gasket, corner piece, cleat etc wall opening as good as same				
i	0.63mm GSS ducting	Sqm	125		
c	Flexible Ducting				
	Supply, Fabrication, installation and testing of the flexible ducting, complete with connecting rings, duct supports, Plenum box etc as per standards and specification				
	100 mm dia	Rm	30		
d	GRILLES & DIFFUSERS				
	Supply and fix the following grilles and				
	diffusers as per specifications				
	(material : Aluminium)				
i	Return air grille/diffuser with vcd	Sqm	1.5		
	SUB TOTAL				

		Unit	Qty	Rate	Amount
SUMMARY SHEET for Animal House					
No.	DESCRIPTION				AMOUNT
1	AHU				
2	Chilled water piping and Valves				
3	Sheet metal work				
4	Electrical work				
5	Ventilation system				
	TOTAL for ANIMAL HOUSE				
SUMMARY SHEET FOR HVAC WORKS					
NO	DESCRIPTION				AMOUNT
1	RESEARCH BLOCK (Excluding Animal House)				
2	Animal House				
3	TOTAL				