

**SCHEDULE OF EQUIPMENTS AND BILL OF QUANTITY**

**NAME OF WORK : - SETTING UP OF SPACE THEATRE FOR SCIENCE CITY AT KOTTAYAM**

**HVAC WORKS**

<b>NO</b>	<b>ITEM DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE</b>	<b>( In figures &amp; Words)</b>	<b>AMOUNT</b>
<b>1.a</b>	<b>VRV Outdoor units</b>					
	Supply at site with full cover insurance during factory to site, fire or any other contingencies					
	20.8 TR (26 HP)	Each	1			
	25.6 TR (32 HP)	Each	2			
<b>b</b>	Testing ,commissioning of the units, Treatment of exposed piping with weather proof mechanical paint & G.I Saddles & stand for piping etc	Each	3			
<b>SUBTOTAL</b>						
<b>2.a</b>	<b>VRV Indoor units with filters</b>					
	Supply at site with full cover insurance during factory to site, fire or any other contingencies					
i	8 TR ceiling suspended ductable Indoor unit	Each	7			
ii	7 TR ceiling suspended ductable Indoor unit	Each	4			

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
b	Testing ,commissioning of the indoor units	Each	11		
c	Cordless remote	Each	11		
d	Touch panel Master controller to control & monitor all indoor & outdoor units	Each	1		
<b>SUBTOTAL</b>					
d	<b>PACKAGE UNIT / SPLIT UNITS</b>				
	Supply, Installation testing and commissioning of split/ Package air cooled Air-conditioners each complete with scroll compressor, air cooled condensor, GSS casing, filters, cooling coils, fan motors, <b>copper refrigerant piping (insulated) length as per drawing maximum upto 15 mts</b> , control wiring, refrigerant controls and accessories, including MICRO-PROCESSOR CONTROL with indication lamps for the operation of the system with thermostat fixed in the respective rooms to adjust the temperature according to the equipments requirements with Micro-processor control panel for each machine. Tenderes to elaborate the features of Micro-processor panel. GI painted frame works for outdoor units & making good of civil work's				
i	1 TR Hiwall unit - for ground floor office	Each	1		

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
ii	2.5 TR CASSETTE - for first floor office	Each	1		
iii	17 TR Package Unit	Each	2		
<b>SUBTOTAL</b>					
<b>3</b>	<b>PIPING</b>				
a	Refrigerant piping with 19mm thick nitrile rubber insulation. (Liquid & discharge line)including refnet joints, control cabling between indoor & out door units	Rm.	400		
b	<b>Drain water piping</b>				
	Supply and fixing in positionn 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.				
	25mm PVC	Rm.	175		
<b>SUBTOTAL</b>					
<b>4.a</b>	<b>SHEET METAL WORK</b>				
	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. wall opening as good as same				

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
i	0.63mm GSS ducting in sq.m.	Sqm	950		
ii	0.80mm GSS ducting in sq.m.	Sqm	250		
iii	1.00mm GSS ducting in sq.m.	Sqm	50		
b	Supply, Fabrication, installation and testing of the Insulated Flexible round ducting, complete with connecting rings, duct supports etc as per standards and specification				
	350 dia	Rm	100		
c	<b>GRILLES &amp; DIFFUSERS</b>				
	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 with vcd	Sqm	0.3		

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
ii	return air grille w/o vcd	Sqm	5		
iii	supply air diffuser with vcd	Sqm	0.1		
iv	return air diffuser w/o vcd	Sqm	0.1		
d	Supply and fixing of Circular Supply air diffusers of powder coated Aluminium with opposed blade dampers with removable core as per drawings for the following neck sizes.				
	350 mm dia	Each	22		
e	Supply and fixing of Circular Return air diffusers of powder coated Aluminium with removable core as per drawings for the following neck sizes.	Each			
	350 mm dia	Each	22		
f	<b>Curved Supply &amp; Return air linear slot diffuser</b>	Each			
	Supply, Fabrication, installation and testing of the Curved supply linear slot diffuser, 4 slot, 20 mm slot width, <b>1 Mt Length</b> as per dwg, with both side end flange & plenum box, damper & fittings etc.	Each	44		

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
g	Supply, Fabrication, installation and testing of the Curved return linear slot diffuser, 4 slot, 20 mm slot width, <b>1 Mt Length</b> as per dwg, with both side end flange damper & fittings etc.	Each	44		
h	<b>Jet Diffuser - 350mm Dia</b> with Rectangular Grille Collar & collar damper for the diffuser panel/duct as per dwg, including plenum Box - noise level to be less than 35DB	Each	19		
i	Plenum Box (450x450x450) made of 22G G.I & Spigot & Butterfly Dampers with necessary threaded rods for supporting.	Each	41		
j	Fresh air damper with louvers & control lever for VRV unit./split	Each	7		
k	<b>DUCT INSULATION &amp; LINING</b>				
	<b>Thermal insulation</b>				
	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	Sqm	750		
l	<b>Acoustic insulation</b>				
	supply & fixing of 10 mm thick acoustic nitrile rubber insulation with adhesive as per the recommendation of the manufacture with density 140-180kg/m3	Sqm	150		
m	<b>NON AC Area insulation - FOR duct running through shaft/Vertical &amp; terrace/Return ducts</b>				

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
	supply & fixing of 19 mm thick class o nitrile rubber insulation with adhesive & aluminium cladding as per the recommendation of the manufacture with density 45-55kg/m3	Sqm	350		
n	<b>DUCT DAMPERS</b>				
	Supply, fix, balance, and commission louvre type smooth supply air duct dampers made of extruded aluminium linkage, lever, fixing arrangement etc.complete brass bushings	Sqm	5		
o	<b>FIRE DAMPERS.</b>				
	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.)	Sqm	5		
<b>SUBTOTAL</b>					
5.a	<b>ELECTRICAL WORK</b>				
	Supply, installation testing and commissioning of extensible type, cubical panel comprising of switch fuse units, busbar, cable alley, fabricated from 20 mm 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.				
	<b>CPRI Approved</b>				
	a) INCOMING -- 1 No. MCCB				
	b) BUSBARS				
	c) 3 phase and neutral Aluminium bus bars with bus supports in suitable bus chamber.				

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
	d) METERING ammeter with CT's and selector switch				
	0-500 volts voltmeter with selector switch and fuses.				
	0- 160 Amp ammeter with CT's and selector switch.				
	e) 1 set R.Y.B lmps with fuses.				
	f) OUTGOING				
	TPN MCCB/ MPCB for ODU's/ IDU DB's				
	1 No. earth bus(CU) throughout the panel with earthing bolts				
a	<b>VRV Panel 1</b> with above specifications and as per drawings - Total HP - <b>85.4 HP</b>	Each	1		
b	<b>VRV Panel 2</b> with above specifications and as per drawings - Total HP - <b>86.5 HP</b>	Each	1		
c	<b>THREE PHASE DB WITH SINGLE PHASE OUTLET FOR INDOOR UNITS</b>				
i	<b>DB -1</b>				
	<b>8 Way</b> three phase db with single phase outlet for indoor units with above specifications & as per drawings - <b>TOTAL HP – 10.2 HP - GROUND FLOOR</b>	Each	1		
ii	<b>DB -2</b>				
	<b>4 Way</b> three phase db with single phase outlet for indoor units with above specifications & as per drawings - <b>TOTAL HP – 3.9 HP - FIRST FLOOR</b>	Each	1		
d	<b>ISOLATORS.</b>				

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
i	3 Phase 100A	Each	10		
ii	I-Phase 40A	Each	11		
<b>e</b>	<b>CABLES</b>				
	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/ 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	3.5 core 16 sq.mm Al. cables	Rm.	150		
ii	3 core 2.5 sq.mm cu cables.	Rm.	400		

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
iii	4 core 25 sq.mm Al. cables	Rm.	100		
iv	4 core 6 sq.mm Al. cables	Rm.	50		
v	4 core 4 sq.mm Al. cables	Rm.	50		
f	Cable tray MS perforated cable tray painted with powder coating 300 X 50 X 1.6 mm	Rm.	300		
g	<b>EARTHING</b>				
	Supply and laying earthing for various equipments and motors.				
	10 SWG copper wire	Rm.	750		
<b>SUBTOTAL</b>					
<b>6</b>	<b>VENTILATION SYSTEM</b>				
	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.				
a	<b>EXHAUST FANS</b>				

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
i	1000 cfm exhaust fans	Each	2		
ii	80 cfm exhaust fans	Each	2		
<b>b</b>	<b>SHEET METAL WORK</b>				
	Supply, fabricate, handle and erect GSS <b>Factory Fabricated rectangular duct</b> 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				
	0.63mm GSS ducting in sq.m.	Sqm	60		
<b>c</b>	<b>Flexible Ducting</b>				
	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	50		
<b>d</b>	<b>GRILLES &amp; DIFFUSERS</b>				
	Supply and fix the following grilles and				

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
	diffusers as per specifications (material : Al)				
	Return air grille/diffuser with vcd	Sqm	0.75		
<b>SUB TOTAL</b>					
<b>7</b>	<b>ADDITIONAL WORKS</b>				
a	<b>Exposed roof insulation</b>				
	supply & fixing of 13 mm thick class o nitrile rubber insulation with adhesive as per the recommendation of the manufacture with density 45-55kg/m3 for terrace floor	Sqm	550		
b	<b>ISOWALL BOXING for SCEINCE GALLERY INDOOR UNIT ROOMS</b>				
	Fixing ISOWALL 50 mm thick EPS, both side GI coated sheet panels for wall and ceiling making return air boxing with necessary angels, sealant etc.	Sqm	100		
<b>SUBTOTAL</b>					
<b>8</b>	<b>AMC</b>				
	Annual maintenance contract charges including				
	spares , gas and consumbles for the above plant				
	per year for 5 years on per ton basis and percentage increase every year for 4 years after				
	warrenty period of 1 year. The frequency of				
	servicing shall be one in 3 months every year for				
	routine service and immediate on break down calls.				
	1st year		106 TR		
	2nd year		106 TR		

NO	ITEM DESCRIPTION	UNIT	QTY	RATE ( In figures & Words)	AMOUNT
	3rd year		106 TR		
	4th year		106 TR		
	5th year		106 TR		
	<b>TOTAL AMOUNT</b>				