

**Corrigendum No. 1**

“Works of Interior of New Office Space for DMICDC at Jeevan Bharti Building, Connaught Place, New Delhi on TURN KEY Basis”

Sr. No	Clause No	Reference from RfQ cum RfP	Corrigendum
1.	Clause No. 4.2.2. (A).(iii)	The bidder shall be holding a valid “A” Class electrical contracting licence as on the date of submission of the bid. For a bidding consortium, the lead member of the consortium shall be holding a valid “A” class electrical contracting licence on the date of submission of the bid.	The bidder <b>or his subcontractor shall</b> be holding a valid “A” Class electrical contracting licence as on the date of submission of the bid. <b>For a bidding consortium, the lead member of the consortium shall be holding a valid “A” class electrical contracting licence on the date of submission of the bid.</b> <b>For a bidding consortium, any member of the consortium or its sub-contractor shall be holding a valid “A” class electrical contracting licence on the date of submission of the bid</b>
2.	Clause No. 4.7.5  Checklist for Online submission of Technical Bid Documents	*Added New* Item No.14	<b>Copy of certificate of valid “A” Class electrical contracting licence as on the date of submission of the bid issued by State Authority/concerned authorities of bidder/subcontractor.</b> <b>OR</b> <b>An undertaking by the Bidder or Lead member in case of consortium, confirming compliance of submitting a Valid “A” Class electrical contracting licence during execution of works.</b>

3.	<p>Clause No. 6.8. Terms of Payment</p>	<p>Payment shall be made on account against the (Running Account) R.A. Bills only to be produced by the Contractor and verified by the Engineer In Charge / Authorized Officer of DMICDC. The R.A. Bills can be put up maximum once as per the payment schedule.</p> <p>Schedule of Completion of works and Payment Terms: The work shall be completed as per the following milestones. The payment shall be released against each item only on completion of the respective milestone or part thereof.</p>	<p>Payment shall be made on account against the (Running Account) R.A. Bills only to be produced by the Contractor and verified by the Engineer In Charge / Authorized Officer of DMICDC. The R.A. Bills can be put up maximum once as per the payment schedule.</p> <p>Schedule of Completion of works and Payment Terms: The work shall be completed as per the following milestones. The payment shall be released against each item only on completion of the respective milestone <b>or part thereof.</b></p>																																										
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		7. Retention After Successful completion of One year	5%		completion of works	
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4.	Technical Specification Part-B POP and False Ceiling related works <b>1. POP Punning</b>	Providing and applying Plaster of Paris punning of average thickness 2mm existing wall surfaces so as to achieve smooth surface finish. The rate to include cost for making grooves if required in horizontal or vertical direction near doors, windows, skirting etc.		Providing and applying Plaster of Paris punning of average thickness <del>2mm</del> <b>22 mm</b> existing wall surfaces so as to achieve smooth surface finish. The rate to include cost for making grooves if required in horizontal or vertical direction near doors, windows, skirting etc.		
5.	Technical Specification Part-B POP and False Ceiling related works <b>2. PLAIN GYPBOARD FALSE CEILING</b> <b>3. GRID FALSE CEILING /Modular False ceiling</b>	2.1 Calcium silicate board False ceiling with coves Location -Toilets 2.2 Gypsum Board false ceiling Location-Server room, Electrical room 2.3 Reception Area - Combination of Gypsum Board ceiling covered in Painted POP & wooden slats 2.4 Gypsum Board False ceiling with coves- Location Cabins 2.5 Cove in false ceiling  3.1 Perforated Metal False ceiling with white paint in Open work area		2.1 Calcium silicate board False ceiling with coves <b>having Noise Reduction Coefficient 0.85 and above</b> Location -Toilets 2.2 Gypsum Board false ceiling <b>having NRC 0.85 and above</b> Location-Server room, Electrical room 2.3 Reception Area - Combination of Gypsum Board ceiling covered in Painted POP & wooden slats <b>having NRC 0.85 and above</b> 2.4 Gypsum Board False ceiling with coves- Location Cabins 2.5 Cove in false ceiling <b>having NRC 0.85 and above</b>  3.1 Perforated Metal False ceiling with white paint in Open work area <b>having NRC 0.85 and above</b>		

6.	3.4 Data Sheet Item No.6	Completion Time from the date of award: 60 days	Completion Time from the date of award: <del>60</del> 75 <b>Calendar days</b>
7.	6.11 Completion Period	The work is required to be completed within a period as specified in the 'Appendix to Tender' from the date of issue of letter of acceptance.	The work is required to be completed within a period as specified in the ' <del>Appendix to Tender</del> ' <b>"Data Sheet Clause 3.4.6. Completion Time"</b> from the date of issue of letter of acceptance.
8.	6.13 Program of Work	The Contractor shall submit the programme for completion of work to the Engineer for his approval within 7 days from the date of receipt of letter of acceptance. Unless otherwise directed, the programme shall be in the form of Bar-Chart showing proposed execution of quantities of principal items of work. The programme shall be related to the capability of equipment proposed to be deployed and site conditions. The Contractor shall also provide in writing methodology for execution of major items of work as desired by the Engineer in Chief. The submission and approval of such programme shall not relieve the Contractor of any of his duties or responsibilities or obligations under the contract. The Engineer shall have full power and authority during the progress of work, to issue such instructions as may be necessary for the proper and adequate execution of the work.	The Contractor shall submit the programme for completion of work to the Engineer for his approval within 7 days from the date of receipt of letter of acceptance <b>which shall include but not limited to the following:</b> <ol style="list-style-type: none"> <li>1. <b>Layout Plan</b></li> <li>2. <b>List of drawings</b></li> <li>3. <b>Detailed Engineering Drawings including Architectural finishes.</b></li> <li>4. <b>Vendor List &amp; Comparative Statements</b></li> <li>5. <b>Bill of Quantities</b></li> <li>6. <b>Warranty Statement for all items</b></li> <li>7. <b>Electrical / HVAC Load calculations</b></li> <li>8. <b>Completion Schedule</b></li> </ol> <p>Unless otherwise directed, the programme shall be in the form of Bar-Chart showing proposed execution of quantities of principal items of work. The programme shall be related to the capability of equipment proposed to be deployed and site conditions. The Contractor shall also provide in writing methodology</p>

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9.	<p><b>Section 6: SCC</b></p> <p><b>Clause No.6.1</b></p>	<p><b>Order of Priority of Contract Documents</b></p> <p>Where there is any conflict between the various documents in the contract, the following order of priority shall be followed i.e. a document appearing earlier shall override the document appearing subsequently:</p> <ol style="list-style-type: none"> <li>1) Agreement</li> <li>2) Letter of Acceptance of Tender</li> <li>3) Special Conditions of the Contract</li> <li>4) General Conditions of Contract</li> <li>5) Broad Scope of work</li> </ol>	<p><b>Order of Priority of Contract Documents</b></p> <p>Where there is any conflict between the various documents in the contract, the following order of priority shall be followed i.e. a document appearing earlier shall override the document appearing subsequently:</p> <ol style="list-style-type: none"> <li>1) Agreement</li> <li>2) Letter of Acceptance of Tender</li> <li>3) Special Conditions of the Contract</li> <li>4) General Conditions of Contract</li> <li>5) Broad Scope of work</li> </ol>

		6) Drawings 7) Relevant codes and Standards 8) Technical Specifications	6) Technical Specifications 7) Drawings 8) Relevant codes and Standards
10.	Section 08: Broad Scope of works, Clause No. 08.3.19, Firefighting works	TURNKEY contractor to calculate and determine the required works for the Fire Fighting provisions of the entire office. The same to be approved by the Client before procurement by the TURNKEY Contractor. The scope of work for firefighting work includes, but is not limited to the following:  a) Clean and inert gas for protection of electrical installation. b) Fire extinguisher CO <sup>2</sup> and ABC in all spaces. c) All design, drawings, detailing, materials & equipment along with technical submittals shall be approved by Employer and Fire authority before procurement by the TURNKEY Contractor.	TURNKEY contractor to calculate and determine the required works for the Fire Fighting provisions of the entire office. The same to be approved by the Client before procurement by the TURNKEY Contractor. The scope of work for firefighting work includes, but is not limited to the following:  a) Clean and inert gas for protection of electrical installation. b) Fire extinguisher CO <sup>2</sup> and ABC in all spaces. c) <b>Installation and commission of</b> <ul style="list-style-type: none"> <li>• <b>Fire Panel, control panel with Built in Digital Communicator, hooters, manual call points, panic switch, burglary alarm at suitable location.</b></li> <li>• <b>Microwave Dual Tech PIR, Multi Sensor (Heat &amp; Smoke), Laser Based Smoke Detector, Optical Smoke Detector, Heat Detector, Response Indicator, CAT 6 Cable for FAS systems.</b></li> </ul> d) <b>Identification and Demarcation of Assembly points and Evacuation plan.</b> e) All design, drawings, detailing, materials &

			equipment along with technical submittals shall be approved by Employer and Fire authority before procurement by the TURNKEY Contractor.
11.	Section 09: List of Makes	<b>*or any other substantially equivalent make*</b> : makes that are substantially equivalent in terms of quality, performance and cost to those mentioned against each item.	<b>*or any other substantially equivalent make*</b> : makes that are substantially equivalent in terms of quality, performance and cost to those mentioned against each item <b>and to be supported with technical and financial Comparative statements.</b>
12.	Section 09: List of Makes B. LIST OF MAKES FOR ARCHITECTURAL WORK	Clear Float Glass: Saint-Gobain / Asahi / TATA <b>*or any other substantially equivalent make*</b> .	Clear Float Glass/ <b>Toughened Glass</b> : Saint-Gobain / Asahi / TATA <b>*or any other substantially equivalent make*</b> .
13.	Technical Specifications Part C: Carpentry Item No. 20	VERTICAL BLINDS Vista/Mac make. Blinds made using translucent fabric papillon flock/ tropicalhyes / twilight. Area - Along with Façade glazing	VERTICAL BLINDS <del>Vista</del> /Mac make <b>or any other substantially equivalent make</b> . Blinds made using translucent fabric papillon flock/ tropicalhyes / twilight. Area - Along with Façade glazing
14.	Technical Specifications Part C: Carpentry Item No. 21	Extra for Motorised blinds with remote. Meeting room and Conference room	<del>Extra for</del> Motorised blinds with remote <b>for</b> Meeting room and Conference room.
15.	Technical Specifications	Providing and fixing of Shatter proof film on glass of Garware make as per design.	Providing and fixing of Shatter proof film on glass <del>of</del> <b>Garware make</b> as per design.

	Part C: Carpentry Item No. 22																																
16.	Technical Specifications	<b>Part E: Anti-Termite treatment</b> <table border="1"> <thead> <tr> <th>Sr no</th> <th>Item</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Anti-Termite Treatment in total</td> <td></td> </tr> <tr> <td></td> <td>Rates based on carpet area of the premise</td> <td></td> </tr> <tr> <td colspan="2">Works to be taken up by PEST CONTROL INDIA (PCI) or Godrej Hicare only</td> <td></td> </tr> <tr> <td colspan="2">To be paid only on submission of one-year warranty certificate from a reputed agency</td> <td></td> </tr> </tbody> </table>	Sr no	Item	Remarks	A	Anti-Termite Treatment in total			Rates based on carpet area of the premise		Works to be taken up by PEST CONTROL INDIA (PCI) or Godrej Hicare only			To be paid only on submission of one-year warranty certificate from a reputed agency			<b>Part E: Anti-Termite treatment</b> <table border="1"> <thead> <tr> <th>Sr no</th> <th>Item</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Anti-Termite Treatment <del>in total</del></td> <td></td> </tr> <tr> <td></td> <td><del>Rates based on carpet area of the premise</del></td> <td></td> </tr> <tr> <td colspan="2">Works to be taken up by PEST CONTROL INDIA (PCI) or Godrej Hicare <del>only</del> *or any other substantially equivalent make*:</td> <td></td> </tr> <tr> <td colspan="2">To be paid only on submission of one-year warranty certificate from a reputed agency</td> <td></td> </tr> </tbody> </table>	Sr no	Item	Remarks	A	Anti-Termite Treatment <del>in total</del>			<del>Rates based on carpet area of the premise</del>		Works to be taken up by PEST CONTROL INDIA (PCI) or Godrej Hicare <del>only</del> *or any other substantially equivalent make*:			To be paid only on submission of one-year warranty certificate from a reputed agency		
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17.	Technical Specifications	<b>Part F: MEP Works includes</b>			<b>Part F: MEP Works includes</b>		
		<b>S. No.</b>	<b>Description</b>	<b>Remarks</b>	<b>S. No.</b>	<b>Description</b>	<b>Remarks</b>
		1	HVAC Works (Low Side)		1	HVAC Works (Low Side)	
		2	Fire Alarm System		2	Fire Alarm System	
		3	Electrical and Lighting fixtures		3	Electrical and Lighting fixtures	Detailed specifications attached as <b>Annexure - A (i)</b> . Other specification given in the tender remains unchanged.
					4	Plumbing	
18.	Technical Specifications	Part G: ICT Works			Detailed Specifications attached as <b>Annexure - A (ii)</b> . Other specification given in the tender remains unchanged.		

## Annexure - A (i)

### Technical Specifications - Part F - Sr. 3. Electrical Works

S.NO.	DESCRIPTION
<b>1</b>	<b>L.T. SWITCH GEARS &amp; DISTRIBUTION BOARDS:</b>
<b>1.1</b>	<b>L.T. PANEL BOARDS:</b>
	Design, manufacture, supply, installation, testing and commissioning of following LT switchgear panels suitable for 415 V, 3 phase, 4 wire, 50 Hz power distribution system. The panel shall be, Indoor, free standing, floor/wall mounting, sheet metal clad, cubicle, dead front, dust and vermin proof type compartmentalized design fabricated out of powder coated 14 SWG sheet steel ( shade Siemens grey -RAL7032), complete with copper/aluminium bus bars, separate earth bus bar to be provided through out the length of the panel. Adequate size cable alley, painting, earthing, numbering, danger plate etc. as required as per specifications and drawings.
	<b><u>SDB - Lighting &amp; Power</u></b>
	<b>Incoming:</b>
	415V, 10KA, 4P Auto Transfer switch suitable for auto as well as manual mode operation, source priority and time delay setting.
	25 KA TPN MCCB.
	<b>Indication :</b>
	Phase indicating lamps with fuses.
	Digital Volt, Current & Frequency (VAF) Meter with in built selector switch, 200A/5A CL-1.0,15VA resin cast CTs and control fuses.
	<b>Busbars:</b>
	Electrolytic high conductivity Aluminium three pole and neutral busbars rated at 250 amps having a maximum current density of 1 amp per sq. mm insulated with heat shrinkable PVC sleeves.
	Set of Class B+C/Class I+II (as per IEC 61643) Surge Protection device Single MOV with built in thermal fuse type with response time < 25 nano seconds each with 3 numbers for the connection between Phase and Neutral and Spark Gap Encapsulated / Non-exhausting type with response time of < 100 nano seconds 1 number between Neutral and Earth, Lightning impulse current 7 KA(10/350 μsec ) phase to neutral and 25 KA(10/350 μsec) neutral to earth. OBO make
	<b>Outgoing:</b>
	63A 4P MCBs (10 KA) 'C' curve type
	32A 4P MCB (10 KA) 'C' curve type
	16-25A SP MCBs (10 KA) 'C' curve type
	Vacant space only for 2 nos. future 4P MCBs
	<b>Note :</b>
	The panels shall be IP54 ingress protection rating
	All MCCBs shall be Ics=100%Icu provided with adjustable thermal releases, spreader terminals, phase barriers and rotary handle operating mechanism.
<b>1.2</b>	<b>DISTRIBUTION BOARDS :</b>
	Supply ,Installation and Testing of following double door type distribution boards fabricated out of 16 SWG, CRCA sheet steel recessed in wall or surface mounted.
<b>1.2.1</b>	<b><u>LPDB</u></b>
	<b>Incoming:</b>
	63 Amp 4P MCB 10 KA as incomer "C" curve type
	63A DP RCCB (30mA sensitivity)
	<b>Outgoing:</b>
	6/16A SP MCBs, 10 KA. "B"/ "C" curve type as per requirement.
<b>1.2.2</b>	<b><u>UPS DB</u></b>
	<b>Incoming:</b>
	40 Amp 4P MCB 10 KA as incomer

	40A DP RCCBs (30mA sensitivity).
	<b>Outgoing:</b>
	6/16A SP MCBs, 10 KA. "B"/ "C" curve type as per requirement.
<b>2</b>	<b>INTERNAL WIRING</b>
<b>2.1</b>	Supplying, wiring, testing and commissioning for lights, exhaust fans and 6 A socket outlets (where 6 A socket connected to lighting circuit) using 1.5 Sqmm. stranded copper, 1100 volts grade, FRLS PVC insulated wires drawn through, black enamelled, MS conduit including laying of conduits in a concealed/ surface manner using necessary conduit accessories, junction boxes, switch outlet boxes, switch plates, bends, collars, clamps, ceiling roses, 6/16 A, one way/ Two way switches, etc. shall be flush mounted in brick wall or in the built up furniture or on the surface of wall for surface installation complete as required.
	The <b>point wiring (using 1.5 Sqmm 1100 V grade FRLS PVC insulated copper wires )</b> shall include the <b>circuit wiring (using 1.5 Sqmm, as mentioned in circuit distribution diagram, 1100V grade FRLS PVC insulated copper wires)</b> from the DB up to the first light/6A convenience socket outlet control switch on wards to light/ chandelier then the looping between switches /lights/fans/ 6A socket etc. Contractor to provide the circuit wiring also.
	Contractor shall provide earthing of each light, switches, switch plates, switch control boxes, 6A sockets using 1.5 Sqmm copper, FRLS PVC insulated wires and flexible conduit from junction box to the fitting as required.
	Cove lighting in an area shall be considered as one primary light point only. No secondary points shall be considered for cove lighting.
<b>a)</b>	Primary light point i.e. one light controlled by one switch or first light in the group in which more than one lights are controlled by one switch.
<b>b)</b>	Secondary light points (Looped light point)
<b>c)</b>	One 6 Amps, 2/3 pin socket controlled by one 6 Amps switch.
<b>d)</b>	Exhaust fan point controlled by a 6A switch on the switch board and 6 A socket outlet near fan.
<b>2.2</b>	Wiring for 6Amp power outlet on UPS power with 1.5 Sq. mm FRLS PVC insulated stranded copper conductor wires in MS conduits including supply and fixing of 2/3 pin 6Amps shuttered switched socket with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated green colour 1.5 Sq. mm copper wire, MS conduit complete with all accessories as required ( Not more than 10 outlets shall be connected to one circuit) for CCTV cameras in ceiling / Wi Fi points etc.
<b>2.3</b>	Wiring for 6/16 Amp power outlet on RAW/UPS power with 4 Sq. mm FRLS PVC insulated stranded copper conductor wires in recessed/surface MS conduit including cutting/filling chases, providing conduit with conduit accessories, saddles, supply and fixing of 6 pin 6/16Amps shuttered switched socket with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated, green colour 4 Sq. mm copper wire, complete with all accessories as required. ( Not more than 2 outlets shall be connected to one circuit)
<b>2.4</b>	Wiring for 6/16 Amp power outlet on RAW/UPS power with 4 Sq. mm FRLS PVC insulated stranded copper conductor wires in existing conduits/raceway/furniture including supply and fixing of 6 pin 6/16Amps shuttered switched socket with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated, green colour 4 Sq. mm copper wire, complete with all accessories as required. ( Not more than 4 outlets shall be connected to one circuit)
<b>2.5</b>	Wiring for a set of 3 nos. 6Amp power outlets on UPS power with 2.5 Sq. mm FRLS PVC insulated stranded copper conductor wires in existing conduits/raceway/furniture including supply and fixing of 3 nos. 3 pin 6A shuttered sockets in a box 1 no. 16A switch in a separate box with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated, green colour 1.5 Sq. mm copper wire, complete with all accessories as required. ( Not more than five sets shall be connected to one circuit)
<b>2.6</b>	Wiring for a 6Amp power outlet on UPS power with 2.5 Sq. mm FRLS PVC insulated stranded copper conductor wires in existing conduits/raceway/furniture including supply and fixing of 1 no. 3 pin 6A shuttered socket with 1 no. 6A switch with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated, green colour 1.5 Sq. mm copper wire, complete with all accessories as required. ( Not more than five sets shall be connected to one circuit)
<b>2.7</b>	Wiring for a 6Amp power outlet on RAW power with 1.5 Sq. mm FRLS PVC insulated stranded copper conductor wires in existing conduits/raceway/furniture including supply and fixing of 1 no. 3 pin 6A shuttered socket with 1 no. 6A switch with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated, green colour 1.5 Sq. mm copper wire, complete with all accessories as required. ( Not more than ten outlets shall be connected to one circuit)
<b>2.8</b>	Supply, installation, testing & commissioning of additional 6A socket adjacent socket outlets.

<b>2.9</b>	Wiring for a set of 2 nos. 6Amp power outlet on UPS power with 2.5 Sq. mm FRLS PVC insulated stranded copper conductor wires in existing conduits/raceway/furniture including supply and fixing of 2 nos. 3 pin 6A shuttered sockets with 1 no. 10A switch with internal wiring in G.I. box, earthing of 3 <sup>rd</sup> pin with PVC insulated, green colour 1.5 Sq. mm copper wire, complete with all accessories as required. ( Not more than five sets shall be connected to one circuit)
<b>2.10</b>	Supply, installation and connecting of 25A 3 pin heavy duty modular socket with switch in GI box for split / casettee / ductable air con unit. ( Conduiting and wiring shall be provided by contractor.
<b>2.12</b>	<b>Wiring</b>
	Supply and drawing of following sizes of FRLS PVC insulated stranded copper conductor wires of 1100 Volts grade in existing conduit, pipe including connection/termination as required.
<b>a)</b>	4x16+2x6 sq. mm
<b>b)</b>	4x10+2x6sq mm
<b>c)</b>	4x4+2x4sq mm
<b>d)</b>	4x6+2x6sq mm
<b>e)</b>	2x16+1x6 sq. mm
<b>f)</b>	2x6+1x6 sq. mm
<b>g)</b>	2x4+1x4 sq. mm
<b>2.13</b>	<b>Conduiting</b>
	Supply and installation of following sizes of black enamelled <b>MS conduit</b> on surface/steel structures including all accessories, GI fishwire, fixing hardware etc. including, chasing the wall/floor and plastering the chased portion and making good the damages including fittings e.g. bends tee, inspection bends etc. as required.
<b>a)</b>	25 mm dia
<b>b)</b>	32 mm dia
<b>c)</b>	38 mm dia
<b>d)</b>	50 mm dia
<b>e)</b>	25mm dia GI flexible conduit complete with doom cover, bush, coupler etc. complete in all respect
<b>2.14</b>	Supply, laying, testing and commissioning of following sizes of FRLS PVC insulated unsheathed flexible cable with annealed copper conductor of 1100 Volts grade on wall, or in existing cable tray / raceway / hume pipe with fixing hardware etc. as required
<b>a)</b>	1 C x 95 Sqmm
<b>b)</b>	1 C x 70 Sqmm for EB meter connection
<b>c)</b>	1 C x 50 Sqmm
<b>2.15</b>	Supply and making cable termination including crimping tinned copper heavy duty lugs/ferrules etc. complete as required for following sizes of PVC insulated unsheathed flexible cable with annealed copper conductor.
<b>a)</b>	1 C x 95 Sqmm
<b>b)</b>	1 C x 70 Sqmm
<b>c)</b>	1 C x 50 Sqmm
<b>2.16</b>	Supply and installation polyamide threaded cable glands complete as required for following sizes of PVC insulated unsheathed flexible cable with annealed copper conductor.
<b>a)</b>	1 C x 95 Sqmm
<b>b)</b>	1 C x 70 Sqmm
<b>c)</b>	1 C x 50 Sqmm
<b>2.17</b>	Supply, fixing, testing and commissioning of following switchgear in powder coated sheet metal enclosure with earthing terminal and internal wiring complete as required.
<b>a)</b>	63A, 4P 10KA "C" curve MCB in MS box (on 20KVA UPS input /output side)
<b>b)</b>	25A, DP 10KA MCB "C" curve in MS box
<b>c)</b>	40A, 4P 10KA, MCB "C" curve in MS box
<b>d)</b>	32A, DP MCB Isolator in Weather Proof MS box near ODUs
<b>e)</b>	200A, 4P 25KA MCCB with spreader terminals, phase barriers and rotary handle operating mechanism, in MS box with cable termination box
<b>2.18</b>	<b>Raceways</b>
	Supplying and installation of following sizes of 1.6 mm thick GI raceways with 2.0 mm thick GI cover and fixing hardware in recess/ on surface including chasing the wall/floor complete as required.
<b>a)</b>	300mmx40mm
<b>b)</b>	200mmx40mm
<b>c)</b>	150mm x 40mm

d)	75mm x 40mm
2.19	Supplying and installation of following sizes 2.0 mm thick 4 way GI boxes with 2.0 mm thick Stainless Steel cover and fixing SS hardware in recess/ on surface including chasing the wall/floor complete as required.
a)	350 x 350 x 50 mm
b)	250 x 250 x 50 mm
c)	150 x 150 x 50 mm
2.20	Supplying and installation of following modules of POP UP boxes inside the table including switches and sockets as required complete with cutting in the tables.
a)	8 module
b)	6 module
c)	4 module
3	<b>CABLES &amp; CABLE TRAYS:</b>
3.1	<b>1.1 KV Cabling</b>
	Supply installation, testing and commissioning of following sizes of PVC sheathed PVC/XLPE insulated Aluminium conductor / copper conductor power / multicore control armoured cable of 1.1 KV grade on wall, or in existing cable tray /masonry ducts/hume pipe with fixing hardware etc. or 750 mm below ground, including excavation for trench , sand cushioning, brick covering etc. refilling the riddled earth, reaming & depositing excess earth as required.
a)	3 1/2 C x 120 Sqmm Aluminium XLPE Cable
b)	3 1/2 C x 95 Sqmm Aluminium XLPE Cable
c)	3 1/2 C x 35 Sqmm Aluminium XLPE Cable
d)	4C x 25 Sqmm Aluminium XLPE Cable
e)	4C x 16 Sqmm Aluminium XLPE Cable
f)	4C x 10 Sqmm Aluminium XLPE Cable
g)	3C x 6 Sqmm Aluminium XLPE Cable
h)	3C x 6 Sqmm copper XLPE Cable
i)	3C x 4 Sqmm copper XLPE Cable
j)	3C x 2.5 Sqmm copper XLPE Cable
3.2	<b>Cable Termination</b>
	Supply and making end termination with brass single compression glands for the following PVC insulated PVC sheathed & armoured 1100 V grade cable including cost of crimping lugs/ferrules, compression glands, solder, cable sockets, insulation tape etc. complete as required.
a)	3 1/2 C x 120 Sqmm Aluminium XLPE Cable
b)	3 1/2 C x 95 Sqmm Aluminium XLPE Cable
c)	3 1/2 C x 35 Sqmm Aluminium XLPE Cable
d)	4C x 25 Sqmm Aluminium XLPE Cable
e)	4C x 16 Sqmm Aluminium XLPE Cable
f)	4C x 10 Sqmm Aluminium XLPE Cable
g)	3C x 6 Sqmm Aluminium XLPE Cable
h)	3C x 6 Sqmm copper XLPE Cable
i)	3C x 4 Sqmm copper XLPE Cable
j)	3C x 2.5 Sqmm copper XLPE Cable
4	<b>EARTHING :</b>
4.1	<b>EARTHING STATIONS:</b>
4.1.1	Supply, installation, testing and commissioning of maintenance free Earthing Station consisting of 1 No. CPRI tested copper bonded steel electrode of 25 mm dia. with minimum coating thickness of 250 microns and length of 3 meters tested according to IEC 62561-2 with 1425 RTC SS Universal Clamp of Size 175X50X3 mm. Earth enhancing compound minimum 25 kgs/station shall be filled in the 100mm augered hole surrounding to the electrode. The FRP / cast iron Under Floor Earth Inspection Pit shall be provided on top of the electrode. This include excavation of earth, filling with back fill compound, exothermic welding and earth pit marking. Make OBO Bettermann / furse / KLK. if required.
4.2	<u>Earthing Strip/Wires</u>

	Supply, installation, testing and commissioning of following sizes of GI/ Copper strip/wire clamped to walls, cable trays, cables in recess or surface etc. for equipment/ System /Lightning protection earthing complete as required including inter connection between length at joints, all fixing accessories saddles, clamps etc. and other fixing hardware material as required for proper installation.
<b>4.2.1</b>	G.I. Earthing strip/wire
<b>a)</b>	32 x 6 mm strip ( for Body earthing)
<b>b)</b>	25 x 3 mm strip ( for Body earthing)
<b>c)</b>	10 SWG wire
<b>4.2.2</b>	Copper earthing strip/wire
<b>a)</b>	Single core 16 sq. mm cu FRLS pvc insulated cable
<b>b)</b>	Single core 6 sq. mm cu FRLS pvc insulated cable ( for Server & UPS Neutral & Body)
<b>4.3</b>	Supply, installation, testing and commissioning of TINNED Copper Earth Bus Bar of size 450mm x 75mm x 6 mm thick on SMC/DMC insulators on wall / floor.
<b>4.4</b>	Supply and installation of 25mm dia 2 mm thick PVC pipe including accessories buried in ground including digging the trench, back filling etc., making good the damages. Complete in all respect as required.
<b>5</b>	<b>LIGHTING FIXTURES :</b>
	Supply, assembling, installation, testing & commissioning of following type of light fixtures and fans. All fixtures shall be provided with driver/control gear with surge protection and THD within prescribed codes and installation arrangement using proper support, GI flexible conduit etc. complete as required.
<b>a)</b>	600mm x 600mm 42W LED recessed Grid Light with with glare-free chequered pattern diffuser & constant current driver complete with all accessories similar to Polycab LED recessed Mounting Luminaire.
<b>b)</b>	15W LED round recessed Downlighter with glare-free diffuser & constant current driver complete with all accessories similar to Polycab Scintillate Dlx Slim Led Down Light.
<b>c)</b>	Ceiling suspended fixture 1200x300
<b>d)</b>	6W LED adjustable recessed round Downlighter with glare-free diffuser & constant current driver complete with all accessories.
<b>e)</b>	3W LED adjustable recessed round Downlighter with glare-free diffuser & constant current driver complete with all accessories.
<b>f)</b>	1200mm long 20W LED Batten Lights
<b>g)</b>	600mm long 12W LED Batten Lights
<b>h)</b>	225 mm dia, 900 rpm single Phase heavy duty exhaust fan with louver shutters etc. complete as required.
<b>6</b>	<b>UPS :</b>
6.1	<p>Description:</p> <p>On-line UPS double conversions high frequency for supplying critical systems that require high reliability and quality in supply, like monitoring system. Battery backup shall be as per the requirement of UPS Module.</p> <ol style="list-style-type: none"> <li>1. UPS DIGITAL ON-LINE double conversion</li> <li>2. Microprocessor control technology</li> <li>3. Acoustic &amp; lighting alarms</li> <li>4. Small frequency harmonic distortion</li> <li>5. Wide input voltage range</li> <li>6. Battery mode start up (without mains lines)</li> <li>7. Protections against over-voltages, short-circuits and low battery voltage</li> <li>8. RS232 communication port &amp; monitoring software</li> <li>9. Programmable shutdown</li> <li>10. High input power factor</li> <li>11. Standard format 19 inches</li> </ol>

	<p>UPS Characteristics:</p> <ul style="list-style-type: none"> <li>· Power: 20KVA</li> <li>· Overload 130%- 60 sec, 150% for 30 sec</li> <li>· Input: voltage range: 415 Vac</li> <li>· Input frequency 50 Hz <math>\pm</math>5%</li> <li>· Output voltage: 230 Vac</li> <li>· Output frequency: 50 Hz <math>\pm</math>5%</li> <li>· Type of wave: Pure sinewave</li> <li>· Harmonic distortion (linear load) THD &lt;3%</li> <li>· Crest factor: 3:1</li> <li>· Standard battery Pb VRLA (lead battery with anti-leak seal)</li> <li>· Backup time: 2 Hours.</li> <li>· Charge time 8h-90%</li> <li>· Communications: Ethernet converter</li> </ul>
	<ul style="list-style-type: none"> <li>· Indicators:</li> </ul> <p>automatic functions shutdown: voltage input/output frequency load status battery capacity temperature historic events system analysis</p>
	<ul style="list-style-type: none"> <li>· Protections:</li> </ul> <p>Current limitation, Overload Short-circuit Temperature</p> <ul style="list-style-type: none"> <li>· Automatic bypass : Yes</li> <li>· RFI filter : Yes</li> <li>· PFC : Yes</li> <li>· Operation temperature : 0 - 45°C</li> <li>· Relative humidity: 0 - 95% (non condensing or ice)</li> </ul>

## Annexure - A (ii)

### Technical Specifications - Part G - ICT Works

Slno	Item	Specification	Remarks
1	<b>Laptop Presentation Point Type I</b>	Sleek laptop connectivity metallic enclosure	
		Power: 1x Universal AC power Socket	
		Pass through Holes for VGA, Audio, HDMI & LAN	
		Til Up lid/ Pneumatic, good quality Black annodised / Powder quouted finish	
2	<b>Multi-Format Scaling Swithcer Transmitter-Receiver System</b>	Transmitter Inputs: 1x VGA, 1x analog Audio , 2x HDMI	
		Transmitter Output: 1x Twisted Pair/HDbaseT	
		Receiver Input: 1x Twisted Pair/HDbaseT	
		Receiver Output: 1x HDMI, 1x Audio	
		Resolution Support: 1920x1200 or more	
		Should have audio embedding & Deembedding feature	
		Should have inbuilt control for Displays	
		Should have automatic input source selection	
		CE,FCC compliant	
		Should have inbuilt HD scaling capability	
3	<b>1:2 HDMI Distribution amplifier</b>	Input: 1x HDMI	
		Output: 2x HDMI or more	
		Resolution Support: 4K/UHD@60Hz or more	
		Should have inbuilt EDID management & HDCP2.2 compliant	
		HDMI data rate support: 18 Gbps or more	
4	<b>7inch or more touch Control Panel</b>	Diagonal Size: 7" or more	
		Resolution: 1024 x 600 / 1280x 800	
		Should have PoE connectivity and supplied with PoE adapter	



		Colour Depth: 8 bits per channel / 16.7 million colors	
		Inbuilt Speakers	
		CE, FCC, RoHs/WEEE compliant	
5	<b>AV Control Processor Type I</b>	For controls of all controllable AV devices in the Room	
		Should have 2 or more RS 232 control port	
		Ethernet Port for control of Ethernet controllable devices	
		CE, FCC compliant	
6	<b>Wall Mount Audio Speaker</b>	Type: Full range or two way speaker	
		Frequency Response: 100 Hz to 20 kHz or better	
		Max SPL: 83 dB SPL or better	
		Impedance: 8/16 Ohms	
		Power Capacity: 15W or better	
		Driver: 3" or more	
7	<b>Dual Channel Audio Amplifier</b>	Type: 2 Channel or more	
		Power: 15 W per channel or more	
		Min Impedance Load: 8ohms/16ohms	
		Cooling: Convection cooling	
8	<b>5000 Lumens Projector</b>	Brightness: 5000 Lumens or more	
		Resolution Support: WXGA or more	
		Native Aspect Ratio: 16:10	
		Contrast: 5000:1 or more	
		Connectivity: 1x HDMI, 1x VGA, 1xDVI/HDMI/DP	
		Controls: RS232/Ethernet	
		Technology: DLP/ LCD	
9	<b>Motorised Projection Screen</b>	Diagonal Size: Approx 110 inch	
		Aspect Ratio: 16:10	
		Matte White Fabric with Unity Gain	
		Supplied with LVC controller	

10	<b>Laptop Presentation Point Type II</b>	Sleek laptop connectivity metallic enclosure	
		Power: 1x Universal AC power Socket	
		Pass through Holes for VGA, Audio, HDMI & LAN	
		Til Up lid / Pneumatic, good quality Black annodised / Powder quouted finish	
11	<b>Multi Format Twisted Pair transmitter</b>	Transmitter Inputs: 1x VGA, 1x analog Audio , 1x HDMI	
		Transmitter Output: 1x Twisted Pair/HdbaseT	
		Resolution Support: 4K or more	
		Transmission Distance support upto 100mtrs or more for audio,video,control & Power	
		Should have automatic input source selection	
		Should have remote powering capability through PoE	
		Should have inbuilt EDID management & HDCP complint	
		Data Rate: 10.2 Gbps or more	
12	<b>8input 4output Digital Matrix Switcher</b>	Inputs: 3x Twisted Pair/Hdbase T (Inbuilt or External), 4x HDMI, 1x VGA/HDMI /DVI input	
		Output: 2x Twisted pair/HdbaseT, 2 xHDMI ( One HDMI & One Twisted pair output will be mirrored or matrixed), 2x Analog audio output	
		Resolution Support: 4K @60 Hz	
		Scaling: Should have scaling on the remote outputs or scaling provided in the HDMI & Control receiver	
		Should support PoE remote powering to transmitters & receivers	
		Twisted pair input & output supporting audio,video,control & power upto 100mtrs or more distance	
		Should have HDMI audio de embedding output	
		Should have 2or more microphone input & microphone ducking feature	
		Should have Ethernet, RS232, IR controls insertions	
13	<b>HDMI &amp; Control</b>	Input: 1xRJ45	

	<b>Twisted Pair Receiver</b>		
		Output: 1x HDMI, 1x RS232/IR controls	
		Distance support: Audio,video, controls & Power upto 100mtrs or more	
		Resolution Support: 4K or more	
		Should have inbuilt scaling or scaling provided in the Remote output of Digital Matrix Switcher	
		HDCP 2.2 compliant & EDID mangement	
14	<b>Chairman Conference Microphone System</b>	Type: Table top Gooseneck Digital Conference Microphone system	
		Length: 450mm or more	
		S/N Ratio : >= 60dB	
		Frequency Response: 100 Hz to 16 kHz or better	
		Built in A/D, D/A conversion	
		Should have Chariman Priority control feature	
14	<b>Delegate Conference Microphone System</b>	Type: Table top Gooseneck Digital Conference Microphone system	
		Length: 450mm or more	
		S/N Ratio : >= 60dB	
		Frequency Response: 100 Hz to 16 kHz or better	
		Built in A/D, D/A conversion	
15	<b>Conference Control Unit</b>	Should have 2 or more chain outputs for Cat5e/ 6pole coaxial cable	
		Shoud be able to control upto 3 Chairman or more, 40 Delegates	
		Should have RS232 control interface with auto tracking feature	
		Frequency Response: 100 Hz to 16kHz or more	
16	<b>Two Way ceiling</b>	Type: 2Way	
		Woofer: 6" or more	
		Tweeter: 0.75" or more	
		Power: 20W or more at 100V/70V	
		Frequency Response: 60 Hz to 20 kHz or better	
		Coverage angle: 110 deg or better	

		86 dB SPL or more	
17	<b>Dual Channel Audio Amplifier</b>	Type Dual channel, 200W or more power	
		Power capacity: 100W or more per channel	
		Class: D/TD/ Equivalent	
		Convection cooled	
		Power Supply: Switching mode power supply	
		Frequency Response: 70 Hz to 18 kHz or better	
		CE certification	
18	<b>Audio DSP</b>	12input 8 ouput	
		AEC: Should have 8 or more channel of AEC	
		S/N ratio: >102 dB	
		A/D, D/A conversion : 24-bit, 48 kHz	
		Noise cancellation: Up to 0-15 dB or more, software selectable	
		AEC tail length : >200 msec	
19	<b>AV Control Processor Type II</b>	For controls of all controllable AV devices in the Room	
		Should have 3 or more RS 232 control port, 2x Relay control port	
		Ethernet Port for control of Ethernet controllable devices	
		CE, FCC compliant	
<b>LAN &amp; IT Equipments</b>			
1	<b>UTM with inbuilt or external access point controller</b>	Controller should support CAPWAP or equivalent.	
		Controller should be ready for supporting 30 AP's or more . The AP license for 30 APs to be provided from day one.	
		WLAN controller (either integrated or through external stateful inspection firewall) should have a capacity to inspect all traffic from each user session and allow or deny any traffic that does not satisfy specified policies. Specify and include if any license required for integrated stateful firewall	
		It should support DHCP server for IPv4 and IPv6	

		It should support IPv4 and IPv6 based firewall policies to inspect all traffic .Controller should support access points deployed in Centralized deployment mode, Distributed deployment mode.	
		The wireless controller support the following types of client load balancing:	
		a) Access Point Hand-off -If the load on an access point (ap1) exceeds a threshold then the client with the weakest signal will be signaled by wireless controller to drop off and join another nearby access point (ap2)	
		b) Frequency Hand-off - the wireless controller monitors the usage of 2.4GHz and 5GHz bands, and signals clients to switch to the lesser-used frequency automatically	
		Controller Should support L2 Client Isolation so User cannot access each other's devices.	
		The wireless Controller should support Rogue AP detection and Blocking in RF and on wire	
		The Controller should have following Wireless Security functionality	
		a) Asleep Attack	
		b) Association Frame Flooding	
		c) Authentication Frame Flooding	
		D) Broadcasting De-authentication	
		E) EAPOL Packet Flooding	
		F) Invalid MAC OUI	
		G) Long Duration Attack	
		H) Null SSID Probe Response	
		I) Spoofed De-authentication	
		J) Weak WEP IV Detection	
		K) Wireless Bridge	
		L) Ad-hoc Network Detection and Containment	
		M) Client de-authentication rate for DOS attack	
		N) It should be able to detect the 3rd party wireless enabled Mobile devices with Hot spot programs and able to prevent the users from connecting those mobile devices	
		It should Include Wireless Guest Access Provisioning for Allowing staff to create Guest account, Assign Time quota, generate temp password, print, email or SMS the information to the Guest user.	

		It should support for 802.1Q trunking and network address translation (NAT) functionality for wired LAN connectivity.	
		The wireless Controller should support the following RF Management features	
		a) Automatic Channel Allocation	
		b) Controller should support the Radio resource management for channel allocation activity in a low-traffic period also it should have an option for schedule optimization for a fixed time.	
		c) Automatic Power Control	
		d) Supporting Neighborhood scanning of RF environment to minimize neighboring AP interference and leakage across floors.	
		e) Having Coverage Hole Detection	
		f) Having Self healing - Automatic neighboring AP power increase to fill in for coverage losses	
		It should support the following controller discovery mechanism from AP's: a) Static IP, b)Automatic discovery via Multicast AND Broadcast C)DHCP Option, D)DNS FQDN discovery	
		Controller should have the below Remote access point features:	
		a)It should support by all access points quoted by bidder	
		b) Enables APs to be deployed remotely (over WAN link) to the centralized wireless controller with encrypted tunnel for management and data traffic	
		c) It should support Split tunnel routing the management frame via tunnel to controller and data traffic locally	
		d) Wireless client connectivity is maintained when the wireless controller is unreachable for open and PSK type SSIDs	
2	<b>Indoor Wifi Access Point</b>		
	<b>Architecture</b>	The Access Point should should support IEEE 802.11a/b/g/n/ac standards	
		Should have the dual radio option and should be able to support devices on 2.4GHz and 5 GHz simultaneously.	
		Should support radio1 as 2.4 GHz b/g/n and radio2 as 5 GHz a/n/ac	

		Should have at least 4 Internal Antennas	
		Should have minimum 1 x 10/100/1000 PoE Interface.	
		Should support Power over Ethernet (PoE) 802.3af ((12.9 W)	
		Access point should support Wave 2 2x2 MIMO with 2 spatial streams.	
		The access Point should support throughput in Radio 1: Up to 300 Mbps, and Radio 2: Up to 867 Mbps	
	<b>Mobility</b>	Should support L2 and L3 wireless controller discovery	
		Should support auto-selection of RF channel and transmit power	
		Access point must have following wireless monitoring capabilities:	
		a) Frequencies scanned for 2.4 and 5 GHz	
		b) Background scan with client access on 2.4 and 5 GHz	
		c) Full-time scan as dedicated monitor	
		d) Full-time scan with client access on 5G GHz	
		e) Should support one radio for air monitor and another radio for client access.	
		WME Multimedia Extensions support 4 priority queues for voice, video, data and background traffic	
		Certified by the Wi-Fi Alliance's Wi-Fi Multimedia™ certification program	
		Should support 16 Simultaneous SSIDs	
		Should support following EAP types : EAP-TLS EAP-TTLS/MSCHAPv2 EAPv0/EAP-MSCHAPv2 PEAPv1/EAP-GTC EAP-SIM EAP-AKA EAP-FAST	
		Should support self-healing, self-optimizing local mesh extending network availability to areas without an Ethernet infrastructure. Include if any license required	
		Should support transmit Beam-Forming	
		Should support Peak antenna gain of minimum 4 dBi for 2.4 GHz,	
		5 dBi for 5 GHz	
		Should support atleast 23dBm Transmission Power	
		Should support Local AP diagnostic web portal	
		Access Points must support Hardware -based DTLS encryption on CAPWAP Standard	

		Should have physical security lock (such as Kensington lock)	
	<b>Management</b>	Should be centrally managed through the wireless controller or cloud based controller	
		Should support DNS based Controller discovery, DHCP Based Controller discovery and static discovery	
		Should support web-based secured management interface	
		Should support Command line(CLI) to access point	
		Should support mounting options of Ceiling, T-Rail and wall all these accessories should included with box. If not quote all mounting kit.	
	<b>Environment</b>	Operating Temperature - 32 - 104 °F (0 - 40 °C)	
		Access Point must be Wi-Fi Alliance Certified	
		Low Voltage Directive , RoHS complaint	
		Access point should have the Power Consumption 7.8W(Average) and 15.72 W(Maximum)	
3	<b>L2 switch 24port, managed</b>		
	<b>General Requirements</b>	Should have 24 10/100/1000 Base Tx ports and 4 Gig SFP for Uplink connectivity	
		Should have 56Gbps of Switching capacity or more	
		Should have 41Mpps of Packets Forwarding or more	
		Should have 8K or more MAC address table	
		Should have 4K or more VLAN support	
		Switch should support simple management access i.e. without the need for local management clients (HTTPS preferred)	
		Switch should support SNMP for polling of system statistics, SNMP traps, SNMP MIB download from GUI	
		Should log all authentication events Locally and to Syslog Server	
		Should support backup of the full system configuration via the GUI	
		Should support a local user database	
		Should have built-in tcpdump-like tool and log collecting functionality	
		Should support REST API for configuration and monitoring	



		Should support multiple configuration files with 2 bootable partitions for better availability and easy upgrade / fallback.	
		Should offer hardware lifetime warranty	
		Should support auto-ranging power supply with input voltages between 100 and 240V AC	
	<b>Layer 2 Requirement</b>	Should support jumbo frames	
		Should support link auto-negotiation	
		Should support Spanning Tree Protocol, STP Root Guard, BPDU Guard	
		Should support Edge Port / Port Fast	
		Should support IEEE 802.1p Mapping to priority queue and VLAN tagging	
		Should support IEEE 802.3ad Link Aggregation with LACP	
		Should support load balancing algorithms with Link Aggregation	
		Should support MCLAG (MultiChassis Link Aggregation)	
	<b>Mangement Requirement</b>	Should support Auto Discovery of Multiple Switches from central management system	
		Should support 802.1x MAC-based authentication	
		Should support MAC Authentication Bypass (MAB)	
		Should support load balancing algorithms with Link Aggregation	
		Should support virtual wire	
		Should support full line rate without traffic oversubscription	
		Should support Time-Domain Reflectometry (TDR) Support, this will be used for testing cable systems and able to detect and pinpoint issues	
		Should support telnet/SSH	
		Should support SNMP	
		Should support firmware download via TFTP/FTP/GUI	
	<b>Authentication Requirement</b>	Should support captive portal for authentication	
		Should support LLDP, LLDP-MED	
		Should support MAC, IP and Protocol based VLAN assignment (802.1v)	
		Should support 802.1x port-based authentication, authentication via certificate EAP-TLS and EAP-TTLS, guest VLAN assignment, authentication fail VLAN for	

		unauthenticated users, MAC-based authentication	
		Should support MAC Authentication Bypass (MAB)	
	<b>Layer 3 Requirement</b>	Should support static routing	
		Should support line rate L3 forwarding	
	<b>Security</b>	Should support Policy-Based Routing from central management system	
		Should support Policy Control of Users and Devices from central management system	
		Should support Black listing and While Listing of MAC address from central management system	
		Should support Storm Control	
		Should support LoopGuard	
		Should support IGMP snooping	
		Should support DHCP snooping and DHCP relay	
		Should support Port mirroring	
		Should support sFlow	
		Should support ACL, ACL classifier, ACL drop action, ACL policer action, ACL counter action, ACL mirror action, ACL redirect action	
		Should support security checks	
		Should support port MAC limit	
		Should support static MAC	
		Should support Dynamic ARP Inspection	
		Should support Sticky Mac	
	<b>QOS</b>	Should support 8 queues per port	
		Should support packet classification, packet marking, packet queuing	
		Should support 802.1p, TOS/DSCP for priority queueing	
		Should support strict scheduling mode, Round Robin (RR), Weighted Round Robin (WRR)	
		Should support policer	
		Should support QoS per VLAN	
4	<b>L2+ managed 24port POE switch</b>		
	<b>General Requirement</b>	Should have 24 10/100/1000 Base Tx PoE ports and 4 Gig SFP for Uplink connectivity	
		Should have 56Gbps of Switching capacity or more	
		Should have 80Mpps of Packets Forwarding or more	

		Should have 8K or more MAC address table	
		Should have 4K or more VLAN support	
		Should have 370W power budget	
		Switch should support simple management access i.e. without the need for local management clients (HTTPS preferred)	
		Switch should support SNMP for polling of system statistics, SNMP traps, SNMP MIB download from GUI	
		Should log all authentication events Locally and to Syslog Server	
		Should support backup of the full system configuration via the GUI	
		Should support a local user database	
		Should have built-in tcpdump-like tool and log collecting functionality	
		Should support REST API for configuration and monitoring	
		Should support multiple configuration files with 2 bootable partitions for better availability and easy upgrade / fallback.	
		Should offer hardware lifetime warranty	
		Should support auto-ranging power supply with input voltages between 100 and 240V AC	
	<b>Layer 2 Requirement</b>	Should support jumbo frames	
		Should support link auto-negotiation	
		Should support Spanning Tree Protocol, STP Root Guard, BPDU Guard	
		Should support Edge Port / Port Fast	
		Should support IEEE 802.1p Mapping to priority queue and VLAN tagging	
		Should support IEEE 802.3ad Link Aggregation with LACP	
		Should support load balancing algorithms with Link Aggregation	
	<b>Management requirements</b>	Should support Auto Discovery of Multiple Switches from central management system	
		Should support 802.1x MAC-based authentication	
		Should support MAC Authentication Bypass (MAB)	
		Should support load balancing algorithms with Link Aggregation	
		Should support virtual wire	
		Should support full line rate without traffic oversubscription	

		Should support Time-Domain Reflectometry (TDR) Support, this will be used for testing cable systems and able to detect and pinpoint issues	
		Should support telnet/SSH	
		Should support SNMP	
		Should support firmware download via TFTP/FTP/GUI	
	<b>Authentication Requirements</b>	Should support captive portal for authentication	
		Should support LLDP, LLDP-MED	
		Should support MAC, IP and Protocol based VLAN assignment (802.1v)	
		Should support 802.1x port-based authentication, authentication via certificate EAP-TLS and EAP-TTLS, guest VLAN assignment, authentication fail VLAN for unauthenticated users, MAC-based authentication	
		Should support MAC Authentication Bypass (MAB)	
	<b>Layer 3 Requirements</b>	Should support static routing	
		Should support line rate L3 forwarding	
	<b>Security</b>	Should support Policy-Based Routing from central management system	
		Should support Policy Control of Users and Devices from central management system	
		Should support Black listing and White Listing of MAC address from central management system	
		Should support Storm Control	
		Should support LoopGuard	
		Should support IGMP snooping	
		Should support DHCP snooping and DHCP relay	
		Should support Port mirroring	
		Should support sFlow	
		Should support ACL, ACL classifier, ACL drop action, ACL policer action, ACL counter action, ACL mirror action, ACL redirect action	
		Should support security checks	
		Should support port MAC limit	
		Should support MAC-IP binding	
		Should support static MAC	
		Should support Dynamic ARP Inspection	
		Should support Sticky Mac	
	<b>QOS</b>	Should support 8 queues per port	

		Should support packet classification, packet marking, packet queuing	
		Should support 802.1p, TOS/DSCP for priority queueing	
		Should support strict scheduling mode, Round Robin (RR), Weighted Round Robin (WRR)	
		Should support policer	
		Should support QoS per VLAN	
<b>Access Control, Biometric System &amp; CCTV</b>			
1	<b>16 channel HD DVR</b>	Recording Resolution: 720p high resolution or more	
		H.264 Profile compression	
		Output: HDMI & VGA output upto 1080p or more resolution	
		SATA HDD: 4 TB or more	
		DHCP, DDNS, IE browser and CMS supported	
		Multiple recording options: manual, schedule, motion detection	
		Inputs: for 16 or more camera on BNC	
		Power supply 12V DC to be supplied along with	
		Video standard: NTSC / PAL	
		recording Rate: 16 channels 720P@400/480 fps or better	
		Network Max number of Users: 10 users or more	
2	<b>Fingerprint Biometric Machine</b>	User capacity: 1000 or more	
		Finger capacity: 500 or more	
		Communication: TCP/IP, USB	
		Transaction Capacity: 50000 or more	
		Display: 2.8" TFT or better	
		CPU: 32 Bit Microprocessor	
		Fingerprint Sensor: 500 DPI optical sensor or better	
		Sound: Stereo Speaker	
		Features: Fingerprint, Face, RFID, and Password	
		TCP/IP for internet connection	
3	<b>4 Door Network Access Controller</b>	No of Doors Control: 4 or more	

		No of readers supported: 4in 4out or more	
		No of Cards: 25000 or more	
		Communication:TCP/IP, RS-485	
		No of Inputs: 8 or more	
		Relay outputs: 4 or more	
4	<b>Dome Camera</b>	1080P resolution HD 2MP DOME Camera along with 12 V power Supply	