

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
<b>1.0</b>	<b>MAIN SWITCHBOARD / SUB-SWITCHBOARD AND LOW VOLTAGE COMPONENTS</b>							
<b>1.1</b>	<b>Switch Room Including Riser Room</b>							
	a. Cleaning of switch room & riser rooms.		✓					
	b. Cleaning of cable trench / condition of cable trench (ensure clean, water free and slab cover – ok).		✓					
	c. Cleaning and repairing doors, locks and repainting (as required).							✓
	d. Ensure that "No Smoking", "No Admittance" & "Danger Signs", "Treatment Shock Card" & Schematic Drawing are in good condition and are visible / readable and replace if damaged.		✓					
	e. Ensure fire-extinguisher and C02/halon system are in good working condition, expiry date not due and take the necessary action.			✓				
	f. Ensure no moisture underneath rubber mate in front of the main switch board-replace if damaged.		✓					
	g. Ensure all electrical spares are sufficient (40%) and stored in order and maintain in good condition.							✓
	h. Ensure anti vermin wire mesh is in good condition - repair if damaged.		✓					
	i. Inspect the roof / floor above to ensure no leakage / damaged - repair if leakage / damaged.		✓					
	j. Ensure no water flowing into Switch Room / Riser room – repair / making good if necessary.		✓					

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1.2	k. Ensure wiring and electrical fittings, power points, light fittings and exhaust fans working properly.		✓					
	l. Ensure duct seals is in good condition – repair if damage.		✓					
	<b>Main Switch Board / Sub-Switch Boards</b>							
	a. Ensure all indicator light, selector switches, voltmeter, ammeter, power factor meter working properly – replace if faulty.		✓					
	b. Verify and retighten all screws, contactors, etc.			✓				
	c. Inspect cables for burn marks, insulation leakage and other abnormal conditions.			✓				
	d. Record readings for maximum current, voltage, power factor, etc into the log book and take necessary action.		✓					
	e. Ensure cable insulation, cable box cable terminations and other related connections in good condition. Repair / replace as required.		✓					
	f. Ensure earthing system and all terminations, connections working properly- repair / replace if faulty.			✓				
	g. Testing, calibration & resetting, all earth fault & overcurrent relays inclusive of current transformers, voltage transformers, etc.							✓
	h. Check copper busbars and ensure that is in good condition -replace / repair if damage.			✓				
i. Carry out load balancing. Balance to ± 5% of load.						✓		

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	j. Ensure capacitor bank is in good condition and working properly - replace if faulty.		✓					
	k. Ensure contactor capacitors working properly- replace if faulty.		✓					
	l. Ensure P.F. meter and ensure P.F reading working perfectly and is better than 0.85 lagging- replace if faulty.		✓					
	m. Verify and retighten cable connector.			✓				
<b>1.3</b>	<b>Air Circuit Breakers (ACB)</b>							
	a. Clean arc chute and arc contacts and replace if faulty.					✓		
	b. Clean all insulating parts.					✓		
	c. Adjust & calibrate circuit breaker- replace if faulty.						✓	
	d. Grease all moving contacts and related components condition.					✓		
	e. Test tripping mechanism to ensure that it is in good working.			✓				
	f. Inspect and retighten all wiring and connections.			✓				
<b>1.4</b>	<b>Fuse Switches / Switch Fuses</b>							
	a. Inspect cover for any damage – replace or repair if damage.						✓	
	b. Ensure switch handle is in good condition, replace if damage.						✓	
	c. Continuity test on fuses – replace with correct rating if damage / faulty.						✓	
	d. Retighten fuse carriers.						✓	

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1.5	e. Clean contacts with clean dry cloth to ensure good contact.						✓	
	f. Retighten all connections / termination to prevent from any sparking when loaded.						✓	
	<b>Residual Current Device (RCD) (Including RCCB)</b>							
	a. Retighten all connections, termination, etc. Ensure all electrical connection are working perfectly.						✓	
	b. Ensure switch handle is in good condition.						✓	
	c. Tripping test ON RCD.			✓				
1.6	d. Test for earth continuity.						✓	
	e. Retighten all earth electrode terminations.						✓	
	f. Test RCD tripping time and sensitivity.			✓				
	<b>Moulded Case Circuit Breaker (MCCB)</b>							
	a. Check switch handle and ensure that it operates "ON" and "OFF".						✓	
	b. Retighten all connections, termination, etc.						✓	
1.7	c. Ensure ELR functions / tripping properly.						✓	
	<b>Distribution Board (DB)</b>							
	a. Check condition and clean / vacuum internal part of the DB.				✓			
	b. Ensure that DB no. / name plate, "Danger" and updated schematic diagram are available and readable / visible.				✓			

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	c. Inspect and ensure spares ways are available in the DB.				✓			
	d. Retighten fuse handle- replace if necessary.						✓	
	e. Test on continuity of fuses- replace if faulty.						✓	
	f. Tripping test for MCB-ensure that is working perfectly - replace if faulty.				✓			
	g. Retighten all connections, terminations, etc. ensure all electrical connection working perfectly.						✓	
	h. Clean internal part of the distribution board.						✓	
<b>1.8</b>	<b>Surge Suppressors</b>							
	a. Ensure all surge suppressors function properly.			✓				
<b>1.9</b>	<b>Record and Log Book</b>							
	a. Record all activities and readings in the relevant room's log book.	✓						
<b>2.0</b>	<b>LOW VOLTAGE DISTRIBUTION SYSTEM</b>							
<b>2.1</b>	<b>Paper or XLPE or PVC Insulated Armoured Underground Cables</b>							
	a. Ensure cable insulation in good condition and working properly.						✓	
	b. Test cable continuity in good condition.			✓				
	c. Phasing out test.						✓	
	d. Retighten all connection, terminations, etc.						✓	

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	e. Inspect all cable route markers – replace if found missing / damaged.			✓				
	f. Inspect labeling.						✓	
	g. Inspect cable end terminations and cable end boxes.						✓	
<b>2.2</b>	<b>Bus Duct and Sub Main Risers In Trunking / Cable Tray.</b>							
	a. Inspect and ensure that trunking is clean and in dry condition.			✓				
	b. Inspect and ensure that no condensation present in the trunking.			✓				
	c. Test for cables insulation and continuity.						✓	
	d. Ensure busbars support in good condition– replace as required.						✓	
	e. Ensure fire barriers working properly – replace if damaged / faulty.						✓	
	f. Retighten all electrical connections, terminations, etc - ensure all electrical connection working properly.						✓	
	g. Ensure that trunking is mounted properly and safely.						✓	
	h. Ensure trunking covers intact - replace / repair if damage.			✓				
<b>2.3</b>	<b>Fire Rated Cable</b>							
	a. Test for insulation and continuity.						✓	
<b>2.4</b>	<b>XLPE / PVC Insulated Type Cable On Cable Tray.</b>							
	a. Inspect and ensure that cable tray is clean in dry condition.			✓				

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	b. Inspect and ensure that no condensation present within the cable tray.			✓				
	c. Ensure XLPE / PVC insulated cable in good condition including for cable insulation between cables and continuity.						✓	
	d. Ensure cable tray earth copper tape is in good condition - replace if damage.			✓				
	e. Ensure cable supports in good condition – replace if damaged.						✓	
	f. Check fire barriers – replace if damaged. Ensure fire barriers in good condition / working properly- replace if damaged.						✓	
	g. Retighten all connections, terminations, etc. Ensure all electrical connectors working properly.						✓	
	h. Ensure that cable tray is mounted properly and safely.						✓	
<b>3.0</b>	<b>LUMINARIES, SWITCHES AND SOCKET OUTLETS, FANS, WATER HEATERS, P.A. SYSTEM, MOTORS AND WATER PUMPS AND OUTDOOR LIGHTING</b>							
<b>3.1</b>	<b>Luminaries</b>							
	a. Inspect components of light fittings i.e cable, lamp holder, lamps, control gear, etc.			✓				
	b. Ensure that “KELUAR” sign is in good working condition- repair / replace if faulty.		✓					
	c. Test emergency light working properly- repair / replace if faulty.		✓					

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	d. Replace “KELUAR” & Emergency light fittings.							✓
<b>3.2</b>	<b>Fluorescent Luminaries (Including SL &amp; PL Type )</b>							
	a. Inspect and ensure the tube is in good condition.	✓						
	b. Inspect and ensure no black mark or oil trace.		✓					
	c. Inspect and ensure no burnt marks at both ends of the tube.		✓					
	d. Ensure the capacitor function perfectly - replace if faulty.		✓					
	e. Ensure all luminaries is working properly - replace if faulty.	✓						
	f. Ensure no noise generated from the ballasts – replace if faulty/ noise.	✓						
	g. Ensure starters are in a good working conditions.	✓						
	h. Retighten all connection, terminations etc. Ensure all electrical connection is working properly.			✓				
	i. Inspect other luminaries (incandescent) – replace if faulty.	✓						
<b>3.3</b>	<b>Switches and Switch Socket Outlets</b>							
	a. Ensure no damage from visual inspection - replace if faulty.		✓					
	b. Open, clean and retighten all connections, termination, etc.			✓				
<b>3.4</b>	<b>Fans (Ventilating &amp; Exhaust)</b>							
	a. Check and clean fan including ventilation & exhaust fan.				✓			



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	b. Ensure continuous rotation or functionality.			✓				
	c. Ensure no noise being generated – repair / replace if faulty/noise.					✓		
	d. Inspect safety wire rope - ensure safety wire tape in good condition.				✓			
	e. Ensure that the exhaust fan is not blocked.			✓				
	f. Ensure that all bolts and nuts, connections, suspension rod, rubber mounting are in good condition.					✓		
	g. Ensure regulator function perfectly- replace if faulty.			✓				
	h. Test for insulation and earthing.					✓		
	i. Inspect regulator and ensure no noise generated during operation.				✓			
	j. Ensure all electrical connections for the fan working properly.	✓						
	k. Ensure auto louvers in working condition.			✓				
<b>3.5</b>	<b>Water Heater</b>							
	a. Clean water heater.			✓				
	b. Ensure that no water leakage to the connecting pipe and tank – repair / replace if faulty.			✓				
	c. Verify and records load reading.					✓		
	d. Inspect and retighten connections, earthing terminations, etc.			✓				
	e. Ensure all electrical connections working properly.			✓				

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	f. Ensure temperature range as stated in manufacturer's specifications.		✓					
	g. Ensure safety valve function perfectly.		✓					
	h. Ensure indicator light working properly.		✓					
	i. Verify and retighten connection and to the double pole switch.		✓					
	j. Ensure pressure control function properly.		✓					
	k. Ensure R.C.D. function properly.		✓					
<b>3.6</b>	<b>Public Address (PA) System</b>							
	a. Ensure PA system working properly.	✓						
	b. Clean amplifier, loud speakers, microphone mixer, tuner, players and other related equipment.		✓					
	c. Ensure all electrical connections working perfectly.			✓				
	d. Ensure battery / battery charger working perfectly.		✓					
<b>3.7</b>	<b>Outdoor Lighting – Compound and Street Lighting, Building Flood Lighting &amp; Security Lightings.</b>							
	a. Ensure all light fittings functional.	✓						
	b. Inspect by visual inspection condition of poles and light fitting, lamp cover, control switch gear, etc.	✓						
	c. Inspect control components and retighten all connections and termination.		✓					

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	d. Ensure time switch working perfectly.	✓						
	e. Ensure isolator is in good condition.		✓					
	f. Ensure condition of cable is in good condition.		✓					
	g. Ensure mounting and support is in good condition.		✓					
	h. Inspect and clean light fittings as required.					✓		
	i. Inspect for paint works / rust and corrosion & repair as required.					✓		
<b>3.8</b>	<b>Fireman's Switch</b>							
	a. Inspect & test fireman switch – replace if faulty.			✓				
	b. Record all activities & reading in the relevant room's log book.	✓						
<b>4.0</b>	<b>ELECTRICAL TESTING (TO ENSURE COMPLIANCE WITH B.S. 7671:1992-16TH EDITION IEE WIRING REGULATIONS; MS.IEC 60364-1996)</b>							
<b>4.1</b>	<b>General Testing</b>							
	a. Inspect the condition of electrical equipment by usual inspection to check for fault indication on switches, socket outlets light points, light fittings, etc.			✓				
	b. Test and verify the accuracy of all meter- ensure all meter working perfectly (in switchboards and control panels).						✓	
	c. Ensure main / sub switchboards is in good condition / working perfectly.			✓				

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	d. Ensure conditions of distribution boards are in good condition / working perfectly.			✓				
	e. Ensure all circuit breakers and fuses working properly.						✓	
	f. Retighten all connections, termination, etc.						✓	
	g. Record locations for each final circuit, check with record available at distribution board and update when necessary.						✓	
<b>4.2</b>	<b>Final Circuit Continuity and Protection Circuit Tests</b>							
	a. Ensure the protective conductor is in good condition.			✓				
	b. Ensure all the wiring installation is in good condition and capable to working properly / function perfectly.			✓				
	c. Ensure copper tape for trunking is in good condition.			✓				
	d. Check and test protection system for conduits. Ensure protection system for condition working properly.			✓				
	e. Ensure final circuit continuity function properly.			✓				
	f. Ensure the insulation test shall be done every 5 years after installation.							
<b>4.3</b>	<b>Installation Impedance Measurement</b>							
	a. Ensure all circuit breakers and fuses working properly - replace if faulty.						✓	
	b. Measure and record into log book insulation impedance between conductors and between conductors to earth.						✓	

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	c. Record locations for each final circuit, check with record available at distribution board and update when necessary.						✓	
	d. Retighten all electrical connections, terminations, etc.						✓	
<b>4.4</b>	<b>Identification of Polarity</b>							
	a. Ensure electrical wiring polarity for light points, switches, power points, etc is in good condition and capable to working perfectly.						✓	
<b>4.5</b>	<b>Measurement of Earth Fault Loop Impedance</b>							
	a. Test & record earth fault loop impedance.						✓	
<b>4.6</b>	<b>Testing of Residual Current Devices (RCD)</b>							
	a. Ensure residual current circuit breaker function perfectly.			✓				
	b. Tripping test & record for RCD including tripping, sensitivity into log book.						✓	
<b>4.7</b>	<b>Measurement of Earth Electrode Impedance</b>							
	a. Test & record for earth conductor continuity.						✓	
	b. Retighten connections, terminations for earth electrode.						✓	
	c. Ensure that concrete inspection box for earth electrode in good condition.			✓				
	d. Test measure & record electrode impedance.						✓	

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<b>5.0</b>	<b>UPS (UNINTERRUPTIBLE POWER SUPPLY)</b>							
<b>5.1</b>	<b>Batteries</b>							
	a. Conduct load test using external load bank to ensure battery capacity & performance.						✓	
	b. Inspect for leakage of acid – replace cell if any.		✓					
	c. Record individual battery voltage.			✓				
	d. Clean terminal from acid corrosion, if any.		✓					
	e. Record individual battery impedance – (5-20 milliohm).			✓				
	f. Inspect connections between cells are secure clean and lubricate with petroleum jelly.			✓				
	g. Remeasure and record cell output voltage after maintenance in battery log sheet.			✓				
	h. Ensure that UPS operation room temperature in the range 20°C ± 1.	✓						
	i. Inspect for deformity of battery and replace if faulty.	✓						
	j. Record battery discharge curve.			✓				
<b>5.2</b>	<b>Battery Charger</b>							
	a. Record the incoming voltmeter & ammeter reading into log book.	✓						
	b. Record the battery voltmeter and ammeter reading into log book.	✓						
	c. Calibrate accuracy of all meters (to Manufacturer's recommendations) - ensure all meter working perfectly.						✓	

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	d. Ensure cleanliness at cubicles.			✓				
	e. Tighten all connections (Mechanical & Electrical).			✓				
	f. Ensure indicators for protection system working perfectly for thyristor fuse, A.T. high voltage, battery fuse, current control limit, thyristor choking fan failure, power failure, battery voltage low , earth fault & other if any.	✓						
	g. Clean all heat sink, capacitor and P.C.B's (use dry brush or vacuum cleaner ).			✓				
<b>5.3</b>	<b>Inverter</b>							
	a. Record voltmeter and frequency reading.	✓						
	b. Ensure the cleanliness of cubicles.			✓				
	c. Check operation of all meters.					✓		
	d. Calibrate accuracy of all meters ( to Manufacture's recommendation) - ensure all meter working perfectly.							✓
	e. Ensure all electrical connections perfectly.			✓				
	f. Ensure protection system working perfectly for current control, fan failure, voltage abnormal, high current, over current & other if any.	✓						
<b>5.4</b>	<b>Static Transfer Switch</b>							
	a. Ensure control circuit working perfectly.			✓				
	b. Inspect completeness of switch functions.			✓				

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<b>5.5</b>	<b>Maintenance By-Pass Switch</b>							
	a. Ensure the cleanliness of 'cubicles'.			✓				
	b. Inspect completeness of switch functions.			✓				
	c. Record harmonic spectrum & distortions.			✓				
	d. Record downstream neutral earth voltage.			✓				
	e. Observe abnormal noise from UPS.	✓						
	f. Mandatory inspection of ventilation.	✓						
	g. Conduct mandatory power failure simulation test for UPS (to be done concurrently with gen-set test).			✓				
	h. Inspect for leaks deformation on A.C & D.C capacitors.		✓					
	i. Ensure no seepage or leak from ceiling.	✓						
	j. Inspect for hot spot areas.	✓						
<b>6.0</b>	<b>GENERATOR SET</b>							
<b>6.1</b>	<b>Lubrication System</b>							
	a. Top up engine oil level as required.			✓				
	b. Change engine oil base on operational hours recorded (200hrs) or duration time as required.						✓	
	c. Change oil full flow and bypass filters.						✓	
	d. Inspect hydraulic governor oil.		✓					
	e. Change hydraulic governor oil.						✓	
	f. Lubricate tachometer drive and throttle control mechanism.			✓				



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<b>6.2</b>	g. Inspect and rectify external leaks.		✓					
	<b>Fuel System</b>							
	a. Check fuel system.						✓	
	b. Service and recalibrate fuel pump, injectors and valve.						✓	
	c. Drain water and sediment from fuel tank, tighten all fuel line connection.				✓			
<b>6.3</b>	d. Top up diesel fuel level at least $\frac{3}{4}$ tank all the times.		✓					
	e. Inspect and rectify external leaks.	✓						
	<b>Cooling System</b>							
	a. Top up cooling water system level as required.	✓						
	b. Clean water filter- replace as required.			✓				
	c. Inspect and adjust water pump belts tension as required. Inspect completeness of switch functions.							✓
	d. Adjust fan belts tension as required.			✓				
	e. Dismantle and service water pump fan hub and idler pulley assembly and the associated bearings.							✓
	f. Inspect and rectify deterioration for radiator hoses.		✓					
	g. Inspect and rectify external leaks.	✓						
	h. Clean radiator fins.		✓					
i. Top up coolant water and blower screen and change as required.					✓			
j. Change fan belt.						✓		

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6.4	<b>Air System</b>			✓				
	a. Clean air cleaner element wet / dry-replace as required.			✓				
	b. Clean crankcase breather element-repair / replace if damaged.				✓			
	c. Tighten all air hose connections from Air Filter to Air Manifold.				✓			
	d. Inspect and clean Turbo charger (if any).					✓		
6.5	<b>Electrical System (To Comply with 5.1 &amp; 5.2)</b>							✓
	a. Inspect battery type (Lead acid or Ni Cad).			✓				
	b. Top up the battery electrolyte level and check S.G (if lead acid type).		✓					
	c. Ensure battery charger function properly.		✓					
	d. Ensure all electrical connections working perfectly.			✓				
	e. Clean battery, starter and terminal.		✓					
	f. Ensure AVR function properly.			✓				
6.6	<b>Alternator</b>							
	a. Ensure the alternator operating frequency at 50hz.			✓				
	b. Inspect alternator, clean and blow out dust.			✓				

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	c. Grease all bearing as required.					✓		
	d. Insulation check on main stator, main rotor and exciter stator and exciter rotor.						✓	
	e. Retighten drive coupling bolts.					✓		
	f. Change all carbon brushes (if applicable).					✓		
<b>6.7</b>	<b>Generator Set Control Panel</b>							
	a. Inspect and service generator set control panel (AMF) including all relays wiring connections etc. and automatic changeover contactor located in the Main Service Board.		✓					
	b. Ensure and rectify safety indicating and alarm devices for normal functioning of over-speed, over temp, oil pressure, overload, low fuel, etc.		✓					
<b>6.8</b>	<b>Operation Testing and General Servicing</b>							
	a. Test running condition (with no load) for 15 minutes.		✓					
	b. Test running condition (with load) for 30 minutes.			✓				
	c. Simulate power failure. On the essential Switch Board by switching off mains supply and conduct load test for minimum 30 min. to be done at appropriate time and not to interrupt the electrical supply for office operation.			✓				
	d. Ensure gen-set engine function perfectly - tuning up as required.						✓	
	e. Inspect acoustic system (air intake, outlets, attenuators, acoustic & measure and record noise level.				✓			

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	f. Record phase to phase voltage RY/ YB / BR (415) +5% - 10 % (monthly).			✓				
	g. Clean gen-set room (internal & external).			✓				
	h. Ensure emergency stop button works.		✓					
	i. Ensure verify and adjust the engine speed (1500rpm or 50 Hz).			✓				
	j. Record generator set operational hours (engine hour run) and indicate future schedule.		✓					
<b>7.0</b>	<b>HIGH VOLTAGE SYSTEM</b>							
<b>7.1</b>	<b>High Voltage Switchboard (11kV and Above)</b>							
	a. Test insulation at 5kV and record in megaohms.						✓	
	b. Ensure all connections, conductors, busbars, switch contacts, fuse contacts, etc. is in good condition / working properly-tighten.						✓	
	c. Ensure all cable boxes are in good condition.						✓	
	d. Clean and vacuum inside switchboard.						✓	
<b>7.2</b>	<b>Vacuum Circuit Breaker (VCB)</b>							
	a. Inspect and clean VCB for contamination, moisture and corrosion.			✓				
	b. Inspect the spring operating mechanism, condition of the lubrication on rotating and sliding bearing surfaces.						✓	

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	<p>c. Test the breaker pole with vacuum interrupter for any suspected damage.</p> <p>d. Ensure auxiliary switch, shunt releases/ blocking magnets, charging motor and D.C. rectifier in functional order.</p>						✓	
<b>7.3</b>	<b>Oil Circuit Breaker</b>							
	a. Inspect OCB, measure insulation and record.						✓	
	b. Recondition contacts, adjust stroke, wipe, overshoot stop and latch, and operating mechanism, record closing and opening times of each pole to verify correct adjustment.						✓	
	c. Check condition of tension rod & turbulator pod and flush breaker components and tank with clean oil.						✓	
	d. Lubricate auxiliary contacts with copper grease and test conductivity of contacts, record results.						✓	
	e. Check and adjust trip operations, interlock integral earthing and report.						✓	
	f. Test acidity and insulating oil for dielectric strength until it passes test of 30kV at 4mm gap for one minute or equivalent approved standard.						✓	
	g. Change insulating oil if necessary.						✓	
<b>7.4</b>	<b>SF6 Circuit Breaker</b>							
	a. Check pressure indication. Report for any low gas pressure.			✓				
	b. Check, test auxiliary and solid-state relay circuits.					✓		
	c. Inspect and clean external surface. Report for any defect.			✓				

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	d. Check all connections and cable boxes condition and report.						✓	
	e. Check and adjust, if necessary all operation and interlocks against inadvertent erroneous switching and report.					✓		
	f. Check geared motor operating condition.				✓			
<b>7.5</b>	<b>Ring Main Unit (Oil Type)</b>							
	a. Inspect and clean external surface. Report if any defect.			✓				
	b. Check all connections and cable boxes condition and report.						✓	
	c. Inspect Ring Main Unit, (HFU switch fuse, OLU oil switch, Busbar & Isolator) measure insulation at 5kV and record.						✓	
	d. Check and adjust, if necessary all operation and interlocks against inadvertent erroneous switching and report.						✓	
	e. Test insulating oil for dielectric strength until it passes test of 30kV at 4mm gap for one minute or equivalent approved standard.						✓	
	f. Change insulating oil (if necessary).						✓	
<b>7.6</b>	<b>Ring Main Unit (SF6 Type)</b>							
	a. Check pressure indication. Report for any low gas pressure.			✓				
	b. Inspect and clean external surface. Report for any defect.			✓				
	c. Check, test auxiliary and relay circuits.					✓		

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	d. Check and adjust, if necessary all operation and interlocks against inadvertent erroneous switching and report.					✓		
	e. Check all connections and cable boxes condition and report.						✓	
<b>7.7</b>	<b>Metering (Voltmeter and Ammeter)</b>							
	a. Ensure meters condition inclusive of glass covers.	✓						
	b. Ensure that the pointer is at zero when not in use.	✓						
	c. Ensure that the reading indicated by the meters is correct – recalibrate if in accurate.	✓						
	d. Record voltmeter and ammeter maximum readings to ensure correct readings and no occurrence of overload.	✓						
<b>7.8</b>	<b>Protection Relays</b>							
	a. Recalibration of over current and earth fault relays.							✓
	b. Recalibration of transformer protection and temperature control devices.							✓
<b>7.9</b>	<b>Direct Current (D.C) Supply</b>							
	a. Record voltage output of each cell.		✓					
	b. Ensure batteries electrolyte level is as per required level - top up if below level.		✓					
	c. Measure S.G of electrolyte (if lead acid type).		✓					
	d. Clean terminal from acid corrosion.		✓					

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	e. Maintain cleanliness of cells.			✓				
	f. Clean, retighten vent plug.		✓					
	g. Ensure connection between cells for cleanliness and lubricate with petroleum jelly.			✓				
	h. Remeasure and record cell output voltage after maintenance.		✓					
	i. Ensure ventilation in battery room.		✓					
	j. Ensure all meters functional.		✓					
	k. For nickel cadmium batteries release air bubbles trapped in the batteries to prolong battery life time.		✓					
<b>7.10</b>	<b>Transformer (Oil-Filled Type)</b>							
	a. External surface to be cleaned and to touch up with paint if necessary, oil leakage to be arrested, if necessary.						✓	
	b. Check oil level, maximum temperature, silica gel condition to be recorded. If necessary top up oil and replaced silica gel.			✓				
	c. Check all connection and cable boxes condition and report.						✓	
	d. Test acidity and insulating oil for dielectric strength until it passes test of 30kV at 4mm gap for one minute or equivalent. Refilter or change when necessary.						✓	
<b>7.11</b>	<b>Transformer (Resin / Dry Type)</b>							
	a. Verify the winding temperature and instrumentation circuits within operational range.		✓					
	b. Ensure the cooling fan is operational.		✓					



No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	c. Conduct visual inspection of coils, wiring and monitoring equipment for any suspected damage.		✓					
	d. Ensure all connections for correct degree of tightness.						✓	
	e. Test and measure insulation resistance. Record all measurement.		✓					
	f. Clean and remove dust /contamination from transformer.		✓					
	g. Observe for any abnormally high temperature / noise level and rectify.		✓					
	h. External surface to be cleaned and to touch up with paint if corroded.						✓	
	i. Ensure that no digging being done near underground cable route.	✓						
	j. Test cable insulation.						✓	
	k. Ensure cable markers are visible.		✓					
<b>7.12</b>	<b>11kV Cable (&amp; Cables&gt;1kV)</b>							
	a. Inspect condition of XLPE cable for any abnormal condition.						✓	
<b>7.13</b>	<b>Earthing System</b>							
	a. Retighten all connections, terminations, earthing.			✓				
	b. Retighten all earth electrode terminations and ensure corrosion free.			✓				
	c. Test and measure earth electrode impedance.			✓				
	d. Ensure marking & tagging of earth electrode in tag.						✓	

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
7.14	<b>H.T. Switch Room</b>							
	a. Cleaning of switch room.		✓					
	b. Cleaning of cable trench / condition of cable trench (ensure clean, water free and slabs are covered).		✓					
	c. Cleaning and repairing doors, locks and repainting if faded.						✓	
	d. Ensure that “No Smoking”, No Admittance” & “Danger Signs”, “Treatment Shock Card” & Schematic Drawing are in good condition and are visible/readable and replace if damaged.		✓					
	e. Ensure fire-extinguisher and CO2 / halon free system are in good working condition, expiry date not due and renew.			✓				
	f. Ensure no moisture below rubber mat in front of the main switch board - replace if damaged.		✓					
	g. Ensure anti vermin wire mesh is in good condition – replace / repair if damaged.		✓					
	h. Ensure the roof / floor above free from leakages – repair if damage / leaking.		✓					
	i. Ensure no water flowing into Switch Room / Riser room - repair if damage / leaking.		✓					
	j. Ensure all electrical wiring function perfectly including electrical and fittings, power points, light fittings and exhaust fans - repair if faulty.						✓	
k. Ensure duct seals is in good condition- repair if damage.							✓	

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
<b>8.0</b>	<b>LIGHTNING PROTECTION SYSTEM</b>							
	a. Visual inspection of all components of lightning protection system e.g. air termination, downdrop, connections, test connections, etc. to ensure that they are in good working condition – replace/repair if damaged. Proprietary type lightning protection systems included.			✓				
	b. Ensure that all finial / copper tape in good condition – if damaged, replace / repair.			✓				
	c. Ensure structural support for system & check support saddles for copper tape- ensure securely fixed.			✓				
	d. Ensure all connections termination points to down conductors are in good condition – replace or repair if damaged.			✓				
	e. Check down conductors from test joints to earth chambers – ensure present and secured in place.			✓				
	f. Clean earth chamber (internal and external).					✓		
	g. Clean surface of connections, joints, terminations of conductors from oxidation and test for continuity to earth electrode.						✓	
	h. Test conductors for earth continuity and ensure that the overall earth impedance does not exceed (10 ohms).						✓	
	i. Record counter device reading.			✓				

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
<b>9.0</b>	<b>TELECOMMUNICATION SYSTEM (VOICE COMMUNICATION)</b>							
<b>9.1</b>	<b>Telephone / PABX System</b>							
	a. Ensure PABX system is functional.	✓						
	b. Ensure telephone sets / system is functional.		✓					
	c. Visually inspect telephone cabling / wiring system.			✓				
	d. Inspect telephone DP- Boxes, replace if damaged.			✓				
	e. Inspect telephone Riser cables securely clamped.			✓				
	f. Ensure MDF & IDF systems are functional.			✓				
	g. Ensure lightning / surge arrestors are functional.		✓					
	h. Ensure battery system / charger (as per 5.1 & 5.2) are functional.		✓					
	i. Top up battery electrolyte level and measure specific gravity.		✓					
	j. Ensure telephone earthing system connection / termination / inspection chambers in good condition.		✓					
	k. Test telephone earthing system, ensure the impedance at least less than 1 ohm, install additional chamber c/w earthing rod if damaged.					✓		
	l. Ensure Operator's system is functional.	✓						
	m. Record all activities and reading in the relevant room's log book.	✓						

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
<b>10.0</b>	<b>MASTER ANTENNA SYSTEM (MATV)</b>							
	a. Inspect for functionality of complete MATV system, repair / replace if faulty.		✓					
	b. Ensure picture quality for every available channel at every floor of the buildings and record in the log book. Execute rectification works if required.		✓					
	c. Inspect MATV riser for cable tray or trunking defect, repair or replace if damaged.		✓					
	d. Inspect antenna elements and support structures for rust, misalignment and defect. Execute rectification or replacement works.		✓					
<b>11.0</b>	<b>STRUCTURED CABLING SYSTEM</b>							
	a. Inspect closets of structured cabling system & telecommunications systems.		✓					
	b. Test all cables for functionality.						✓	
	c. Other items:- (Manufacturer's recommendation to be complied with).							
<b>12.0</b>	<b>AUDIO AND VIDEO SYSTEM</b>							
<b>12.1</b>	<b>Video Screens &amp; Projection Systems</b>							
	a. Ensure monitor / 100Hz monitor is functional.	✓						
	b. Ensure screen unit is functional.	✓						
	c. Ensure image controller/ audio & video system is functional.	✓						

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	<p>d. Inspect metal base frame of monitor, screen, rollers for rust / corrosion, repair or paint if corroded, clean large screen PMMA for stain dirt.</p> <p>e. Service video cassette player, laser vision player, caption camera, computers and related equipment as per duration.</p> <p>f. Test master power supply.</p> <p>g. Retighten all connections and termination.</p> <p>h. Other items:- (Manufacturer's recommendation to be complied with).</p>			✓				
<b>12.2</b>	<b>Sound Reinforcement System</b>							
	<p>a. Inspect for functionality of complete Sound Reinforcement System.</p> <p>b. Clean power amplifier, speakers, paging and other audio related equipments.</p> <p>c. Retighten all connections &amp; termination.</p> <p>d. Other items:- (Manufacturer's recommendation to be complied with).</p>	✓		✓				
<b>12.3</b>	<b>Conference System</b>							
	<p>a. Inspect for functionality of complete conference system.</p> <p>b. Clean power amplifier, delegate conference sets and other related equipments.</p> <p>c. Retighten all connections &amp; termination.</p>		✓	✓				

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
13.0	d. Other items:- (Manufacturer's recommendation to be complied with).							
	<b>BUILDING MANAGEMENT / AUTOMATION SYSTEM</b>							
	a. Service the central processing unit, monitors, power instrumentation and PDC unit.			✓				
	b. Inspect PIR scanners & miniature contactor.		✓					
	c. Ensure built-in control module in electrical switch board is functional.			✓				
	d. Ensure AC to DC converter is functional.		✓					
	e. Ensure UPS system is operational.	✓						
	f. Service all electrical contactors.			✓				
	g. Record all activities and reading in the relevant room's log book.	✓						
14.0	h. Other items:- (Manufacturer's recommendation to be complied with).							
	<b>SECURITY, CCTV AND CARD ACCESS SYSTEM</b>							
	a. Test system functionality.	✓						
15.0	b. Manufacturer's recommendation to be complied with – all items.							
	<b>COMPUTERISED MAINTENANCE MANAGEMENT SYSTEM (CMMS)</b>							
	a. Setup the CMMS with the help of the supplier.	✓						

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	b. Setup Help Desk facilities to manage CMMS including telephone line to receive complaints and fixed internet access computer via broadband.	✓						
	c. Record work request, issue and close work orders for complaints.	✓						
	d. Prepare monthly report as per government format.			✓				
<b>16.0</b>	<b>CHANDELIER LIGHTING</b>							
	a. Test system functionality.	✓						
	b. Ensure that all the bulb is in good condition, replace if faulty.	✓						
	c. Ensure the whole luminaries is in good condition, replace if faulty.			✓				
	d. Manufacturer's recommendation to be complied with all items including cleaning.							
<b>17.0</b>	<b>STREET LIGHTINGS</b>							
<b>17.1</b>	<b>Routine Inspections</b>							
	a. Carry out scheduled inspection of every street lighting which shall be energized to ascertain the number of faulty lamps.		✓					
	b. Check and ensure the correct operation time for all street lightings.		✓					
	c. Check, take photo and document detail of damaged pole resulting from accidents / damaged cables resulting from earth works by others if necessary.		✓					
<b>17.2</b>	<b>Lamps</b>							
	a. Check luminaries canopy, hinges operation/ clips for lamp cover, bowl and gasket. Repair if necessary.				✓			



No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	b. Replace all faulty lamp (refer to item 17.1 (a) above ) if necessary.		✓					
	c. Check waterproofing status and IP compliance.				✓			
	d. Clean light fitting enclosure housing and glass cover (bowl).				✓			
	e. Check lamp holder condition and associated supports / brackets. Repair if necessary.				✓			
<b>17.3</b>	<b>Lamp Control Gears</b>							
	a. Check and maintain all components : Ballast, igniter, capacitor, etc.				✓			
	b. Check and retighten all connections.				✓			
<b>17.4</b>	<b>Poles</b>							
	a. Straighten all slanting / fallen pole.		✓					
	b. Maintain service door, service door lock and hinges on all poles. Ensure they are in good condition.				✓			
	c. Check and maintain electrical components at service compartment such as earthing terminal, etc.				✓			
	d. Check, clean and retighten cable terminations.				✓			
	e. Check connection for rust / crack at arm bracket and base plate. Ensure devoid of rust and repaint (touch-up) if necessary.				✓			
	f. Check for rust at bolt / nut and tighten if necessary.				✓			
	g. Check and maintain labeling for all poles. Ensure they are in good condition and readable.				✓			

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
17.5	h. Ensure no destructive pest and use suitable chemical repellent if necessary.				✓			
	i. Keep clean of all grass / shrubs / rubbish near pole for an area of 1m around the pole.				✓			
	<b>Feeder Pillar.</b>							
	a. Measure and record incoming supply voltage and operation current.		✓					
	b. Check the functionality of circuit breaker, time switch, contactor fuse, MCB, MCCB, bypass auto / manual selector, etc.		✓					
	c. Check moisture level and take necessary actions.		✓					
	d. Check anti-vermin / insect netting and repair if necessary.		✓					
	e. Check, clean and test all equipment / accessories / components at the Feeder Pillar and restore in working condition if necessary.				✓			
	f. Check and retighten all connections, terminations and cable lug. Repair if necessary.				✓			
	g. Check for rust, damage, leakage and repaint if necessary.				✓			
	h. Apply lubricating grease for hinges and locks.				✓			
	i. Check functionality / operation of padlock. Change if necessary.				✓			
j. Keep clean of all grass / shrubs / rubbish for an area around 1m of Feeder Pillar.				✓				

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
17.6	k. Ensure no destructive pest and use chemical repellent if necessary.				✓			
	<b>Cable and Wiring.</b>							
	a. Check and retighten all connections, cable terminations and wirings.				✓			
	b. Ensure all cables labeling are in good conditions.				✓			
	c. Check all underground cable markers in accordance to the actual cable route. Replace if found missing / damage.					✓		
17.7	d. Test insulation wiring from control gears to lamp. Record and certify the result.					✓		
	<b>Earthing System.</b>							
	e. Test insulation for every underground cable and wiring at lamp. Record and certify the result.					✓		
	a. Ensure all earthing connections bonding in good condition including connection for copper electrode, main earthing terminal, earth circuit cable, etc.				✓			
	b. To check and retighten all connections, cable terminations and wirings.				✓			
	c. Check and maintain earth chamber.				✓			
	d. Test continuity test between earth electrodes to main earthing terminal at the controller. Record and certify the result.				✓			
	e. Measure, test, and record earth electrode impedance.					✓		

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
<b>18.0</b>	<b>TRAFFIC LIGHTS</b>							
<b>18.1</b>	<b>Routine Inspections</b>							
	a. Carry out scheduled routine inspection for all traffic lights and to ascertain the number of defective lights.		✓					
	b. Record the operation time of traffic light in accordance with the traffic flow for each phase.		✓					
	c. Take photo of damaged pole resulted from accident / whatever type of damages caused by others if necessary.		✓					
<b>18.2</b>	<b>Lamps ( Ordinary/ Overhead Aspects )</b>							
	a. Check and maintain the aspects, hinges, clips and gasket. Repairs if necessary.		✓					
	b. Replace all faulty lamps (refer to item 18.1 (a) if necessary.	✓						
	c. Check and realign all aspects if necessary.		✓					
	d. Check and clean lenses, sign of direction and reflectors.		✓					
	e. Check aspects waterproofing condition.		✓					
	f. Check for cracks / disappearance of aspects. Replace if necessary.		✓					
<b>18.3</b>	<b>Detectors/ Loop Sensors</b>							
	a. Check for damage / potholes on road surface which may expose sensor cable.			✓				
	b. Check sensor feeder cable and all cable terminations.			✓				

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
18.4	c. Check and retighten all connections.			✓				
	d. Check and clean panel /concrete chamber for cable terminations.			✓				
	<b>Poles</b>							
	a. Straighten all slanting / fallen poles.		✓					
	b. Maintain service door, service door lock and hinges for all poles. Ensure they are in good condition.			✓				
	c. Check and maintain electrical components at service compartment such as earthing terminal, etc.			✓				
	d. Check, clean and retighten cable terminations.			✓				
	e. Check connection for rust / crack at arm bracket and base plate. Ensure devoid of rust and repaint (touch-up) if necessary.				✓			
	f. Check for rust at bolt / nut and tighten if necessary.				✓			
	g. Check and maintain labeling for all poles. Ensure they are in good condition and readable.				✓			
18.5	h. Ensure no destructive pest and use suitable chemical repellent - if necessary.				✓			
	i. Keep clean of all grass / shrubs / rubbish near pole for an area of 1m around the pole.				✓			
	<b>Controllers.</b>							
	a. Measure and record incoming supply voltage and current operation.		✓					

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	<p>b. Check functionality of interface cards and electronics switch panel.</p> <p><b>Notes:</b> Maintain in accordance to manufacturer's requirement.</p> <p>c. Check functionality / operation of circuit breaker, time switch, contactor, fuse, MCB, MCCB, bypass auto / manual selector, etc.</p> <p>d. Check moisture level and take necessary actions.</p> <p>e. Check anti-vermin / insect netting and repair if necessary.</p> <p>f. Check, clean and test all equipments / accessories / components at the controller and restore in working condition if necessary.</p> <p>g. Check and retighten all connections, terminations and cable lug. Repair if necessary.</p> <p>h. Check for rust, damage, leakage and repaint if necessary.</p> <p>i. Apply lubricating grease for hinges and locks.</p> <p>j. Check functionality / operation of padlock. Change if necessary.</p> <p>k. Keep clean of all grass / shrubs / rubbish for an area around 1m of controller.</p> <p>l. Ensure no destructive pest and use suitable chemical repellent if necessary.</p>		✓					
<b>18.6</b>	<b>Cable and Wiring.</b>							
	a. Check and retighten all connections, cable terminations and wirings.				✓			

No.	Description	Maintenance Frequency						
		D	W	M	3M	6M	Y	2Y
	b. Ensure all cables labeling are in good conditions. c. Check all underground cable markers in accordance to the actual cable route. Replaces if found missing / damage d. Test insulation for every underground cable and wiring at lamp. Record and certify the result.				✓			
<b>18.7</b>	<b>Earthing System.</b>							
	a. Ensure all earthing connections bonding in good condition including connection for copper electrode, main earthing terminal, earth circuit cable, etc.				✓			
	b. Check and retighten all connections, cable terminations and wirings.				✓			
	c. Check and maintain earth chamber.				✓			
	d. Test continuity between earth electrode and main earthing terminal at the controller. Record and certify the result.				✓			
	e. Test all earth electrode impedance. Record and certify the result.				✓			
<b>19.0</b>	<b>INSPECTION OF ELECTRICAL SERVICES ABOVE CEILING.</b>							
	a. Inspect for proper electrical installation and wiring.					✓		
	b. Inspect for conduit, trunking and cable tray in good condition.					✓		