		The fittings listed above are only indicative. **Testing Requirements** All the type test & routine test on the transformer shall be carried out as per relevant IS & IEC standard. Type test to be submitted for approval of the transformer.
23	**Illumination & Lighting System**	1. Adequate lighting arrangement with suitable illumination level for the indoor and outdoor area shall be done by bidder. 2. The lighting scheme and determination of illumination level shall be finalized during detailed engineering as per the requirement of system. 3. LIGHTING TRANSFORMER 1) Type & Rating Dry type / 100 KVA, 2) Voltage Ratio 415/415V, +/- 5% taps in steps of 2.5% 3) Class of insulation B or better 4) One-minute power frequency withstand voltage 2.5 KV 5) Enclosure protection IP-42 LIGHTING Each AC Lighting Distribution Board (LDB) shall be fed from 415V / 415V, 100kVA isolating transformer. 4. Lighting transformer shall be dry type, natural air cooled with class B insulation or better. Impedance of lighting transformer shall be so selected that the fault level of lighting system shall be reduced to 3 to 5 KA. Lighting transformers shall be tested as per IS: 2026. Off circuit tap changer with ± 2.5% and ± 5% tapping shall be provided. Transformer terminal box shall have IP-52 degree of protection. 5. A comprehensive illumination system shall be provided in the entire areas. 6. All outdoor lighting system shall be automatically controlled by synchronous timer. Provision to bypass the timer shall be provided in the panel. 7. The system shall include distribution boards, normal/ emergency lighting panels, lighting fixtures, junction boxes, receptacles, switch boards, lighting pole/masts, conduits, cables, and wires, etc. The system shall cover all interior and exterior lighting such as area lighting etc. Outgoing circuits in LPs shall be provided with MCBs of adequate ratings. 8. The illumination system shall be designed on the basis of best engineering practice and shall ensure uniform, reliable, aesthetically pleasing and glare free illumination. The lighting

		fixtures shall be designed for minimum glare. The design shall prevent glare/luminous patch seen on VDU/ Large video screens, when viewed from an angle. The finish of the fixtures shall be such that no bright spots are produced either by direct light source or by reflection. The diffusers/ louvers used in fixtures shall be made of impact resistant polystyrene sheet and shall have no yellowing property over a prolonged period. 9. Normal AC lighting system: Normal AC lighting system 415V, 3Phase, 4wire, will be fed from lighting panels (LPs) which in turn will be fed from the lighting distribution boards (LDBs)/Switch board MCC. 10. Emergency AC Lighting System: This system shall be provided for certain important areas in the main plant. The lighting fixtures connected to this system shall be normally "ON" along with the normal AC system. These will be fed from emergency lighting panels (ELPs) which in turn will be fed 3-phase, 4-wire supply from the emergency lighting distribution boards (ELDB'S). These lights will go off for a few seconds in case of AC supply failure at Emergency Switchgear but shall be automatically restored when Emergency Switchgear is energized by Diesel generator set. 11. DC Lighting System: At strategic locations in the main plant, a few lighting fixtures fed from 220V, DC supply, shall be provided to enable safe movement of operating personnel and access to important control points during an emergency, when both the normal AC and Emergency Lighting system fail. These lighting fixtures will be fed from 220V DC LDBs which in turn will be fed from DC lighting panels. 12. The supply to the DC lighting panels shall be automatically switched ON in case of loss of AC supply at station service switchgear as well as Emergency switchgear. The DC supply will be automatically switched OFF after about 3 minutes following the restoration of supply to normal AC or emergency AC lighting system. 13. Emergency DC lighting is to be provided, through self-contained DC emergency fixtures with four hours' back-up duration, at strategic locations, in auxiliary/offsite buildings wherever DC supply system is not available. The fixtures shall be switched 'ON' automatically in case of failure of AC supply. 14. AC normal, AC emergency and DC system wiring shall run throughout in separate conduits. Wires of different phase shall run in different conduits. 15. All the lighting fixtures and accessories shall be supplied as per site requirement.

16. 2.5mtrs platform mounted GI pole suitable for mounting well glass fixture.
17. 8meter high Lighting pole for single Street lighting fixture with junction.
18. 1.5Mtr swan neck pole for Building Periphery lighting.
19. LED, Street Light Luminaire, IP66 protection 110W.
20. Relevant codes & standard shall be followed for illumination and lighting fixtures.
21. Indoor normal, Emergency LDB, DC Critical lighting panel, Outdoor flameproof normal and emergency panel, outdoor WP street light panel.
22. Lighting Mast shall be of continuously tapered polygonal cross section hot dip galvanized. The Mast shall be of 30 M or suitable height with lantern carriage to enable raising/lowering for ease of maintenance, including the Head Frame, Double Drum Winch, continuous stainless steel wire rope, in built power tool, luminaires, suitable aviation warning light, lightning along with necessary power cables within the mast. The mast shall be delivered in not more than three sections & shall be joined together by slip stressed fit method at site. No site welding or bolted joints shall be done on the mast The Mast together with the fixtures shall be capable of withstanding the appropriate wind loads as per IS: 875. The Mast shall be fabricated from special steel plates conforming to BS-EN10-025 and folded to form a polygonal section. Suitable feeder pillar with TPN MCB, contactors, timer, MCB and other necessary accessories for operation & protection of the mast and fixtures shall be provided.

Location	**Illumination level (Lux)**	**Type of fixture**
Switchgear rooms, Charger	200	Industrial type LED luminaire
Control room, computer	350	LED luminaire equivalent to Mirror optics with anti-glare features
Offices, conference rooms	300	Decorative mirror optics type LED
Battery rooms	100	Total enclosed corrosion & flameproof LED Luminaire
Transformer area	20	(General) LED luminaire and 50 (on equipment)
DG Room	150	LED medium bay / Industrial type LED luminaire