**Scope of Work & Technical Specifications**

1. **Technical Specification for Item No. 1:**
2. **Technical Specification for Main Distribution Panel.**

This includes design, supply at site, installation, testing & commissioning of outdoor pedestal type Main Distribution Panel, double shutter, handle with locking arrangement (Pad lock-5 lever with keys), dust, damp and vermin proof. The main distribution panel shall be fabricated from MS Sheet of 2.00 mm thick, 316 grade MS angle and MS flat of suitable size.

The main panel shall be designed as per IS norms and shall be specious for easy maintenance and frame structure shall be with MS angle of suitable size (min. 35 X 35 X 6mm) with inner sheet & inner angles & pedestal of pane made from 65 X 65 X 6mm MS angle of 316 grade with four legs of 1200 mm and shall be provided with following items.

|  |  |  |
| --- | --- | --- |
| 1 | 400A, 4 Pole ON LOAD Change over switch | 1 No. |
| 2 | 200A, 4 Pole, 415V, 35KA, Panel Mounted MCCB | 2 No. |
| 3 | 50A, 4 Pole, 415V, 35KA, Panel Mounted MCCB | 4 No. |
| 4 | Indicating Lamps, 230/240V, AC with in-built resistance | 3 No. |
| 5 | Suitable size of Analog Ammeter & Volt meter with four portion selector switches | 1 each |
| 6 | Indicating Lamp- Red, Green and blue, 230V AC with in-built resistance. | 1 each |
| 7 | Three phase, 4 wire electronic energy meter | 1 No. |
| 8 | Surface mounted light sensor time switch | 1 No. |
| 10 | 50A, Three phase Ait Breaker Contactor | 1 No. |
| 11 | Electrolytic copper bus-bar of suitable size for phase and neutral, PVC sleeved with colour code, Danger Board tie belt MS Wall Mounted stand etc. |  |

All these compartments shall be mounted in the Panel by means of suitable cadmium passivated hardware. The Panel shall be complete in all respects with cable glands, lugs for incoming and outgoing cables including interconnection with PVC insulated cable single core, standard copper conductor of 650/1100V grade.

The Panel shall be erected on cement concrete platform duly plastered with tapped collar of suitable size having height of 500 mm above ground level including grouting of legs in reinforced foundation of suitable design.

The Pane shall be tested as per IS and test certificate to be submitted along with panel at site. All the components shall be panel mounted type and hardware cadmium passivated. The Main Distribution Panel shall be provided with 2 Nos. GI Terminals for earthing.

The Panel shall be manufactured from type test certificate holder having Type Test Certificate of Distribution Panel of similar or above ratings. This includes all labour & material as directed by Engineer-In-Charge.

1. **Technical Specification for Feeder Panel.**

This includes design, supply at site, installation, testing & commissioning of outdoor pedestal type Feeder Pillar Panel, double shutter, handle with locking arrangement (Pad lock-5 lever with keys), dust, damp and vermin proof. The main distribution panel shall be fabricated from MS Sheet of 2.00 mm thick, 316 grade MS angle and MS flat of suitable size.

The main panel shall be designed as per IS norms and shall be specious for easy maintenance and frame structure shall be with MS angle of suitable size (min. 35 X 35 X 6mm) with inner sheet & inner angles & pedestal of pane made from 65 X 65 X 6mm MS angle of 316 grade with four legs of 1200 mm and shall be provided with following items.

|  |  |  |
| --- | --- | --- |
| 1 | 200A, 4 Pole, 415V, 35KA, Panel Mounted MCCB | 1 No. |
| 2 | 50A, 4 Pole, 415V, 35KA, Panel Mounted MCCB | 8 No. |
| 3 | Indicating Lamps, 230/240V, AC with in-built resistance | 3 No. |
| 4 | Suitable size of Analog Ammeter & Volt meter with four portion selector switches | 1 each |
| 5 | Indicating Lamp- Red, Green and blue, 230V AC with in-built resistance. | 1 each |
| 6 | Three phase, 4 wire electronic energy meter | 1 No. |
| 7 | Surface mounted light sensor time switch | 1 No. |
| 8 | 50A, Three phase Ait Breaker Contactor | 1 No. |
| 9 | Analog Timer for control of street light |  |
| 11 | Electrolytic copper bus-bar of suitable size for phase and neutral, PVC sleeved with colour code, Danger Board tie belt MS Wall Mounted stand etc. |  |

All these compartments shall be mounted in the Panel by means of suitable cadmium passivated hardware. The Panel shall be complete in all respects with cable glands, lugs for incoming and outgoing cables including interconnection with PVC insulated cable single core, standard copper conductor of 650/1100V grade.

The Panel shall be erected on cement concrete platform duly plastered with tapped collar of suitable size having height of 500 mm above ground level including grouting of legs in reinforced foundation of suitable design.

The Pane shall be tested as per IS and test certificate to be submitted along with panel at site. All the components shall be panel mounted type and hardware cadmium passivated. The Feeder Panel shall be provided with 2 Nos. GI Terminals for earthing.

The Panel shall be manufactured from type test certificate holder having Type Test Certificate of Feeder Panel of similar or above ratings. This includes all labour & material as directed by Engineer-In-Charge.

1. **Technical Specification for Item No. 2:**

This includes supply at site 1.1 KV grade, 4 core aluminum conductor, XLPE insulated armoured cable of given sizes confirming to IS: 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The manufacturer shall produce TYPE TEST certificate with similar size of cable, which shall not be more than 3 years old. The cable shall have marking/embossing at the interval of every meter showing its progressive length. The manufacturer’s routine test certificate shall produce with supply of cable at site.

1. **Technical Specification for Item No. 3:**

This includes laying of cable through following type.

1. **Existing RCC Cable Trench:**

The item includes laying of single length LT XLPE Insulated aluminum conductor XLPE insulated armoured cable of 11kV grade in the existing cable trench. The cable shall be laid after opening of trench by removing the MS cheered plates / RCC trench cover. If any unwanted cable or waste is available in the trench the contractor should clean the trench before laying the new cable and obtaining clearance in writing from Engineer-in- charge. After laying of the cable, cable trench shall be properly covered with existing chequered / RCC trench cover plates as per original. The item includes required material and labour as directed by Engineer in charge.

1. **Hard/Soft Soil:**

This includes laying of single length LT XLPE Insulated armoured aluminium Conductor Cable of 1.1KV Grade (excluding supply of cable) through excavation in soft/hard soil. The trench to be excavated 0.3 Mtr. wide 0.6 Mtr. deep. The bed of 50mm of river sand shall be provided in the bottom of the excavated trench. The cable shall be laid over the bed of river sand. The cable shall be protected by providing and laying bricks both the sides lengthwise parallel to the cable & the gaps shall be filled with river sand. The cable shall be covered by keeping two bricks over the side bricks. The filling of the trench shall be done with the excavated stuff & should be watered and rammed properly to its original position. The excess excavated stuff shall be disposed off from the Site of work and spreader in low laying area as directed.

The contractor shall provide heat shrinkable straight through joint of relevant size of approved make if the laying of cable shall be more than standard drum length. This includes all labour and material as directed by Engineer-in-Charge.

1. **On wall through saddles & clamps:**

This includes laying of supplied single length cable up to 4.0 core x 50 Sq.mm LT armoured aluminium Conductor XLPE Cable of 1.1KV Grade (excluding supply of cable) on existing wall/cement structure. The G.I. Saddle set with base & Clamps shall be provided of suitable size (with respect to cable outer diameter) made from G.I. flat 25 x 3 mm with G.I. Nut bolts/heavy duty screws for clamping. The base shall be fixed rigidly on wall/cement structure through cemented wooden gutties at 0.50 mtr. Intervals & the cable shall be laid on 3mm thick G.I. saddle base on wall/cement structure and clamped rigidly by G.I. screwing/bolting of clamps. The work includes with all materials and labour as directed by Engineer-in-charge.

1. **In RCC/Rail/Road through HDD method:**

HT & LT XLPE Cable various sizes shall be laid underneath by using Horizontal Directional Drilling (HDD) method by putting suitable diameter Dia HDPE. HDPE pipe having strength 10Kg/sq.cm} shall in contractor scope), the contractor shall have arranged JCB Machine for excavation, water for drilling, de- watering pump, HDD equipments at their own cost. The cable shall be pass through heavy duty HDPE pipe buried at nominal minimum depth 165 cm or according to construction of RCC Road/ Rail network or as per directed by EIC. For single size/length cable, individual HDPE pipe shall be passing through a road /rail crossing, for another cable; separate HDPE pipe shall pass through the Tunnel / trench. Laying of HDPE pipes coupled by HDPE socket only after standard length in excavated trench/tunnel and also sealing of HDPE pipe ends by suitable cap. Back filling & dressing of excavated trenches as per specification. This includes all labour and material as directed by Engineer-in-Charge

1. **Technical Specification for Item No. 4:**

The item includes providing & fixing concealed wiring for single phase sub-circuit from the main switch /meter /DBs / MCBs to the switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 2.5 / 4.0 sq. mm. as desired by EIC for phase & neutral wire and 1.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of suitable of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grove and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grove shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. Complete work consists of necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 5:**

The item includes providing & fixing concealed wiring for Modular light/tube/bell point from switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase & neutral wire and 1.0 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grove shall be prepared in old construction by contractor on wall/ floor and the conduit pipe shall be laid through prepared grove in such case on the ceiling portion the pipe is to be laid on the false ceiling by clamping properly. But for new construction the pipes shall be laid during reinforcement work. After laying of pipe the grove shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling/ floor also incase of false ceiling the pipe shall be properly clamped over the ceiling. The work consists providing & fixing of one Moduler Bell Push/SP switch 6A x 250V with spark shield ISI mark and to meet specifications of IS & 2 way connector at the end side. The PVC unbreakable concealed box for required modules shall be embedded properly in the wall and the switches shall be fixed on Modular Plates for required Modules on the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 6:**

The item includes providing & fixing concealed wiring for Modular fan point from switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase & neutral wire and 1.0 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grove shall be prepared in old construction by contractor on wall/ floor and the conduit pipe shall be laid through prepared grove in such case on the ceiling portion the pipe is to be laid on the false ceiling by clamping properly. But for new construction the pipes shall be laid during reinforcement work. After laying of pipe the grove shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of one module SP switch 6A x 250V with spark shield with ISI mark and to meet specifications of IS, 2 module Step cut electronic fan regulator with rotary steps & 3 plate Ceiling Rose made from polycarbonate on suitable size of PVC box with cover. The PVC unbreakable concealed box for required modules shall be embedded properly in the wall and the switches shall be fixed on Modular Plates for required Modules on the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 7:**
2. **Full Point:**

The item includes providing & fixing concealed wiring for Modular plug point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase & neutral wire and 1.0 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of one module SP switch 6A x 250V with spark shield with ISI mark and 2 Module Modular 2 in 1 socket 6A x 250V with shutter made from polycarbonate on suitable size of PVC box with cover. The PVC unbreakable concealed box for required modules shall be embedded properly in the wall and the switch & Socket shall be fixed on modular plate of required modules on the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Half Point:**

The item includes providing & fixing half Modular point in existing switch board with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 1.5 sq. mm. for phase, neutral & earth. The work consists providing & fixing of one module SP switch 6A x 250V with spark shield with ISI mark and 2 Module Modular 2 in 1 socket 6A x 250V with shutter made from polycarbonate on existing modular plate (by considering 3 extra modules for half point in point wiring for light/fan/tube/bell point). The complete work consists necessary wiring connections and earth linking with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 8:**

The item includes providing & fixing concealed wiring for Modular Power point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 4.0 sq. mm. for phase & neutral wire and 2.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 25 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of 2 module 15/16A x 250V socket with shutter with ISI mark, 1 module SP switch 15/16A x 250V with spark shield with ISI mark & 1 module 10/16A fuse unit on suitable size of PVC unbreakable concealed box with 4 module modular plate. The PVC unbreakable concealed box shall be embedded properly in the wall and the fuse, switch & Socket shall be fixed on 4-module modular plate and modular plate shall be fixed on the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 9:**

The item includes providing & fixing concealed wiring for Modular telephone/intercom point from distribution box of telephone/intercom placed in the lobby to the room as directed by Engineer-in-Charge. The telephone/intercom wiring shall be done with 0.5 Sq.mm. x 2 Pair PVC insulated & PVC sheathed annealed tinned copper conductor to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of 1 Module 2 line telephone jack with shutter made from polycarbonate on suitable size of PVC box with cover. The PVC unbreakable concealed box for required modules shall be embedded properly in the wall and the 1 Module 2 line telephone jack shall be fixed on modular plate of required modules on embedded box. The complete work consists necessary wiring connections at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 10:**

This includes providing & fixing concealed wiring for A.C point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 4.0 sq. mm. for phase & neutral wire and 2.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe with IS: of size 25 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grove shall be prepared in old construction by contractor on wall/ floor and the conduit pipe shall be laid through prepared grove in such case on the ceiling portion the pipe is to be laid on the false ceiling by clamping properly. But for new construction the pipes shall be laid during reinforcement work.. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of 2 module 25A x 250V socket with ISI mark & 2 module SP switch 25A x 250V with spark shield with ISI mark and to meet specifications of IS, on suitable size of PVC unbreakable concealed 2 Nos 2 modular boxes. One box to be fixed on top of dealing for socket and one box to be fixed at 1.5 Mtr height with switch. The PVC unbreakable concealed box shall be embedded properly in the wall and the fuse, switch & Socket shall be fixed on 4-module modular plate and modular plate shall be fixed on the embedded box.

Also, the separate 2 Modular switches to be fitted on the outside of the room to control the lighting ckt of individual switchboard from outside, the work also consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 11:**

The item includes providing & fixing concealed wiring for Modular plug point for computers (With 2 module, 4nos. 2 in 1 socket 6A x 250V & 4 nos. 1 module SP switch 6A x 250V with spark shield) with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire of size 2.5 sq. mm. for phase & neutral wire and 1.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe of size 20 mm Diameter of Medium Mechanical Strength (MMS) type and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make. The proper size of grew shall be prepared by contractor on wall/ceiling as case may be & the conduit pipe shall be laid through prepared grew and incase of new construction the pipes shall be laid during reinforcement work. After laying of pipe the grew shall be closed with mixture of cement & sand and to match with existing surface of wall/ceiling. The work consists providing & fixing of 2 module, 4nos. 2 in 1 socket 6A x 250V & 4 nos. 1 module SP switch 6A x 250V with spark shield with ISI mark on suitable size of PVC unbreakable concealed box with 12 module modular plate. The PVC unbreakable concealed box shall be embedded properly in the wall and the switches & Sockets shall be fixed on 12-module modular plate and modular plated shall be fixed on the embedded box. The complete work consists necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

1. **Technical Specification for Item No. 12:**
2. **Supply:**

This includes supply of 4 way Double Dorr TPN DB as per following specification & make.

- No. of Ways: 4 (8 Incomer + 12 Outgoing)

Protection device type: Main incomer: Molded case circuit breaker (MCB)- 3P or 4P

Outgoing: Miniature circuit breaker (MCB) - 1P or 3P

Enclosure/Cubicle description: Double door enclosure

Enclosure material: CRCA

Colour: White (RAL 9003)

Total number of 18 mm modules: 20

**-** IP degree of protection IP43

Make: L & T/Schneider/Siemens/ABB/Hager

The DB shall be fitted with Busbar, DIN Rail and neutral link. The rates shall be excluding the cost of MCB as directed by Engineer-in-Charge.

1. **Installation, testing & commissioning:**

This includes installation, testing & commissioning of supplied double door 4 Way TPN DB on wall / structure as directed. The DB shall be fixed rigidly on wall through suitable size of nut bolts/anchor fasteners/cemented wooden gutties as directed. This includes necessary wiring, connections & earth linking with all material, labour tools & tackles as directed by Engineer-In-charge.

1. **Technical Specification for Item No. 13:**
2. **Supply:**
3. This includes supply of DIN Rail mounted ‘C’ Series 6-32 Amps. X 240 Volts 50 Hz. Single Pole MCB with 10kA Breaking Capacity. The terminals of MCB shall be serrated type. The impulse withstand voltage and impulse power frequency voltage shall be 4KV (1.2/50 μs & 2KV (50Hz.).

**(b)** This includes supply of 100 Amp., 4 Pole TPN MCB as per following technical specifications.

1) Poles description/ Number of protected poles: 4P/4

2) Rated current: 100 Amp. At 30 C

3) Network type: AC

4) Trip unit technology: Thermal-magnetic

5) Curve code: C

6) Breaking capacity: 10000 A Icn at 230...400 V AC 50/60 Hz conforming to EN/IEC 60898-1

7) Suitability for isolation: Yes conforming to IEC 60947-2

8) Rated operational voltage : 380...415 V AC, 50 Hz/440 V 50 Hz

9) Magnetic tripping limit: 5...10 x In

10) Rated insulation voltage: 500 V AC 50 Hz conforming to EN/IEC 60947-2

11) Rated impulse withstand voltage: 6 kV conforming to EN/IEC 60947-2

12) Contact position indicator: Yes

13) Control type: Toggle

14) Mounting mode: Clip-on

15) Mounting support: DIN Rail

Make of MCB: Make: L & T /Schneider /Siemens /ABB /Hager

**(c)** This includes supply of 100 Amp., 4 Pole RCCB as per following technical specifications.

1) Poles description: 4P

2) [In] rated current: 100 Amp.

3) Network type: AC

4) Earth-leakage sensitivity: 40 Ma

5) Earth-leakage protection time delay: Instantaneous

6) Earth-leakage protection class : Type AC

7) Network frequency: 50 Hz

8) Rated operational voltage : 380...415 V AC, 50 Hz

9) Residual current tripping technology: Voltage independent

10) Rated breaking and making capacity: Idm 1500 A, Im 1500 A

11) Rated conditional short-circuit current: 10 kA

12) Rated insulation voltage: 500 V

13) Rated impulse withstand voltage: 6 kV

14) Surge current: 250 A

15) Contact position indicator: Yes

16) Control type: Toggle

17) Mounting mode: Clip-on

18) Mounting support: DIN Rail

1. **Fixing:**
2. This includes fixing & commissioning of supplied 6-32 Amp SP MCB in above supplied double door DB on wall / structure. The MCB shall be fixed on DIN Rail provided in existing DB. This includes necessary 1φ wiring, connections, distribution & earth linking of DB with all material, labour tools & tackles as directed by Engineer-In-charge.
3. This includes fixing & commissioning of supplied 4 Pole MCB in supplied double door DB on wall / structure. The MCCB shall be fixed on DIN Rail provided in existing DB. This includes necessary 3φ wiring, connections, distribution & earth linking of DB with all material, labour tools & tackles as directed by Engineer-In-charge.
4. This includes fixing & commissioning of supplied 4 Pole 100 Amp RCCB/100 Amp TPN MCB in supplied double door DB on wall / structure. The MCB shall be fixed on DIN Rail provided in existing DB. This includes necessary 3φ wiring, connections, distribution & earth linking of DB with all material, labour tools & tackles as directed by Engineer-In-charge.
5. **Technical Specification for Item No. 14:**
6. **Supply:** This includes supply at site 4 ft LED Tube light fixture of 20-22 Watt. The tube light shall be operating on single phase 230V, 50Hz AC supply. It shall be with white light and shall be have the facility of clamping the tube rod on fixed clip (on the wall) The LED rod shall be fluctuation proof and shall provide with in-built driver.
7. **Fixing:** This includes fixing and commissioning of supplied 4ft LED 20-22 Watt tube light fixture on wall/ceiling at suitable height on cemented wooden gutties as directed and connection with 3 core flexible copper cable from nearest source of supply/ceiling rose & necessary connection with all material and labour as directed by Engineer-in-Charge.
8. **Technical Specification for Item No. 15:**
9. **Supply:**

This includes supply of 18 Watt Round Sleek LED Down Light having Robust Design with Pressure Die-Cast Alu. Housing, ensuring long life as per per following technical specification.

1) Lumen: 2000 Lm

2) System Power : 18 Watt

3) CCT: 4000 K

4) CRI >80

5) Efficacy of >110 lm/w

6) Surge Protection: 2.5 kV

7) SDCM : < 5

8) THD (i) : < 10%

9) Input Voltage Range: 130-320 V AC

10) Beam Angle 120°

11) Optical Cover/Lens Type: Polycarbonate

10) Material : Housing: Pressure Die Cast Aluminum

11) Diffuser: Polycarbonate

12) Clip : Steel Clip (Spring)

1. Driver: Non Integral
2. Serviceability : Class B
3. Power Factor (Min): 0.95
4. Life: L70B50@50K Hrs.
5. Warrantee: 2 Year
6. **Fixing:**

This includes fixing & commissioning of supplied 18 Watt Round Sleek LED Down Light Luminaries on existing false ceiling by making & providing necessary cutout of fitting dimensions and required supporting material, facilitate mounting in false ceilings as directed. The fitting shall be fixed rigidly nearby fitting through suitable size of screws/nut bolts/anchor fasteners and connections with 3 core flexible copper cable from nearest source of supply/ceiling rose & necessary connections with all material and labour and as directed by Engineer-In-charge.

1. **Technical Specification for Item No. 16:**
2. **Supply:** This includes supply of 1200 mm sweep ceiling fan fitted with heavy duty grease filled double ball bearing that ensures noiseless performance and long lasting smoother life of fan suitable upto 250V AC supply. The Fan blades aerodynamically balanced to ensure maximum air delivery at lower power consumption & the blades shall be made of 'heavy gauge' aluminium sheet so as to retain the blade's angel over a longer period. The Fan motor made of superior grade copper wire and impregnated in special varnish for long life operation. The motor shall be totally enclosed and low-loss-silicon steel stampings ensure minimum power consumption with high optimum output. The Fan coated with a special anticorrosive enamel paint that makes them rust free and ensures a classic appearance and longer life. The supplied fan conforming to ISI specifications. The fan shall be supplied all accessories such as down rod 30/60/120cm long, PVC Bobbin, Stainless Steel Nut Bolt with cotter pin, capacitor etc. of approved make and as per IS specification as directed by Engineer-in-charge.
3. **Fixing:** This includes fixing & commissioning of supplied ceiling fan with all accessories in existing hook including necessary wiring and connection from nearest point / Ceiling rose through PVC flexible copper conductor wire and earth linking etc. with all material and labour as directed by Engineer-in-charge.
4. **Technical Specification for Item No. 17:**
5. **Supply:** This includes supply of exhaust fan of size 225mm with capacitor start and run type motor, continuously rated, totally enclosed fitted with heavy duty grease filled double ball bearing that ensures noiseless performance and long lasting smoother life of fan suitable for single phase 220/250 Volts A.C. 50HZ. The impeller shall be used in an Exhaust Fan is of the propeller type & both hub and impeller shall be dynamically balanced, frames and arms mounted on rubber bushings, to avoid vibrations.
6. **Fixing:** This includes fixing & commissioning of supplied exhaust on existing exhaust hole so that discharge of exhaust air can be done easily. However if exhaust hole is not provided, it is to be done by contractor. The grouting of the fan is to be done by suitable size of anchor fastener bolts, and by providing metallic mesh/louvers as directed to other side so that birds can be restricted in the passage. This includes connections with 3 core flexible copper cable from nearest source of supply & necessary connections & earth linking with all material and labour and as directed by Engineer-In-Charge.
7. **Technical Specification for Item No. 18:**
8. **Supply:**

Supply at site energy efficient LED 140 watt warm White LED Street light fixture. The LED fixtures should be suitable for pole pipe bracket which is including with LED.

The contractor shall take prior approval from the Engineer in charge for make of LED Street Light fixture

1) Light source color: 857 daylight

2) Driver included: Yes

3) Optic type: Asymmetric Beam angle 60°

4) Optical cover/lens type: Polycarbonate

5) Beam angle of light source: 60°

6) Protection class IEC: Safety class I

7) Warranty Period: 2 Years

8) Material: Aluminum

9) Input Voltage: 120 to 277 V

10) Initial input power: 140 Watt

11) Housing Material: Aluminium Die Cast

12) IP Code : 66

13) Mech. Impact Prot. Code: IK 08

14) Initial luminous flux (system flux): 16000 lm

15) Initial LED luminaire efficacy: 122 lm/W

16) Color Temperature: 5000 to 5700 K

17) Init. Color Rendering Index: > 70

18) Median useful life L70B50: 50000

19) Internal Surge Protection: 4 KV

1. **Fixing:**

This includes fixing & commissioning of supplied LED Street Light for outer periphery of building. The supplied fitting shall be fixed on nipple on pipe/bracket at building height. This works includes supply & fixing the DB Box, the DB shall contain with one Digital timer. 3 phase 40 amps Contactor.20 amps DP for switching/control the street light complete with internal wiring (with providing & connecting with 3CX 2.5 sq.mm copper flexible cable) & necessary pipe/bracket with all required accessories & hardware for fixing of street light.

The works also including necessary wiring, connections & necessary earth linking connections with all material, labour, tools & tackles as directed by Engineer-In-charge.

1. **Technical Specification for Item No. 19:**
2. **Supply:** This includes supply of energy efficient LED 10 Watt, cool white, surface mounted bulk head light fixture of approved make and as desired by Engineer In Charge.
3. **Fixing:** This includes fixing and commissioning of supplied LED 10 Watt bulk head light fixture on wall/ceiling at suitable height on cemented wooden gutties as directed and connection with 3 core flexible copper cable from nearest source of supply & necessary connections & earth linking with all material and labour and as directed by Engineer-In-Charge.
4. **Technical Specification for Item No. 20:**

High Mast Design, Manufacturing, supply at site, of 20 Mtrs. height with raising and lowering arrangement head frame luminaries carriage suitable to install 12 to 15 Nos luminaries in symmetrical arrangement double drum winch and required accessories like wire trailing cable connector integral power cable tool motor, manual handle, junction box, lightening arrestor, finial wiring material power cable panel between panel and mast MCB in base compartment Cg mounting clamps and bolts etc. Also included foundation bolts special steel along with nuts washers anchor plate and template HIGH MAST 20MT 150/450 MM SECTION THIKNESS 3/4 MM PCD 590 MM (8 HOLE). This including preparation of civil foundation duly proved from Design section of Civil Engineering Department of DPA and as directed by Engineer-In-Charge.

1. **Technical Specification for Item No. 21:**

This includes preparation of earth station with chemical treated back filled compound 50 mm dia. Pipe In Pipe GI Type 2 Mtr Depth, Maintenance free including all accessories & Masonry work Enclosure with cover plate.

A cement concrete (ratio 1:4:8) chamber of at least 30 Cm. x 30 Cm. shall be provided just below the surface of ground over the funnel for watering and having RCC/CI cover of suitable size as directed. This also includes removal of extra-excavated earth from the site. The work shall be carried out to entire satisfaction of Engineer-in-charge. This work includes all labour and material as directed by Engineer-in-Charge. The works also include earthing value marking & painting on earth strips & earthing station by suitable paints (Green Colour on Strips ) and also mentioned the earth value on earth pits.

1. **Technical Specification for Item No. 22:**
2. **Supply:** This includes supply at site of G.I strip of size 25x3 mm. G.I. Strip shall be hot dip galvanized with minimum 80 Micron uniform coating.
3. **Laying & Connecting:** This includes laying & connecting of G.I. Strip from earth station/existing earthing system to equipment/ Main DBs or as per site requirement. The work includes all material & labour required shall done as directed by Engineer-in-charge.
4. **Technical Specification for Item No. 23:**

This includes supply at site, laying, fixing and connecting of G.I wire of size 8 SWG from earth station/existing earthing system to Junction Boxes/Distribution Boards/lighting accessories etc. as directed. The 8 SWG earth wire shall be passed through conduit pipe.